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Guide to Producing Statistics on Time Use

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Department of Economic and Social Affairs

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Preface

At its forty-eighth session, held in 2017, the Statistical Commission endorsed the 2016 International Classification of Activities for Time-Use Statistics (ICATUS 2016) and supported the development of methodological guidelines on how to operationalize it to produce internationally comparable time-use data, using the latest technologies, to support the monitoring of the Sustainable Development Goals.[1]

Since 2018, the United Nations Statistics Division and the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics have been working towards promoting the collection of time-use data across countries and over time, in particular through the development of light solutions and the use of modern technologies to ensure that national statistical offices (NSOs) have access to a sustainable model that serves as a basis for institutionalizing the systematic collection of those data.

The present *Guide to Producing Statistics on Time Use* is an updated, revised version of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work* (United Nations, 2005), which builds on the work of the Expert Group and is aimed at providing NSOs and policymakers with recommendations and best practices for collecting, processing, analysing and disseminating time-use statistics to inform research and the development of a broad range of policies, including on unpaid work and non-market production, well-being adnd gender equality. The *Guide* introduces key concepts and definitions related to time-use data and provides NSOs with advice on the different phases and processes involved when implementing a time-use survey or appending a module on time use to a nationally representative household survey.

The *Guide* is accompanied by an online hub that was developed by the United Nations Statistics Division to facilitate access to relevant material on time-use statistics, including country examples and tools for data collection. In the *Guide*, reference is made to resources that are available in the hub and other sources that can be used for more detailed guidance. The address for the hub is the following: https://unstats.un.org/UNSDWebsite/demographic-social/time-use/resources-hub.

The United Nations Statistics Division invites comments on useful ways to improve this *Guide*. Comments and additional material may be sent to:

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[1] See *Official Records of the Economic and Social Council, 2017, Supplement No. 4* (E/2017/24), decision 48/109 (b) and (c); see also *Official Records of the Economic and Social Council, 2020, Supplement No. 4* (E/2020/24), decision 51/115 (e).

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The *Guide* was prepared under the direction of the Assistant Director and Chief of the Demographic and Social Statistics Branch of the United Nations Statistics Division, Francesca Grum. It was drafted by a consultant to the United Nations Statistics Division, Celeste Marin, under the supervision of Iliana Vaca Trigo, Statistician of the United Nations Statistics Division, who provided secretariat services to the Expert Group, also contributed to the drafting and was responsible for the finalization of the *Guide*. Special gratitude goes to Harumi Shibata Salazar, Statistician of the United Nations Statistics Division, for her critical support and inputs. Margarita Guerrero, a former United Nations employee, also provided valuable guidance as an external expert.

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Abbreviations and acronyms

ABR	administrative business register
ABS	Australian Bureau of Statistics
ADB	Asian Development Bank
CAPI	computer-assisted personal interviewing
CATI	computer-assisted telephone interviewing
CAUTAL	Classification of Time-Use Activities for Latin America and the Caribbean
CAWI	computer-assisted web interviewing
COVID-19	coronavirus disease
CSV	comma-separated values
GDPR	General Data Protection Regulation
GPS	global positioning system
HETUS	Harmonised European Time Use Surveys
ICATUS 2016	2016 International Classification of Activities for Time-Use Statistics
ICT	information and communications technology
ILO	International Labour Organization
MTUS	Multinational Time Use Study
NSO	national statistical office
PAPI	paper-assisted personal interviewing
PSU	primary sampling unit
SNA	System of National Accounts
UNICEF	United Nations Children's Fund
UN-Women	United Nations Entity for Gender Equality and the Empowerment of Women

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Introduction

Time-use data play an important role in measuring unpaid household service work, well-being and gender equality. Different international agreements point to the importance of collecting time-use statistics for developing evidence-informed policies and guiding research. In the Beijing Declaration and Platform for Action, adopted at the Fourth World Conference on Women in 1995, for example, Governments requested that regular time-use studies be conducted to measure unpaid work. Furthermore, in 2013, the nineteenth International Conference of Labour Statisticians adopted a new resolution concerning statistics of work, employment and labour underutilization, which updated the definition of work in alignment with the System of National Accounts (SNA) general production boundary. Time-use surveys are the principal source of data on forms of work outside the general production boundary and produce statistics that are critical for a more comprehensive measurement of all forms of work (ILO, 2023b). In target 5.4 of the Sustainable Development Goals, States are called upon to "recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate". Time-use data are, therefore, necessary and serve as a direct input for monitoring indicator 5.4.1 "proportion of time spent on unpaid domestic and care work, by sex, age and location". In 2017, at its forty-eighth session, the Statistical Commission endorsed the 2016 International Classification of Activities for Time-Use Statistics (ICATUS 2016), which is aimed for use as an international statistical classification.

Time-use data are also critical to guiding policies and research related to changing work practices, commuting and transportation, as well as education, health, culture, environment and sports. In addition, time-use data can provide insights related to the life conditions of certain population groups, such as older persons, children and persons with disabilities. When carried out regularly, time-use surveys also provide evidence of changing patterns in people's use of time, including as a result of using new technologies. Time-use data analysis is, therefore, fundamental for the design, implementation, monitoring and evaluation of a broad range of public policies, including those called for to achieve the Sustainable Development Goals set out in the 2030 Agenda for Sustainable Development. Time-use data are also important components for the measurement of quality of life, which is an area of high policy attention, in particular in the context of accounting for people's well-being to complement the measurement of economic performance beyond gross domestic product (see E/CN.3/2022/12). In addition, as part of the 2025 revision of SNA, additional "extended accounts"[2] will be included for improved monitoring and analysis of well-being, as well as measures of unpaid household work.

National statistical offices (NSOs) are confronted with great demands to produce high-quality time-use data that are granular enough to inform policy formulation and respond to other users' needs, and that are suitable for trend analysis and cross-country comparisons. However, many countries are facing challenges in conducting time-use surveys as they are complex and costly. Traditional time-use surveys, in particular those in which respondents are required to complete leave-behind paper diaries, are facing low response rates. Furthermore, coding and processing time-use data are com-

[2] Extended accounts were previously referred to as satellite accounts. The terms "extended accounts" and "satellite accounts" are used interchangeably in the text.

plex and resource-intensive procedures (see E/CN.3/2022/12). As a direct consequence of these challenges, there is a lack of time-use data in many countries.

The primary objective of this publication is to ensure the production of high-quality time-use statistics and indicators by providing guidance to statisticians of NSOs on the different phases and processes of a time-use survey (data needs, design, build, collect, process, analyse, disseminate and evaluate). The present *Guide* is also designed to help a broader range of time-use data users to develop an understanding of the opportunities and limitations of different methodological decisions.

While this *Guide* is an updated version of the 2005 *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*, much of the latter is still valid. The revised *Guide* is not intended to replace the previous version, but rather to supplement the content thereof, through the inclusion of developments that have been made since it was produced, such as the development of innovative technologies and processes, as well as new global and regional initiatives and lower resource options for collecting quality data.

The present *Guide* synthesizes and extends the work of the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics in order to develop standards for the production of time-use statistics to support national, regional and global mandates. Given that every country and context is unique and that there is no one single solution that responds to the data needs of all, the *Guide* is not prescriptive. Instead, it proposes a "basket of options" covering different instruments and modes for collecting time-use data and highlights the advantages and shortcomings of the options, as well as ways to mitigate any shortcomings. The options presented are based on good practices that have worked in different contexts, and national examples are provided to illustrate how they were successfully applied in practice. The *Guide* is also aimed at helping countries to learn from the difficulties experienced by other countries, by presenting common challenges faced by NSOs. It is hoped that the lessons learned can provide insight that countries can adapt to their contexts. Some of the distinctive features of the *Guide* are outlined below.

- It is a technical document containing 11 stand-alone chapters that describe the steps involved in planning, collecting, processing and using time-use statistics. While each chapter may be read on its own, the content is not repeated across the chapters. There are, however, cross-references to relevant content in other chapters, where appropriate.
- At the end of each chapter, there is a quality checklist. Users can refer to the checklists to ensure that they are addressing critical issues that affect the quality of time-use statistics. In the final chapter, there is also a comprehensive checklist for the entire process that is in line with the Generic Statistical Business Process Model and the *United Nations National Quality Assurance Frameworks Manual for Official Statistics* (United Nations, 2019).
- The *Guide* is supplemented by a comprehensive online hub that is designed to serve as a one-stop shop for materials related to time-use statistics. In the *Guide*, there are references to resources in the hub. Users can search the hub for items that are relevant to specific chapters or to cross-cutting themes. The hub is updated regularly with newly available materials to reflect the latest developments in time-use statistics.

Part I.
Relevance of time-use statistics

I. Rationale for producing time-use statistics

A. What are time-use statistics?

Time-use statistics are quantitative summaries of how individuals "spend" or allocate their time over a specified period, typically over the 24 hours of a day or over the seven days of a week. Time-use statistics shed light on the daily life of a population in terms of what people do (activities), how much time they spend doing that (duration) and the context of those activities (whom they are with, where they are, who benefits from what they are doing). Some examples of time-use statistics are:

- Proportion of individuals 15 years of age and over who participate in unpaid care work.
- Average number of hours spent commuting on weekdays.
- Total number of hours in a week spent working in a paid job.

Time-use surveys are specialized household surveys that make it possible to measure all the activities that people undertake and the time that they allocate for each of these activities over a given period. The aim of this type of survey is to shed light on the specific ways that societies organize their time, with a view to ascertaining how belonging to social groups determines people's time use (Delfino, 2009). The *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work* and the *Methodological Guide on Time-Use Measurements in Latin America and the Caribbean* (Economic Commission for Latin America and the Caribbean, 2022) both provide a brief history of time use.

B. Why produce time-use statistics?

Time-use data can reveal the details of an individual's "daily life with a combination of specificity and comprehensiveness" not achieved in any other type of survey data (Gershuny, 1992). Time-use surveys are the only way to adequately measure unpaid domestic and care work. Information gathered through these surveys also enables the analysis of the time spent on all forms of work, including the various activities related to unpaid domestic and care work, paid work and community and volunteer work, as well as personal activities. When properly collected and analysed, time-use data can allow for relating time allocation patterns to the demographic and socioeconomic status of the individual.

Time-use data are crucial for measuring gender equality, in particular gender disparities in the distribution of unpaid domestic and care work,[3] which are also at the base of persistent inequalities in the labour market and the overrepresentation of women among people living in poverty.[4] Measuring time spent on unpaid domestic and care work also reveals the "invisible" value of women's contribution to the economy and society and highlights the intergenerational reproduction of gender roles and

[3] The Beijing Declaration and Platform for Action serves to emphasize the need to improve the collection of time-use data to measure unpaid work in quantitative terms, in order to shed light on women's contribution to the economy and on the sexual division of labour.

[4] See United Nations, Department of Economic and Social Affairs, "The world's women 2020: trends and statistics". Available at https://worlds-women-2020-data-undesa.hub.arcgis.com.

stereotypes (Economic Commission for Latin America and the Caribbean, 2022). In contexts of scarce resources or limited political support for promoting gender equality, emphasizing other policy areas to which time-use data can contribute will be key to improving the allocation of resources for time-use surveys.

It is increasingly acknowledged that time-use data are key components for assessing quality of life, which is an area of high policy attention, in particular in the context of accounting for people's well-being to complement the measurement of economic performance beyond gross domestic product. In addition, it is expected that in the 2025 update of SNA, additional "extended accounts" will be included for improved monitoring and analysis of well-being, as well as measures of unpaid household service work.

Time-use data, suitably augmented by sociodemographic characteristics, have innumerable applications for identifying behavioural patterns and informing policies to address social problems. Knowing and understanding how people spend their time is fundamental for comprehending both the personal and social experience of the organization of life and time. Time-use data are crucial for analysing the inequalities inherent in the use and distribution of time, including time poverty and other measures, and how time use contributes to society and the economy.

Time-use data are also critical to guiding policies and research related to changing work practices, commuting and transportation, as well as education, health, culture, environment and sports. Time-use data can provide insights related to the life conditions of specific population groups, such as older persons, children and people with disabilities, thus helping us to understand the challenges that they face in their lives. Over time, time-use surveys also provide valuable insights into the changing patterns of how people use their time and the impact of technologies, such as the Internet, on how people allocate their time.

A more comprehensive discussion on why time-use statistics are important for designing, implementing and monitoring public policies, including country-specific examples, can be found in the regional time-use guides for Europe (Economic Commission for Europe, 2013), Asia (Economic and Social Commission for Asia and the Pacific, 2021) and Latin America and the Caribbean (Economic Commission for Latin America and the Caribbean, 2022). The regional publications show that time-use research is relevant to countries with diverse populations and living conditions and across the development spectrum.

A national dialogue between data users and producers at the outset of any statistical process can serve to clarify what information is needed to formulate evidence-informed policies. Time-use surveys, in the same way as all surveys, generate financial costs for NSOs and place a burden on respondents, but given the many applications of time-use data, they are a good investment. Time-use surveys should, therefore, be an integral part of the national statistical system, rather than ad hoc or experimental activities, and they should be conducted regularly with guaranteed funding. How time-use surveys fit into a national statistical system will depend on the expected uses of time-use statistics, the data that are available from other sources and how time-use data can be integrated with those data to meet users' needs (Economic Commission for Europe, 2013).

In partnership with data users, NSOs should prioritize the applications to determine the key objectives of time-use surveys. A dialogue between users and producers is an opportunity for NSOs to explain what can and cannot be achieved with a time-use survey. For example, time-use statistics can be used to calculate SNA extended accounts, but only if the time sample is representative of the entire year. Time-use

statistics can provide information about time poverty, even though there is still no standard definition of the term. It may be necessary to choose between maintaining the same activity classification to create a time series and updating the classification to reflect societal changes. The objectives of the survey will help to determine which type of survey (e.g. stand-alone or modular), instruments, sampling, analysis and dissemination approaches are the most appropriate.

C. Importance of time-use data in the context of the Sustainable Development Goals

The analysis of time-use data is fundamental for the design, implementation, monitoring and evaluation of public policies that will enable societies to progress towards sustainable development and the achievement of the Sustainable Development Goals set forth in the 2030 Agenda.

Gender equality and the rights and empowerment of women and girls play a central role in the 2030 Agenda. In the 2030 Agenda, they are referred to in the declaration and in the Sustainable Development Goals and corresponding targets, as well as in the sections entitled "Means of implementation and the Global Partnership" and "Follow-up and review" and in the proposed indicators for measuring progress. Time-use data are essential for measuring progress towards Goal 5 on achieving gender equality and empowering all women and girls, including target 5.4, in which States are called upon to "recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate".

At the global level, Sustainable Development Goal indicator 5.4.1 (proportion of time spent on unpaid domestic and care work, by sex, age and location) was proposed to monitor the achievement of gender equality and the empowerment of women and girls by ensuring a better share of unpaid work. This is a major step towards the inclusion of time-use data for informing public policies relating to unpaid care and domestic work. The initiative by Mexico to create a national care system is a specific example of how time-use statistics feed into policies to advance progress towards Goal 5.[5]

Time-use data are also important for monitoring other Sustainable Development Goals and targets. For example, time-use information collected and analysed around the world has shown that:

- There is a very close link between economic poverty (Goal 1) and unpaid work.[6]
- The provision of early childhood education services (Goal 4) not only prepares children for primary education, but also frees up time for their caregivers (Economic Commission for Latin America and the Caribbean, 2017).
- The gender division of labour is a structural challenge of gender inequalities (Goals 5, 8 and 10) (Azcona and others, 2023; Economic and Social Commission for Asia and the Pacific, 2021).
- A lack of services, such as drinkable water, electricity or transport infrastructure, increases unpaid work time and disproportionately affects women (Goals 6, 7, 9 and 11) (Azcona and others, 2022).

[5] In the explanatory statement of the constitutional reform and in the consultation convened by the General Congress of Mexico, the legislative and executive powers, as well as different governmental and non-governmental organizations and institutions, used time-use information, including indicators on time spent on domestic work and unpaid and paid care work, as well as total workload, and indicators on the use of time that accounts for the multiple and intersecting discrimination experienced by certain groups of women (Economic Commission for Latin America and the Caribbean, 2022).

[6] See United Nations, Department of Economic and Social Affairs, "The world's women 2020: trends and statistics".

Looking towards the future, time-use statistics can provide information on:

- The changing nature of work (e.g. increase in remote working, working from home and the automation of jobs) that will have an impact on workforce planning, education and the skills needed, among other things (Goals 4, 8 and 9).
- The age-old question concerning work and what human beings will do to fill their time if automation takes over daily work routines, with resulting changes in care work, leisure and activities (Goals 3, 8 and 11).
- The role of climate change and what it means for unpaid production activities, for example gardening and growing produce for own or other household consumption (Goals 12 and 13).

As societies continue to age, it is necessary to promote efforts in many areas, including the employment, social engagement, health and welfare of older persons. In an ageing society with diverse values, older persons need opportunities to enrich their minds and fulfil their purpose in life through learning and social engagement activities. Time-use data can be utilized to understand how older persons spend their time, such as the amount of time they spend alone or with family members, as well as the percentage of older persons who are engaged in sporting activities, learning, hobbies and leisure and volunteer activities, among others. Time-use data may also be used to determine the extent to which they take up opportunities to continuously acquire new knowledge and adapt to technologies, in order to keep up with social changes, through the continuation of employment and daily life.

Box I.1
Quality checklist: rationale for producing time-use statistics

The first task involved in collecting the data requirements is to understand the data needs. This understanding will help to determine the best approach to take to achieve the highest quality outcomes and, indeed, whether a time-use survey is the best option for addressing the identified data needs.

Collecting the data requirements will also help survey managers to determine the design, enumeration, processing and dissemination components of the survey. There are several options for collecting time-use data and having a good understanding of the data requirements means that a "fit for purpose" survey can be designed. Some key quality considerations at the outset of a time-use survey include:

- Identifying the key data users.
- Consulting extensively with data users and stakeholders to ensure a thorough understanding of the data needs and relative priorities.
- Identifying the data needs to the highest possible level of specificity (e.g. level of disaggregation).
- Documenting the proposed use of the data required.
- Identifying any conflicts between the requirements.
- Identifying alternative data sources available.
- Considering whether the data needs can be met by means of the proposed survey vehicle.
- Assessing whether NSO has the resources (time, money, expertise) to undertake a time-use survey.
- Determining whether a time-use survey is the best option for addressing the data needs in the light of the existing resources.

Part II.
Key design specifications for time-use surveys

II. Scope and coverage of time-use data

The wide range of possible objectives and applications of time-use data affect decisions relating to the scope and coverage of time-use data collection. Specific goals will require particular data items and affect the choice of the population to be covered. The basic content of a time-use survey comprises the activities of individuals and the amount of time that they engage in them. Other dimensions also need to be included in the data to be collected to the extent that they are essential to the survey objectives; context gives meaning to activities and groups of activities. The background characteristics of the population covered serve to provide information about the respondents and their behaviours.

Box II.1
Considerations before developing a time-use survey

Engaging respondents

- It can be difficult to explain to potential respondents how they will benefit from participating.

Sampling

- In many cases, only one household member is sampled; multiple members of a household need to be sampled for intrahousehold analysis.
- An unbalanced representation of certain times of the year or days of the week may result in the overreporting or underreporting of particular activities. In order to develop internationally comparable satellite accounts from a time-use survey, the sample should be representative.
- The sample distribution should be geographically representative of the population distribution (e.g. people living in urban areas and rural areas, as different areas may be associated with different types of activities).
- The sample distribution should be representative of different subpopulations, in particular vulnerable populations.

Mode of data collection

- The mode of data collection (e.g. interview, full-text diary, web diary with a limited list of activities) can affect the information provided.
- If respondents are offered a choice of mode and different modes are associated with specific population characteristics (e.g. younger populations opt for computer-assisted web interviewing (CAWI), while older populations prefer paper diaries), it will be difficult to isolate the effects of the mode from true subgroup differences.

Box II.1 (*continued*)

Classifications and coding

- Activity classification systems need to be able to respond to the different uses of time-use data. International harmonized classifications should be used for cross-country comparisons. It is recommended that countries use ICATUS 2016.
- Time-use surveys may require significant coding (activity, location, with whom). Thorough coding training and procedures are needed to ensure the consistent coding and categorization of responses.

Simultaneous activities

- As people do more than one thing at the same time, but a day has only 24 hours, the collection and dissemination of data on simultaneous activities are encouraged.

Recall and reporting

- Most surveys require respondents to report on a previous day and to accurately estimate the time spent on each activity. How well they do this can vary depending on the respondents and types of activities.
- There must be a trade-off between collecting comprehensive data and minimizing the respondent burden. Excess burden reduces the quality of the data (people provide responses that are not very precise in order to finish more quickly) and the response rate (people consider time-use surveys too time-consuming or intrusive).

A. Activity and time

1. Describing activities

Activity may be defined as human behaviour in terms of what is being done and it may be characterized by the context in which it occurs, as well as its timing, duration, sequence and the frequency with which it takes place.

Activity classifications are used to classify activities into groups to support policymaking and facilitate the collection and organization of statistics (Moutzouris and others, 2020a). A detailed, comprehensive, systematic listing of activities can serve as the basis for assessing the completeness of coverage of activities. This listing can be used as a guide in the design of survey instruments and selection of methods. Furthermore, it defines the framework for analysis of the time-use survey data, serving as the basis for defining analytical and tabulation categories of activities. The activity listing specifies the level of detail required from respondents in both diaries and stylized questions and is used for developing coding rules and indexes for full diaries.

In order to harmonize the collection and reporting of time-use statistics across countries and over time, the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics developed a "light" survey instrument. At its fifty-third session, in 2022, the Statistical Commission endorsed the minimum harmonized instrument for time-use data collection (see E/2022/24-E/CN.3/2022/41, decision 53/111; see also Houle, Benes and Vaca Trigo, 2022). The instrument comprises a minimum set of background questions, as well as a minimum list of daily activities for the collection of time-use data, including for the measurement of Sustainable Development Goal indicator 5.4.1, in line with ICATUS 2016 and other international standards.

The minimum list of activities covers all the possible activities that could be carried out by a person in a day (Pääkkönen and others, 2020). There are 25 categories, including an "other" category to account for activities that are not listed. The list was

developed for use in precoded light diaries and with stylized questions, based on the information collected from 15 surveys using light diaries and 15 time-use surveys using stylized questions around the world. It represents the minimum requirements to enable the production of time-use statistics in line with ICATUS 2016 (second-level activities[7] in most cases). It is acknowledged, however, that the minimum list may need to be adapted to reflect different national contexts.[8] In total, 9 of the 25 activities are related to unpaid domestic work (7 activities) and unpaid care work (2 activities) and are recommended for the collection of data to measure indicator 5.4.1. In table II.1, the 25 categories are described using everyday language that is suitable for use in digital diaries.

Table II.1
Minimum harmonized instrument activity categories

No.	Category
1	Working for pay or doing activities to generate an income for yourself or your family.
2	Unpaid activities done to produce goods for use by your household or family.
3	Helping neighbours, friends or others without receiving payment.
4	Cooking, preparing or heating meals, setting or clearing the table, or washing the dishes.
5	Cleaning inside or outside the dwelling, disposing of garbage or recycling, or watering plants.
6	Making minor repairs to the dwelling or repairing or maintaining furniture, appliances or household vehicles.
7	Washing, ironing, hanging clothes to dry, mending clothes or cleaning footwear.
8	Budgeting, paying bills, organizing or planning household-related activities or completing administrative forms such as passports, contracts and applications, or collecting benefits from a social programme.
9	Taking care of a family pet, feeding it, bathing it, taking it for walks, cleaning its space or using veterinary or pet services.
10	Buying household supplies, food or clothing for family members, when done in person or online.
11	Taking care of children in your household or family by feeding them, dressing them, putting them to bed, talking or playing with them, assisting them or supervising homework or a school activity, accompanying them to appointments or providing health care.
12	Taking care of adults in your household or family by feeding them, bathing them, dressing them, putting them to bed, talking with them, listening to them, providing or planning for health care, or helping them with personal business management.
13	Attending education-related classes or courses on-site or online or doing education-related assignments or homework.
14	Getting together with others for social purposes, talking, chatting, writing or reading personal emails or texts.
15	Joining in community festivities or events, fulfilling civic duties or participating in religious celebrations or practices.
16	Attending cultural, entertainment or sports events.
17	Participating in hobbies, such as painting, music or photography, playing games or relaxing.
18	Participating in a sport or exercising.
19	Reading for leisure (e.g. newspapers, books, e-books, social media, magazines).
20	Watching television, listening to the radio or streaming.
21	Sleeping.
22	Eating or drinking.
23	Own personal hygiene, such as showering, getting dressed, getting a haircut or personal health care, including resting, sick or visiting doctors or specialists.
24	Travelling to or from places.
25	Other (activities not listed or unknown).

[7] Second-level activities, also called divisions, represent more detailed activities coded at the two-digit level in ICATUS 2016.

[8] For example, religious activities might be of special interest in some countries, while other countries might be interested in capturing data on the activities of specific population groups, such as community-based activities that are very prevalent among Indigenous groups.

The minimum list of activities makes it possible to construct indicators that are based on comparable activities, regardless of whether a precoded diary or stylized questions are used. It is recommended that all time-use surveys, regardless of the mode of data collection or type of instrument, include the minimum activities as a starting point. If more granularity is desired, countries can expand the list, as long as the categories can be aggregated into the 25 activity categories and adhere to the ICATUS 2016 framework.

The time-use survey conducted in India in 2019 is an example of how a different list of activity categories can be aggregated into the minimum harmonized list (India, 2020). The survey had separate codes for the following categories:

(1) Childcare and instruction
(2) Care for dependent adults
(3) Help to non-dependent adult household members
(4) Other activities related to unpaid caregiving services for household members
(5) Travelling and accompanying goods or persons related to unpaid caregiving services for household members

When computing unpaid work, to report on Sustainable Development Goal indicator 5.4.1, India could, therefore, include data on all these categories. For consistency with the 25 minimum harmonized instrument categories, India can combine category 2 "Care for dependent adults" and category 3 "Help to non-dependent adult household members" into minimum harmonized instrument category 12 "Taking care of adults in your household or family". Category 4 "Other activities related to unpaid caregiving services for household members" could be classified under minimum harmonized instrument category 25 "Other", and category 5 "Travelling and accompanying goods or persons related to unpaid caregiving services for household members" under minimum harmonized instrument category 24 "Travelling to or from places".

The underlying principles of a classification should be consistent with the objectives of the survey.

Box II.2
Quality considerations for activity classification

- Consider which activity classification will be used. If ICATUS 2016 is not used, consider using correspondence tables relating data coded under the chosen classification to the international standard.
- If the minimum harmonized instrument activity list is used, ensure that it covers the key activities of interest and understand the limitations.
- Consider the activity classification from the perspective of data users to determine whether category groupings make instinctive sense. Activity classifications are a hierarchy.
- If designing your own activity classification, avoid duplication and the overlapping of categories.

2. Reference period

The reference period is the time frame over which survey respondents are asked to report their activities. Time-use surveys benefit from the mixture of work and rest

days in their sample, which supports the analysis of data collected across the week, in particular the different activities that might be undertaken on workdays compared with rest days. For example, some unpaid care and domestic work occurs throughout the week but may be concentrated at weekends.

When deciding how to attain full week or workday/rest day coverage, survey managers should consider:

- The length of time over which information will be sought from each respondent, for instance one day, two days or one week.
- The type of day, for example a reference day, all the days of the week or only two days, that is one representing a workday and the other a rest day (weekend).
- The modality of reporting, whether retrospective or prospective.

(a) Length of time (day versus week)

If the reference period is a single day, it is easier for respondents to recall and estimate the time that they spent on different activities. However, if the survey objective is to measure the difference in time use across different days of a week (or even a longer period, for less frequent activities), a longer length of time will allow more activities and data to be captured, making it possible to measure differences in time use for each person on the days selected. While a seven-day diary is generally considered too burdensome,[9] several countries in Latin America have used a reference period of one week with stylized questions.[10] However, even with stylized questions, a reference period of one week is more challenging for respondents than one day, as they must recall their activities over a period of seven days.

The decision regarding the length of the reference period must be balanced with the respondent burden and the risk of recall error. Time-use surveys are relatively burdensome in comparison with other types of household surveys. In all surveys, increased burden tends to discourage response or encourage the respondent to take "shortcuts" in reporting (Krosnick, 1991; Andreadis and Kartsounidou, 2020). In the case of retrospective diaries, reducing the length of the reference period substantially reduces the respondent burden and the possibility of recall error in a time-use survey.

(b) Type of day

If survey managers decide to assign a single day as the reference period, they must decide whether all the days of the week will be evenly distributed across the sample or whether only the workday and rest day cycle should be measured. With the latter methodology, one workday and one rest day per respondent might be selected or one type of day might be randomly assigned to each respondent. The benefit of this approach is that the respondent burden may be much lower than the "week" approach, since respondents are only asked about two days, but it still allows for comparative analysis of the different activities undertaken on workdays and rest days.

If single days are assigned, it is necessary to ensure a balanced distribution of all the days of the week across the sample. To guarantee the representativeness of the seven days of the week, field operations must be carried out from Monday to Sunday. In some countries, hiring staff on Saturdays and Sundays is complicated or adds to costs. Furthermore, if rest day data are going to be produced separately, for example weekend days versus weekdays, the sample design will need to allow for the oversampling of weekend days to ensure that the sample of those days is sufficient to produce accurate data outputs.

[9] For a detailed discussion on the advantages and disadvantages of using longer reference periods with diaries, see Glorieux and Minnen (2009). The findings of the study suggest that the first day is the worst in terms of respondent burden and that once respondents have filled in one day, it becomes easier to continue for seven days without real signs of lower quality over the days.

[10] Costa Rica in 2001 and 2017; Cuba in 2016; Ecuador in 2012; Mexico in 2009, 2014 and 2019; Panama in 2011; Paraguay in 2016; and Peru in 2010.

(c) Modality of reporting

The mode of data collection is a factor that determines whether a retrospective or prospective approach is best.

Retrospective approach. The retrospective approach is best for interviewer-administered diaries because the interviewer can prompt the respondent and methodically work through the reference period from one activity to the next. A well-trained interviewer can also prompt for typical activities that might have been missed, such as travel or eating, and probe for other details, such as whether other people were present. In retrospective surveys, the respondent is generally asked about "yesterday" or "last week"; however, to achieve a balanced sample, sometimes it is necessary to ask about a day two or three days past. Ideally, the reference day should be the previous day, since recall diminishes with time, so a gap of much longer is not recommended.

In the retrospective approach, regardless of whether a diary or stylized questions are used, respondents are asked about all the activities that they undertook on the designated day, starting from a particular time (often 4 a.m.) and continuing for 24 hours. This approach places the least burden on the respondents selected, because the reference period is only one day and their activities should be relatively fresh in their minds. With the retrospective week methodology, respondents report their activities over the previous week.

Prospective approach. This methodology is used for self-enumerated diaries. In theory, it is possible to give respondents a questionnaire with stylized questions in advance, but since they report the cumulative time spent on each activity category throughout the day, the questions are answered after the day is over.

Once the household questionnaire is completed, the interviewer gives respondents a diary and asks them to complete it for the following day or a designated date in the near future (usually a few days later). Online diaries can become available "tomorrow" or on the diary date. Diary dates are kept close to the date the household questionnaire is completed to minimize the risk of respondents forgetting to complete it or of household characteristics changing.

If respondents complete a prospective diary throughout the day, they are not required to remember as much information, which should increase the accuracy of reporting. However, evidence shows that respondents tend to record their activities in one or two sessions per day, rather than continuously throughout the day. Survey organizations have little control over when respondents complete the diary, in particular paper diaries. It is theoretically possible to add a feature in an online diary to prompt respondents regularly to complete it during the day. In practice, however, reminders should be managed carefully, as they can annoy respondents and result in them abandoning the survey.

"Typical" versus specific day or week approach. In the past, respondents have been asked in a survey about a typical day or week. However, this approach is not recommended for time-use surveys. If respondents are asked to report on an actual day or week, the information provided will be more accurate. It can be difficult for respondents to conceive of what a "typical" day or week is. The cognitive burden of first determining what "typical" is and then estimating the quantity of time spent on an activity means that some activities are likely to be unintentionally overreported and others underreported. Furthermore, the amount of time spent on socially desirable activities is more likely to be overestimated and the amount of time spent on socially undesirable activities underestimated to a greater degree when imagining what "typically" happens rather than recalling a specific time period.

Box II.3
Quality considerations for the reference period

- Decisions about how many days of the week and which days to cover (workdays or rest days) will depend on the data output requirements. For example, if rest day activities are to be reported separately from workday activities, survey managers must ensure that the sample allocated to each type of day supports these output requirements.
- It is important that there should be balance between how many survey days the respondent is required to complete and the respondent burden. The longer the reporting period, the more respondent fatigue is likely to affect the quality of the data.
- Retrospective or prospective assigning of the day will have different quality implications. For retrospective collection, the further the recall day is from the survey day, the less likely respondents are to remember all the activities undertaken and accurately report the duration of those activities.
- The timing and duration of the survey can also potentially affect the quality of data. It is, therefore, preferable to collect data over an entire year in order to cover all seasons and capture variations in activities across the year. For example, activities carried out in summer may differ from those carried out in winter, as is also the case with activities undertaken during holiday periods and non-holiday periods. It may not always be possible to conduct the survey across the full year because of operational, resourcing or other constraints. Survey managers need to have a good understanding of their environment and plan the survey for the right time to best reflect the activities of their community.

3. Recording time

Time has several dimensions relevant to activity: timing or the point in time at which actions occur (e.g. weekday or weekend, morning or evening, between 9 a.m. and 10 a.m.); duration or the period during which actions occur (e.g. 45 minutes, three hours); tempo or the frequency at which actions occur (e.g. twice a day, once a week) and sequence (before or after, past, present or future).[11] To capture all these dimensions, it is necessary to use a time diary, to record the beginning and ending times of activity episodes. Stylized questions are used to ask respondents to report on the total amount of time that they spent doing an activity, by providing the cumulative duration for the day (or week), rather than in distinct episodes; start and end times are not collected. Stylized questions, therefore, provide information on the duration of the activity, but not on the timing, tempo or sequence.

[11] Adapted from Harvey and Wilson (1998).

In a time diary, the time interval relates to the unit of time in which respondents report their activities. Time diaries may use open intervals or fixed intervals. For a more detailed description of these options, see chapter III.

B. Simultaneous activities

1. What are simultaneous activities?

People regularly engage in more than one activity at the same time. People who are multitasking may actually be performing concurrent activities (cooking and taking care of a child, reading while travelling by bus or watching television while eating) or they may be doing activities sequentially and thus frequently switch back and forth between them (gardening and doing laundry). The terms "simultaneous" and

"secondary" are often used interchangeably. A simultaneous activity is one that is carried out at the same time as another. There is no hierarchy or value judgment. A secondary activity, however, generally refers to one that is considered to require less attention or to be less intense than the simultaneous "primary" activity. In a diary, the primary activity is typically the one that respondents describe first and any secondary activities are those that they were "also" doing. If they are asked to specify, the primary activity is the one that they consider to be the most intense in terms of focus or energy.

2. Importance of measuring simultaneity

If respondents experience their activities as simultaneous occurrences, allowing them to report and record secondary activities when time-use data are being collected enhances the accuracy of the resulting data. Some activities that are very important for time-use research are frequently reported as secondary activities. Therefore, while collecting data on simultaneous activities in a time-use diary adds to the respondent burden, it enhances the accuracy and completeness of the data. Time-use surveys should, therefore, always explicitly ask about simultaneous activities.

One of the main purposes of time-use surveys is to measure unpaid work. Unpaid work, and unpaid care work in particular, is often done while carrying out other activities. Collecting data on simultaneous activities can help to identify routine unpaid domestic and care work that would otherwise not be reported or would typically be underestimated if only primary activities were covered. Capturing the extent to which people engage in unpaid domestic and care work is essential for the development of SNA extended accounts, to monitor well-being, evaluate the economic empowerment of women, develop policies on caregiving and assess work-life balance.

3. Challenges of measuring simultaneous activities

The main challenges of measuring simultaneity relate to collecting and analysing data. They are discussed in more detail in chapters III and VII of this *Guide*. Survey managers must decide whether and how they will distinguish between primary and secondary activities and how they can convey that difference to respondents. In principle, the survey instrument may make it possible to collect data on more than one activity. For instance, when time-use diaries are used, it is possible to collect data on all simultaneous activities reported with the same level of granularity. However, it is also possible to provide the respondent or interviewer with fewer options for those activities considered to be secondary, by using a subset of activities that are relevant for analysis, and thus reduce the survey time.

Analysts can sometimes infer a simultaneous activity, such as childcare, based on the "for whom" and "with whom" context data collected. However, a protocol for using such context information to code activities must be developed.

There are some activities that respondents do not report consistently in diaries (as a primary or secondary activity). To address this problem, survey instruments (diaries or a stylized questionnaire) can include summary or probing questions. Supervisory care, for example, is one activity that is underestimated in time-use surveys. Owing to its pervasive nature and the fact that it is generally performed in the background, respondents may omit to report it and more often report personal activities, such as watching television or listening to the radio, even when specifically asked about simultaneous activities ("What else were you doing?"), rather than supervisory care activities. In box II.4, an explanation of the relevance of measuring supervisory care is provided, as well as a definition of supervisory care for statistical purposes and some recommendations for improving the reporting thereof in time-use surveys.

Box II.4
Measuring supervisory care

Defining supervisory care

Caring for dependent household or family members (e.g. a child, adult with a disability, family member who is sick) entails an element of active involvement whereby the care provider interacts directly with the dependant to meet the latter's care needs, for example by feeding, bathing or administering medical care to the dependant or helping a child with homework. The responsibility of caring for someone also requires that the caregiver undertakes a supervisory role. This means that while care providers are not actively engaged with the dependant, they are "on call", that is to say nearby to provide immediate assistance to the dependant. In practical terms, this implies that supervisory care is provided simultaneously while performing other activities and, if measured, the relevant data are collected as a secondary activity. In some contexts, the provision of supervisory care is also a legal obligation as children under a certain age cannot be left alone and unattended.

Care, and all the components thereof, plays a fundamental role in social reproduction and cohesion. Gender gaps in the provision of care are widely documented, with women disproportionally providing the bulk of unpaid domestic and care work. According to data on the minimum set of gender indicators, women are responsible for two thirds of unpaid domestic and care work. These gaps may be further exacerbated during crises and in contexts where public or private caregiving services are not easily accessible or affordable, thus affecting caregivers' opportunities to participate in other important life spheres, including the labour market, politics, learning, leisure and sports.

The measurement of both active and supervisory care also serves to inform a wide range of policies and strategic frameworks in the care economy, which are deemed to be increasingly relevant in view of demographic changes and ageing populations.

There are several challenges associated with measuring supervisory care. Respondents may perceive supervisory care as a background responsibility. To improve measurement approaches, in 2021 the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics formed a subcommittee on supervisory care. The subcommittee worked on developing a reference concept for measuring supervisory care to produce official statistics, reviewed country practices and identified main data uses. The following definition acts as a reference concept for measuring supervisory care for the production of official statistics:

> Unpaid supervisory care refers to the time the caregiver is in hearing or visual proximity to a dependent household or family member to provide unpaid caregiving services, should such need arise. The provision of supervisory care does not require the active involvement implied in the provision of those caregiving services where an interaction between the caregiver and dependent household or family member is needed. Supervisory care may occur at any location where the dependent household or family member is present and in close proximity with the caregiver. There is no requirement for bodily proximity of the caregiver with the dependent household or family member, such as being in the same room.

This definition aligns with relevant international statistical standards, namely the resolution concerning the measurement of working time and the resolution concerning statistics of work, employment and labour underutilization, adopted by the International Conference of Labour Statisticians in 2008 and 2013, respectively, and ICATUS 2016. More specifically, the definition draws a parallel with the concept of on-call time related to employment and extends it to other forms of work.

Supervisory care in ICATUS 2016

Unpaid supervisory care includes time when caregivers are "on call" to provide unpaid caregiving services. In ICATUS 2016, it is an activity classified under group 416 "Minding children (passive care)" and group 425 "Passive care of dependent adults".

Box II.4 (*continued*)

More specifically, the provision of unpaid supervisory care includes:

- Time when caregivers engage in other activities in parallel, including the remunerated activities listed under major division 1 of ICATUS 2016, provided that they remain accessible and in proximity should the need to provide caregiving services arise.
- Time when caregivers are not necessarily interacting with the dependent household or family member, but are "on call" should caregiving services be needed. This includes time when the dependent household or family member is engaged in activities alone, including sleeping, or when the caregiver is engaged in personal activities.

Measuring supervisory care

The following recommendations are provided by the Expert Group:

- In diary-based instruments, summary or probing questions should be asked after the main time-use information is collected. This is called a "recovery sequence". Examples of probing questions from the American Time Use Survey are provided below. This recommendation is further supported by the outcome of cognitive testing in Mexico, which highlighted that probing questions after each activity (rather than at the end) can disrupt the flow of the interview and place an unnecessary burden on the respondent.
- In order for retrospective stylized questionnaires to accurately capture the time spent on supervisory care, the reference period should be the previous day. It is more challenging to capture such data when the reference period is a week, as respondents' estimation strategies usually fail to accurately account for simultaneity.
- To avoid double counting, there should be a distinction between active care and supervisory care reported. This distinction is important for calculating SNA extended accounts. When respondents are providing active care, they are not providing supervisory care at the same time.
- Each country should set an upper age limit for children, under which they are deemed to require supervisory care, based on the laws and norms in the respective country. The upper age limit may be determined on the basis of the following:
- The minimum age for employment and exceptions specified in national laws or regulations or the age of completion of compulsory schooling;
- National regulatory frameworks on custodianship. Such regulatory frameworks should specify the age limit for being considered a child, for whom any legal liability arises when adult supervision is not provided. This notion is linked to the legal concept of guardianship of children. Other lower age limits could be introduced when necessary for reporting purposes only, taking into consideration, for example, national legislation;
- The Convention on the Rights of the Child, according to which a child means every human being below 18 years of age.

Respondent perspective

To support the work of the subcommittee on supervisory care, in 2022 the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women), the Global Centre of Excellence on Gender Statistics and El Colegio de México conducted cognitive testing to assess the understanding of the concept of supervisory care and determine the best phrasing for it (UN-Women, 2023). The research confirmed the expected challenges associated with the measurement of supervisory care. For respondents to accurately report supervisory care time, they must understand the conceptual difference between active and supervisory care, but many carers are not used to thinking about that.

Box II.4 (*continued*)

Based on the study, it was recommended that supervisory care questions be preceded by an explanatory task that includes examples, vignettes or visual aids, as appropriate. Furthermore, participants in the study generally recalled having performed supervisory care only when they were asked a probing question. The research found that respondents used many terms to describe different types of care, with *estar al pendiente* or *estar pendiente*, which both mean "minding" in Spanish, the phrases that were spontaneously mentioned the most often. Based on the study, it was recommended that cognitive testing be carried out to determine the best way to describe supervisory care before designing a questionnaire. Descriptions might include vernacular languages used in rural areas, as the phrasing is likely to vary even within countries.

An essential part of the definition of supervisory care is that the carer is in close proximity to the dependent household or family member to provide immediate assistance if needed, for example if a child calls from another room or the garden. The study found that some respondents considered being reachable by phone to be a form of supervision; if the care recipient needed the carer, they could call the caregiver for assistance. Researchers cautioned, however, that the explanation in the survey should clarify that being "on call" by phone does not constitute supervisory care and that the type of proximity has to be spelled out to aid accurate responses.

Country-specific examples of probing questions for supervisory care

The correct wording for probing questions will vary across cultures, in particular as family structures differ. For example, questions in the American Time Use Survey refer to childcare only. Separate summary questions would, therefore, be necessary to measure care for adults. In a pilot study conducted by Prospera, the Demographic Institute of the University of Indonesia and Investing in Women, with support from the International Labour Organization (ILO), UN-Women and Statistics Indonesia, respondents were asked about caring for adults and children separately.

It is essential to cognitively test survey questions to ensure that they convey the concepts to respondents.

American Time Use Survey

In the American Time Use Survey, when the diary is completed, the interviewer asks follow-up questions about childcare, as well as paid work and volunteer activities. There are childcare-related questions for four groups of children: (a) the respondent's own children who live in the household; (b) the respondent's own children who live in another household; (c) other (non-own) household children, such as siblings or grandchildren; and (d) non-own non-household children, such as a neighbour's children.

For each group of children, the interviewer first asks what time the first child woke up in the morning and what time the last child went to bed. The interviewer then asks the following:

> I'd like to ask you about children who live with you. A child was awake between [time first child up] and [time last child to bed]. At which times or during which activities during that time period was/were [name(s) of all the respondent's own children under 13 in the household] in your care?

The interviewer then asks the probing question: "Any other times or activities?"

Pilot study conducted in Indonesia

This pilot study tested a light diary module attached to a labour-force survey. The questionnaire was administered using computer-assisted personal interviewing (CAPI), which meant that after asking probing questions, interviewers could easily go back to previous episodes to record supervisory care that had been reported during the recovery sequences. The separate roster permits the timing, sequence and duration of supervisory care episodes to be recorded in fixed 15-minute episodes.

Box II.4 (*continued*)

It is important to note that the description of supervisory care, namely locally tested expressions for looking after, minding or keeping an eye on a child, should always be cognitively tested in all local languages that will be used in the survey, as it will vary, as shown in the case of Mexico described above.

The phrases in italics are approximate English translations.

During the diary, after reporting each activity, respondents were asked:

> Were you doing anything else at the same time as [activity 1]?

The first time no simultaneous activity is mentioned, the interviewer asked a probing question:

> For instance, were you talking with a family member, friend or neighbour or [locally tested expression for looking after, minding or keeping an eye on a child] or listening to the radio or watching television?

The second probing question was not repeated, but respondents were asked about a simultaneous activity for each activity reported.

When the diary was completed, the interviewer asked the recovery sequence questions on supervisory care separately for children and then for adults. An example is provided below.

> Thinking back to yesterday, were there any times when you were responsible for [locally tested terms for supervising/minding/watching over] a child under the age of 18, staying close by and being ready to respond in case of need?

If yes:

> When was this?
>
> What is their relationship to you?

The interviewer recorded each episode of supervisory care separately if there was more than one, for example before school and after school. The respondent was then asked about dependent adult household/family members (18 years of age or older) who require assistance from others to undertake daily activities as a result of illness, injury, frailty or disability, whether temporarily or long term. For example:

> Thinking back to yesterday, were there any times when you were responsible for [locally tested terms for supervising/minding/watching over] an adult aged 18 or over who needs help with daily life, staying close by and being ready to respond in case of need?

If yes:

> When was this?
>
> What is their relationship to you?

For more details about the pilot study, see Prospera, Investing in Women and the University of Indonesia (2023) and ILO (2023a).

When stylized questions are used, it is possible to ask respondents about the time that they spent on different primary activities and subsequently determine which activities were carried out simultaneously and the frequency of this simultaneity. To reduce the respondent burden, only questions relating to activities that are relevant to the survey objectives may be asked. In order to ensure that data obtained using stylized questions and data obtained from time-use diaries are comparable, it should be clear that the questions are relating to activities that are often secondary, that is "while you were doing something else".

When it is reported that time was spent on two activities at one time, the total time spent on all the activities may be longer than a 24-hour period. Survey managers must decide how time should be allocated if estimates need to be limited to the 24 hours of a day. It can be divided equally among simultaneous activities or divided unequally according to a hierarchy or weighting system, or simultaneous activities can be reported separately. This is discussed in more detail in chapter IX.

Box II.5
Quality considerations when collecting data on simultaneous activities

- Collecting data on simultaneous activities (providing that they are collected correctly) provides more accurate time-use data.
- If simultaneous activities are not reported in detail, this can result in the underreporting of activities, in particular the amount of time spent on unpaid care and domestic work.
- When the diary format is used, data should be collected on the primary activity, but also on a secondary activity, if possible. It is, therefore, important that respondents should be aware that this information is required and that the instructions and examples in the diary highlight the interest in collecting data on all activities and not just those demanding their greatest attention.
- In the case of self-completed diaries, as respondents tend to group activities in broader time slots, collecting data on simultaneous activities can provide insight on missing episodes or time.
- Collecting data on simultaneous activities increases the respondent burden and cost, so the trade-offs need to be considered at the survey development stage.
- Cognitive testing is important to ensure that respondents understand the concept of simultaneous activities.

C. Contextual information

1. Importance of studying context

An episode, also called an activity episode, refers to one occurrence of an activity, without a change in any of the contexts. In time-use statistics, contextual information refers to features of the environment in which a specific activity episode takes place (e.g. location, with whom), additional defining characteristics of the activity (e.g. for whom, paid/unpaid) or subjective aspects (enjoyment, stress and well-being). In diaries, contextual variables are collected at the activity episode level. Stylized questions include contextual information in the wording of the question, for example "Did you work for pay or profit?" or "Did you care for family members without receiving payment?".

To understand the significance of any activity, it is important to understand the context in which it took place. Activity-related contextual information can be used to help to code activities properly. Contextual information can also help to answer specific research or policy questions, for example relating to remote working, means of transport, the use of information and communications technologies (ICTs), health and quality of life (such as the time that children spend outside, the time that older persons spend alone and the time that parents spend with or without their children).

Context also improves data quality by aiding recall. When respondents consider where they were or whom they were with, it helps them to put what they were doing into perspective.

2. Defining context variables

(a) Location

Location is an important objective contextual variable. It facilitates recall and supports important areas of analysis, such as spatial mobility, social integration and isolation, and the accessibility of utilities, services and infrastructure. This contextual variable can also improve the quality of data if it is used to check activities that succeed one another. In the time-use surveys conducted in Belgium in 2013 and Canada in 2022, for example, activity episodes where the location changed without a travel episode were flagged.

The minimum harmonized instrument recommends collecting information on location for all activity episodes (see annex I). In most surveys, a generic description from the respondent's perspective is provided for location (e.g. home, non-home workplace, school). If the respondent is travelling, location is defined in terms of how they are travelling (e.g. car, walking, bus). In Europe, the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines* provide 17 locations and modes of transport, but countries can include more (e.g. in the Italian time-use survey, there are 36 types). Typically, the location of each activity is recorded by asking respondents where it took place. Digital tools allow the use of drop-down menus to provide interviewers or respondents with a list of locations to choose from. Where respondents can provide free-text answers, the level of detail required is indicated in an example in the case of self-administered surveys or a list of locations is provided for interviewers in the case of interviewer-administered surveys. Table II.2 shows examples of response categories for "location" and "mode of travel" in various instruments.

Table II.2
Examples of response categories for "location" and "mode of travel"

Instrument	Location	Mode of travel
Minimum harmonized instrument	1. At home 2. At place of work or school 3. At another residence 4. Outdoors (away from home) 5. At store or place of service 6. Other (non-travel)	7. Car, van, truck as a driver 8. Car, van, truck as a passenger 9. Public transportation such as bus, tramway, subway, light train, ferry 10. Bicycle 11. Walking 12. Taxi, limousine service 13. Plane 14. Other transport 99. Refusal, no answer
2021 Bangladesh time-use survey[a]	At home At the office/workplace At school/college/university At a shop/grocery store At the marketplace At a restaurant At a mosque/place of worship At a hospital/medical centre In an agricultural field In a sports field At a neighbour's home At a relative's home At the household farm Outdoors/near home On a public road/in a public space	Walk Bicycle Motorcycle Bus Car/truck Van/rickshaw Train Launch Boat Airplane Other (specify)
2022 Canadian time-use survey	At home or on property At place of work or school Away on business	Car, truck or van, as driver Car, truck or van, as passenger Walk

Table II.2 (*continued*)

Instrument	Location	Mode of travel
2022 Canadian time-use survey	At someone else's home or property In the neighbourhood Outdoors Grocery store, other stores or mall Library, museum or theatre Sports centre, field or arena Restaurant, bar or club Place of worship Medical, dental or other health clinic Elsewhere	Public transit (bus, streetcar, subway, light rail transit, commuter train) Airplane Bicycle Motorcycle, scooter or moped Taxi, limousine service Ride-hailing Boat, ferry Other
2018 HETUS	Home Weekend home or holiday apartment Workplace or school Other people's home Restaurant, cafe or pub Shopping centres, malls, markets, other shops Hotel, guest house, camping site Other specified location (not travelling) Unspecified location (not travelling)	On foot Bicycle Moped, motorcycle or motorboat Passenger car Other private transport mode Public transport Unspecified location/transport mode (not known whether respondent is travelling or not) Unspecified transport mode
2010 New Zealand time-use survey	At home At other people's home Workplace or place of study Public or commercial area Bush, beach or wilderness Marae and other sites of cultural significance to Māori	Travelling by foot or bicycle Travelling by car, motorcycle, truck or van Travelling by bus, train, taxi, ferry, plane Other locations or modes of transport
2010 South African time-use survey	Own dwelling Someone else's dwelling Workplace Educational establishment Public space	Walk Bicycle Private transport Public transport Other

[a] In the 2021 Bangladesh time-use survey, respondents were asked where they were when the activity took place and they provided a free-text answer. The responses were then categorized as shown in the examples in the table.

Devices with a global positioning system (GPS) make it possible to use geolocation to record the location of respondents more accurately, rather than relying on them to report their location. The absence of travel descriptions in self-completed diaries is one of the most frequent problems that needs to be solved in the data editing phase. As geolocation records not only locations but also travel times, and even suggests modes of travel that could be confirmed by respondents, it can help to improve the accuracy of travel information.[12] However, the use of geolocation raises many potential quality, privacy and operational concerns, which must be weighed against the benefits. See section 4.2 of Scanlon (2022) for further discussion. While useful, the geographic coordinates of a location do not provide any information on the relationship between the place and the respondent, which means that they serve only for knowing where activities took place.

[12] Geolocation information might be useful for analysing data at different geographic levels or in contexts where the level of regular travel across administrative boundaries (such as cross-border commuting) is high, and for integrating different sources of information as part of more complex analyses of time-use data.

(b) With whom

The "with whom" contextual variable provides information on social contact. It can be used to understand the amount of time that people spend alone and with others, and as a strategy for improving the recording of supervisory care (Economic Commission for Europe, 2013, p. 17). It is, therefore, recommended that "with whom" contextual information be included with all activities, except sleeping.

Respondents might interpret "with whom" questions in various ways if no direction or definition is provided. They might focus on those persons with whom they had an intentional relationship or with whom they were interacting, thus leaving out someone in the same room watching television, for example. They might report those persons who were in the same physical location (e.g. in the same area or in the same

house). It is, therefore, important to clarify the meaning of the question being asked. If the question is broken down into two parts – "Who was present, but not participating?" and "Who was participating?" – this results in more accurate information being reported, but places an extra burden on the respondent. Most surveys, therefore, define being "with" someone as being in the physical presence of another person, regardless of the level of interaction. This does not necessarily mean that the other person must be in the same room or within sight.

Responses to "with whom" questions can be recorded verbatim, but it is more common for respondents to choose from a list of types of persons present. Understanding how this information will be used will help when defining the response categories. If the intent is to use the information as a proxy for care work, then it would be best to include a detailed list of household members for respondents to select from. In the case of childcare, the list can be subdivided into age groups of the children, in recognition that younger children generally require more parental attention than older children. In Italy, where data are also collected in diaries for children, the list of household members includes mother, father and siblings as the options to choose from, so that the types of activities performed in the presence of the various household members can be studied. If the aim of data collection is to understand how much time people spend alone and with others, less detail is needed. Table II.3 shows examples of response categories for "with whom" questions in various instruments.

Table II.3
Examples of response categories for "with whom"

Instrument	With whom
Minimum harmonized instrument	1. Alone 2. Spouse or partner 3. Household children 4. Other household or family adult 5. Friends 6. Workmates, colleagues, classmates 7. Other
2021 Bangladesh time-use survey	Alone/unknown persons (e.g. in public) Own household: › Husband/wife › Children up to 9 years of age › Another adult household/family member Other people/members of other households
2022 Canadian time-use survey	On my own Own household: › Spouse, partner › Household children (less than 15 years old) › Household children (15 years or older) › Parents or parents-in-law › Other household adults › Other family members from other households Friends Colleagues or classmates Other people
2018 HETUS	Alone (also with unknown persons, alone in crowd) With other household members: › Partner › Parent(s): mother, father › Children up to 17 years › Other household member(s) With non-household members: other person(s) known to the respondent

Table II.3 (*continued*)

Instrument	With whom
2023 Italian time-use survey	Alone (also with unknown persons, alone in crowd) Own household members: › Mother › Father › Partner › Children › Siblings › Other household member(s) Other people/members of other households

(c) Activity-determined context

Other context variables can be collected to study specific aspects related to particular activities.

For whom. This context variable is particularly useful for identifying the purpose (motivation) of an activity and classifying activities correctly using ICATUS 2016.[13] A typical difficulty encountered in classifying activities is producing descriptions of activities that correspond to the boundaries that make sense to analysts, for example the "general production boundary" that separates non-market work from other non-market activities. The context variable "for whom" has been found to be useful in providing information for clarifying these situations.

[13] ICATUS 2016 is harmonized with the nineteenth International Conference of Labour Statisticians resolution concerning statistics of work, employment and labour underutilization, and is consistent with the SNA framework.

This variable should identify for whom the primary activity was performed from at least the following four categories:

- For paid work or own or family business
- For use by own household member(s)
- For use by family members residing elsewhere
- For use by others

The "for whom" variable can be used to help to code other data items of interest such as volunteering. For example, in the Australian time-use survey, if an activity (such as baking a cake) was undertaken for a school event ("school fete" was the answer to the question "for whom"), it was coded as voluntary work on the basis of the Australian activity classification, whereas baking a cake for the family ("family" was the answer to the question "for whom") was coded as food preparation. In the diary format that is recommended in the *Harmonised European Time Use Surveys* (*HETUS) 2018 Guidelines*, the "for whom" context question has been excluded to avoid burdening the respondent. However, in the explanation of how to describe activities, respondents are asked to specify for whom they were doing the activity when describing helping others, in order to distinguish between unpaid domestic services for household and family members, and direct or organized volunteering.

The transition to digital diaries has made it possible to link context questions, such as "for whom", to particular types of activities, where relevant, rather than all the episodes reported in diaries.

Annex I provides an example of the response options for different types of activities for the "for whom" context variable. Table II.4 shows examples of "for whom" response categories in the 2021 Bangladesh time-use survey and the 2010 New Zealand time-use survey.

Table II.4
Examples of response categories for "for whom"

Instrument	With whom
2021 Bangladesh time-use survey	Self Own household/family children up to 9 years of age Other own household/family members Other households Community/organization Work for pay or profit
2010 New Zealand time-use survey	Own household (including self) Household member between 0 and 13 years of age Household member aged 14 or over with an illness or disability Another household or individual Non-household member between 0 and 13 years of age Non-household member aged 14 or over with an illness or disability Organization or group Non-profit organization Government organization

Paid and unpaid activity. The definition of work adopted by the nineteenth International Conference of Labour Statisticians, in 2013, created the need to measure all forms of work, whether paid or unpaid. The integration of unpaid work into SNA extended accounts has also stimulated interest in the extent to which people allocate time to paid and unpaid work activities. The distinction between paid and unpaid work also informs policy on the advancement of more gender equitable divisions of labour.

Use of ICTs. The increased use of computers, smartphones and the Internet in almost all activities (shopping, work, entertainment) has prompted countries to increasingly ask about the use of ICTs. The *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines* recommend that a variable be included in questions to identify whether the respondent was using ICT when carrying out the activities that they reported in the diary. In some countries, specific surveys have been conducted to measure Internet coverage and use, and the computer skills of the population, but they fail to assess the pervasiveness of the Internet in terms of daily time use, so the inclusion of this context variable is considered important, at least in the European context.

When a respondent uses ICTs, the activity recorded should be classified according to the purpose for which time is spent, with ICT use recorded as a contextual variable. "Use of ICTs" is not an activity. For example, if a person uses the Internet for shopping, the activity should be classified as shopping and the ICT contextual variable should be marked. Some examples of how activities are classified when performed using ICTs are shown in table II.5.

Table II.5
Interpretation of sample information and communications technology-reported activities

Information and communications technology activities reported by respondents	Classification of activities for the production of time-use statistics
Reading mail for work	Working in paid job or income-generating activities
Reading mail for school	Education
Doing homework on the computer	Education
Browsing pages for a school research project	Education
Browsing pages looking for school uniforms for my kids	Shopping for own household or family
Texting with husband on cell phone	Socializing and communication
Looking for a job online	Seeking employment

(d) Subjective context variables

Adding subjective dimensions to the typical objective ones for activity episodes may help to tap into the emotional and psychological side of behaviour. If the survey objectives are extended to measure quality of life issues, surveys can incorporate subjective context variables, such as how stressed people are when performing an activity and how much people enjoy what they are doing, or their reasons for doing it. For example, in the 2013/14 time-use survey in Italy and 2010 time-use survey in France, a pleasantness variable was collected using a full 24-hour diary. In the 2020/21 time-use survey conducted in Finland, the variable was also collected using both paper and web-based diaries. In the American Time Use Survey, data have periodically been collected in a module on well-being in an electronic diary via computer-assisted telephone interviewing (CATI). See section 3A.3 of *Harnessing Time-Use Data for Evidence-based Policy, the 2030 Agenda for Sustainable Development and the Beijing Platform for Action: A Resource for Data Analysis* for further discussion.

Subjective context variables can be complex to interpret and difficult for respondents to provide. Is the level of enjoyment that people experience associated with the activity, the time of day, whom they are with, their location or all of these? Data collected in the American Time Use Survey well-being module were typically presented as comparisons, for example "people report higher levels of stress when doing activity x compared with activity y". These data are published as a research data set only. Respondents should be informed as to whether they are expected to assess their level of enjoyment associated with individual episodes or as an overall daily rating.

Subjective dimensions may not be essential to the survey objectives for general-purpose national time-use data collection. In countries where the aim is to reduce the respondent burden by using as light an instrument as possible, it may be decided not to include those dimensions. For example, in the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines*, an additional column for self-assessed "well-being/satisfaction" in the model diary for the HETUS 2020 wave is not recommended. Instead, four questions are included at the end of the diary, which ask about the diary day in general and the most pleasant, unpleasant and stressful activities.

Box II.6
Quality considerations when collecting contextual information

- Contextual variables included in diaries should be tested to ensure that respondents have a clear understanding of what is being asked and that they answer correctly. The concepts should be well understood and easy to answer.
- If too much contextual information is requested, this adds to the cognitive load and may affect the overall response rate and quality of responses. There should be a sound data requirement for adding these items.

D. Background (covariate) information

The collection of time-use data using a diary or stylized questions should always be accompanied by a questionnaire on the background characteristics of the respondents and their households. For a theoretical discussion on the need for background information, see the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work* (paras. 187–198). The present section outlines the priority background variables and provides suggestions as to how they should be selected and where they can be placed when using the minimum harmonized survey instruments. The timing

between the collection of background data and the collection of time-use data and guidance on question design are covered in chapter III of the present *Guide*.

Background characteristics, such as the sex and age of respondents, and their household composition, are critical to supporting the analysis, interpretation and use of time-use data, including through a gender lens. The background characteristics of household members may be necessary to select respondents who are eligible to complete the time-use data component of the survey. The information can also improve the quality of data by enabling checks and validations. For instance, it is possible to use the background characteristics for the household component of the survey to identify the presence of children or adults with disabilities, in order to activate a module to measure unpaid care for those populations.

1. Priority background characteristics

The recommended minimum set of background characteristics for households and for individuals is provided in table II.6. The table also provides other suggested characteristics that may be important, depending on the national context. Together, these data are considered to be a high priority for time-use analysis.

Table II.6
Priority background characteristics for time-use data collection

At the household level	All persons eligible as time-use respondents
Minimum	
Household size Household composition: classification based on age and sex Place of residence (urban/rural) Household income	Age Sex Marital status[a] Educational attainmenta Current school attendance (and level)a Current employment statusa Labour-force statusa Labour-force status of spouse/partnera
Additional as relevant to the national context	
Access to and use of care services Presence of persons requiring help with daily living activities Access to public services or utilities Household wealth	Disability statusa Race/ethnicity General health status Access to timekeeping devicesa

[a] Only individuals selected as respondents.

When deciding which background characteristics to capture, it is important to consider:

- How relevant they are to the analysis, interpretation and intended policy uses of the time-use data.
- The national context.
- The characteristics of the survey, in particular its coverage, sample design and size, and the expected duration of the survey interview.

Careful consideration of these aspects will greatly contribute to the overall quality and relevance of the time-use data.

2. Selection of priority background characteristics

At a minimum, the background characteristics should include both the personal and household-level information necessary to select the respondents and conduct a basic analysis of time-use and activity patterns, and necessary for data quality considerations.

(a) Minimum individual data

Personal characteristics, such as sex, age and relationship with each household member, must be collected for all persons eligible to provide time-use data. This is necessary to create a respondent selection grid should the need arise. Respondents to the time-use component must also provide the following essential additional information: marital status, level of educational attainment, current school attendance and level or current labour-force status, current employment status and labour-force status of their spouse or partner.

(b) Minimum household data

Individual data on sex and age provide information on household size and composition. In addition, information on place of residence (urban and rural) and household income is required.

(c) Additional data depending on the national context

Depending on the national context, additional household information may be required on access to and use of care services, the presence of persons requiring help with daily living activities, access to public services or utilities, or household wealth. Questions relating to public services may be focused on access to electricity, indoor plumbing or public transportation. Questions about household wealth may be relating to the ownership of labour-saving technologies, such as a washing machine, dishwasher or other assets. Such information can enhance the analysis of time spent on unpaid domestic and care work, which is a primary objective of time-use surveys. It can also help to inform policies on care work and time poverty, among other things. However, whether it is relevant to include these background characteristics will depend on their prevalence in the national context. Where there are important gaps in data on public services or household wealth, either among the general population or priority groups, for example rural populations, low-income households and single-parent households, their inclusion as part of the minimum set of background characteristics is recommended.

Some characteristics that are deemed important may have a low prevalence in the population or be concentrated in certain geographic regions or among groups that are difficult to reach. In such cases, it is necessary to assess whether or not the survey can support disaggregation to enable robust subgroup estimation or analysis with a sufficient level of precision. Only background characteristics that are deemed relevant for meeting users' needs and at the same time allow for the production of estimates with sufficient precision should be considered for inclusion.

Users' needs and data quality concerns should guide the choice of additional background characteristics to include in the time-use survey, if any. For example, to support the analysis of unpaid domestic and care work, information on access to and use of care services should be considered. This includes public, private or community services that may be used to substitute for the unpaid work of household members, such as childcare centres, nursing care, domestic workers and nannies. A general measure of self-perceived health may be included to support the basic analysis of how subjective health status is associated with daily activity participation. This may be important in ageing societies where age-related declines in population health, as well as associated care needs, must be monitored over the medium to long term. As part of quality control mechanisms, capturing basic information on the use of timekeeping devices may be considered, particularly in contexts where the rhythm of daily life is less regulated by "clock-oriented" time for a significant part of the population.

In all cases, to ensure that the quality of the time-use data is not affected by respondent burden, the number of background characteristics to be included should be limited to the extent possible.

In order to serve in the analysis of time-use and activity patterns, it is important to collect essential background characteristics at the same time as, or as close as possible to, data for the time-use component. In cases where the sample for the time-use survey has been selected from another household survey, it may be necessary to readminister some of the questions relating to essential background characteristics or to confirm the responses to ensure that they are up-to-date. This is particularly the case for characteristics that are likely to change over time, such as household composition, marital status, current school attendance and current labour-force status, and the essential employment characteristics of respondents and their spouses.

Box II.7
Quality considerations for background information

- Background information provides a richer data file, which supports more detailed data analysis. However, the amount of information collected must be balanced with the cognitive load associated with collecting data.
- Users' needs and data quality concerns should guide the choice of background characteristics to be included in the survey.
- Background information should be collected as close as possible to the dates of the time-use component. For example, if information is collected in the background questionnaire well before the diary dates, the individual's circumstances may have changed (e.g. when a respondent reports that they are unemployed in the background questionnaire but includes employment activities in the diary).
- Any background information that is provided by a proxy or "any responsible adult"[a] should be recorded.

[a] Individual time-use information should be collected from direct respondents. Some surveys, such as labour-force surveys, collect some household information from an "any responsible adult". The Australian Bureau of Statistics (2022a) describes the approach as follows: "The Any Responsible Adult (ARA), or proxy, method of interviewing is used in a number of [Australian Bureau of Statistics] household surveys as an alternative to personal interviewing. This involves obtaining information about all the persons in a selected household who are in scope of the survey, from the first responsible adult with whom the interviewer makes contact (rather than speaking to each individual personally). The method is only used for collecting information on topics where other members of the household are likely to be able to answer the question. If the ARA is unable to supply all of the details for another individual in the household, a personal interview is conducted with that particular individual."

E. Survey population

The survey population of a time-use survey consists of two dimensions, namely the persons or "population of interest" dimension and the time dimension. The unit of analysis is a measure of person-time, which is typically person-days or person-weeks over a year. Representation of the time dimension is a feature that is unique to time-use measurement and is discussed in more detail in chapter V.

The population of interest for time-use surveys is defined in the same way as for other surveys and the inclusion criteria are often set on the basis of geography, sex and the age of respondents, although socioeconomic, racial, ethnic and other characteristics may be considered (see box II.8 for considerations when collecting information on time use from Indigenous populations). As with all surveys, it is important to align the survey population with the objectives of the survey. This is of particular concern

when adding a time-use module to another survey. For example, if the objective is to measure all forms of work, the working-age population must be included. A different survey population would, however, be necessary to measure transportation for school-age children or time spent alone among older persons. In order to produce data to report on indicator 5.4.1 of the Sustainable Development Goals, the lower age limit is 15 years of age, but there is no upper age limit.

Box II.8
Indigenous populations

Collecting data from Indigenous populations and some ethnic groups presents certain challenges.

Language. If the group speaks a language other than the primary survey language, it will be necessary to translate the survey instruments and supporting materials or engage interpreters. Interpreters need to receive training in the survey objectives, methods and elements of informed consent in order to be effective. As with all surveys, the relationship between local interpreters and the respondents may affect the information reported.

Concepts. Indigenous concepts and variables are often more fluid and dynamic than mutually exclusive Western or Eurocentric ideas. Members of Indigenous communities should be involved in providing and/or adapting questions, collection methods and output requirements. Indigenous perspectives need to be identified and provided by those communities, as often the underlying concepts used in time-use surveys are not necessarily reflective of Indigenous realities. In other words, it is important not to simply translate Indigenous concepts into, or equate them with, Western concepts, for example, because of the nuances and contexts that influence them. Instruments and classification systems should reflect relevant activities that may be different from the main population.

Customs and structures. It may be necessary to adapt field processes or workflows or request permission from traditional authorities, such as tribal elders, who can validate the process and share insights on appropriate approaches for data collection.

The goal of many time-use surveys is to measure disparities among social groups. If that is the case, the subgroups must be sufficiently represented in the target population to enable precise estimates.

Direct (non-proxy) respondent. In order to obtain the most detailed, accurate information possible, time-use surveys should be conducted with direct respondents, who report on their own time use, without the participation of or being heard by other household members. Proxy respondents, however, report on the time use of other individuals and may be required to report on the time use of very young children, for example. This is discussed in more detail in the following section. Some countries also allow proxies in other situations, such as when a respondent's ability to communicate is affected by a disability or language barrier and there is no alternative way to obtain the information directly from them. To the extent possible, NSOs should translate questionnaires into relevant languages and use inclusive data-collection modes and instruments to minimize the use of proxy reporting.

F. Time-use surveys of children

Many countries have successfully collected data from children who are 10 years of age or older. Some countries include children as young as 3 years of age, in which case their caregivers serve as proxy respondents. When collecting data on children's time use, there are more considerations to take into account than with surveys of adults.

1. Why collect data on children?

For children and adolescents to enjoy a healthy childhood and adolescence, they require opportunities to have an education and develop life skills; creative outlets, such as sports and hobbies; and supportive social networks, made up of both peers and adults. Time-use surveys can provide data on all these aspects. In addition, the "with whom" contextual variable provides a proxy for supportive social networks. Time-use statistics shed light on the competing demands on children's time that should be spent on activities necessary for healthy development, thus highlighting the extent to which paid or unpaid work is associated with reduced time spent on education or training activities and leisure.

Many children are engaged in own-account agriculture or informal labour for their family, as well as in collecting firewood or water and doing other domestic chores. Gender differences in time use begin early, with girls spending more time on household chores and care work than boys at the global level (Bruce and Hallman, 2008; Mmari and others, 2017; Charmes, 2015; United Nations Children's Fund, 2016). The burden of unpaid work limits girls' opportunities to study and develop marketable skills. While primary school enrolment has reached gender parity in approximately three out of every four countries worldwide, girls still leave school earlier than boys in many countries, often as a result of competing demands on their time owing to household chores (Putnick and Bornstein, 2016; Bruce and Hallman, 2008; Larson and Verma, 1999).

In high-income countries, time-use statistics can inform policy priorities relating to aspects of health and well-being other than work. Activities and variables relating to exercise, screen time, active travel and independent travel, time in school or studying, and time with parents and peers can inform steps to improve outcomes relating to children's and adolescents' lifestyles, sleep, learning and psychosocial well-being.

2. Ethical issues

The ethical issues of surveying children on time use are the same as those that arise when surveying children on other topics, but they are important to consider at an early stage. NSOs need to develop informed consent and assent tools and procedures that are tailored for children and ensure that ethical approval is obtained. Where survey programmes do not normally collect data directly from children, comprehensive resources on ethical approaches for collecting data from children should be consulted.[14]

[14] Some resources include Alderson and Morrow (2020), Graham and others (2013), Schenk and Williamson (2005) and Thompson, Cannon and Wickenden (2020).

Surveys should be conducted in accordance with national laws and conventions, but the usual procedure is to obtain the informed consent of the parent or guardian of the child and then the verbal assent or agreement of the child. Even if children under 18 years of age are able to provide their own consent, it may be necessary to obtain permission from the head of household or a parent to ensure that they can take part in the survey.

The informed consent statement for adults must be adapted using language that is appropriate for children. While younger children might not understand all the details about privacy and confidentiality, it is important that they understand what is expected of them and that they can choose whether to participate or not, and that if they participate, they can take breaks or stop whenever they want to. Moreover, while child respondents should be ensured the same degree of confidentiality, anonymity and data protection as adult participants, when it comes to matters of child protection, the duty to ensure the safety of the child takes precedence over any responsibility to guarantee confidentiality.

In order to ensure the protection of the child and that of the interviewer, it is important that a parent or an adult whom the child knows should be in the vicinity, but not too close to where the interview is taking place, for example within view or

calling distance, without being able to overhear what is being said. However, if a child wants a parent or caregiver to be present, this should be agreed.

3. Population sample

Selecting the sample. When younger children are included in the sample, this does not affect the two-stage sampling approach whereby first the household is selected and then the respondent(s) within the household. The age for inclusion in the sample is lower, but household members are listed in the same way, and either all the household members are selected or the respondent is randomly selected from the household listing, depending on the survey protocol (see chapter V).

Minimum age. Different countries have different minimum ages for inclusion in time-use surveys. In the *Harmonised European Time Use Surveys* (*HETUS) 2018 Guidelines*, the recommended minimum age for inclusion is 10 years of age. Italy and Romania collect data on children who are 3 years of age or older. Other countries in Europe start collecting data from 7 years of age (Bulgaria), 8 years of age (United Kingdom of Great Britain and Northern Ireland) and 9 years of age (Norway). In Morocco, data have been collected from children who are 7 years of age or older, while in South Africa and Mexico, data are collected from children who are 10 and 12 years of age or older, respectively.

Proxy respondents. Proxy respondents are needed for very young children. Most children can report on their own time from between 8 and 10 years of age (Eurostat, 2016). Proxy respondents, however, have the potential to increase or decrease the quality of data. Quality is improved because adults are better at estimating time and may be better at recalling activities carried out. Most children, however, spend significant amounts of time away from their primary caregiver every day, so proxy respondents may not accurately report activities carried out. Children vary in terms of their abilities and maturity, which means that some are better than others at self-reporting. In Italy and Romania, the quality of self-report (without a proxy) children's diaries was assessed in terms of the number of episodes per day and simultaneous activities reported and the non-response rate (failure to complete the diary). In Italy, it was found that the quality of data was similar for children and adults. In Romania, however, it was found that the quality of answers provided by children between 8 and 9 years of age was lower, but that the quality of data provided by children over 10 years of age was comparable to that of adults.[15]

[15] See https://ec.europa.eu/eurostat/documents/9986036/10940593/GRANT_2016_HETUS_RO_2017.pdf; see also Radoi (2022) and Cappadozzi, Meli and Cialdea (2022).

Different countries have different policies on proxy respondents. In Italy and Romania, for example, proxy respondents and assistance from a parent are permitted for children under 14 years of age. In Morocco, the ethical review board allowed the parents of children up to 14 years of age to be present during the time-use survey if they chose to and to provide assistance if the child wanted it. In the United Kingdom, proxy respondents are not used. Surveys should be flexible and allow proxy respondents or at least assistance by parents if the child wants it.

Where proxy respondents are used, this should be flagged in the database and explained in dissemination products. When data are provided by proxy respondents and via self-reporting, this may affect comparability.

4. Time sample

Number of days. One option for reducing the burden on children is to ask them to provide data for one reference day only, even if the diary calls for two days for adults.

Seasonality. Children's time use is often structured around the school day and term. Survey managers must decide how the school year will be represented if a survey covers only part of the year. Since schools play an important role in developing opportunities for intervention, as well as establishing policy priorities, it is recommended that time-use surveys of children always include the school term. As with all time-use surveys, comparisons between surveys should show how days were sampled.

5. Survey instrument

Many smaller studies use a mix of qualitative and quantitative methods, as illustrated by the pilot study conducted in Hungary (Virágh, 2018) or research carried out by Young Lives in Ethiopia, India, Peru and Viet Nam (Espinoza-Revollo and Porter, 2018). At the national level, however, surveys, whether based on stylized questions or light or full diaries, tend to use the same instruments for children and adults, with some modifications.

Children will need simplified instructions and tailored examples for self-completed diaries. For a light diary with predefined categories or stylized questions, the examples of what activities fit into each category should be relevant for children and use language that they understand. In settings where children often provide care for younger siblings, it is necessary to clarify how to distinguish between playing together and providing care.

Depending on the survey objectives, it may be necessary to provide more detailed activity categories and perhaps distinguish between physically active and more sedentary recreation or types of study or education. As an example, Romania has separate categories for formal school/university, homework and free time classes. It may also be necessary to include different options for the "with whom" contextual variable in order to distinguish between time with siblings, peers and adult non-relatives.

For free-text diaries that are coded later on (post-coded), it may be necessary to add categories to allow for when insufficient information is provided, for example if a child reports being with a parent or other person, but does not specify an activity, or reports travelling with a parent for an unspecified reason.

Layout and structure. In pilot tests in Italy and Hungary, as well as the Growing Up in Australia study and Millennium Cohort Study, it was found that children were more engaged by visually appealing self-completed diaries and visual aids in interviews. In Hungary, a five-point emoji scale was used for rating subjective well-being, which children preferred more than selecting a text description of how they were feeling. While having them choose from the 15 text descriptions resulted in more accurate information being provided, it was much more time-consuming. To get young children to report on eating and drinking, they were given stickers to put on paper diaries in the Growing Up in Australia study. They were also given pens with a built-in clock so that they could record exact times.

For light diaries in Hungary, it was found that a list of "favourites" or common activities worked better than hierarchical menus where the child first chose the broad category, then a more specific activity.

6. Mode and enumeration procedures

Children are better at remembering what they did and the order in which they did it than they are at estimating how long it took. Rather than starting with waking up and proceeding chronologically through the day with activities and times, it may be better to record the most memorable activities of the day first and then fill in other activities and times to reconstruct the day around these anchoring points. On a school day, chil-

dren will have regular times for waking up and going to school at least. On weekend days, they may have other structured activities or even television programmes that they watch and can be used as a guide. This type of non-linear reconstruction of the day is important to consider when designing a diary. It should be possible to navigate back and forth in a digital diary to fill in less memorable activities around the anchor points, as well as to correct mistakes, adjust times or add forgotten activities.

Mode choice. Children should be able to choose between interviewer-administered and self-completed diaries, and between paper and digital self-completed diaries, if those options are offered to adults. Some children will feel more comfortable using a digital diary, while others will prefer a paper diary. For children who would prefer a paper diary but it is not an option, instructions provided can suggest that the child jot down the activities for the day on paper first, before starting the CAWI diary. This can be especially helpful for parents who are assisting young children, as young children are more prone to forget activities and more often need to go back and add activities as they remember them.

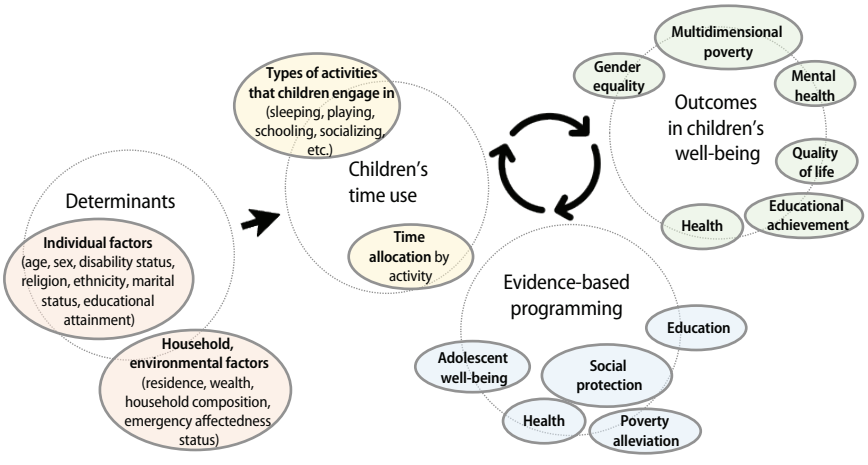
Box II.9

Measuring how children spend their time in multi-topic household surveys: new United Nations Children's Fund-supported Multiple Indicator Cluster Survey children's time-use module

While a number of dedicated time-use surveys collect information on children's time use, most data-collection efforts are focused on the adult population. The lack of standardized data-collection instruments to measure children's time use hinders the ability to understand how it affects their well-being and shapes their opportunities.

The Multiple Indicator Cluster Surveys, supported by the United Nations Children's Fund (UNICEF), currently collect data on a range of outcomes in children's well-being, such as their educational achievement and health, and their living conditions, including time spent on household chores and economic activities. With the development of a full time-use module to capture the types and durations of all activities children engage in, it will be possible to assess how patterns in children's time use differ by age and sex, and how these patterns correlate with their well-being. These data will also make it possible to analyse the disproportionate burden of unpaid care work on girls and its impact, on average, on other activities that they may have less time to engage in, such as playing, learning and socializing.

The value of collecting time-use data in Multiple Indicator Cluster Surveys



Box II.9 (*continued*)

Overall, countries will have a better understanding of children's lives and their participation in society, which can inform more effective policies and programming for children.

Considerations for time-use data collection in Multiple Indicator Cluster Surveys

The process of developing and testing the Multiple Indicator Cluster Survey children's time-use module was guided by the following considerations:

- Activities had to be representative of how children spend their day across a range of settings at the global level and be relevant to UNICEF policy and programming on children.
- A compromise was needed between the desired granularity of the information obtained and the complexity of activity coding and interviewer training.
- The introduction of time-use data collection into Multiple Indicator Cluster Surveys should not adversely affect the overall quality of surveys.

The following issues were explored by reviewing existing literature and time-use instruments and conducting three rounds of field testing, in Malawi, Belize and Zimbabwe between 2017 and 2022:

- Stylized questions versus time diaries
- Child reports versus caregiver reports
- Adaptation of ICATUS 2016 to prioritize activities that children engage in
- Inclusion of contextual questions
- Additional respondent burden and implications for interviewer training in the context of a multi-topic survey
- Feasibility of implementation in more traditional rural societies where tracking time may not be culturally relevant

	Malawi (2017)	Belize (2019)	Zimbabwe (2022)
Instrument	**Stylized questions with two reference periods** (seven days and 24 hours)	Survey-based **time diary** (past 24 hours) **Adaptation of ICATUS 2016 to prioritize children's activities**	Survey-based **time diary** (past 24 hours) **Further adaptation of ICATUS 2016** Introduction of **contextual questions**
Sample design	Split purposive sample of 447 households in two rural districts (Nkhata Bay and Balaka)	Probability-based sample of 680 households in two districts (mostly rural, as well as urban settings)	Split purposive sample of 250 households in urban, peri-urban and rural settings in Mutare
Respondent	Proxy reporting by **primary caregiver** of children aged 5–17	Proxy reporting by **primary caregiver** of children aged 5–17	**Self-reporting by adolescents aged 15–17 and proxy reporting by primary caregiver** of adolescents aged 15–17
Implementing partners	UNICEF Malawi and Malawi National Statistical Office	UNICEF Belize and Statistical Institute of Belize	UNICEF Zimbabwe and Zimbabwe National Statistics Agency

Key findings from the field-testing process

- In general, respondents were pleased to speak about their day or their child's day.
- In Malawi, stylized questions required detailed probing for accurate reporting and assistance from the interviewer to aggregate the information over the reference period of one week. Respondent fatigue was observed, potentially owing to the cognitive burden of recalling activities and summing the time spent on them.

Box II.9 (*continued*)

The 24-hour reference period proved easier for respondents. In fact, respondents usually provided answers for the previous 24 hours even when asked about the past week.

- The experience in Malawi confirmed the expected challenges of collecting accurate time-related information in rural, low literacy settings where respondents provided non-numeric responses (e.g. "not long", "a bit") that required time estimation after extensive probing.
- Some limitations were observed with proxy respondents in all the field tests. In Malawi and Belize, caregivers were not able to report what activities their child had done or for how long on days that the child was away from home. In Zimbabwe, where the reports of direct and proxy respondents were compared, it was noted that caregivers found it harder to report activities engaged in by adolescents than the adolescents themselves. The preliminary results of this field test show that there are differences between proxy reports and self-reports, but the extent and meaning of these differences need to be further analysed.
- The time diary method was considered a better fit for measuring time use in Multiple Indicator Cluster Surveys. Time diaries are a facilitated conversation rather than a scripted set of questions. They require special interviewing techniques that differ from the way that typical survey questions are administered. Chronological reporting in time diaries seems to help respondents' recall and is not too time-consuming, even though probing is needed to avoid gaps in the accounting of activities. It is also challenging for interviewers to identify the main activity when simultaneous activities are reported (e.g. eating while watching television).
- The use of CAPI can minimize entry and estimation errors through prompting and consistency checks, but it can also interfere with the interview flow and the interviewer's performance.
- Developing a time diary that is meaningful for children involved two steps:
  1. Reclassifying and regrouping the ICATUS 2016 activities and introducing new activity labels to prioritize children's activities and align with the programme of work of UNICEF, for example school attendance in person or remotely, gaming as a distinct activity that is different from play, socializing in person or using digital technologies and social media as entertainment.
  2. Introducing contextual questions related to homework support and tutoring, as well as digital or online engagement associated with learning, socializing and civic participation.
- Overall, the ICATUS 2016 adapted activities and contextual questions were well understood by interviewers and respondents.
- In general, the quality of time-use data depends on whether there is a good rapport between the interviewer and the respondent and whether the interviewer has strong interviewing skills. With adequate training and practice, interviewers' probing and activity coding skills significantly improved. The customization of training manuals to provide country-relevant examples can help to make activity coding easier for interviewers. Sufficient time for training is central to obtaining quality time-use statistics.

Roll-out of the children's time-use module in Multiple Indicator Cluster Surveys

The seventh round of Multiple Indicator Cluster Surveys, which were officially launched in March 2023, offers a complementary module on time use for children between 10 and 17 years of age in countries wishing to collect these data. The module is included in three individual questionnaires and administered to different respondents as described below.

Box II.9 (*continued*)

For children between 10 and 14 years of age, the module is included in the questionnaire for children and adolescents between 5 and 17 years of age and administered to the mother or the primary caregiver of the child randomly selected for interview, if that child is between 10 and 14 years of age.

For adolescents between 15 and 17 years of age, the module is included in the questionnaires for women and men between 15 and 49 years of age and administered directly to the adolescents.

The module and accompanying tool packet, including administration guidelines, interviewer instructions, protocols and ethical considerations for interviewing children and adolescents, are available at https://mics.unicef.org/tools.

G. Use of harmonized classifications for time-use surveys

ICATUS 2016 is a classification of all the activities on which a person may spend time during the 24 hours of a day. It is intended to serve as a standard framework for time-use statistics based on activities that are grouped in a meaningful way. It is important that countries that are starting to conduct time-use surveys use an international classification system. Harmonized classification systems make it possible to compare statistics across countries and time.

ICATUS 2016 provides a framework that includes standardized concepts and definitions for the systematic dissemination of internationally comparable time-use statistics, regardless of the type of instruments used for data collection. ICATUS 2016 can also be used to guide the collection of time-use data or be adapted by countries to develop classifications that reflect the national context and needs.

ICATUS 2016 was developed on the basis of internationally agreed concepts, definitions and principles in order to improve the consistency and international comparability of time use and other social and economic statistics. These include the production boundaries defined in SNA and the definition and framework for labour statistics adopted by the nineteenth International Conference of Labour Statisticians. In ICATUS 2016, the basic principle applied in classifying activities is that daily activities can be categorized into those that are considered productive and those that are considered personal activities or "non-productive" from an economic point of view. The resulting structure highlights time spent on all forms of work, as well as time spent by people on personal activities, to obtain statistics on time spent studying, socializing, exercising and on many other activities defining the general well-being of the population.

ICATUS 2016 serves as an important input for monitoring progress made towards the achievement of the Sustainable Development Goals and targets, including indicator 5.4.1 on the proportion of time spent on unpaid domestic and care work, by sex, age and location. The minimum harmonized instrument is based on ICATUS 2016. Annex IV shows how the minimum harmonized instrument activity categories are mapped onto ICATUS 2016, HETUS and the Classification of Time-Use Activities for Latin America and the Caribbean (CAUTAL).

ICATUS 2016 was developed to achieve:

- Mutually exclusive and exhaustive categories
- Comparability with other related national and international standard classifications
- Categories that are well described

Box II.10
Quality checklist: scope and coverage

- Consider the extent to which the survey content addresses the identified data needs.
- Ensure that the highest priority needs are addressed.
- Consider the level of detail that is required in the activity classification to meet the data needs, but balance this against how easily responses can be coded to that level.
- Where data collection is new or has been substantially redeveloped, consider keeping the activity classification flexible enough to be iterated if issues are encountered when coding diary entries (e.g. removing a category if very few responses are coded to it).
- Undertake cognitive testing to determine whether diaries or stylized questions accurately measure the intended concepts.
- Consider the mode of data collection, for example self-administered or interviewer-administered, retrospective or prospective.
- Consider the length of diary time intervals (which are usually 5, 10 or 15 minutes), while balancing the respondent burden against the desired level of precision in measurement.
- Consider the number of diary days collected from each respondent while balancing the respondent burden against any improvements in accuracy.
- Consider providing examples of a completed diary to increase the respondent's understanding of the responses expected and level of detail.
- Consider retaining personal details and using them to check that information collected in the background questionnaire matches that in the time-use records. Determine whether and how this can be done in accordance with applicable legislative and privacy frameworks.
- Consider the data entry and processing requirements for the survey content and the impact on timely data dissemination.
- Consider whether the survey content is coherent with other data sources available.
- Ensure that data-collection modes are coherent (e.g. paper diary versus electronic diary).
- Design a method for reliably matching questionnaire records with diary records.
- Consider the comparability of the instrument with previous iterations of the survey and with international time-use surveys.
- Consider implementing electronic data-collection methods to improve accessibility and reduce collection costs.
- Consider the activity classification from the perspective of data users to determine whether category groupings make instinctive sense.
- Consider which activity classification will be used, for example ICATUS 2016, HETUS or another classification.
- If country comparisons are a data requirement, consider using internationally recognized activity classifications.
- If using the minimum harmonized instrument activity list, ensure that it covers the key activities of interest and understand the limitations.

Box II.10 (*continued*)

- If designing your own activity classification, it is important to avoid duplication and the overlapping of categories.
- Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load.
- For interviewer-administered diaries, provide survey-specific training for interviewers.
- Consider the usability and respondent experience associated with diary collection instruments. Make use of visual features and the layout to alleviate the cognitive load and help respondents to think in a natural way about how they spend their time.

III. Survey instruments for collecting time-use data

There are many options to consider at the survey instrument design stage. Decisions, in that respect, will depend on the survey objectives, as well as the resources available at NSO and the characteristics of the target population. Regardless of the instrument chosen, it is recommended that all time-use surveys be consistent with the minimum harmonized instrument, which is described in more detail below. The minimum harmonized instrument includes a minimum list of activities that can be used in diary or stylized question formats, as well as minimum essential background questions.

In the present chapter, the two most common survey instruments that are used to collect time-use data from individuals are discussed, namely 24-hour time diaries and stylized questions, as well as household questionnaires, which are used to collect background information. In chapter IV, the type of survey that these instruments are placed in is discussed (e.g. a stand-alone or dedicated time-use survey or a module in a multipurpose survey), as well as the mode of data collection (e.g. self-reporting or interview; electronic or paper).

A. Harmonization efforts in time-use surveys

There is no one single solution that would respond to the data needs of all countries. A common conceptual framework, however, can improve international comparability between diverse instruments and modes of data collection.

As previously mentioned, in 2022 the Statistical Commission endorsed the minimum harmonized instrument for time-use data collection, which can be used by NSOs in the proposed format, or can be considered as the basis for designing a more detailed time-use data-collection method using either diaries or stylized questions (see chapter II). The minimum harmonized instrument was designed for digital data collection, but can also be used with paper instruments.

If additional questions or activity categories are added, it is important to maintain the structure of the categories used in ICATUS 2016. The minimum harmonized instrument list proposes categories for gathering information on time spent on activities corresponding to the major divisions of ICATUS 2016, but it is also possible to further disaggregate the information into two-digit groups (e.g. for care activities), while ensuring that the activities being asked about are mutually exclusive and exhaustive. For example, in the minimum set of time-use activities for Latin America and the Caribbean, the minimum harmonized instrument activity list has been maintained for most items, but unpaid care has been further disaggregated. This is because developing care policies is a regional priority and more detailed knowledge of specific activities is, therefore, required. However, data relating to the 31 categories that constitute the minimum set of time-use activities for Latin America and the Caribbean can be aggregated into the 25 minimum harmonized instrument activity categories for international comparisons.

As for the scope and coverage of time-use surveys, this section will be focused on the minimum essential information that countries should collect, but the instrument selected (comprising a background questionnaire, either stylized questions or a diary and relevant contextual questions) can be expanded as needed to meet the survey objectives of the country. NSOs have a range of options to choose from; they

can opt for an instrument based on a diary or stylized questions, a stand-alone survey or module in a multipurpose survey, or interviewer-administered or self-completed paper or electronic modes of data collection, which are discussed in more detail in chapter IV. They may sample one or more household members, over a period of one or more days. Those options are described in part two of this *Guide*. All time-use surveys, however, must use an activity classification system to measure the main and simultaneous activities carried out and, where possible, the context thereof. They must collect background information to correctly categorize the activities, guide follow-up questions and enable subpopulation analysis.

The exact wording of activity descriptions will need to be determined at the country level, so that the understanding of activities is relevant in the country context.

Table III.1
Minimum harmonized instrument activity categories, contextual dimensions and 2016 International Classification of Activities for Time-Use Statistics definitions

No.	Activity	Description	Contextual information	ICATUS 2016
1	Working in paid job or income-generating activities	**Includes:** Paid work as an employee, including overtime Helping in a family business or on a farm to produce goods, mainly for sale Growing produce for sale, raising animals or fishing, mainly for sale, making goods for sale, buying and reselling goods, providing services for pay Reading work-related documents and mail Working as a driver, for example a taxi driver Training and studies in relation to working in paid job or income-generating activities, which are recognized by the employer or directly linked to one's job **Excludes:** Lunch, which should be coded under "Eating and drinking" Gaining skills or workplace experience as unpaid trainees, apprentices and interns and related activities, which should be coded as "Other activities" Seeking employment or setting up a business, which should be coded as "Other activities" Commuting from one's home to the workplace, which should be coded as "Travel"	Location Use of ICTs For whom With whom Is the activity paid or unpaid?	Major division 1
1	**Probing questions:** Where an interviewer-assisted collection tool is used with the proposed background questionnaire, the probing question below is suggested for countries that wish to make a direct link between labour-force status and paid work activity from the diary. In a self-completed collection tool, the contextual information "for whom" should be used, as it may be too complex to program the probing question correctly. Was this activity done for one of your jobs? If so, which one? Yes, main job Yes, secondary job No → Ask additional questions below **Additional questions:** I need to verify some information with you. I recorded earlier that you do not own either a business or a farm, that you did not do any work for pay in the last week and that you do not have a job, including a job from which you were absent. Is this correct? 1. Yes → Continue with diary 2. No → Correct responses to relevant labour-force questions			
2	Making goods for own household or family use	**Includes:** Growing produce, including kitchen gardening, raising animals or fishing for own household or family use Preserving food, making flour, making clothes, textiles, mats and other goods for own household or family use Working on own or family home construction/renovation **Excludes:** Small repairs, which should be coded under "Maintaining and making small repairs in own or family dwelling"	Location For whom With whom	Major division 2

Table III.1 (*continued*)

No.	Activity	Description	Contextual information	ICATUS 2016
		Activities done to help friends or other persons, for example helping a friend with a home renovation		
3	Volunteer work	**Includes:** Helping neighbours, friends and other non-related people without receiving pay Working willingly without pay for the community or organizations	Location For whom With whom Is this activity paid or unpaid?	Divisions 51 and 52
4	Preparing and serving food and meals for own household or family members	**Includes:** Cooking, serving foods, cleaning after cooking Setting the table Putting away clean dishes **Excludes:** Preserving food and grinding flour, which should be classified under "Making goods for own household or family use"	With whom Location For whom	Division 31
5	Cleaning own or family dwelling	**Includes:** Cleaning inside and outside Recycling and disposing of trash Caring for plants (landscaping, lawn and plant care)	With whom Location For whom	Division 32
6	Maintaining and making small repairs in own or family dwelling	**Includes:** Small repairs of dwelling Vehicle maintenance and repairs Repairing small appliances **Excludes**: Construction and major renovations, which should be coded under "Making goods for own household or family use"	With whom Location For whom	Division 33
7	Cleaning and care of clothing and footwear of own household or family members	**Includes:** Hand/machine-washing, hanging clothes Ironing Mending clothes Cleaning and repairing shoes **Excludes:** Making clothes, which should be coded under "Making goods for own household or family use"	With whom Location For whom	Division 34
8	Managing own household	**Includes:** Paying bills Budgeting Planning, organizing duties and activities in the household	With whom Location Use of ICTs For whom	Division 35
9	Taking care of pet of own household or family	**Includes:** Walking the dog Feeding the dog, cat, fish Taking the pet to veterinary or other pet services (grooming, stabling, holiday or day care) **Excludes:** Activities related to animal husbandry (tending animals), which should be coded under "Working in paid job or income-generating activities" or "Making goods for own household or family use"	With whom Location For whom	Division 36
10	Shopping for own household or family	**Includes:** Grocery shopping Ordering home supplies online Browsing clothes for kids online **Excludes:** Acquiring supplies for income-generating activities, which should be coded under "Working in paid job or income-generating activities"	With whom Location Use of ICTs For whom	Division 37
11	Taking care of child (own household or family) (use country definition of child)	**Includes:** Talking, playing with child Feeding child Bathing, dressing, toileting child Putting child to bed Helping with homework Passive care/minding/supervising	With whom Location For whom	Division 41

Table III.1 (*continued*)

No.	Activity	Description	Contextual information	ICATUS 2016
12	Taking care of or helping adults (own household or family) (use country definition of adult)	**Includes:** Washing, dressing, toileting dependent adult Preparing medicines for older household or family members Completing bank forms or insurance claims for dependent household or family members Collecting a pension for dependent household or family members Paying taxes for dependent household or family members Taking care of a temporary sick adult Passive care/supervising Cutting hair of partner or another adult in the family (not for pay) **Excludes:** Taking care of children Helping non-related persons from other households, such as neighbours or friends	With whom Location For whom	Divisions 42 and 43
12	**Probing questions:** Depending on the survey instrument setting, countries can either use a probing question or the "for whom" contextual information for coding purposes. Probing question for dependent adults: Was this activity done for a household member? Yes → Who from the roster? No.			
13	Education	**Includes:** Attending classes Attending a club at school Doing homework Watching a lecture online Taking a cooking course	Location Use of ICTs	Major division 6
14	Socializing and communication	**Includes:** Talking to a neighbour Phone calls and texting Going to birthday parties Visiting relatives, friends Writing letters and preparing seasonal postcards **Excludes:** Checking work-related emails, which should be coded under "Working in paid job or income-generating activities"	With whom Location Use of ICTs	Division 71
15	Community participation, civic and related responsibilities and religious practices	**Includes:** Participating in local parades, festivals Attending a civil ceremony (marriage) or funeral Voting or attending a trial as a witness Meditating, praying Participating in religious celebrations and ceremonies	With whom Location	Divisions 72, 73 and 74
16	Cultural, entertainment and sports events	**Includes:** Going to the movies, theatre, music festival Visiting a historical place, monument Going to the zoo Going to an amusement park, theme park Going to a baseball game, basketball game, watching a sport event at the place where it is being held	With whom Location	Division 81
17	Hobbies, games and other pastime activities	**Includes:** Hobbies (e.g. painting as a hobby or taking pictures) Playing video games Playing on a mobile phone Gambling Resting, reflecting and relaxing	With whom Location Use of ICTs	Division 82
18	Sports participation and exercising	**Includes:** Playing soccer, basketball, among others Running or walking for exercise Going to the gym Practising Zumba	With whom Location	Division 83

Table III.1 (*continued*)

No.	Activity	Description	Contextual information	ICATUS 2016
		Excludes: Walking or running for a specific purpose (other than exercising), which should be coded accordingly, for example under "Travel" or under "Taking care of pet of own household or family" for walking the dog		
19	Reading for leisure	**Includes:** Reading for leisure a newspaper, book, novel/poems/literature, graphic novel Going through social media Reading an article on Facebook, a website/blog Scanning a magazine **Excludes:** Reading to a child, which should be coded under "Taking care of child (own household or family) (use country definition of child)" Reading for work or learning, which should be coded under "Working in paid job or income-generating activities" or "Education"	Location Use of ICTs With whom	Group 841
20	Watching television, listening to the radio or streaming	**Includes:** Watching a video on YouTube Watching television Watching/streaming a movie Listening to the radio, music, audiobooks **Excludes:** Watching videos related to work or learning, which should be coded under "Working in paid job or income-generating activities" or "Education"	With whom Location Use of ICTs	Groups 842 and 843
21	Sleep	**Includes:** Night sleeping Napping Staying in bed without sleeping (sleeplessness) **Excludes:** Resting, which should be coded under "Hobbies, games and other pastime activities"	Location	Division 91
22	Eating and drinking		With whom Location	Division 92
23	Personal hygiene and care	**Includes:** Having a bath or shower Taking a bath in a public place/bath/sauna Applying sunscreen Getting dressed Inserting contact lenses, using an asthma aerosol Resting in bed when sick Preparing and taking medicines Having one's hair cut or nails done Receiving assistance with personal hygiene, dressing, showering, among others Visiting the doctor	Location With whom	Divisions 93 and 94
24	Travel	**Includes:** Travelling, commuting Moving from point A to point B Walking and running if the purpose is to reach a different location/place **Excludes:** Walking and running for exercise Driving for a job, for example taxi drivers	Purpose Mode of travel With whom	
24	**Probing questions:** What was the purpose of the travel? Going to work Going back home[a] Going to school Accompanying own household or family members			

Table III.1 (*continued*)

No.	Activity	Description	Contextual information	ICATUS 2016
24	Accompanying others Other Location: location is given as a generic description of where respondents are, for example their home, work or school. If they are travelling, location is defined in terms of how they are travelling, for example by car, foot or bus.			
25	Other activities	**Includes activities not listed or mentioned before, such as:** Gaining skills or workplace experience by unpaid trainees, apprentices and interns and related activities Seeking employment or setting up a business	Is this activity paid or unpaid? For whom With whom Location Use of ICTs	

[a] This activity should be coded according to the previous activity.

Box III.1
Time-use surveys in times of crisis

In times of crisis, people's behaviours change. During the coronavirus disease (COVID-19) pandemic, many people began working from home. With schools and childcare services closed for extended periods, parents had to balance caregiving with their other responsibilities. Many older persons were unable to carry out their usual activities and were isolated from their social contacts. In such changing circumstances, Governments need updated information to create policies that respond to new needs.[a]

Rapid surveys

In 2021, the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics developed a short instrument and guidance for time-use studies during crises.[b] Such studies are not intended to be comparable with previous time-use surveys or to replace time-use surveys, but rather to quickly provide a snapshot of current time use. The minimum required data-collection period is seven days, which is significantly shorter than the collection period for a normal time-use survey. The instrument uses stylized questions as opposed to a diary format, and includes questions that require respondents to compare their current time use with their time use before the crisis. The study is designed for telephone interviewing, but can be adapted for face-to-face or online interviews, as appropriate, depending on the local context and contact information available for sampling. There is also an abbreviated crisis background questionnaire.[c]

Crises may be protracted, as is the case with ongoing conflicts or complex humanitarian emergencies, or they may have an acute phase followed by a recovery period. The latter is more common with natural disasters and was the case with the COVID-19 pandemic. In the acute or emergency phase, the main priority is to save lives and meet basic needs, which means that conducting even a rapid telephone survey on time use may be difficult or inappropriate. Conducting a crisis time-use survey is more appropriate during the recovery phase or a more stable protracted crisis. A description of rapid gender assessment surveys and time-use surveys carried out during the second year of the COVID-19 pandemic is provided in the *Methodological Guide on Time-Use Measurements in Latin America and the Caribbean*, boxes IV.8 and IV.9.

Full time-use surveys

The COVID-19 pandemic resulted in many countries having to cancel or postpone surveys that had been planned; several countries were, however, able to carry out full time-use surveys after the initial stage of the pandemic.

The Bangladesh Bureau of Statistics, for example, conducted its first stand-alone national time-use survey during the COVID-19 pandemic in 2021. Conducting a time-use survey in

Box III.1 (*continued*)

such a difficult situation was challenging. It had to take extra measures to protect field enumerators, supervisors and data providers from infection. It adopted appropriate health measures for enumerators and respondents and ensured proper physical distancing; all interviews were conducted in a suitable setting, in accordance with strict instructions from the time-use survey core team.

In the light of the situation, all enumerators were provided with adequate health and safety information to protect them and the respondents. Strict health measures were maintained during training sessions organized by the Bangladesh Bureau of Statistics and UN-Women. The Bangladesh Bureau of Statistics provided reserve enumerators with training in case they had to withdraw enumerators from the field owing to sickness.

As face-to-face interaction was inevitable during the survey, the Bangladesh Bureau of Statistics took several steps to reduce transmission of the virus. All teams were provided with adequate masks and sanitizer to help to keep them safe during data collection. Masks were also provided to respondents for the interview. Interviews were conducted in open places, with only the enumerator and respondent present. A reasonable physical distance between the enumerator and the respondent was maintained during each interview, as instructed by the Bangladesh Bureau of Statistics and field supervisors. Enumerators were assigned three households per day in each primary sampling unit (PSU).

Senior officials from the Bangladesh Bureau of Statistics were deployed in different districts to regularly monitor the health status of each data-collection team, as well as provide positive encouragement. Regular follow-ups with the data-collection teams helped to improve the understanding of the field scenario. Only in one case was an enumerator unable to conduct a survey as a result of not feeling well. That enumerator was immediately replaced by a reserve data enumerator so that the field operation could proceed.

Bangladesh Bureau of Statistics field offices were mobilized to conduct follow-ups with the data collectors and provide support, including transport and accommodation, as required. The Director General of the Bangladesh Bureau of Statistics sent letters to each District Commissioner requesting them to provide support in the light of the COVID-19 situation, where necessary. They received support from local government representatives in many locations.

Access to some households in the city corporation areas was challenging. However, the Bangladesh Bureau of Statistics took appropriate measures to create an enabling environment for the enumerators to collect data within a set time frame.

Every 15 days, questionnaires that had been filled in were collected from the field to complete the editing and coding of activities. This reduced the time of the overall process and helped to assess the performance of the teams and to guide them accordingly.

In Colombia, the National Administrative Department of Statistics also conducted a time-use survey in 2021. At the time, schools and childcare services were closed and people worked remotely when they were in a position to do so. In the same way as in Bangladesh, infection prevention policies were also implemented in Colombia. Interviewers also offered respondents the option of doing the survey by telephone. Only 2 per cent of respondents chose a telephone interview over a face-to-face interview.

To create awareness of the survey, flyers were distributed, as well as a video with sign interpretation. The field schedule sometimes had to be adjusted, which led to the responses being unequally distributed across the days of the week. The National Administrative Department of Statistics addressed this by applying weights during analysis.

[a] A short video summarizing the importance of time-use statistics during the COVID-19 pandemic is available at www.youtube.com/watch?v=TblvW8YeM44.

Box III.1 (*continued*)

[b] See https://unstats.un.org/unsd/demographic-social/time-use/time-use-expert-group/TU-during-crises-instrument-final.pdf.

[c] See https://unstats.un.org/unsd/demographic-social/time-use/time-use-expert-group/Background-domains-questionnaire-for-TU-during-crises-final.pdf.

B. Instrument alternatives: diaries or stylized questions

The instruments used to collect time-use data are typically based on diaries and stylized questions, which are used in combination with a questionnaire to record background information. The definitions provided in this section are consistent with those provided by the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics, as presented at the fifty-first session of the Statistical Commission (Moutzouris and others, 2020a).

Time-use diaries. Time-use diaries capture the full sequence of activity episodes performed during a specific reference period (e.g. a full 24-hour period, a weekday or a weekend day), together with the start and end times of each activity. They, therefore, provide information on the duration, timing, sequence and number of episodes of specific activities during the reference period.

In a diary, respondents report each activity episode, in order, throughout the reference day. In addition to the activity, respondents are often asked to provide additional information for the episode, such as whether they were doing any other simultaneous activity, where they were or whom they were with. This is discussed in more detail in chapter II. Respondents are usually able to reconstruct their day chronologically without assistance. Sometimes, however, they could be prompted, for example if any common activities are omitted, such as eating or sleeping, childcare if they have a young child in the house, or travel between activities in different locations.

Stylized questions. In stylized questions, respondents are asked about the total amount of time that they spend on selected activities during a specific reference period. Categories that cover every possible activity may be used, or they may be limited to a specific subset or subsets of activities (e.g. only unpaid domestic and care work). A limited set of questions can be exhaustive if the categories are broad enough; more specific activity categories require more questions to be exhaustive. Respondents add up the amount of time that they spent on the activity category across all activity episodes during the reference period to calculate the total amount of time. Stylized questions do not capture the timing of activities, sequence of activities or the number of activity episodes during a given reference period.

Diaries and stylized questions produce information on the activities that a respondent engages in and for how long. Diaries, however, also provide information on specific episodes, for activities done more than once in a day. Rushing through breakfast, for example is distinguished from a leisurely dinner with others. Diaries also permit more complex analysis of the sequence and timing of activities.

Table III.2 provides a summary of some of the key features of each type of instrument, which are described in further detail in subsequent sections of this *Guide*.

Table III.2
Comparison of the features of stylized questions and 24-hour diaries

Considerations or objectives	Stylized questions	24-hour diaries
Timing/ sequence	▸ They do not capture the timing at which the activity occurs or the sequence of the episodes.	▸ They capture the timing and sequence, thus improving accuracy, aiding recall and enhancing the data uses/type of outputs.
Simultaneous activities	▸ They can capture simultaneous activities, but in a limited way (e.g. questions can ask about activity pairs or the time spent doing one thing while doing something else).	▸ Simultaneous activities can be captured even at the episode level.
Activity context	▸ Data can be collected if the context is included in the question.	▸ Data can be collected even at the episode level.
Completeness	▸ Questions about specific activities prompt memories, thus improving recall and reporting; these activities are unlikely to be accidentally excluded. ▸ The total amount of reported time might not add up to the exact number of hours in the reference period, resulting in days with activities accounting for more or less than 24 hours.	▸ Some activities may be forgotten and underreported. ▸ The amount of time spent on the main activities should add up to the exact number of hours in the reference period (although some time slots may be blank).
Simplicity	▸ Data are simple to collect and process. ▸ The same type of output is produced (number of minutes or hours) for all respondents.	▸ The data-processing and analysis stage is more complicated, in particular for full diaries. ▸ Respondents provide varying levels of detail.
Literacy and comprehension	▸ Respondents with low literacy levels may have difficulties with the activity categories (e.g. categories encompassing many activities).	▸ Respondents with low literacy levels may have difficulties with self-completed diaries.
Cost	▸ Data processing and analysis are simpler, thus reducing costs. Lists with fewer activities reduce the data-collection time, thus reducing field costs.	▸ Data processing and analysis are more complex, thus increasing costs. The lighter the diary, the simpler the analysis process and lower the costs.

C. Survey instruments based on a 24-hour diary

The diary instrument that requires the least effort during data collection, processing and analysis is the light diary with fixed time intervals. This type of diary simplifies data collection, processing and analysis for NSOs. It is recommended that countries that are in search of the lightest diary solution use the minimum harmonized instrument as a starting point. The minimum harmonized instrument was developed by merging the key features of all the light instruments used at the time to reflect best practices. In this section, a description of the minimum harmonized instrument diary format is provided, as well as some of the choices that countries can make to adapt it, in accordance with the level of detail desired and the resources available.

1. Describing activities: "full" versus "light" diaries

In full diaries, respondents either report their activities in their own words or they are provided with a very detailed predefined list of activities (with an extensive number of categories) to choose from. When respondents are allowed to use their preferred terminology (and have been instructed to provide as many details as possible), it is possible to collect a broader range of activities and to identify new and emerging activities. The process of interpreting, coding and analysing full diaries, however, can greatly increase the cost of processing and analysing the data.

In light diaries, the activities are coded directly into a limited list of activities, either by the interviewer in an interviewer-administered setting or by the respondent in the case of self-administered instruments. The Statistics Bureau of Japan uses both light and full diaries for different purposes. For large-scale surveys, in order to obtain detailed results, disaggregated by region and individual/household attribute, light dia-

ries are used because they can be processed and analysed in a relatively short period of time. Full diaries, however, are used to capture a broader range of activities and compare the data collected with time-use data in other countries. Table III.3 provides a comparison of the features of full and light diaries.

Table III.3
Comparison of the features of full and light diaries

Instrument	Advantages	Limitations
Full diary with free text	▸ When using free-text full diaries, respondents have the flexibility to provide granular information on their time allocation rather than comply with a rigid precoded list of activities. ▸ Free-text fields give respondents freedom. ▸ The variety of activities is limitless, which means that these diaries are able to capture activities that may be more relevant for some population groups. ▸ They provide a good indication of how respondents think about how they spend their days and what they define as an activity. ▸ They can generally accommodate a high number of contextual variables and account for simultaneity. ▸ They are appropriate for a wide range of analytic objectives. ▸ Activities can be coded into detailed categories, which enables comparison with time-use data in other countries.	▸ Staff are required to enter data and code activities (or it is necessary to have modern tools or to invest in automatic natural language processing categorization methods), which thus increases the overall costs. ▸ Respondents may not describe an activity in sufficient detail or may describe it in too much detail, which then needs to be removed. ▸ The interview time is longer.
Light diary with predefined categories	▸ Respondents do not have to look through or remember a long list of activities. ▸ Staff are not needed to code the activities later on; coding is done as the diary is completed, thus decreasing the overall costs. ▸ The list can remind respondents to record activities that are easily missed, such as travelling. ▸ The interview time is shorter, thus reducing the respondent burden. ▸ These diaries are suitable for responding to specific objectives or public policy interests.	▸ The space available on the page or screen may mean that the variety of activities that can be collected is limited. ▸ The nature of an activity may not be accurately captured as respondents may just select a category that is "close enough". ▸ Social, cultural or geographical linguistic differences between respondents are not represented. ▸ The number of contextual variables (depending on the mode and layout) may need to be limited. ▸ They are appropriate for a narrower range of analytic objectives.

(a) Full diaries

Self-completed full diaries with free-text fields for activities can be administered using either paper or digital tools. Free-text fields allow respondents to use their preferred terminology (i.e. verbatim reports) and make it possible to collect a broader range of activities and to identify new and emerging activities. In addition to instructions, an example page can help respondents to understand the terms and level of detail expected.

Some full diaries use extensive predefined lists, which obviates the need for a separate coding step. The most feasible predefined lists are hierarchical drop-down menus in digital tools. If the diary is to be self-completed, long lists of predefined activities could, however, result in fatigue and coding errors (Andreadis and Kartsounidou, 2020; Krosnick, 1991). If the diary is administered by an interviewer, the interviewer can be trained to accurately code the activity directly in the diary tool.

Another option that countries may choose is to have all diaries coded by a central team of coders in an office. While "aftercoding" may improve consistency, it does not guarantee that coding is more accurate if the level of detail in the descriptions is not sufficient, as the coder cannot ask the respondent to clarify; such queries must be made while the team is still in the field.

Free text (whether handwritten or typed) adds greatly to the time and resources needed for data processing and analysis and often places a greater burden on respondents. Where NSOs seek to collect quality data with limited resources, the "Other" field, that is for an activity that does not fit into any predefined category, should be the only free-text field. It is important that the categories should be well described and easy to find. If a large number of activities are reported in the "Other" field, further analysis of the coding process will be needed, which adds to the processing time and costs. For more detailed information on full diaries, see chapter IV of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*, or annex III to the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines*. Additional full diary instruments can be found at https://unstats.un.org/UNSDWebsite/demographic-social/time-use/resources-hub.

(b) Light diaries

In light diaries, respondents (or interviewers) select the best matching activity from a predefined list with a limited number of categories. If the minimum harmonized instrument is used to conduct interviews, interviewers will code the answers verbatim directly to the corresponding activities, which are based on the ICATUS 2016 categories at the one-digit or two-digit level. Drop-down menus that display a minimum list of activities, described using appropriate wording, would be used in a digital self-administered instrument. Annex I to the present *Guide* provides a set of model diary questions for recording primary activities, the context in which they occur and secondary activities. Further examples of light diary instruments can be found on the hub website.

If more detail than that offered in the minimum harmonized instrument is desired, hierarchical drop-down menus with broader categories, followed by more detailed activities, can be used in digital tools to help respondents to find the correct activity more easily.

2. Recording time

(a) Fixed versus open interval

The time interval relates to the unit of time in which respondents report their activities. Time information can be collected in an open interval diary or a fixed interval diary. In open interval diaries, respondents record the start and finish time of the activity. Respondents report the activity that they were doing when the diary time starts and progress from one activity to the next through the entire diary period. Fixed interval diaries specify intervals of time on the diary for recording activities. These are usually 5-, 10-, 15- or 30-minute intervals.

As with free-text fields, the precision of open interval diaries can vary greatly, and the open intervals make data processing and analysis more complex and labour-intensive.

Open interval diaries

In open interval diaries, respondents are required to record the start and finish times of the activity. Respondents report the activity that they were doing when the diary time starts (usually 4 a.m.) and progress from one activity to the next through the entire diary period.

While this approach appears to be, theoretically, the most accurate, as respondents can report the exact time an activity commenced and ended, it can place an extra burden on them to report the exact timing. The level of precision required from respondents is also not clear with this method, and it may result in a greater degree of variability in how respondents report their activities. Some respondents may choose to report to the minute, while others may round the time to 5, 10, 15 or 30 minutes.

For interviewer-administered diaries, the interviewer can instruct respondents as to the level of precision required. Self-completed diaries with open intervals should provide instructions or examples to help to clarify the level of precision required.

Data entry and processing can be more complex when using open interval diaries than with fixed interval diaries.

Fixed interval diaries

Fixed interval diaries are designed to be less burdensome, as it is not necessary to record actual times. The time interval also gives an indication of the level of detail expected, with shorter intervals suggesting that more detailed activities should be reported. In the paper diary version, the time interval is generally printed in the margin. The activity is entered next to the time that it commenced and arrows are used to indicate the duration of that activity. In the electronic version, the application is usually programmed to automatically add the start time of the activity (the first interval of the day or the end time of the previous activity). The interviewer or respondent selects the end time from a drop-down list of fixed episodes. The drop-down list of episodes updates to automatically exclude past episodes, thus reducing scroll time.

(b) Length of fixed time intervals

The challenge of fixed interval diaries is choosing an interval that is neither too short nor too long. Five-minute intervals may be considered to obtain the most accurate data, because of the finer level of granularity, but very short intervals place an extra burden on respondents given the amount of detail requested.

Long intervals, however, may increase the cognitive burden, as respondents must decide which activities to report if more than one activity is undertaken in that time slot. This could result in the underreporting or overreporting of time spent on some activities. Short breaks for snacks or personal care may be missed, or respondents may report multiple activities for a time interval because the period is longer. Data analysts will have to decide how to allocate time across multiple activities, but it may not be possible to determine whether multiple activities are sequential or simultaneous. These decisions could potentially introduce error and more importantly undermine comparability. For interviewer-completed diaries, the interviewer can prompt respondents for further information about the sequence of activities and/or whether they occurred simultaneously. Some countries, in particular lower-middle-income countries, have used intervals lasting as long as 60 minutes. Their field experience shows that respondents who did not usually use a time measurement device or did not keep track of non-routine activities found it more difficult to report activities in shorter time intervals, thus adding to the response burden. In those cases, longer intervals were used. For example, in the time-use surveys conducted in South Africa (2010) and Bangladesh (2021), a 30-minute slot for up to three activities was used and respondents were asked whether the activities were continuous or simultaneous. In 2000, however, South Africa used 60-minute intervals for up to five activities. In general, in interviews in which longer intervals are used, respondents are asked about each time interval separately, as opposed to questionnaires, in which respondents are asked for a start time and either an end time or duration, as described above.

Clear instructions must be provided at the data-collection and data entry stages to ensure that interviewers, respondents and data entry staff understand the requirements when longer intervals are used. For self-administered diaries (in which instructions must be limited), it may be simpler and more consistent to use a shorter interval, such as 15 minutes.

Quality checks for time spent on travel and basic physical needs should also be conducted and follow-up questions asked if, for instance, no eating or sleeping time

is reported. Without such checks, results based on the diary format may diverge from the stylized questions format, in which respondents are systematically asked about all activities.

3. Collection of simultaneous activities

In addition to the main activities, data on secondary activities should be collected, if possible, when the diary format is adopted. Although this increases the respondent burden, collecting data on simultaneous activities enhances the accuracy and completeness thereof. The relevance of collecting simultaneous activities is described in chapter II.

In principle, the list of activities offered in an instrument may be the same for both primary and secondary activities. An alternative is to use a shorter list for secondary activities that is limited to those that are most often done simultaneously or that are considered the most relevant for the objectives of the survey, such as unpaid domestic and care work activities. An example of an abridged drop-down list for secondary activities is provided in box III.2.

Box III.2
Example of abridged drop-down list for secondary activities in the minimum harmonized instrument

Secondary activities

Unpaid domestic and care work activities:

- Housework (e.g. washing the dishes, cleaning the table, taking out garbage, doing laundry)
- Childcare (e.g. supervising homework, watching child swim, minding)
- Adult care (e.g. supervising someone else taking medication or receiving medical treatment)
- Organizing, planning or paying bills
- Pet care

Additional activities:

- Eating or drinking
- Socializing or communicating in person (e.g. talking, conversing)
- Socializing or communicating using any type of technology (e.g. phone, email, social media, video call, text messaging)
- Reading
- Watching television or videos
- Listening to music or the radio
- General computer use
- Hobbies

Collecting data on simultaneous activities will improve the reporting of specific activities, but it may still not guarantee comprehensive measurement. For this reason, the inclusion of probing questions should also be considered. These additional questions are used to ask respondents to identify episodes during which specific types of activities, such as childcare, were also being done (see box III.3).

Box III.3
Time-use surveys in times of crisis

Intro Many of our daily activities involve helping persons from or outside our household. The following question is asked to determine how much informal support people provide for one another.

##Q1 **Of the activities that you reported in the diary, which one(s) did you do to help another person?** Please select all that apply. Note to programmer: bring full list of activities from the diary with checkboxes. For each activity identified, have a loop of questions (Q2 to Q6).

##Q2 **Did (this activity) help a person from your own household, another household or an organization?**

<1> Person from your own household..... Go to ##Q3
<2> Person from another household..... Go to ##Q3
<3> Organization.....Go to ##Q6
<4> No.....(Go to next episode)
<x> Don't know.....(Go to next episode)
<r> Refused.....(Go to next episode)

##Q3 **Was the person helped 65 years of age or older?** (If more than one, answer on the basis of the principal person helped.)

<1> Yes
<2> No
<x> Don't know
<r> Refused

##Q4 **Does the person that you helped have a long-term health or physical limitation?** (Any condition lasting or expected to last more than six months and which may be either chronic or permanent)

<1> Yes
<2> No
<r> Refused

##Q5 **What is this person's relationship to you?**

<1> Husband/wife/partner
<2> Child under 5 years of age
<3> Child between 5 and 13 years of age
<4> Child over 13 years of age
<5> Parent(s) or parent(s)-in-law
<6> Child of respondent living outside the household
<7> Other member(s) of the family living outside the household
<8> Friend(s)
<9> Neighbour(s)
<10> Co-worker(s)
<11> Others
<x> Don't know
<r> Refused

[Go to next episode]

Box III.3 (*continued*)

##Q6 Was this organization mostly concerned with older persons, children, persons with disabilities or other?

<1> Older persons
<2> Children
<3> Persons with disabilities
<4> Other
<x> Don't know
<r> Refused

[Go to next selected activity]

End of diary instrument

Of all the activities that you did on (diary day), were any of them performed to help the following persons?

Children 14 years of age or under living in your household	Yes	No
Adult 65 years of age or older living in your household	Yes	No
Children 14 years of age or under not living in your household	Yes	No
Adult 65 years of age or older not living in your household	Yes	No
Friends, acquaintances	Yes	No

It is also possible to infer simultaneous activities from the "with whom" context data, but it is preferable to explicitly ask respondents about them to avoid assumptions being made that might bias the data. It is recommended that the simultaneous activity be assigned the same episode duration as the main activity. If a simultaneous activity occurs over the course of a day, such as providing passive care or listening to the radio while doing other activities, it should be recorded separately with each new main activity.

4. Reporting activity context

Contextual information collected in the instrument captures the context or the physical, psychological, social and temporal features of the environment in which a specific activity takes place, as well as additional defining characteristics of the activity (e.g. location, for whom, with whom) or subjective aspects, such as enjoyment, stress and well-being. Certain contextual information associated with each activity episode is considered to be the minimum information required to properly code an activity or fulfil the analytical needs using predefined categories. These requirements are highlighted in paragraph 58 of ICATUS 2016.

In the minimum harmonized instrument, it is recommended that diaries include the following contextual variables for each activity:

- Location
- With whom
- For whom
- Use of ICTs (if relevant to the national context)

These variables are discussed in more detail in chapter II.

5. Diary layout and organization

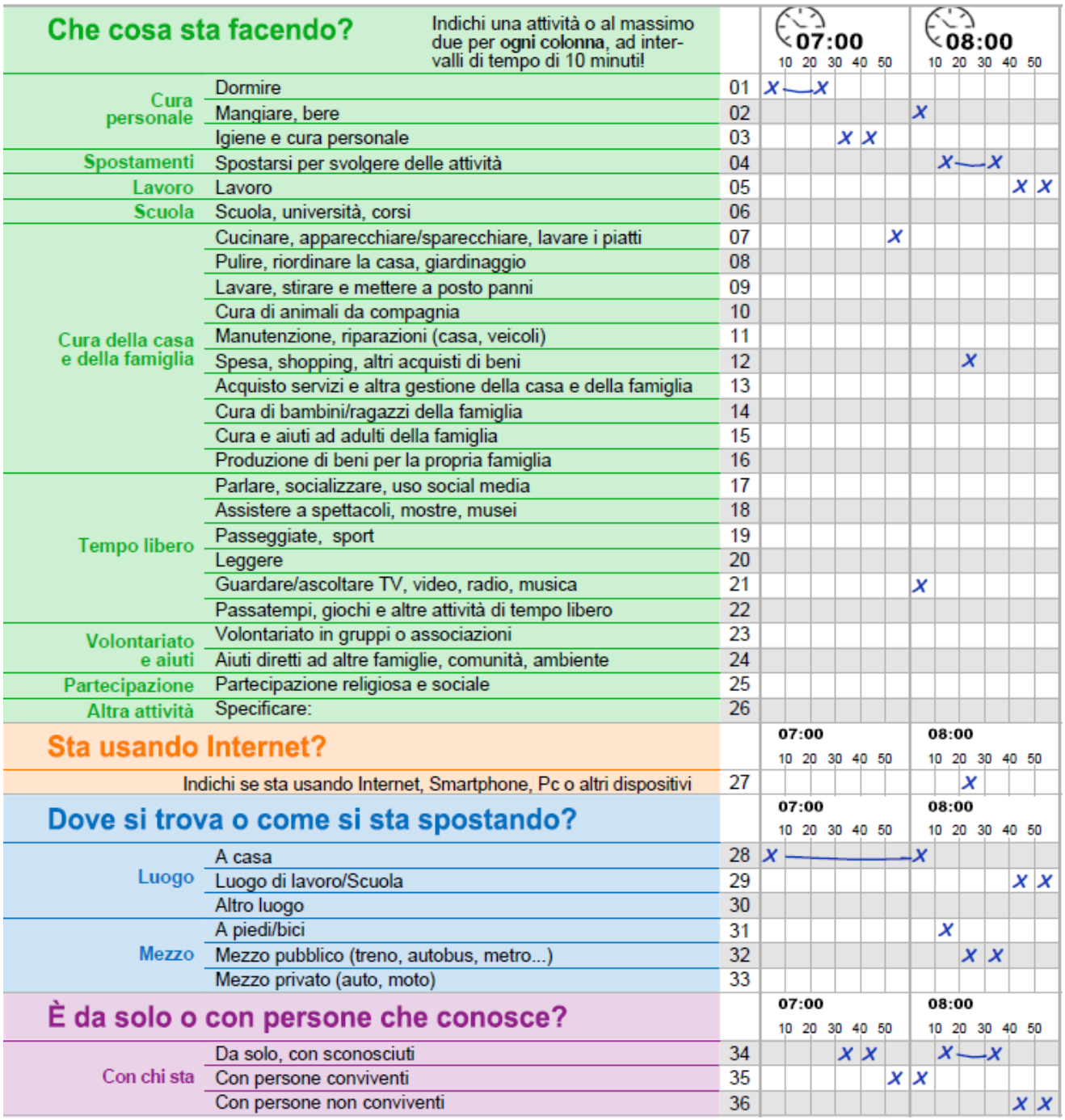
(c) Light diary

A time diary can start and end at any time, but 4 a.m. is a typical time because that is when most people are at home and asleep.

On paper, the lightest diary can be presented on a single page as a grid, with no space for context variables. The time intervals would be presented along the x-axis and a list of activity categories on the y-axis. Respondents or interviewers can mark the activity by drawing a line across the relevant time intervals and adding a second line for simultaneous activities. In order to include the recommended context variables and simultaneous activities, one alternative layout for a paper diary is to have a row for each time slot, with at least two activity columns to allow for simultaneous activities, and additional columns for context variables. With this layout, interviewers or respondents can also draw a line to mark where activities continue across intervals. It is easy to examine a fixed interval paper diary to identify any rows or columns that were missed.

Another alternative is that used by Italy in its pilot survey in 2023, shown in figure III.1. In its paper light diary, the activities proposed in the minimum harmonized instrument were presented in rows; however, given that a distinction was made between direct and organized volunteering, there were 26 options in total. The diary also included a very simplified version of the context variables that were present in the full diary: location (six options), with whom (three options) and use of ICTs. It was also possible to record simultaneous activities by marking all the activities carried out in the same time interval, as shown in figure III.1 for 8–8.10 a.m. when the respondent carried out activity 2 (eating, drinking) and activity 21 (watching television or video, listening to radio or music).

Figure III.1
Paper light diary with fixed intervals used in Italy in 2023



Self-administered digital instruments should be optimized for large and small screens, because many people will use a mobile phone for reporting. There should, therefore, be a separate screen for each activity episode, but simultaneous activities and contextual variables may also be included on the same screen (an example is provided in figure III.4). Given that respondents often need to go back to a screen to add

or to correct something that they remember at a later stage, it should be possible to navigate backwards and forward through the episodes.

With interviewer-administered digital instruments, it is possible to plan what type of device will be used and to optimize the instrument for the device size. In Argentina, for example, interviewers used tablets in the 2021 survey, which meant that there was more space on the screen. Figure III.2 shows how 90 minutes of activities can be displayed on one screen. When the interviewer selected an activity group (in this case, paid work), a pop-up window of activity options within that group was displayed.

Figure III.2
Tablet-based light diary used in Argentina in 2021

For self-completed diaries, it is important to provide instructions with sufficient detail on how to fill them out, but also short and simple enough for respondents to read and comprehend. Examples should also be provided.

(d) Full diary

The HETUS sample paper diary comprises a cover page, two pages of instructions, three pages of examples, the diary, including some questions about the day, and a checklist. The checklist helps respondents to check for common errors and ensure that they have completed all parts of the diary. Figure III.3 shows an extract from the example diary.

Figure III.3

Extract from a sample paper full diary with fixed intervals in the Harmonised European Time Use Surveys (HETUS) 2018 Guidelines

Elderly example page 1/2

Time	*What were you doing?* *Record your main activity for each 10-minute period from 07.00 to 10.00!* Only one main activity on each line! Distinguish between travel and the activity that is the reason for travelling.	*What else were you doing?* *Record the most important parallel activity.*	*Did you use a computer, smart device, internet, online tool, or similar technology or device for doing this?* Yes	*Where were you?* *Record the location or the mode of transport.* e.g. at home, at friends' home, at school, at workplace, in restaurant, in shop, on foot, on bicycle, in car, on motorbike, on bus, ...	*Were you alone or together with somebody you know?* *Mark "yes" by crossing*					
					Alone (or with unknown persons)	With other household members				Other persons that you know
						Partner	Parent	Children (up to 17 years)	Other household member	
07:00-07:10	*Got out of bed*		☐	*At home*	☐	☒	☐	☐	☐	☐
07:10-07:20	*Took a shower*		☐		☒	☐	☐	☐	☐	☐
07:20-07:30	_"_		☐		☒	☐	☐	☐	☐	☐
07:30-07:40	*Made breakfast*	*Talked to my wife*	☐		☐	☒	☐	☐	☐	☐
07:40-07:50	_"_	_"_	☐		☐	☒	☐	☐	☐	☐
07:50-08:00	*Had breakfast*	*Read online newspaper*	☒		☐	☒	☐	☐	☐	☐
08:00-08:10	_"_	_"_	☒		☐	☒	☐	☐	☐	☐
08:10-08:20	_"_	_"_	☒		☐	☒	☐	☐	☐	☐
08:20-08:30	*Cleared the table*	*Listened to the radio*	☐		☐	☒	☐	☐	☐	☐
08:30-08:40	*Dressed*	_"_	☐		☒	☐	☐	☐	☐	☐
08:40-08:50	_"_	_"_	☐		☒	☐	☐	☐	☐	☐
08:50-09:00	*Waited for a taxi to go to doc*	*Talked to my wife*	☐		☐	☒	☐	☐	☐	☐
09:00-09:10	*Went to the doctor*		☐	*Taxi*	☒	☐	☐	☐	☐	☐
09:10-09:20	*Waitin in doctor's wating roo*	*Listened to the music*	☒	*Doctor's waiting room*	☒	☐	☐	☐	☐	☐
09:20-09:30	*Had a medical examination*		☐	*Doctor's room*	☐	☐	☐	☐	☐	☒
09:30-09:40			☐		☐	☐	☐	☐	☐	☒
09:40-09:50			☐		☐	☐	☐	☐	☐	☒
09:50-10:00			☐		☐	☐	☐	☐	☐	☒

Use an arrow, citation marks or the like to mark an activity that takes longer than 10 minutes.

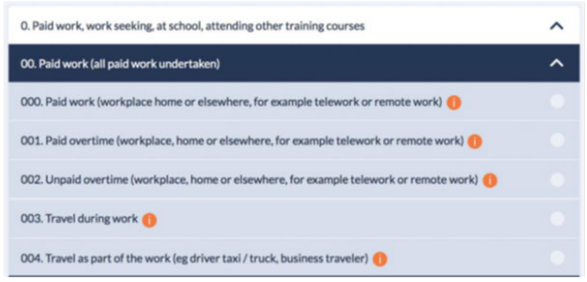
Figure III.4 provides an overview of the MOTUS (Modular Online Time Use Survey) time diary functions that are accessible to users through the mobile app or website.

Figure III.4
Digital full diary with open intervals on the MOTUS platform

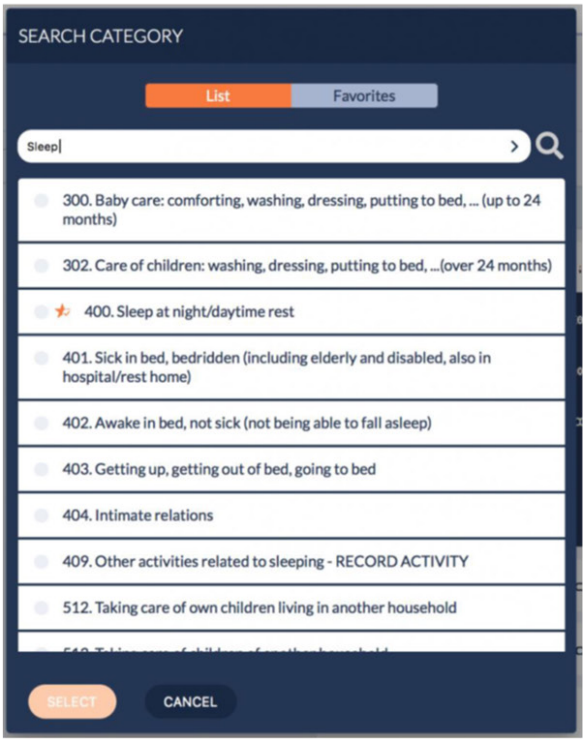
1) Select starting and ending time of the activity

2) Select a primary activity

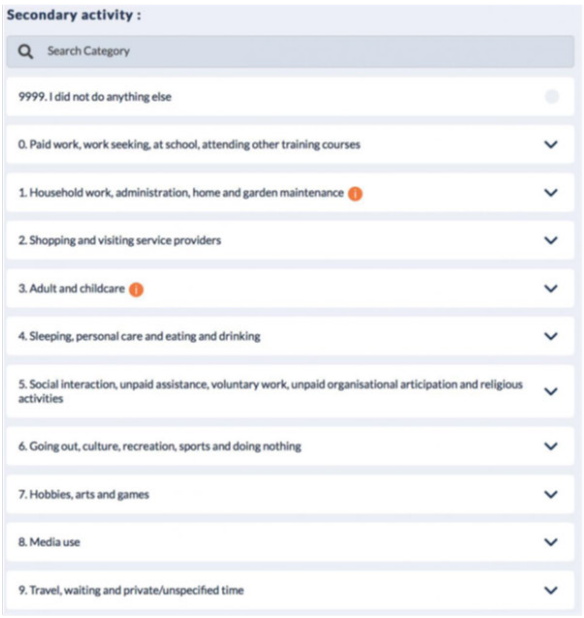
a) Tree structure



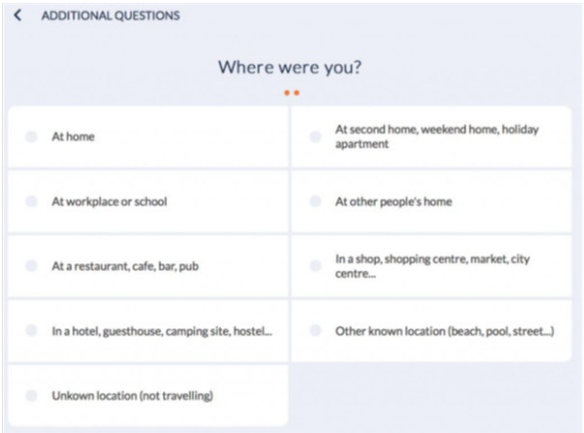
b) Search category

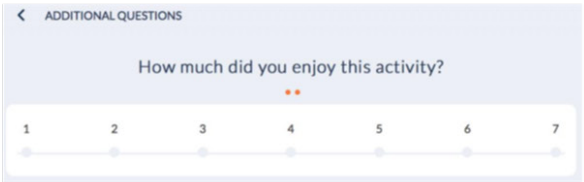


3) Select secondary activity



4) Select context





D. Stylized questions

1. Questionnaires based on stylized questions

Where survey instruments based on stylized questions are used, respondents are asked to indicate whether they participated in each activity during the reference period and, if so, the total time that they spent on the activity. The reference period is usually a day or a week. With stylized questions, it is not possible to collect contextual data for each activity episode, but specific questions can be included about activities carried out at the same time as others, such as supervisory care.

Respondents do not need to report on the chronology of events, but they do need to be familiar with clock time as they need to estimate the duration of activities (Seymour, Malapit and Quisumbing, 2020). They also need to be able to sum the time of separate episodes; the interviewer can help them with that. Interviewers should be trained to correctly convert summed minutes into hours (e.g. 150 minutes is 2 hours and 30 minutes, not 1 hour and 30 minutes). Automated time calculators in digital tools can help with this.

The minimum harmonized instrument stylized questionnaire uses the exhaustive and mutually exclusive categories that constitute the minimum activities list (i.e. the 25 activities presented in chapter II), with some operational amendments. The stylized questionnaire, presented in annex II, could be included as part of a specialized time-use survey or as a module in a household survey. If it is incorporated into another survey, the stylized questions could be an independent module or they could be integrated into the thematic structure of the survey. For example, stylized questions on time spent in paid work activities could be asked immediately after the questions on the economic characteristics of respondents. Questions on childcare could be asked with other questions about children.

As with time diaries, background information needs to be collected to compute appropriate indicators, as discussed later, in section E of the present chapter. In the questionnaire, one question is proposed for each of the 25 recommended activities, except for several activities that are further disaggregated to ensure that relevant data are adequately captured using the stylized questions (see subsection 3 "Minimum list of activities for stylized questionnaires" below for further discussion). A more detailed disaggregation will ensure that good quality data are collected and support more detailed analysis to inform relevant policies. When using a stylized questionnaire, explicit probing for certain activities is necessary to ensure that respondents take such activities into consideration in their answers. Probing questions minimize potential calculation errors in the time reported for activities that are done multiple times throughout a day.

In Latin America and the Caribbean, stylized questions have been used extensively. Based on the lessons learned in countries in that region, the minimum harmonized instrument stylized questionnaire provides suggested wording that may be used to capture the activities on the minimum list, as well as the question order that has proved appropriate to facilitate recall. Countries should, however, adapt the questionnaire to their cultural and linguistic context and always pretest their version.

Each question proposed includes a note indicating the corresponding ICATUS 2016 activities and relevant remarks, where appropriate. The reference period is either a day or a week; both options are provided, but only one should be selected. In annex 3 to the minimum harmonized instrument, the text in colour serves to provide additional guidance for the interviewer.

In each set of questions, respondents are asked to include travel and waiting time in the total amount of time for each activity, except for employment and education-related travel, for which two questions were added in sections A and B (see annex II to the present *Guide*). This is in line with ICATUS 2016.

Stylized questions are valuable in situations where the survey has limited objectives, for example to measure only a few activities or when a time-use module in a larger survey must be limited to a very small number of questions. In these cases, an abbreviated activities list can be used. It is recommended that the full minimum activities list be used for periodic surveys, for example those conducted every 5 to 10 years, but shorter lists may be appropriate for interim monitoring.

2. Operational considerations for the stylized questionnaire approach

With the proposed questionnaire, there is the option to measure unpaid work for family members living in other households separately from domestic and care work done for household members. NSOs should choose the option that ensures consistency with other surveys and/or responds to national policy requirements.

While diaries that are longer than one day are considered to be overly burdensome, the reference period used in instruments with stylized questions is sometimes a week. As shown in annex II, the minimum harmonized instrument stylized questionnaire provides two reference periods, namely one day and one week, but NSOs should choose the appropriate period and only include that period in the actual questionnaire. If the week reference period is used, it is suggested that the week be split into weekdays and weekend days, as shown in figure III.5.

Both hours and minutes should be included in each of the time allocation questions. It is important that interviewers should be trained to record the total time spent on all the episodes of an activity during the reference period.

Figure III.5
Sample layout for a day or week reference period in the minimum harmonized instrument

Reference period a day	Reference period a week	
How much time did you spend on it? [} hours and [ ] minutes	How much time did you spend on it?	
		Hours and minutes
	Monday to Friday	[ ] and [ ]
	Saturday and Sunday	[ ] and [ ]

3. Minimum list of activities for stylized questionnaires

To ensure that estimates from stylized questionnaires are comparable with those obtained from diary-based measures, while guaranteeing high-quality statistics, two groups of activities related to care work and the production of goods for own final use require further explanation. Stylized questions may contain more detail than the diary format in order to capture contextual information.

(e) Care work activities

In the minimum list of activities, unpaid care work is organized according to two population groups that receive care: children and adults.

Taking care of child (own household or family) – activity 11 in the minimum list of activities. Although the minimum list of activities has only one category that covers all the activities related to the unpaid care of children under ICATUS 2016, division 41, these activities are further disaggregated in the stylized questionnaire, based on the type of care.

Activities relating to the provision of care for own (household or family) children are divided into separate questions to capture data on the following:

- Basic care and support (activities under ICATUS 2016, groups 411, 414, 415 and 416)
- Health-related care (activities under ICATUS 2016, group 412)
- School-related and education support (activities under ICATUS 2016, groups 413 and 417)

Taking care of or helping adults (own household or family) – activity 12 in the minimum list of activities. The minimum list of activities combines all the activities that fall under ICATUS 2016, divisions 42 and 43, in activity 12. The proposed set of stylized questions further disaggregates these activities as follows:

- Basic care and support (activities under ICATUS 2016, groups 421, 424, 425, 431 and 432)
- Health-related care (activities under ICATUS 2016, groups 422 and 426)
- Support with administrative errands (activities under ICATUS 2016, group 423)

(f) Production of goods for own final use

Data on time spent on activities related to the production of goods for own final use are collected using one question. In countries where all or some of these activities are prevalent or are particularly important for selected groups of the population (e.g. rural populations and women), NSOs should consider including an optional module on own-use production. An example is provided in annex II, which should be adapted according to the national context.

E. Choosing between a diary and stylized questions

Both diaries and stylized questions have advantages and limitations. When deciding which format is the most appropriate for a particular survey, it is important to consider the survey objectives, resources available to NSO and constraints at that time. It is possible for countries to use both, for example a stand-alone survey with a diary every 5 to 10 years to collect comprehensive data, and a short list of stylized questions in quarterly labour-force surveys or continuous household income and expenditure surveys to monitor time spent on unpaid care work or other specific topics.

Table III.4
Advantages and limitations of diaries and stylized questions

Diaries		Stylized questions	
Advantages	**Limitations**	**Advantages**	**Limitations**
Content			
A diary provides information at the episode level (frequency of the activity, time of day), as well as the sequence. It captures a broader range of activities than if a separate question is asked for each activity. It captures simultaneous activities and contextual information at the episode level.	Given that respondents are not prompted to think about specific activities, the likelihood is greater that activities that require less attention, such as supervisory care, are missed.	Stylized questions are better for measuring infrequent activities, such as volunteering, sports or cultural activities. Given that respondents are asked explicitly about activities that they usually forget to report, those activities are recorded.	Stylized questions do not provide information on daily rhythm (frequency of the activity, time of day or sequence of the episodes). Episode-specific contextual variables cannot be collected. It is possible to ask respondents about activities done while doing something else, for example supervisory care, but the details of simultaneous activities are, however, limited unless more questions are added.
Data collection			
Diaries follow a narrative order. Reconstructing the day in chronological order follows a logical progression. This may reduce the cognitive burden on respondents as they do not have to try to think of similar activities and total the time in the abstract. The chronological order and contextual variables make it easier to detect errors, such as missed activities (e.g. travel) or incompatible activities. Diaries are designed to capture data over exactly 24 hours in a day.	Some respondents find it more difficult to complete diaries. The interviewer's skills and layout of self-administered diaries affect the level of difficulty. Special training is needed for interviewers who are unfamiliar with the format. Even in the lightest diaries, respondents are required to reconstruct a day, which may demand more time; it is important to take this into consideration if a diary is added as a module in a long survey. Respondents may become suspicious and hesitant to provide information to the level of detail required.	It is possible to target only the activities that are the most relevant to the objectives of the survey. If NSO is only interested in specific activities, they can be measured by including relevant questions in a labour-force survey or other specialized household surveys that are carried out frequently (e.g. household income and expenditure surveys) without being too burdensome.	The cognitive burden of recalling all episodes of sporadic or irregular activities and summing the duration can be high. The time required to complete the survey may be as long as or longer than a 24-hour diary, in particular if the activity list is long or a reference period of a week is used. Activities might account for more or less than 24 hours.
Analysis			
Diaries can be used for a broad range of research questions relating to, for example, transportation, health or social isolation. Information on the timing and sequence makes more types of visualizations possible.	In order to fully exploit the data, more data management and analysis skills are required. Free-text or open interval diaries can be much more complicated to process and analyse.	Processing and analysis are simple, given that the total time per respondent is already provided and the only indicators produced are the average time and participation rate for each activity.	Stylized questions are appropriate for a narrower range of analytic objectives.

While adopting a common conceptual framework can enhance international comparability across various data-collection instruments and modes, it is crucial to customize instruments to meet specific country requirements. Box III.4 outlines procedures that can be carried out to ensure that countries' needs are met and the survey results are accurate.

Box III.4
Pretesting tools and guidelines for national adaptation

Testing is a key statistical procedure that is carried out to ensure the accuracy of survey results. As an essential component for building the statistical solution, it is usually performed prior to data collection. According to the Generic Statistical Business Process Model, for statistical outputs produced on a regular basis, this process is usually carried out for the first rather than for every iteration of the survey or following a review or a change in methodology or technology.

Testing can be divided into two distinct subprocesses:

- Pretesting of survey tools
- Small-scale piloting of field procedures and data collection

These are sequential subprocesses; the pretesting of survey tools may result in instruments being revised and then piloted on a small-scale sample along with field procedures.

Pretesting of survey tools

The main objective of pretesting instruments is to minimize potential sources of measurement error due to a lack of comprehension or the poor performance of the instrument. An important aim of pretesting newly designed instruments is to ensure a uniform understanding of the wording of survey questions among population groups and thus among potential survey respondents who may differ in key characteristics, such as education. This is particularly important in contexts where vernacular languages are predominant or when the survey tool is to be administered in multiple languages. When pretesting the comprehension of time-use instruments, this should include testing not only the wording associated with activity titles (e.g. gardening) and the scope of activities, but also the language associated with reference periods, such as "yesterday". In Indonesia, a pilot study supported by UN-Women and ILO showed that the meaning of the wording associated with "yesterday" changed across geographical areas. For time-use measurement, pretesting the survey instrument should also involve verifying that the activity categories are truly exhaustive, which may be achieved by adding activity titles that are particularly relevant to the national context and needs.

Pretesting can also play a crucial role in identifying activities that have been omitted and assessing the overall performance of the instrument in terms of flow and administration. For instance, pretesting could be focused on the format and functionality (e.g. layout, logic, technology), thus helping to gauge whether the instructions are adequate, whether additional support is needed and what automated checks can be added to digital tools. This is especially important for self-administered tools. Some of the modifications made by Canada to its self-administered instrument after pretesting are described below.

Qualitative research methods, such as cognitive testing, focus groups and in-depth semi-structured interviews, are being increasingly employed in the pretesting of survey instruments. However, as these methods are not specific to time-use surveys, they are not discussed in more detail here.

The preparatory phase of the time-use survey conducted by Statistics Canada provides an illustration of how qualitative testing can have a positive impact on the design of a survey instrument. In the autumn of 2021, the Questionnaire Design Resource Centre at Statistics Canada conducted 30 virtual qualitative interviews (10 in French and 20 in English) with participants from across the country. While both the interviewer and the participant typically had their cameras on during the interview, except in the case of technical difficulties, the two observers from Statistics Canada who attended the interview had their microphones and cameras turned off.

Box III.4 (*continued*)

The aim of qualitative testing was to understand how participants responded to the electronic diary and to collect feedback on new content, as parts of the questionnaire that had undergone qualitative testing for previous Statistics Canada surveys were omitted. The aim was achieved by observing how participants reacted to the questionnaire, such as where they perhaps had difficulty in navigating the diary or understanding a question, and by asking specific probing questions about the experience. Testing also included collecting inputs on the relevance of the information included in the invitation letter and whether anything was missing that would help to encourage people to complete the survey.

Qualitative pretesting was a key process to address potential sources of measurement error. For instance, during interviews, it emerged that travel activities were frequently omitted and at times participants were confused by the appearance of an error message when the location of an activity changed without a travel activity. Following pretesting, Statistics Canada made changes to the questionnaire, which ranged from making small adjustments, such as rewording the help text that was not as clear as it could be, to restructuring the layout of the time-use diary. The content of the diary remained the same, but for some of the questions, the team changed the options from a drop-down list to radio buttons. The team added help text to remind respondents of their reference day and the activity in each instance. The diary was also reduced from three to two pages by including hidden related questions.

As participants typically encountered more challenges with the diary, Statistics Canada created three short videos to answer some relevant frequently asked questions. The videos explain what the 24-hour diary is, how to report simultaneous activities (including a reminder to avoid grouping multiple activities together) and how to report travel activities, in particular as participants in the Questionnaire Design Resource Centre testing frequently forgot to report that type of activity and were sometimes confused by the error message that they received when their location changed without a travel activity.

Field test

According to the Generic Statistical Business Process Model, a field or pilot test of the statistical process typically includes small-scale data collection to test the collection instruments, followed by the processing and analysis of the data collected to ensure that the statistical business process performs as expected. Following the pilot test, it may be necessary to go back to a previous step and adjust the collection instruments, systems or components. This subprocess may be iterated until the performance is satisfactory. For time-use measurement, pilot tests could serve to assess the performance of field procedures for maintaining the designated day or interviewing multiple respondents per household without relying on proxy informants.

It is important to note that field or pilot testing is separate from interviewer training. Interviewers will certainly need field practice, but pilot testing should be carried out by those who are already familiar with the survey and not during the training process.

F. Background questionnaires

1. Placement of priority background characteristics

The decision as to where questions to capture the selected background characteristics are placed in the survey can have a strong impact on the quality of the time-use data. The options, when deciding where to capture this information, however, may vary depending on whether the survey is a fully independent and dedicated time-use survey, a dedicated time-use survey with a sample or panel selected from an existing household survey or a module attached to another base or parent survey.

Background characteristics may be collected in a household roster, in a section on housing characteristics or in an individual background questionnaire. A household roster is best suited to capture essential background characteristics that are needed for all household members. An individual background questionnaire is, however, the most efficient way to capture essential background characteristics needed only for respondents completing the time-use data component.

Whether in a household roster or an individual background questionnaire, individual background characteristics are generally best captured before the time-use data component. They can then be used to select eligible respondents for the time-use questions and to optimize the application of the time-use component, for example by enabling selected data quality checks and dependent interviewing, and supporting coding. For stylized questions, household characteristics are used to filter specific questions. For example, in a household without children, questions on care provided to household children will not be asked.

Other questions relating to essential household characteristics, such as household income or household wealth, are best placed in a section on housing characteristics or household sources of livelihood and asked only to a household reference person. To the extent possible, and to minimize the potential impact on the quality of the time-use data, it is recommended that detailed questions on household wealth, if included, be placed towards the end of the survey, after the time-use data component. If a modular approach is used, those questions are likely to have been included in the parent survey already.

2. Data-collection period for background characteristics

In order to serve in the analysis of time-use and activity patterns, it is important that background characteristics be collected at the same time as (or as close as possible to) the collection of the time-use data. This ensures that the background information describes the respondent's situation when the time-use information is collected. If the sample for the time-use survey has been selected from another household survey, it may be necessary to readminister some of the questions relating to essential background characteristics or confirm the responses to ensure that they are up-to-date. This is particularly the case for characteristics that are likely to change over time, such as household composition, marital status, current school attendance and current labour-force status, and the essential job characteristics of respondents and their spouses.

3. Question design to capture background characteristics

Most of the questions on background characteristics that are identified as priority for time-use data collection are generally included in major national household surveys. To promote coherency across sources, countries should endeavour to use the same set of questions to capture these essential background characteristics on a consistent basis

across all major national household surveys. Taking account of good practices and with a view to supporting international comparison, the questions should be aligned with the latest internationally agreed concepts, definitions, classifications and operational guidance. For a list of recommended background characteristics, see chapter II.

4. Labour-force characteristics of household members

The Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics, under the guidance of one of its members, ILO, identified the "essential" economic characteristics that should be captured during time-use data collection to facilitate the correct coding of activities under ICATUS 2016 major division 1 "Employment and related activities" and major division 2 "Production of goods for own final use", as well as the "optional" characteristics that should be captured to enrich the analysis of time-use data. Model questions and sequences that may be used to capture those characteristics are provided for illustrative purposes in annex III and are aligned with the ILO recommendations on capturing data on employment and the production of goods for own final use, as defined in the nineteenth International Conference of Labour Statisticians resolution concerning statistics of work, employment and labour underutilization.

It is recommended that countries (a) use the approach already established at the national level to capture those characteristics in surveys, in particular labour-force surveys, providing that the details required for coding time-use activities are captured, or (b) adapt the national approach in line with the characteristics set out below, in order to be suitable for time-use surveys.

The labour-force characteristics that should be captured in the background questionnaire include:

- Identification of persons employed during a specified time (week/seven days)
- For employed persons
  - Multiple job-holding status
  - Core characteristics of the main, second or other jobs, as relevant[16]
    - Employment status
    - Occupation
    - Industry
    - Institutional sector of employment
    - Business incorporation for those employed in the private sector
    - Business registration

[16] Some of these characteristics could be derived from tax data.

For countries where own-account work in agriculture or fishing is commonplace in certain regions or among certain population groups, the background questionnaire should also capture, at a minimum, the following items:

- Participation in own-account farming, animal husbandry and fishing during the specified week
- Main intended destination (for sale versus own use) of the products from farming, animal husbandry and fishing
- Main products from farming, animal husbandry and fishing.

Box III.5
Supplemental questions to measure volunteer work

Most volunteer work is not carried out regularly. Time-use surveys are good for measuring volunteer work that is done daily or weekly. They can be used to determine which daily activities constitute volunteer work, but they are not suitable for a comprehensive measurement of volunteer work, volunteer rates or the number of volunteers, or the characteristics of volunteers. To address the need for such data, ILO developed modules on volunteer work that can be added to regular labour-force surveys or censuses (ILO, 2019), as well as a self-guided online course on the topic. NSOs that seek to improve their statistics on volunteering are advised to refer to the *Volunteer Work Measurement Guide* (ILO, 2021) for further discussion on the issue, as well as sample questions.

While NSOs have the option of including a volunteer work module in another type of survey, it is also possible to include a few stylized questions on volunteering in a time-use survey to better capture data on volunteer work (even for diary-based surveys). The main reason for including stylized questions is to allow questions on volunteering to refer to a longer reference period, typically four weeks or 30 days.[a]

Drawing on the *Volunteer Work Measurement Guide*, the main stylized question that should be asked is:

> In the last [four weeks/30 days] that is from [date] up to [date/yesterday], did you [volunteer/do voluntary work] or spend any time helping:
>
> a) Friends, neighbours, strangers (excluding help given to members of own family)?
>
> b) Organizations, associations, clubs, institutions (such as non-governmental organizations, religious organizations, sports clubs, schools, online groups)?
>
> c) (The/Your) community?
>
> d) Nature, wild/street animals (such as dogs, cats, birds, fish)?
>
> e) Did not provide unpaid help.

Respondents should read and mark all the options that apply to them. If respondents say that they do volunteer work (by selecting one of the options above), the survey should collect data on one or two activities to determine the beneficiaries, amount of time, frequency, reason for doing the work and organizer. If respondents report more than two volunteering activities, they should choose the two that they spent the most time on during the reference period. The recommended questions can be found in appendix I to the *Volunteer Work Measurement Guide*.

[a] It may be advisable to use other reference periods, for example if an event has occurred that may have led to a change in volunteer work carried out, such as droughts, storms or other emergencies.

G. Privacy in instrument design

NSOs are familiar with the need to maintain the privacy of respondents throughout the data-collection, processing, analysis, dissemination and archiving processes. In general, time-use surveys are no different in this respect. With the increase in digitalization, there are new threats to privacy, as data are collected in new ways and new types of data are collected. These issues are addressed in chapter IV, but it is also important to mention privacy in relation to instrument design.

"Privacy by design" and "privacy by default" are increasingly accepted as standards for data protection, for example under legislation such as the General Data Protection Regulation (GDPR) of the European Union, in effect since 2018, and the

African Union Convention on Cyber Security and Personal Data Protection, in effect since 2014.

"Privacy by design" is the concept that privacy is an integral part of any data-collection and processing activity from the point it is first developed and throughout the process, continuing to its conclusion. Privacy by design does not start with data collection or management, but rather with instrument design. Privacy by design is proactive; it calls for anticipating potential privacy risks and preventing them, rather than reacting to them.

"Privacy by default" is the approach whereby the default setting of a tool or application is the one with the highest privacy protection. This means that individuals using a digital instrument do not have to take proactive steps to protect their data; if they do nothing, their privacy is intact. They would, however, have to take proactive steps if they wanted to relax the privacy protections or to allow additional types of data to be collected or shared.

Time-use data-collection instruments, like other data-collection instruments, should provide privacy by default. An important element of privacy by default for instrument design is the principle of data minimization, that is to say, only data that are relevant and needed should be collected. Data minimization would apply equally to types of data (such as geolocation), questions or variables, or even aggregated responses or categories (e.g. if activities are going to be aggregated into broader categories).

Box III.6
Quality checklist: survey instruments for collecting time-use data

Type of instrument

- The decision as to whether to use stylized questions, open interval diaries or fixed interval diaries will depend on the data requirements and enumeration model (self-administered or interviewer-administered). Other considerations that should be taken into account include the data entry and processing procedures. There are quality issues related to each of those processes, and they need to be considered at the survey design phase.
- If only broad high-level data are required for a few key activities, a set of stylized questions is a suitable option for capturing quality data. Those questions should be quicker to develop, administer and process. However, stylized questions do not support detailed data analysis, such as time of day analysis. It should also be noted that the data collected may not be comparable with diary data.

Pretesting

- Undertake cognitive testing to determine whether a diary or stylized questions accurately measure the intended concepts and to identify any aspects of the diary that create a particularly high cognitive load. Cognitive testing is recommended, in particular when including probing questions on supervisory care in the survey instrument design.
- Weigh the cost of building and testing different collection instruments, in particular electronic diaries, against any savings achieved as a result of reduced data-collection efforts.

Recording time

- Consider the length of the time intervals in diaries (which are usually 5, 10 or 15 minutes), while balancing the respondent burden against the desired level of precision in measurement.

Box III.6 (*Continued*)

Consider

the number of diary days that will be sampled for each respondent while balancing the respondent burden against any improvements in accuracy. •

- Open interval diaries are better suited for interviewer-based data collection. Interviewers can prompt for the next activity and also ask about activities that might be missed, such as eating or travel when the location of an activity changes. Fixed interval diaries tend to be mostly used for self-administered diaries. They rely on respondents to follow instructions.

Questions

- Design questions so that they are easy to understand and can be answered by a broad range of respondents. Avoid overreliance on instructions to explain ambiguous questions or form completion. Cognitive testing can help to identify any aspects of the survey that create a particularly high cognitive load.
- Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.

Instructions

- Consider the usability and respondent experience associated with diary collection instruments. Make use of visual features and layout to alleviate the cognitive load and help respondents to think in a natural way about how they spend their time. • Instructions for any type of self-completed questionnaire should be clear and easy for respondents to understand.
- For interviewer-administered questionnaires, interviewers need survey-specific training (see chapter VI).

Privacy

- Consider retaining personal details and using them to check that information collected in the questionnaire matches the diary records. Determine whether and how this can be done in keeping with applicable legislative and privacy frameworks.

IV. Survey frameworks for collecting time-use data

A. Type of household survey

"Dedicated", "stand-alone" or "independent" time-use surveys are designed specifically to collect data on time use. The content, methodology and enumeration procedures are aligned for the collection and production of time-use statistics. These types of time-use surveys provide the optimal outcome for time-use statistics because of the wealth and depth of information that they can capture (Economic Commission for Latin America and the Caribbean, 2022). Dedicated time-use surveys, however, require an allocated budget and the development of the entire statistical operation. As NSOs have sought to modernize their survey operations, this traditional "stovepipe model" of statistical production has come under greater scrutiny. One alternative is survey modularization, which is aimed at achieving efficiencies, cost savings and enhanced data quality. Survey modularization refers to the process of splitting and flexibly reconstituting sample surveys as a series of "core" and "add-on" modules (i.e. blocks of questions) related to one or more specific topics or subtopics (ILO, 2023a). NSOs may choose to collect time-use data using a stand-alone survey or modular approach, or they may conduct a stand-alone survey every 5 to 10 years and use modules in between. As with other design choices, the type of survey used to collect time-use data involves making trade-offs. In the present section, the advantages and limitations of each approach are described to help NSOs to decide which best aligns with their objectives.

A dedicated or stand-alone survey may be fully independent or use a sample that is linked to another survey.

- **Fully independent.** The survey is designed specifically for the purpose of collecting time-use data, with the sample design and training for interviewers also configured for that purpose; it is designed with targeted and specific content. Fully independent time-use surveys have been used in Canada, Colombia, Mexico, Mongolia, Morocco and South Africa.
- **Linked sample.** The survey is designed for specific measurement objectives, with independent operations, but it uses a sample derived from another survey. This type of survey was used in Belgium (in 1999 and 2005, with the sample derived from the national expenditure survey, and in 2013 when it was derived from the labour-force survey), Thailand and the United States of America.

An alternative type of time-use data collection involves incorporating a time-use component into another survey process. There are two main options:

- Fully integrating time-use questions into a household survey on a related topic.
- Adding a time-use module or set of questions to an existing household survey with specific implementation procedures.

Dedicated and modular surveys are further described below. The description of dedicated surveys is, however, shorter as they are, in effect, the default survey described throughout this *Guide* and in the *Guide to Producing Statistics on Time Use: Measuring*

Paid and Unpaid Work. Time-use modules are described in greater detail, on the basis of pilot testing conducted in recent years.

1. Dedicated or stand-alone time-use surveys

Dedicated or stand-alone time-use surveys are tailored to the time-use data objectives and requirements.

(a) Advantages

Background. The background questionnaire is designed to collect information that is required to support the analysis of time-use data and properly classify activities.

Sampling. The sample design and frame are appropriately designed to ensure the correct representation of different cohorts of the population (e.g. urban and rural areas and areas with higher proportions of older and younger populations). A dedicated or stand-alone time-use survey should be designed to achieve an adequate representation of weekdays, weekends, holidays and seasons. The sampling methodology and weighting can also be tailored to optimize the time-use survey.

(b) Limitations

Cost. The main limitation of a dedicated or stand-alone survey is the cost, in particular because many countries have yet to include time-use surveys as a regular part of their statistical programmes and do not have designated budgets to conduct them periodically. When resources are limited, it may be hard to guarantee their availability.

2. Time-use module in a multipurpose survey

(c) Advantages

Versatility. The chief attraction of modular survey designs is their relative adaptability. While certain survey content (in "core" modules) remains constant, add-on modules can be incorporated or eliminated in line with the required periodicity, or in response to changing social contexts, information needs and policy priorities (Reis, 2013).

Respondent burden. There is a substantial body of evidence showing that increases in survey length correlate with declining response rates (Reis, 2013; Blumenberg and others, 2019) and reduced data quality (Bradley, 2016) across all modes. Survey modularization permits the overall survey length to be optimized and the respondent burden to be managed or dispersed by, for example:

- Scheduling the rotation of different add-on modules for repeated surveys, thus minimizing the overall respondent burden and interviewer fatigue (Allen, Fleuret and Ahmed, 2020).
- Selectively administering add-on modules to a subset of the total sample (sometimes referred to as "between respondent modularization") and/or by administering core and add-on modules at different times (sometimes referred to as "within respondent modularization") (Allen, Fleuret and Ahmed, 2020).

These strategies may be particularly relevant for modular approaches, as reflected in some current national practices and international guidance (ILO, 2023a).

Analysis. A modular approach offers an expanded scope for multivariate analysis, as data are available from the core survey modules and the add-on module(s) for identical sample units (Ioannidis and others, 2016).

Cost. A modular approach permits economies of scale, with the fixed costs of administering a nationally representative survey largely provided for under the core survey budget. As a result, the mobilization of funds for time-use measurement may be restricted to the variable costs incurred as a result of introducing additional module(s).

Periodicity. With a modular approach, topics covered in add-on modules can be embedded within the national survey infrastructure, scheduled for periodic inclusion therein alongside other core statistical topics and funded centrally (and/or included in proposals to mobilize funding for the statistical system). This may result in the increased periodicity of statistical collection for important, but historically neglected, topics.

Sampling. Established national sample surveys tend to be characterized by relatively large sample sizes, rigorous sampling and data-collection methodologies that ensure the representativeness of the data and minimize threats to data quality, as well as protocols for secure data transfer and storage and timely release.

(d) Limitations

Scope and coverage. Careful consideration is required to ensure that the base or parent survey aligns as closely as possible with the time-use survey requirements. For example, there may be limited survey time available for the time-use survey content. The scope and coverage of the base survey may not be ideal for the time-use survey.

Sampling. The target population of the base survey may not align with the time-use survey requirements. The number of people enumerated in the household, for example, may not be suitable (i.e. enumerating all adults, a randomly selected person or any responsible adult). The geographic coverage may not be complete. Time-use surveys should include urban and rural settings to capture the different activities undertaken by people living in different areas. The enumeration profile of the base survey may affect the time-use survey requirements, such as the length of time in the field, follow-up, requirement for interviewers to return to the household to collect diaries and the ability to achieve a representative distribution of days, seasons and holidays. In time-use surveys, both people and time are sampled, ideally to try to cover at least all seasons of the year. Most surveys, however, are less concerned with seasonality or the day of the week. See chapter V for a more in-depth discussion of sampling and coverage issues.

Proxy respondents. In time-use surveys, direct respondents are necessary to guarantee the accuracy of responses and multiple household members often need to be interviewed. However, with some base surveys, it is necessary to interview only one person in the household (a proxy respondent). In 2022, in Grenada, the level of unpaid domestic and care work reported by direct respondents was compared with that reported by proxy respondents. It was found that the level reported by direct respondents was approximately twice as high as that reported by proxy respondents.[17] If the base survey allows proxy respondents, additional sampling and field considerations need to be taken into account to ensure that direct respondents respond to the module on time use.

Respondent burden. One of the justifications for using a module is to reduce the respondent burden. However, one of the main challenges of using a module is the limited amount of time that is available to add to the collection process without overburdening the respondents and compromising the quality of the parent or base

[17] In the report, other variables that may account for part of the difference are discussed, such as the fact that proxy respondents were more likely to be used for people who were in full-time employment and, therefore, less likely to be home. However, the researchers used regression analysis to explore the impact of such characteristics as gender, employment and the presence of children in the household, and concluded that "proxy status is a strongly significant determinant with large impact even after controlling for all the other factors" (UN-Women, 2021, p. 10).

survey, as well as the time-use survey. Even if time-use data are collected separately from the base survey, it is important to remember that respondents will have already provided background information in the base survey. Limiting the number of questions is, therefore, necessary to avoid overburdening respondents. For instance, in a modular approach, the number of contextual variables that can be included in the instrument design may be limited.

3. Choosing between a stand-alone and modular approach

As a norm, the decision as to which type of survey to use should be driven primarily by the users' and producers' information needs.

Given the specialized nature of time-use measurement, independent or stand-alone time-use surveys are the preferred data-collection instrument for ensuring that high-quality data are produced. For these types of surveys, resources must be available on an ongoing basis to support their integration within the national statistical system.

Where committed long-term resources for time-use measurement are lacking, a modular approach may be a cost-effective alternative. The trade-offs, however, should be carefully considered. Costs are reduced as the survey infrastructure has already been established and can be used across surveys. There are also further advantages to be gained from the rich data derived from the base survey, which thus offer greater analytical opportunities.

In a modular approach, a time-use module is integrated into or attached to a "parent" survey, which is usually an established, nationally representative household sample survey. The background questionnaires that are included in an independent time-use survey are substituted by the core content in the parent survey. This shifts the distribution of the survey content away from being weighted towards the time-use module, to being weighted towards the core survey content instead. In this scenario, the time-use module is kept comparatively light, and the survey design and field operations are optimized to meet the needs of the parent survey (although some adjustments to accommodate time-use measurement will normally be necessary). Adjustments at the survey design and implementation phases are normally restricted to the time-use module, thus allowing for the parent survey to proceed as normal (unless there are efficiencies or data quality advances to be gained by modifying the overall design). This results in trade-offs, namely the ease of implementation and affordability are balanced against the depth of coverage, as time-use modules tend to generate informative, but less than fully comprehensive, time-use data results.

The modular approach has drawn more attention as NSOs have taken action to mobilize CAWI-mode surveys and mixed-mode surveys using CAWI. This is because the results from CAWI have been found to vary considerably depending on the length of the survey (and so CAWI is particularly suited to survey modularization), in particular when mobile phone and tablet-based modalities are supported alongside the desktop or laptop modality (Toepoel and Lugtig, 2022).

Recent advances in survey modularization theory and practice emphasize the adaptability and versatility of the modular approach, which is capable of accommodating a wide variety of time-use measurement approaches. The modular approach is well suited to situations where NSOs are exploring the possibility of collecting time-use data with limited resources and objectives that are compatible with an ongoing household survey, or monitoring indicators in between data collections using stand-alone surveys. The timeline for the design and build processes may be reduced. The survey can be mobilized relatively quickly since the sampling frame, workflows and field teams are available and the background information has already been collected.

The motivating factors underpinning the survey modularization model more broadly are applicable to modular time-use measurement. However, owing to the highly specialized nature of time-use measurement, careful consideration is required before deciding to use a time-use module. Key design features, as well as the demand placed on respondents and interviewers, the need to reflect seasonal differences in time use, the need for direct reporting, the pre-assignment of diary days and probabilistic within-household respondent selection, where relevant, dictate that where a dedicated or stand-alone time-use survey is feasible, it should be preferred. This is because independent time-use surveys weight their content towards obtaining a very detailed time-use record that is sufficient to support key multivariate analyses of the relationships between household and individual characteristics and time use. The survey population, survey periodicity and reference periods, sample design and field operations are optimized for a single purpose, that is to achieve a specified level of precision of the time-use statistics produced for a given target population and reference period.

(e) Integrated questions

In the lightest modular approach, time-use measurement is restricted to a brief series of stylized questions, which are fully integrated into the parent survey (United Nations, 2005). Typically, this integrated approach has relied on a "usual" or "typical" (or, where supported by the parent survey, seven-day) reference period for the time-use content. Since this approach has little impact on the survey length and fielding protocols, there are few budgetary considerations over and above the fixed costs for the parent survey (some limited variable costs may be introduced at the questionnaire design phase, as well as for targeted piloting and interviewer training). While simple and inexpensive to implement, such an approach can support only very limited measurement objectives and is not generally recommended.

(f) Time-use module

To avoid compromising the quality of the data and to support a wider range of time-use measurement objectives, a time-use module based on a light diary or stylized questions[18] is recommended over integrated questions. Relative to a full or verbatim diary, these light approaches reduce the time it takes to complete the survey and provide substantial efficiencies at the data entry, cleaning and analysis stages. This, in turn, minimizes the time lag between data collection and data release. Relative to the lightest approach, some of the defining methodological features of time-use measurement can be retained with light approaches.

In assessing the suitability of a candidate parent survey, several considerations arise, which are relating to the compatibility of the parent survey and time-use module measurement objectives and the survey design features underpinning them. While candidate household surveys retain sufficient commonalities to permit alignment with international statistical standards and to support comparative analysis, national implementation practices may differ in key respects, such as the temporal coverage, periodicity (including whether continuous or not), data-collection mode(s), target population and whether the base survey relies heavily on proxy respondents, among others. Therefore, the most appropriate parent survey may vary from one country to another and/or may change over time. Examples of candidate parent surveys include labour-force surveys,[19] household income and expenditure surveys, the Living Standards Measurement Study, and Multiple Indicator Cluster Surveys.

[18] This is the model adopted by ILO for labour-force-survey-based modular time-use measurement (ILO, 2023a), as well as by the World Bank for Living Standards Measurement Study-based approaches.

[19] Following extensive piloting with partner NSOs and independent research institutes, ILO has produced freely available time-use measurement toolkits, including CAPI-modules (available in the Census and Survey Processing System), methodological guides, national adaptation guidance and interviewer manuals and training curricula to support low- and middle-income countries in periodically carrying out modular time-use measurement using their national labour-force surveys.

Table IV.1
Country experiences using a modular approach to collect time-use data

Country and year of most recent survey	Base survey	Characteristics
Cameroon, 2014	Household survey	› Multipurpose survey on poverty and living conditions: health, education, labour-force characteristics, agriculture, migration › Diary using 60-minute intervals, up to five activities per interval › Mixed-mode: paper-assisted personal interviewing (PAPI) and CAPI › Provides estimates at the national and regional levels (12 regions)
Mexico, 2019	National occupation and employment survey	› Sociodemographic and labour-force characteristics of the population (15 years of age or older) › Stylized questions on time use › Mode: CAPI › Provides estimates at the national, State and municipal levels › Proxy respondent: one respondent who is 15 years of age or older provides information on all the household members who are 15 years of age or older
Switzerland, 2016	Labour-force survey	› Stylized questions on unpaid work: domestic work, care work, formal volunteer and informal volunteer work › Mixed-mode: CAWI with CATI option › Provides estimates at the national and regional levels
United Republic of Tanzania 2019/20 (Zanzibar) 2017/18 (mainland)	Household budget survey	› Household budget survey measuring poverty and living conditions: food security, health, education › Diary with open intervals › Mode: CAPI › Provides estimates at the national and regional levels and a disaggregation of the time-use patterns of individuals above and below the poverty line

B. Data-collection approaches

In time-use surveys, the mode of data collection refers to whether the survey is interviewer-administered or self-administered and the technology that is used to solicit and record responses. In the present section, the features of interviewer-administered and self-administered surveys are compared and then a description of how they are implemented using different technologies is provided (e.g. personal interview using paper or an electronic device, self-reporting using paper or a device).

NSOs are facing challenges in conducting time-use surveys and social surveys in general, owing to decreasing response rates, increasing costs and delays in the dissemination of results. They are increasingly modernizing data-collection modes as a way to address some of these challenges. As part of the modernization of their national statistical systems, NSOs are exploring alternative ways to use technology to collect time-use data. For instance, mixed-mode data collection allows respondents to choose how they provide the requested information. Furthermore, technology is becoming an integral part of the production of time-use statistics in many countries, as it serves as a means to improve efficiency in data collection and increase the quality of the data.

The use of personal computers, tablets and smartphones can improve the quality of data and reduce the respondent burden, thereby increasing response rates. Digital methods enable validity checks, as well as the inclusion of context questions that are linked to information from the pre-questionnaire and the use of tags, for example. Technology can increase efficiency by streamlining data processing, thus potentially reducing costs. shows how costs compare across modes and how representative modes are.

Table IV.2
Costs and representativeness of different data-collection modes

Mode	Initial investment cost	Ongoing cost	Representativeness
Paper	Low	High	High
Phone	Low	High	Low
Computer/app	High	Low	May be higher or lower depending on the context

Given the initial investment that is necessary to purchase the equipment and develop software applications, digital methods may or may not lead to an overall cost saving in the short term. However, most NSOs are making efforts to digitalize and modernize statistical operations in general. The modernization of time-use surveys should become a part of these efforts, which should include taking advantage of organizational capacity to adapt time-use data collection and dissemination processes.

1. Interview or self-administered

Traditionally, the most common mode of data collection was a household face-to-face interview. A background questionnaire was followed by either an individual time diary or a list of stylized questions about the activities carried out during the reference period. Most countries still use interviews, whether they are completed face-to-face with the interviewer using paper or an electronic device or over the phone. Fewer countries, mostly with high incomes, use a self-completed approach where the respondent personally records the time-use information in the survey instrument.

The key advantage of interviews over self-reported surveys is the ability of skilled, well-trained interviewers to use their organizational and interpersonal skills to contact selected respondents, explain the survey and obtain informed consent, support the respondents in reconstructing their day, and fill out forms completely and accurately. Most of these are the responsibilities of an interviewer for any survey, but they are particularly relevant for time-use surveys. In order to accurately report the total time spent on activities, respondents require help to reconstruct their day, regardless of whether the instrument is based on a diary or stylized questions. Interviewers must understand the coding scheme to be able to correctly translate the respondents' words into codes, for example, if they are coding on the fly (for more information, see chapter VI). They must ensure that the household members interviewed report on their activities for the designated reference days or follow procedures for replacement days.

More resources are needed for interviewer-administered surveys to cover salaries and field expenses.[20] Teams of interviewers need to be moved to the study area and may need to make repeat visits, in particular if data are to be collected from multiple household members or on multiple days. Another factor that adds to the complexity of these surveys is maintaining a balanced sample of days of the week, which is not a requirement for other types of household surveys that NSOs conduct. In face-to-face interviews, respondents may adjust their responses, thus overreporting socially desirable activities and underreporting others. Social desirability bias can also occur with self-administered questionnaires, but it is generally assumed to be greater when respondents speak with an interviewer face-to-face (Klausch, Hox and Schouten, 2013; Gnambs and Kaspar, 2015). This is less of a problem with diaries than with stylized questions because of the chronological listing of activities, but respondents may still adapt their day for interviewers. Table IV.3 summarizes the main advantages and limitations of interviewer-administered and self-completed surveys.

[20] Díaz de Rada (2022) provides a literature review of studies comparing costs by survey mode in Europe, the United States of America and Australia. He also presents possible ways to implement a sequential mixed-mode design.

Table IV.3
Comparison of interviewer-administered and self-completed surveys

Survey type	Options	Advantages	Limitations
Interview	Face-to-face **PAPI** **CAPI** CATI	› Interviewer can probe the respondent to record the details required. › Good training and supervision of interviewers improve quality and standardization. › Appropriate for populations with a low level of literacy or numeracy. › Interviewers can code on the fly, saving time spent on aftercoding.	› Cost of interviewers and travel, in particular to remote settings, except in the case of CATI. › Logistics and timing, as respondents and interviewers need to be in the same place (or on the phone) at the same time. › Social desirability bias, resulting in the overreporting or underreporting of time.

Self-administered	Paper
	CAWI
		› No recall bias if completed in real time.
		› No need to allocate a budget for interviewers.
		› Not biased/influenced by the presence of an interviewer (there is still, however, potential for social desirability bias).
			› Cognitive burden, in particular for participants with a low level of literacy or numeracy:
			  › Understanding concepts and classifying activities correctly.
			  › Navigating forms.
			  › Understanding time/time sense.
			› Lack of consistency across participants in terms of the level of detail in which activities are reported.
			› May reduce response rate or increase errors.
			› For paper diaries, costs may increase as a result of printing extensive instructions.

2. Data-collection modes

In this section, an overview is provided of the modes of data collection available, namely PAPI and CAPI, CATI and web or mobile questionnaires, followed by a more in-depth discussion of the digital tools.

Outside official statistics, other modes of data collection may also be used for smaller time-use studies with specific research objectives, such as observation or other qualitative approaches and the use of wearable cameras or other technologies. It is also possible to send questions in which respondents are asked about what they are doing right then, or what their mood or stress level is, at random points during the day. This is called ecological momentary assessment or the experience sampling method,[21] and is particularly suitable for measuring transient states, such as subjective well-being, but may also capture activities that tend to be missed in retrospective studies. These methods are not included in this *Guide* because at present they are only used with small samples, not national-scale surveys.

[21] This method is described in Shiffman, Stone and Hufford (2008) and in Hektner, Schmidt and Csikszentmihalyi (2007).

(a) Paper-assisted personal interviewing

PAPI is the most basic mode of time-use data collection. The principal advantage and the reason that some NSOs still use interviewer-administered paper questionnaires is that they are not reliant on new technologies. NSOs without the expertise or the equipment required for digital collection will have to make high initial investments to move away from paper. In addition, the start-up time when moving from paper-based data collection to other data-collection modes that are dependent on technologies could affect the timeliness of the process. With PAPI, respondents do not need to have any type of technology or technical ability to complete the forms. This may, however, be a challenge for populations with low literacy levels. In many countries and subpopulations, these are important concerns. Even in countries that use CAPI, interviewers still carry paper forms to cater for specific subpopulations or as a backup. In Argentina, for example, interviewers carry paper questionnaires in case the tablets that they use malfunction, and in Mexico, paper questionnaires are also used in unsafe regions where it is not possible for interviewers to carry laptops or tablets.

The main limitation of PAPI, now that digital modes of data collection are more widely available, is that it is very labour-intensive and time-consuming. Interviewers and supervisors need to check the completed questionnaires carefully before leaving the field, which includes doing arithmetical checks, such as totalling the time reported in stylized questions. Trying to conduct these checks quickly can lead to errors, as can the pressure of trying to appear competent when doing them in front of respondents. The layout of a paper diary, in particular a light paper diary, looks more like a timeline and so may be more intuitive for interviewers and respondents. It can be easier to enter anchor points and fill in activities that are not as easy to recall around them.

Surveys using paper diaries can be expensive to administer and take longer to process. The costs of printing, distributing and collecting the diaries, as well as the salaries of data staff who are needed to enter and code the information, add to the total costs of paper-based surveys.

There is a risk of keying error and subjectivity, as data entry staff need to interpret handwriting, as well as making other editing decisions. Data editing staff should receive thorough training and instructions to apply the rules consistently. The amount of time required for data entry will increase with the amount of editing and imputation, such as cross-referencing the data with the data in the diaries of other household members to complete any gaps or look for consistency.

(b) Computer-assisted personal interviewing

With CAPI, interviewers enter the data into a laptop, tablet or mobile phone. As with PAPI, a longer enumeration period is required with CAPI surveys to allow for travel and interview time, and this makes them expensive to administer. However, eliminating the need for separate data entry reduces costs and time.

Although interviewers are the main expense associated with CAPI, they are also the main benefit. Interviewers can prompt respondents and help to clarify and explain what is required of them, resulting in high-quality data. As interviewers are doubly tasked with collecting data and ensuring that coding is conducted properly, longer training sessions may be required to prevent misclassification errors. In contrast with paper surveys, the content of which is generally limited to text in black-and-white print, colour and icons may be used in the design of CAPI surveys to help the interviewer to navigate through them. Figure IV.1 Figure IV.1 Icons in computer-assisted personal interviewing surveys used in Argentinashows how interviewers in Argentina can select from different coloured tabs (representing the ICATUS 2016 major divisions) to display a short list of activities. This is the equivalent of a cascading drop-down menu, but images and colours are used instead of only text. Images can be especially useful if interviewers are switching between languages, as is the case in some countries.

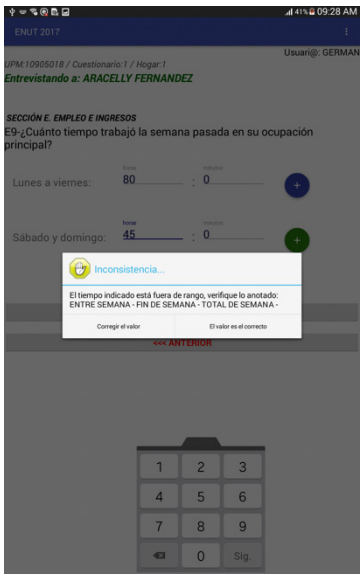
Figure IV.1
Icons in computer-assisted personal interviewing surveys used in Argentina

CAPI software can validate the answers (e.g. activities, codes for contextual information) while the interview is taking place. The interviewer is then notified when a value given by the respondent falls outside a valid range or when a response is inconsistent with those recorded for previous items. This allows interviewers to correct errors immediately, thus improving data quality. Figure IV.2 shows examples of such alerts in the time-use survey conducted in Costa Rica.

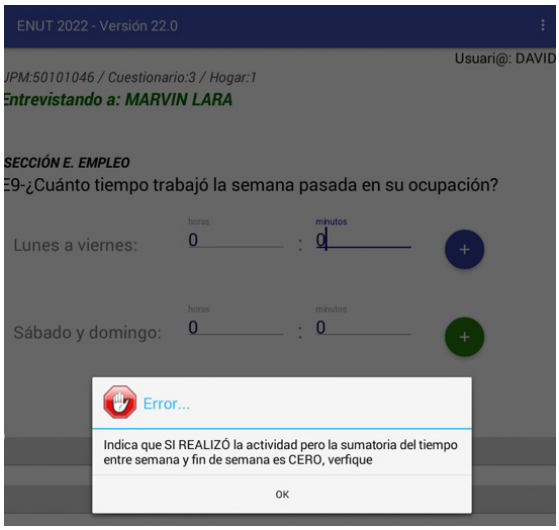
Coding software can also be added to CAPI questionnaires to help interviewers to accurately code in the field, rather than simply recording the information and then having it brought back to NSO and coded by a coding team.

CAPI (and CATI) applications can collect paradata on the time required to complete the whole survey or subsections thereof, which can be useful for quality assurance or the supervision of interviewers.

Figure IV.2
Example of validation checks in the Costa Rican time-use survey



(a) Soft check (yellow alert)
for an activity time out of the probable range



(b) Hard check (red alert)
for impossible duration (e.g. 0 minutes)

Box IV.1
Changing modes in Mexico

In 2009, Mexico switched from PAPI to CAPI to modernize the collection of time-use data. Since then, Mexico has introduced new features in its time-use surveys, including:

- The automated validation of field information, thus reducing interview times while at the same time reducing human error and improving the quality of the information provided.
- The inclusion of a time calculator, in 2014, that automatically sums the time spent on activities as interviewers record it. In addition to seeing the total time at the end of the questionnaire, interviewers can see the cumulative time as they progress. This has made it easier for them to verify information during the survey.
- Controls that ensure that interviewers correctly follow skip patterns, thus reducing interviewer error.

To facilitate a smooth transition from PAPI to CAPI, Mexico recommends taking the following steps:

- Identify the specific needs to be met with the data capture system, including the need for validation checks. Field tests identified the need for a time calculator, as well as the validation of the maximum and minimum times spent on each activity, with alerts when values were out of range.

Box IV.1 (*continued*)

- Have adequate personnel for the development of the data capture system and try to ensure that it can be used in subsequent editions of the time-use survey, in order to extend the benefits and reduce the investment cost per survey.
- Identify the time required to develop the data capture system, from the base through to the programming of the validation checks. Once the time to develop the system has been assessed, include it in the schedule for survey planning and adjust the timing of other phases as needed.
- Acquire devices in time (laptops, tablets, mobile phones), with the appropriate specifications, to test the application during development; conduct pilot tests in the field using the devices and provide interviewers with training on them.

(c) Computer-assisted telephone interviewing

With CATI surveys, the interviewer calls the respondent by telephone to complete the survey instead of conducting a face-to-face visit. As with CAPI, CATI software include validation checks.

Costs for telephone interviewing are much lower than for face-to-face interviewing, as neither travel time nor travel expenses must be paid. Response rates, however, tend to be lower than with face-to-face interviews. The overreporting and underreporting of socially desirable and undesirable activities may be less problematic since the interviewer and respondent are not face-to-face (De Leeuw, 2018; Gnambs and Kaspar, 2015; Kreuter, Presser and Tourangeau, 2008).

CATI relies on respondents having access to a telephone. Depending on how the telephone numbers are sourced, if the population coverage is incomplete, the quality and population representativeness of the data may be affected. This is particularly relevant in low- and lower-middle-income countries.

In both CAPI and CATI surveys, the interviewer – not the respondent – interacts with the instrument. Interviewers are well trained in how to use their equipment and programs. CAPI and CATI surveys, therefore, will not require the same level of instrument design and on-screen instructions as self-completed instruments.

(d) Self-administered paper questionnaires

Although respondents can complete paper questionnaires at their convenience, the questionnaires need to either be delivered to their house (and collected when completed) or be sent by post. Self-administered paper diaries are not suitable for areas with low levels of literacy and numeracy, but may be preferred by those who have a sufficient level of literacy but are not comfortable with technology.

In the case of self-enumeration surveys, the paper diary has long been the method for collecting data on time-use activities. Japan continues to use paper diaries; they are also recommended, among other alternatives, in the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines*. For more information on paper diaries, see chapter III of the present *Guide*, or refer to the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work* and the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines*.

(e) Computer-assisted web interviewing

A modernized alternative to self-completed paper diaries is self-completed web or mobile diaries or questionnaires. Although the term includes the word "interviewing", CAWI does not actually involve an interview. Instead, the respondent follows on-

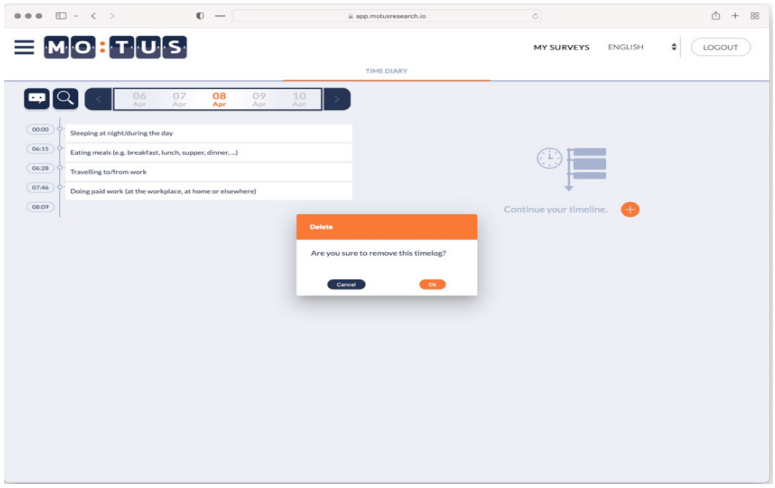
screen questions and completes the time diary or questionnaire. It can be completed using any device via a website or a dedicated app. The notification strategies are similar to those used for other modes of data collection, whereby participants are informed about the survey and provided with a hyperlink via which they can access the web app. They visit the link when they choose, but should be given some directions as to when and how to complete the survey. Countries that have developed websites for the self-reporting of activities for time-use statistics include Australia, Austria, Belgium, Canada, France, Germany, Hungary, Japan, Luxembourg, Norway, Poland and Serbia.

CAWI applications can be similar to those for CAPI and CATI, but require some modifications. Interviewers are trained to use the tools, but respondents are only likely to read brief instructions. Built-in prompts, error messages, sequencing and auto-correction can be coded into the instrument to improve flow and help respondents to navigate the tool, thus increasing the accuracy and completeness of the data. An explanation of how instructions on specific topics are provided via videos in Canada is provided in box IV.2.

Programmers can use soft or hard checks if an error is detected. Soft checks are messages in which users are asked to confirm that they meant to do something, for example adding an unusually long activity. After confirming, they are allowed to proceed. Hard checks are those that prevent users from advancing. Hard checks prevent invalid responses, but if overused can lead to user frustration and early termination. Figure IV.3 shows examples of such alerts in the time-use survey conducted in Belgium.

Figure IV.3
Example of validation checks in the Belgian time-use survey

(a) Soft check for deleting activity



(b) Hard check for missing activity

With online applications, it is also possible to monitor field progress by collecting paradata, which provide information on how many surveys are completed, the number of times access to the diary was obtained or other measures considered useful for an existing survey or improving future ones.

CAWI relies on respondents having access to equipment and the Internet. In the same way as telephone access for CATI, coverage errors are amplified with CAWI in many countries and for populations with low levels of access to the Internet and technology or low levels of digital literacy. There are still population groups that cannot or prefer not to participate online. This may be due to preference, computer literacy skills or a lack of Internet facilities. Alternatives such as CAPI, CATI and/or paper diaries should also be available, otherwise these groups will be excluded, which leads to non-response bias.

Another problem with CAWI is related to the quality of data, whether measured by unit non-response (response rate), item non-response, early termination (dropout) or speed and non-differentiation (satisficing or straight-lining), which tends to be much more prevalent in self-administered online surveys, although research on this topic is still emerging.

Box IV.2
Instructions in self-administered time-use surveys in Canada

One of the challenges of self-administered surveys is providing participants with instructions that are clear and simple, but which still provide an adequate level of detail. The advantage of online surveys over leave-behind paper diaries is that it is possible to include links to written or video instructions. Pretesting can help to identify areas in which participants are the most likely to need support and ensure that the materials are understood and useful.

Since participants typically experienced more challenges with the diary, Statistics Canada created a series of three short videos[a] to provide answers to some frequently asked questions. The videos serve to explain what the 24-hour diary is, how to report simultaneous activities (and a reminder to avoid grouping multiple activities together) and how to report travel activities. During pretesting, travel was the activity that participants most frequently forgot to report, and they were sometimes confused by the error message that they received when their location changed without a travel activity.

Statistics Canada sent a brochure to participants along with the introduction letter. In the brochure, there were links to the videos. The links were also provided in the online survey application, right before respondents started the diary.

[a] Available at www.statcan.gc.ca/en/sc/video/time-use-survey-questions, www.statcan.gc.ca/en/sc/video/time-use-survey-activity and www.statcan.gc.ca/en/sc/video/time-use-survey-travel.

(f) Mixed-mode data collection

The use of mixed modes in the collection of time-use data could help to address many of the representation and access challenges discussed, as population segments would be targeted with a different, more suitable mode. For example, a highly literate, working-age urban population with good technology access might be best surveyed by means of CAWI or a mobile application, with initial contact being made by mail, email or short messaging service (SMS), while low literacy or rural populations with poor Internet coverage may be best surveyed by means of CAPI, with initial contact being made via mail if appropriate. Either a sequential or concurrent strategy could be chosen for an effective data-collection design, based on the sample, time, questionnaire or a combination thereof.

Mixed modes can also address unexpected challenges. In 2020, Colombia conducted its time-use survey during the COVID-19 pandemic. With infection prevention protocols in place, interviewers visited households, but offered to conduct telephone interviews with respondents who did not want to have face-to-face interaction. The protocol called for the interviewing of multiple household members. Interviewers also conducted follow-ups by phone with individuals who were not at home at the time of their visit. Although only 2 per cent of the interviews were conducted by means of CATI, respondents appreciated having the option.

Offering respondents a variety of participation options (i.e. by offering a combination of paper, telephone and web-based data-collection modes) is likely to improve the response rate and survey quality. Multiple options can also reduce potential bias arising from differing access to the Internet and technology in the population, since respondents can select their preferred mode.

Many middle- and high-income countries have started to use mixed-mode approaches. In Denmark in 2008/09 and in Finland in 2020/21, data were collected

using paper diaries and a web application. Japan used the same mixed-mode approach in 2011 and 2016, before incorporating a web application for smartphones and tablets in 2021. In 2015, respondents in Serbia had the option of providing data in a paper diary or via a web application or mobile application. In Australia in 2020/21, CAWI, CATI and CAPI were the options for collecting data in the background questionnaire, while a paper or an electronic diary was the option for the time-use component. In 2022, Canada used CATI and an electronic questionnaire in a web application. A more detailed description of how people were assigned to or selected a mode in Canada and Japan is provided in box IV.3. Japan used a concurrent design, whereby people were given the choice of using a paper mode or an online mode concurrently. Finland also used a concurrent design, but provided paper diaries only if requested. Canada, however, used a sequential design, which meant that individuals who did not respond online were followed up by means of CATI.

An area for future research is the extent to which the use of technology has led to new data comparability issues, because of the use of different data-collection modes and quality of the data. For example, the use of technology may result in more episodes being produced or affect the response rates.[22] If only younger populations use CAWI and older populations prefer self-administered paper diaries, the mode effect will be associated with population groups, making it more difficult to assess whether differences in time use among different population groups are real or confounded by the use of different modes. Research on the effects of mode on surveys is in its early days and modes continue to evolve; NSOs should always consider the current standards.

[22] In a Dutch study in which the mode of data collection was assigned randomly, it was found that the presence or absence of an interviewer had an important impact (Klausch, Hox and Schouten, 2013). When the presence or absence of an interviewer was held constant, the medium, whether paper or an electronic device, had no effect on responses. Other studies have explored the costs and quality as a result of sequential (e.g. in Canada) or concurrent (e.g. in Japan and Finland) mixed-mode designs, but there are no definitive recommendations. For example, in Spain, Díaz de Rada (2022) recommends a concurrent design as being the most cost-effective, while in Germany, Mauz and others (2018) found no significant difference, but used modelling to project cost savings for a sequential design in an adequate sample.

Box IV.3
Assignment of mode in mixed-mode data collection

Canada

In 2022, Statistics Canada conducted a survey using a combination of CATI and online electronic questionnaires. Using multiple strategies to collect data meant that Statistics Canada had a higher chance of contacting the selected respondents. It also enabled Statistics Canada to accommodate respondents who preferred one mode over another. While it was hoped that most respondents would complete the survey online (and most respondents tended to prefer this over telephone interviews), providing alternatives meant that respondents with limited access to a computer or Wi-Fi, or those who were not comfortable with navigating an online survey, were not excluded. Those respondents could still be contacted by telephone to complete the survey.

The mode of data collection for each respondent was determined on the basis of the contact information available in the sampling frame. Statistics Canada was fortunate to have more than one type of contact information for many people in its sampling frame, which is not the case for many countries. All respondents for whom there was a mailing address and at least one other means of contact (telephone number or email address) were mailed an introduction letter and a brochure[a] with information about the time-use survey. This letter was sent before collection began and was only to inform the members of a household that they had been selected to participate and would be contacted soon to complete the survey. It could not be used to obtain access to the questionnaire. About a week later, Statistics Canada sent out email invitations to all respondents for whom there was an email address in the sampling frame.

If the diary was not completed, up to three email reminders were sent, each seven days apart. If the survey had still not been completed after the final email reminder, and a telephone number was available, the interviewer attempted to complete the survey with the respondent over the phone. If there was no telephone number available, no further contact was made after the last email reminder was sent.

Respondents for whom there was a telephone number but no email address received the introduction letter by mail and were then contacted directly by an interviewer to complete the survey over the phone.

Respondents for whom there was neither an email address nor a telephone number received an invitation letter by mail with their brochure. This letter was different from the introduction letter that was sent in the three other scenarios. In this case, there was a code in the letter that they could use to complete the survey online. If it was not completed, they also received a reminder by mail.

Assigning diary days according to mode to minimize the recall period

In the 2022 dedicated time-use survey conducted by Statistics Canada, respondents were assigned to a reference day or the day before data collection (the yesterday method), according to the mode of collection. In this mixed-mode survey, some respondents received an email in which they were asked to complete an online survey, while others received a telephone call to complete a phone interview.

In 2020, Statistics Canada conducted a pilot test using email invitations and found that, in general, respondents completed the questionnaire within 48 hours of receiving their invitation. Given that Statistics Canada could guarantee when an email was sent and because of the findings from the pilot test, it was decided to use reference days for email invitations. Reference days were always the day before (i.e. the yesterday method) the email was received; they were a day of the week, not a specific date. This meant that follow-up reminders could be sent seven days later without having a long recall period.

Box IV.3 (*continued*)

The yesterday method was used for respondents who completed the survey over the phone, owing to limitations with the collection tool that prevented Statistics Canada from controlling which day interviewers received a particular case and the aim was to avoid long recall periods. The yesterday method was also used for the small portion of the sample for which only a mailing address was available, because it was not possible to control when respondents received their invitation letter.

Japan

In its 2021 survey, the Statistics Bureau of Japan used self-administered paper questionnaires and online questionnaires.

The survey was conducted as follows: Within each prefecture, enumerators conducted preparatory surveys in the survey regions and created lists of households and maps. Based on this information, the Statistics Bureau randomly selected sample households. It sent pre-notice postcards to sample households to inform the members that they had been selected for the survey. Enumerators then visited the target households, explained the purpose of the survey and how to respond, and distributed survey materials for responding both online and by paper. Respondents could freely choose whether to respond via the Internet or by paper.

[a] Available at www.statcan.gc.ca/sites/default/files/timeusesurvey_en.pdf.

3. Choosing between modes

Each digital mode offers some advantages over paper-based interviewing or self-completed diaries and questionnaires, but also comes with some costs. Depending on the national context, digital modes may mean making trade-offs in terms of accessibility and representativeness. In choosing which mode(s) to use, NSOs should consider the following:

- The literacy levels and experience in completing complex forms at the population and subpopulation levels, in order to determine if the presence of an interviewer is required.
- The availability of a reliable Internet connection to complete online forms or to use an application and transfer the data to a server on completion, if using CAWI, at the population and subpopulation levels. The Internet is also useful for transferring data from CAPI surveys, but data can also be stored and transferred later. For example, interviewers in Mexico used an external storage device to back up their interviews on an ongoing basis to prevent any loss of data.
- The availability of a sampling frame that enables selected respondents to be contacted remotely. If one is not available, some form of contact is still needed, even for self-completed web or mobile surveys. One possibility is for interviewers to visit households to conduct the background questionnaire and let selected respondents choose how they want to respond to the individual time-use component.
- The instructions and technical support that will be provided to users, in particular when difficulties arise, including the options for when transfer processes fail or servers are down.
- The resources available. The initial costs of setting up digital tools are generally higher in terms of time and money; they also include the cost

of building and testing the tool. However, the costs and time relating to data collection and data entry will be reduced. NSOs must invest in strengthening the technical capacity of their staff if the tool is being developed and maintained in-house.

Box IV.4
Changing modes in Finland

Before 2009, Statistics Finland conducted only face-to-face interviews. To reduce costs, half of the 2009/10 sample was randomly assigned for telephone interviews. It was found that there was no significant difference in the quality of diaries administered through either interview mode, but the response rate for telephone interviews was higher.

Following this positive experience with telephone interviews, Statistics Finland decided to conduct all background interviews by telephone (CATI) in 2020/21. Telephone interviews were considered to be the most suitable mode owing to the COVID-19 pandemic.

There were two kinds of background interviews, namely household interviews and personal interviews. One adult household member, who was familiar with the circumstances of the household, completed the household interview. All the members of the household who were 10 years of age or over completed a personal interview and were provided with a time-use diary to fill in.

For the time-use part of the survey, there were two kinds of diaries: online diaries (primary option) and paper diaries (if requested). Both diaries were free-text full diaries and were coded manually after collection. Of the diaries that were returned, 79 per cent were web diaries and 21 per cent were paper diaries.

Not every country is ready to make the transition to web and mobile solutions. Modernizing the production of time-use statistics may have different meanings in different contexts and countries. It should be seen as a journey; the most important question that each country should, therefore, ask is what its next step will be.

Regardless of the technology chosen, further data validation is necessary to ensure that the data collected are accurate. There must be ongoing maintenance and revision of the software used to ensure that it produces clean text, in particular if the next step is to automatically code the responses once they have been scanned or recognized. Clean text ensures that scanned/repaired text is coded automatically, without regular review; text that has not been scanned/repaired correctly can result in the presence of special characters, autocoding not working or miscoding, and the revision of the coding index may become an issue.

For some countries, modernizing the production of time-use statistics may result in a shift from PAPI to CAPI. A target that may be achievable for many countries is to use mixed-mode and mixed technology solutions. In the longer term, statistical agencies may reap the benefits of modernization by spreading the costs thereof over time and across different statistical operations, since investing in CAPI, for example, will mean that the technology can be used for multiple surveys.

In some settings, in particular where literacy and numeracy levels are low or access to technology is limited or unevenly distributed, face-to-face or telephone-monitored interviews might still be needed. In other contexts, self-completed approaches may be a suitable solution to lower costs and reach some population groups.

C. Digitalizing data collection

Differences in people's access to technology, the Internet and devices and in their capacity to use digital tools mean that NSOs are at different stages of digitalization. For countries that will continue to use PAPI as their principal mode of data collection, it is recommended that they refer to the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*. For those countries, however, that are in a position to switch from paper-based to digital data collection, the present section describes how digitalization can improve time-use surveys, as well as the considerations to bear in mind when choosing devices and designing tools. The options that are available for incorporating digital data-collection modes into the time-use survey process are also discussed.

1. Benefits of digitalizing data collection

Digital technologies can be used to address a number of the challenges of time-use surveys. These challenges include offering various options for responding to the survey, reducing the respondent burden, improving response rates and increasing the representativeness of the results (Díaz de Rada, 2022; De Leeuw, 2018; Stern, Bilgen and Dillman, 2014), and improving the monitoring and management of data-collection operations, as well as contact and communication with the respondents (such as sending invitations and reminders). Information technology can reduce the costs of survey programmes, improve data quality, address certain sampling problems, such as difficulties contacting individuals for face-to-face surveys, and allow deeper survey questioning by integrating different data sources.

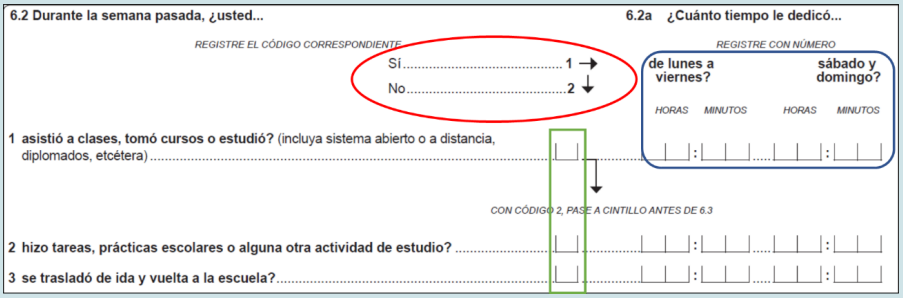
One of the key advantages of electronic tools is that they may include validity checks to improve the quality of data and/or to avoid registration errors. These checks are the most flexible and effective with web or online technologies. Direct checks are programmed for certain activities registered to ensure that the information is consistent. For example, when a user attempts to register activities in the future, report a change of place without a travel activity or record inconsistencies, such as travelling at home or gaps and overlaps in time, a warning is triggered. Digital tools can also be programmed to conduct summary checks at the end of the questionnaire, for example counting the number of episodes in a diary or totalling the hours in a stylized questionnaire. Survey managers can also use the information, such as the time to complete a survey, to help to supervise field staff.

Another important benefit of using a modernized mode of data collection is the potential to capture more question-specific information from respondents. Digitalization enables specific questions related to the background questionnaire to be incorporated. For example, a digital tool can be used to ask respondents with multiple jobs to clarify their work activities so that they can be linked to specific jobs. With such a tool, more targeted questions could be asked relating to location or co-presence. Some of those questions could even be partially automated, thus allowing for a smoother respondent experience and lower burden. Respondents with young children in the household may be provided with different response options to those without children. Or the tool could serve to probe for details about "with whom" or "for whom" an activity was performed. Although these context questions are also asked in paper questionnaires, there is a greater reliance on the ability of interviewers (or respondents) to navigate complicated skip patterns and recall information across different parts of the questionnaire.

Box IV.5

Validation criteria used in the 2019 national time-use survey in Mexico

In 2019, the National Institute of Statistics and Geography of Mexico conducted a national time-use survey using CAPI and stylized questions with a reference period of one week. Respondents were first asked whether or not they had done an activity in the previous week. If they had, they reported how much time they had dedicated to the activity separately between Monday and Friday and on Saturday and Sunday (the figure below is an example of three questions about education-related activities).



The total time for all the activities reported should add up to approximately 168 hours (excluding time spent on simultaneous activities), but sometimes the sum of activities was higher or lower. Owing to the complexity of post-collection adjustment, the amount of data to be analysed and the time frame for doing so, the National Institute of Statistics and Geography of Mexico did not adjust the numbers after data collection. Instead, validation and data quality control measures were incorporated into the data-collection process. One of these was the use of time intervals for each activity.

There were minimum and maximum ranges for each time-use activity (101 variables). Intervals were constructed by estimating the 2.5 and 97.5 percentiles for each activity in the previous national time-use survey. In cases where the activity did not appear in previous surveys, intervals were established empirically. When interviewers entered a response that was outside the interval, they were notified of a potential error. This allowed them to check whether they had made an error when entering the data or to confirm the respondent's answer. Using these intervals minimized the variance of reported times and improved the precision of estimates.

Examples of ranges used in the 2019 national time-use survey

MNEMONIC	ACTIVITIES	PROBABLE TIMES (HOURS)			
		MONDAY TO FRIDAY		SATURDAY TO SUNDAY	
		MIN	MAX	MIN	MAX
NEEDS AND PERSONAL CARE					
During the last week, how much time did you spend in total…					
Q6_1_1	to sleep (include nap)	20:00	60:00	8:00	24:00
Q6_1_2	to eat your daily meals (breakfast, lunch, lunch, dinner, etc.)	1:30	15:00	0:30	6:00
Q6_1_3	to your grooming or personal grooming such as bathing, going to the bathroom, brushing your teeth, etc.	0:50	10:00	0:20	6:00

Box IV.5 (*continued*)

STUDY ACTIVITIES					
During the last week, have you…					
Q6_2_1	studied, took courses or classes? (include open or distance system, graduates, etc.)	4:00	45:00	1:00	12:00
Q6_2_2	did you do homework, school practices or any other study activity?	1:00	20:00	0:30	8:00
Q6_2_3	moved back and forth to school?	0:20	10:00	0:10	5:00

Data outside the intervals were considered to be potential errors. This triggered a soft check, thus prompting interviewers to check the time and correct it if needed, while allowing them to keep the time if they considered it to be valid (e.g. a person who spent an unusually high number of hours sleeping because they were sick).

In addition to time ranges, other validations were incorporated to reinforce the quality of the information, for example:

- For each activity reported as having been carried out during the past week, the time must have been recorded.
- For personal care activities (e.g. sleeping, eating, grooming), the time must always have been recorded.

After the survey, validation tasks were mainly focused on correcting logical inconsistencies between other types of variables.

Other questions that are related to the diary day and serve to provide a more complete picture of time use across both activities and related information (enjoyment, location, activity-specific follow-ups, etc.) are integrated more naturally into a digital tool. Questions can be presented sequentially by using links, shortcuts and inference of related categories to reduce the cognitive overload. For example, for travel activities, only travel modes could be offered for "location". Hence researchers do not have to restrict the options as much as they may have to do with physical paper diaries in which there is limited space. The automated linking of activity-related questions can reduce interviewer error.

If paper questionnaires are used, they have to be transferred to a central location where the data are entered and verified. This takes time and costs money (to pay salaries and for facilities) and is also an opportunity for errors to be introduced. Data entry clerks may not be able to read respondents' handwriting or understand what is written, or they may make keystroke errors. The use of devices to collect data can help to bridge the time gap between data collection and the reporting phase by enabling data to be uploaded automatically or manually to the server when the device is connected to the network, thus eliminating the data entry process associated with paper surveys. The automation of post-interview processes, including processing, cleaning and digitizing data, reduces the cost of operations. In addition, devices can be used for other statistical operations in NSOs, such as household surveys and censuses.

Digital tools respond to the public's preferences and expectations. Many people are accustomed to filling out online forms and prefer that means of participation.

2. Considerations for technology selection

Web-based or app-based tools

The following options are available for collecting data using modern technology:

- Web-based surveys, which work through an Internet browser and require a device to be connected to the Internet.
- App-based surveys, which require an application (or app) to be downloaded to a device, but it can be operated without an Internet connection.

Both web-based and app-based surveys can be operated on a smartphone, tablet, laptop or desktop computer. Given that respondents will use the device that is available to them and that they are most comfortable with, web-based and app-based surveys need to be optimized for both large and small screens. The amount of content that can be displayed on the screen of a mobile phone is much lower, that is to say usually one or a few questions at a time. In adopting new technology, NSOs will need to consider a number of trade-offs. The needs, existing infrastructure and expertise of a country, as well as where it is on its journey towards the modernization of data collection, will determine how it prioritizes these considerations.

Additional functionalities create new opportunities. For example, it is possible to communicate directly with respondents using a smartphone to prompt them to complete the diary, as well as sending other reminders or prompts. Additional information can be collected automatically from respondents, such as the time spent on the device and the time spent using certain categories of apps, for example social media and Internet banking, providing that they are aware of this and have given their consent. App-based surveys can be tailored to suit the operating system of a device better than a web-based solution, allowing for a cleaner user experience.

Additional functionalities, however, also pose some new types of risks. Normally, an app has to be downloaded from an app distribution platform, which some users may find confusing. In order for an app to be made available on a distribution platform, it must be approved to make sure that it abides by the platform's terms and conditions. This may cause privacy concerns, depending on the restrictions set out in those terms. The development of the app requires specialist skills, in iOS or Android programming for example. In fact, multiple versions of the app may be required to cater for users across the multiple operating systems. As these operating systems change, more regular updates may be required to ensure that the app still functions. The developers of the tool may require further specialist skills in data security for mobile-data storage and transfer.

Screen and keyboard size

Tools should be designed for use on computers (desktops and laptops) and mobile devices (tablets and smartphones). Some respondents will have only one of those devices available to them or they may prefer one over others. In many low- and middle-income countries, for example, smartphone use may be more prevalent than computer use.

Computers have a large screen, and a keyboard and mouse. There is, therefore, space on the screen to include more content and incorporate greater use of colour or formatting to highlight content. The keyboard and mouse allow for easier typing and the use of functions such as drag and drop. Mobile phones, however, have smaller screens, which means that less content can be displayed (whether follow-up contextual questions or long activity lists) on a single screen. It is more difficult to type, so typed text will contain more errors. A further explanation of the features that can be used to enhance accessibility is provided below, under subsection 3 "Promoting accessibility".

For both types of devices, it is possible to program tags that result in activities from the predefined list of activities being suggested. Since tags are usually short words (or even parts of words), typing tags on a smartphone is not an issue for most respondents.

Portability

One of the main advantages of smartphones is that most people who own one carry it with them all the time. This means that they always have their smartphone to record activities on the go. If completing a diary is made more convenient and easier for respondents, they might be more willing to fill in more days and provide more details, resulting in higher quality data by eliminating recall bias. If they do not, however, the expected quality improvements may not be realized.

As respondents usually have their smartphone with them, it is possible to program a time tracker to record activity times or send push notifications to respondents with a reminder to complete prospective diaries. The advantages of the smartphone, which include that people usually carry them around, are dependent on one important condition: battery life. If the battery runs low, the device is no longer available for input and registration.

Desktop computers tend to be connected to the Internet, thus facilitating the input and synchronization of data, but laptops and smartphones are not always connected. Limited or unstable Internet access might be a problem for web-based tools, which could potentially lead to the loss of data. It is, however, also possible to develop apps that can be used offline and the data uploaded once they reconnect to the Internet.

Smartphones are better adapted for more advanced means of input, such as external GPS and wearable sensors and, of course, smartphone native applications (e.g. GPS, camera, user statistics) can also be used as a means of input for diaries. They are not available on personal computers or useful if the device is not carried around by the respondent all the time.

3. Promoting accessibility

The functionality of the technology should reflect all abilities. When considering different users' experiences with modernized tools, any areas of functionality that may have been overlooked for persons with disabilities should be systematically tested. The following are some examples:

- Consider how screen readers interpret the information on the form. Speech recognition can be programmed for personal computers and smartphones and is native in more recent mobile and personal computer operating systems.
- Apps should function for those who use a keyboard, but not a mouse. Drag and drop and certain hover options are difficult or impossible for keyboard-only users to navigate.
- General design choices for a clear user experience help everyone, including people with dyslexia or visual impairment. These choices include placing as little information as possible and avoiding simultaneous, multiple-field collection on a screen or mobile page.
- When shapes or colours alone are used to convey information to users, this puts respondents with visual impairment at a disadvantage.

- The use of interactive elements as a core standard for data collection should be avoided for persons with cognitive impairment.
- Timelines should be integral to data collection in diaries, and not only in more traditional data-collection approaches.

Survey managers should consider accessibility even when using more traditional forms of collection. Being able to hold a writing implement or telephone (if reporting through an interviewer) might be difficult for those with arthritis. Telephone interviews may exclude persons with hearing disability, unless equipment or help is provided. An online-based tool that is inclusive, allowing for participation using adaptive technologies, may actually enable greater response rates and foster inclusion. These factors show the importance of accommodating mixed modes of data collection.

Some countries, statistical unions and other bodies have developed accessibility guidelines. In the European Union, for example, the Web Content Accessibility Guidelines were introduced in line with the Harmonised European Standard on accessibility requirements for ICT products and services (EN 301 549);[23] New Zealand has an equivalent set of guidelines.[24]

[23] For resources, see Web Accessibility Initiative, "Making the web accessible". Available at www.w3.org/WAI.

[24] See www.digital.govt.nz/standards-and-guidance/design-and-ux/accessibility.

4. Design considerations for digital tools

Hardware and software limitations can affect the design of a survey. The way that respondents interact with an online diary is very different to the way that they interact with an interviewer-based diary or self-administered grid-based paper diary (Stern, Bilgen and Dillman, 2014). This needs to be taken into consideration in the survey design phase. Digitalization is not just about turning a paper survey into an electronic one. In some respects, for mixed-mode data collection, the electronic survey should be designed first, and the paper form produced as a by-product.

Significant testing across the most common operating systems, devices and platforms is required to ensure that the survey is displayed and performs as designed. If respondents experience performance issues and/or difficulties, they may not complete the survey.

An online tool should keep the respondent engaged. How the page sends and receives information affects the user experience. The following are some examples of considerations that survey teams should explore with their information technology departments:

- How often should the tool save or send data? If the last few responses – perhaps one episode with two activities and three context questions – are saved and submitted before moving on to the next, this reduces the chance of losing a great deal of data entered if the device loses connectivity or the website times out. However, if each entry is submitted individually and respondents have to wait for a page to load, this can also cause frustration.
- After how long a period of inactivity should the application time out, requiring the user to log back in? When determining automatic time outs (for online and mobile tools), the potential exposure of personal data must be balanced against the needs of people who take more time to complete the survey.

Some of these considerations may affect the expected costs for server usage during collection. Many respondents will typically log on to the tool at peak times.

There are several free, proprietary software solutions for designing CAPI and conducting CAPI data collection. These include the Census and Survey Processing System, ODK, Survey Solutions and Blaise. Using open-source software lowers software costs, reduces application development and testing time, avoids vender lock-in and facilitates scaling.

Box IV.6
Privacy and data protection in digital modes

While NSOs have experience in protecting data privacy, the use of digital modes poses additional data protection risks that need to be addressed.

The principle of "privacy by design" dictates that instruments were developed to protect privacy from the start (see chapter III). It is relevant, in particular for CAWI, regardless of whether web-based or app-based tools are used. Devices used by interviewers for CAPI should also provide privacy by default, but the data security features of an app may also be covered in interviewer training. Respondents who complete a survey on their own are less likely to understand and be able to manipulate the security settings. Tools should, therefore, be configured so that the highest privacy settings are automatically enabled. Users should be able to lower the privacy settings, but this should require proactive steps.

Electronic data are vulnerable on the device in which they are entered and stored and during the transfer process.

- **Devices.** CAWI tools should offer some form of protection, so that users may only gain access with a unique user identifier or link, or a user login and password. It is important to remember that CAWI tools may be completed on shared devices and are vulnerable to theft. CAPI devices should be password-protected; it should be possible to erase them remotely if they are lost or stolen. Enumerators should transfer data from the devices frequently to minimize the data stored on the device.
- **Transfer and storage.** Data transfer should be encrypted. Once transferred, data should be stored on a secure server, in line with the NSO data security protocols.

Digital data collection and storage must obviously be consistent with relevant national or regional laws and policies on data protection, such as GDPR in Europe, and the African Union Convention on Cyber Security and Personal Data Protection.

For example, MOTUS,[a] which is one of the CAWI tools for time-use surveys developed by the Research Group TOR, Vrije Universiteit Brussel, has a privacy policy that describes how data from respondents are collected, managed, stored and processed through its services, as well as how the data and privacy are secured in each process. Data collected via MOTUS are stored across different secure servers and digital keys are required to combine these data. In addition, MOTUS can capture location information using sensors in the mobile app to improve the quality of the data. In order to protect respondents' privacy, MOTUS stores only location information during the period when respondents are asked to complete a questionnaire or diary, while they are completing the task or when they enter/exit the specific geographical area.

As discussed above, smartphones and wearable devices make it possible to collect new types of data, such as GPS points, biometrics or photographs. While this may add to the richness of time-use data, the value of these data should be weighed carefully against the privacy and data security concerns. The data might be inherently identifiable, for example the location where a person sleeps at night. The data might not be relating to only the respondent, who has consented to participate, but also others who have not, in the case of photographs. As technology continues to evolve, so will data protection challenges and solutions.

[a] For more information about MOTUS, see www.motusresearch.io.

D. Survey frameworks: illustrative examples

Survey frameworks are the combinations of survey instruments and modes of data collection that are feasible for national-level or large sample data collection. Table IV.4 shows the survey frameworks used by selected countries. Self-completed and mixed-mode diaries are increasingly being offered, but background questionnaires and stylized questions are still largely interview-based.

Table IV.4
Illustrations of national time-use survey frameworks

Type of survey	Mode	Background questionnaire	Full diary	Light diary	Stylized questions
Independent or stand-alone survey	Interview				
	Face-to-face (PAPI	South Africa (2010) Bangladesh (2021)	South Africa (2010) Bangladesh (2021)		
	Face-to-face (CAPI)	Thailand (2014/15) Mexico (2019) Mongolia (2019) Colombia (2020) Argentina (2021) Australia (2020/21) Uruguay (2021)	Thailand (2014/15)	Argentina (2021)	Mexico (2019) Colombia (2020) Uruguay (2021)
	Telephone (CATI)	Canada (1986, 1992, 1998, 2005, 2010, 2015, 2022) Colombia (2020) Finland (2020/21) Australia (2020/21)	Canada (2022)	Canada (2015)	Colombia (2020)
	Self-administered Paper				
	Paper	Japan (2016, 2021)	Japan (2016, 2021) Finland (2020/21) Australia (2020/21)	Japan (2016, 2021) Mongolia (2019)	
	Web-based (CAWI)	Japan (2016, 2021) United Kingdom (2020/21) Canada (2022)	Canada (2015, 2022) Japan (2016, 2021) Finland (2020/21) United Kingdom (2020/21) Australia (2020/21)	Japan (2016, 2021)	
	App-based (CAWI)	United Kingdom (2020/21)	United Kingdom (2020/21) Australia (2020/21)	Mongolia (2019)	
Module in a multipurpose survey	Face-to-face (PAPI)	Argentina (2013) Cuba (2016) Dominican Republic (2016)			Argentina (2013) Cuba (2016) Dominican Republic (2016)
	Face-to-face (CAPI)				
	Telephone (CATI)	United States (2003–present) Switzerland (2016)			Switzerland (2016)

Box IV.7
Quality checklist: survey frameworks

- Weigh the cost of building and testing different collection instruments, in particular electronic diaries, against any savings achieved as a result of reduced data-collection efforts.
- Consider implementing electronic data-collection methods to improve accessibility and reduce costs.
- Ensure that there are appropriate security and privacy provisions for both electronic and paper data collection.
- Make the user interface and form completion process more user-friendly, to reduce the cognitive load and respondent burden.
- Plan to build the instrument iteratively, to allow time for usability testing and resulting improvements.
- Consider, if a new data-collection mode is being introduced, selecting independent samples that will be offered each mode, so that statistically valid tests can determine whether there is a mode effect.
- Consider whether to use a stand-alone time-use survey or to include a time-use module in another survey vehicle to maximize participation and reduce the respondent burden.
- Consider the usability and respondent experience associated with diary data-collection instruments. Make use of visual features and layout to alleviate the cognitive load and help respondents to think in a natural way about how they spend their time.
- Consider whether any content included in previous data collections can be removed.
- Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load.
- Consider the data entry and processing requirements for the survey content and the impact on timely data dissemination.
- Consider whether the content is coherent with other data sources available.
- Ensure that data-collection modes are coherent (e.g. paper diary versus electronic diary).
- Consider the comparability of the instrument with previous iterations of the survey and with international time-use surveys.
- Offer different modes to allow respondents to choose their preferred response style.
- Offer interviews at a wide range of times during the day to suit respondents.

V. Sample designs for time-use surveys

A. Standard considerations in sample design for time-use surveys

Most of the issues relevant to sampling for time-use surveys are the same as those for other household surveys carried out by NSOs. In the present chapter, some of the issues that are particular to time-use research will be discussed and some general guidance will be offered.

1. Population of inference

In addition to the standard issues relating to population coverage that are addressed in household surveys, time-use surveys require additional decisions concerning the reference population. The main complexity of sample design in time-use surveys is encountered when incorporating the time dimension in the design. Since people's activities vary by day of the week and season of the year, time-use surveys need to ensure that the sample design provides a suitable representation of the time period for which estimates are required, which is typically the full year.

The population of inference for a time-use survey covering an entire year can be viewed as a two-way grid, with persons arrayed along one axis and days of the year along the other axis, as illustrated in table V.1. The cells in the grid represent person-day combinations. For example, the top-left cell designates person 1 on the first day of the survey year, and the bottom-right cell designates person N on the last day of the year. The collection of person-day combinations or cells may be viewed as constituting the population of inference of the survey. With unlimited resources and a cooperative population of individuals, data could theoretically be collected for all the applicable cells of the grid. In practice, however, only a sample of person-day cells is selected to represent the full population of person-days.

Table V.1
Population of inference for a time-use survey

Person	Day						
	1	2	3	4	…	364	*365*
1					…		
2	X	X	X		…		
3					…	X	X
4					…		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
N					…		

The population of persons to be covered by a time-use survey will change to some extent over the time period of the survey owing to new entrants to or exits from the population. Entry into the population can occur through "birth" (that is to say,

reaching the defined minimum age for the survey), through immigration or through entering the non-institutional population by leaving an institution (for a survey confined to the non-institutional population). A person may leave the population through death, emigration or entry into an institution.

Such changes in the population of inference are shown in table V.1 by the cells in the grid that are marked with X. These represent situations where a person-day is not in the target population. For example, the cells for days 1, 2 and 3 for person 2 are marked with X; this means that person 2 had not been in the target population prior to day 4, but entered on day 4. Similarly, the cells for days 364 and 365 for person 3 are marked with X; this means that person 3 had been in the target population prior to day 364 but left it on day 364 and remained outside the population. It is also possible for an X to appear in the middle of a year, for example when a person goes abroad or enters an institution for a period but then returns to the population at a later point in the survey year.

For some sample designs and forms of analysis, the variation in the composition of the target population over time due to "births" and deaths may be readily accommodated. This variation raises problems, however, for sample designs that involve repeated interviews with sample persons to collect time-use data for several days (in particular when the interviews are widely spaced across the year) and for analyses at the person level, where a person's time-use data for several days are aggregated.

2. Time of year coverage

It is important at the design stage to consider when the survey should be enumerated to capture seasonal variations in activities. For example, the activities undertaken during the cold winter months are likely to be different to those in the warmer summer months, with more indoor activities in winter and outdoor activities in summer. Agricultural activities are also closely linked to the changing seasons, as are home-based craft-making activities for which raw materials are available on a seasonal basis. Ideally, enumeration should be evenly spread across the year to reflect changing activity patterns. Alternatives to approximate 12-month coverage are discussed below, in the present chapter under section C "Technical and operational considerations specific to sampling for time-use surveys".

3. Day-of-week coverage

The duration and frequency of time spent on an activity may vary depending on the time of day, the day of the week or the season of the year. Personal care activities (such as eating, sleeping and housework) are typically carried out every day, but some activities (such as house repair or buying a refrigerator) are undertaken much less frequently. Some people have regular working hours or are in school on weekdays and have weekends off. Many informal sector work activities do not have the same regularity in working hours. Other activities, such as worship, are often organized on a weekly basis and would predominantly occur on a particular day. Based on the survey objectives, decisions will have to be made on the following:

- *Unit of time to be observed*. Should the reference period be a day, for example, or a week?
- *Days of the week*. Should all days of the week be covered? If so, should coverage include each day or is it sufficient to distinguish only between weekdays and weekend days?

The implications of these choices are discussed in chapter II.

4. Age limits

The age limit will depend on the survey data requirements, survey organization guidelines and applicable legislation. Should, for example, the survey exclude those older than the maximum working-age limit? People of retirement age may be excluded from some economic indicators, but their time use is relevant for many health and well-being indicators and social policy. From what age should the survey cover children? It is important to ensure that the sample meets the objectives of the time-use survey. Inferences can only be made in relation to the surveyed population.

If the survey is a time-use module rather than a stand-alone survey, the sample will be dictated by the needs of the base survey. Survey managers may not have any choice about age limits, but they should make sure to explicitly state what they are when reporting the results. If a labour-force survey covers only the working-age population, for example, the survey cannot provide information about older persons, which might, however, be necessary for the survey objectives. Such a survey might provide information on children as recipients of unpaid work, but not as performers of paid or unpaid work. Some countries include children in their time-use surveys to better understand how their time allocation affects key outcomes related to their well-being, including early childhood development, health, educational achievement and gender equality.

In a pilot study conducted in 2016 in Romania, it was found that children 8 years of age or older were able to complete their own diary, or sometimes with the assistance of an adult. Proxy respondents, however, were used for children between 2 and 7 years of age. In Mexico, face-to-face interviews were conducted with children between 12 and 17 years of age in the presence of their parents. Furthermore, in the Plurinational State of Bolivia, a pilot test was conducted in 2019 with children who were 10 years of age or older, and it was found that although minors could provide detailed information, it was not always easy to include them, owing to distrust expressed by their parents or guardians. One of the objectives of that survey was to provide information on the interrelation between market work and unpaid domestic and care work. In addition, the official minimum working age in the Plurinational State of Bolivia is 14 years of age. Taking into account these facts, it was decided that the time-use survey should sample Bolivians 14 years of age or older. For more information on including children in time-use surveys, see chapter II.

B. Analytical considerations in sampling for time-use surveys

1. Number of respondents per household

While all the members of a household are enumerated in background questionnaires, time-use surveys vary in terms of the number of people in the household that must complete the time-use component. Some countries choose one person, while others select every adult or everyone including children. Some select one adult and one child. Examples of the number of respondents sampled per household for some countries are available in the hub. Regardless of how many household members are selected and how they are selected, they must each report on their own time use.

Different objectives may mean different units of analysis and so require different sampling combinations of days and persons. The analytical objectives determine which level of analysis is appropriate: (a) the person-time unit level; (b) the person level; or (c) the household level.

(a) Person-time unit level analysis

Many analytic objectives require only estimates of average levels of time use in different activity categories (and for different population subgroups). This is the case for developing estimates for satellite accounts of household production or for measuring progress on Sustainable Development Goal indicator 5.4.1. For example, the proportion of time that women and men spend on unpaid domestic and care work can be estimated regardless of how the basic unit of time is defined. All that is needed for analyses of average levels of time use is a probability sample of person-days; time-use data for more than one day per respondent is not required. However, if data are collected for more than one day, these data can be readily incorporated into the analysis by constructing a person-day data file, with one record and associated weight for each sampled person-day.

For some analyses, the preferred unit of analysis may be a person-week rather than a person-day. While a reference period of a week may be used in stylized instruments, it is not necessary (or advisable) to do the same in diaries. Instead, a common alternative is to construct a synthetic week based on sampled days, using weighting factors.

(b) Person-level analysis

For some other analytic objectives, the appropriate unit of analysis is the person rather than the person-day combination. For example, an analysis may be aimed at measuring the extent to which the amount of time women with children spend on childcare affects the intellectual growth of their children. Here, the focus is on how the outcome is associated with the variation among individual women in respect of time use, averaged over a period of time, rather than averaged over a group of women at a single point in time. Multiple days of time-use data are, therefore, needed for each sampled person for this type of analysis; a sample of a single day per person is inadequate because of the substantial within-person or intraperson variation in time use from day to day that applies to many activities. Researchers are often interested in issues that require person-level analysis. Such issues may be a lower priority for some NSOs. For most NSOs, the aim of collecting more granular data to be able to account for individual well-being is the greater priority and challenge.

(c) Household-level analysis

Of more relevance to many NSOs is intrahousehold analysis, such as examining the division of labour between couples. This type of analysis, performed at the household level, examines the time use of the household as a whole and the trade-offs between different household members. This helps to explain power and task dynamics within a household. For such analyses, time-use data are required for multiple household members and for the same days.

2. Sample size considerations

(d) Analysis level

For person-day analysis, it can be more efficient to collect multiple days of data per respondent. As with all surveys, multiple related observations tend to be correlated. Collecting data on multiple days per person, or multiple people in a household, can reduce the precision of estimates. As this issue is not unique to time-use surveys, it is not discussed here; it is described in more detail in chapter VI of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*. It is important to remember that in intrahousehold analysis, the unit of analysis is the household, not the individual. The sample size is, therefore, the number of households, not persons or person-days. This may reduce the cost-effectiveness of sampling multiple members per household.

(e) Subpopulations of interest

Another important determinant of overall sample size is often the need for estimates for various domains. Separate time-use estimates are very often needed for different regions of the country, for urban and rural areas, and for a variety of population subgroups. Population subgroups are commonly defined by age and sex, but other subgroups may be of particular interest as well. If a survey objective is to provide information to design family-friendly policies, subgroups might be defined by family structure, for example, number of parents present (single-parent households being different from two-parent households) or age of children. The goal of many surveys is to measure gender disparities, but other disparities may also be important, such as those based on ethnicity, disability status, level of education or income, mobility status or the intersection of several characteristics. In order to conduct a robust analysis that incorporates intersectionality, an adequate sample of people with the intersectional characteristics is required.

The production of domain estimates of a specified precision often requires sampling smaller domains with higher sampling fractions. For geographical domains, the sampling fractions can be set separately to produce the domain estimates. In 2019, Mexico oversampled localities with high levels of Indigenous language speakers to estimate total work time separately for Indigenous-language-speaking and Spanish-speaking women and men.

In most cases, population subgroups cannot be pre-identified for sampling at higher rates. Thus, a two-phase sample design may be needed. In the first phase, a large-scale screening sample is selected to determine subgroup membership. In the second phase, the samples in the smaller subgroups are retained, whereas subsamples are selected from the larger subgroups in order to produce the desired sample sizes for each of the subgroups. Multistage sampling is a common approach for household surveys and so it is not discussed here; it is described in greater detail in the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

C. Technical and operational considerations specific to sampling for time-use surveys

1. Seasonality

In the ideal design for a time-use survey, data are collected over a 12-month period. Sometimes a fieldwork plan can be developed to satisfy this requirement, with, for instance, interviews spread evenly over the 12 months at both the national and subnational levels. However, such a design may not be feasible and will depend on the operational requirements, such as the availability of interviewers, funding and timing constraints. When it is not feasible, the aim should be to approximate the ideal to the extent possible. One alternative is to take a sample of time periods, such as weeks or months, and concentrate data collection in those periods. Strong efforts should be made to choose a set of periods that are representative on average of the full 12 months. The more periods that can be covered, the better. In practice, the number of time periods selected is generally small, say, between two and four, in which case they may be best chosen by purposive selection. Within the chosen months, the sample can be spread across weeks and days of the week, according to the survey specifications.

An unbalanced representation of certain times of the year may result in the overreporting or underreporting of particular activities. It is important that the enumeration dates and any such quality considerations be included in the published survey

documentation so that data users understand the potential limitations of the data. This is standard practice but especially important in the case of unbalanced time samples.

2. Sample selection for online surveys (online only or mixed-mode data collection)

Many countries use multistage sampling for household surveys and create a sampling frame by physically mapping residences. Any country can create a sampling frame in this way. The same is not true for surveys that are conducted remotely, for which a sampling frame with some sort of contact information is required. There are several options for dealing with the absence of a complete sampling frame, which contains the information required to contact respondents remotely. One alternative is to use the sampling frame from another household survey for which contact information is available. It may be possible to use administrative sources to match selected household addresses to phone numbers or email addresses. This is what Canada does. Interview teams can also follow the sampling procedure for face-to-face surveys. During an initial visit, they can collect background information and select household members for the time-use component, giving the respondent the option to complete the survey online. This is the approach used in Japan.

3. Number of persons sampled in a household and number of days collected for each sampled person

Survey managers generally want to achieve as large a sample as possible with the resources available. The least expensive way to increase the sample size of a time-use survey is by (a) increasing the number of persons in the survey (selecting more than one household member) or (b) increasing the number of days each selected person reports on (assigning, for example, a weekday and a weekend day).

NSOs should be familiar with choosing the most efficient cluster sampling design to minimize the sampling errors of the survey estimates for a given budget. In order to determine an efficient design, an evaluation is, therefore, required of the effects on sampling error of clustering the sample of persons within households. This evaluation involves assessing both the effect of weighting for unequal selection probabilities and the effect of cluster homogeneity. For time-use surveys, the household or individual can be conceived of as a cluster.

If it is feasible and consistent with the survey objectives, selecting all eligible persons per household is recommended. In addition to enabling intrahousehold analysis, this makes it possible to cross-check household members' diaries during the data entry and editing phase if information is missing. The household-level burden will be increased, however, as will the complexity of field or data-collection operations. Where all the members of a household are interviewed, they may consider this to be an excessive burden and so may be more likely to refuse to participate than if one or two members had been selected. Selecting two respondents in the household may still support intrahousehold analysis in part, but reduce the collective household burden. If one person is chosen, intrahousehold analysis cannot be undertaken. The division of labour within the household cannot be examined, but an analysis of the gender gap in the division of labour is possible across households.

Box V.1
Sampling in Finland, 2020/21

Sampling frame. The sample was drawn from the statistical register compiled by Statistics Finland. A dwelling unit was formed of individuals with the same address code in the register. In most cases, a dwelling unit was equal to a single household. The dwelling units were included in the sampling frame.

Type of sampling. One-stage cluster sampling was used, where dwelling units served as the clusters and individuals were the elementary units.

Respondents per household. All eligible respondents in the household were selected.

Age limits. Individuals who were 10 years of age or older at the time of the survey.

Time of year coverage. The sample was allocated across 52 survey weeks with a weekly sample of 170 households. The sample was updated four times during the data-collection period (September 2020–September 2021).

Day-of-week coverage. The sample was allocated to survey weeks and diary days uniformly, ensuring that the number of households was the same for each weekday. The weekly sample was portioned out to diary days (i.e. Monday to Friday) with a daily sample of 34 households. In addition to a weekday, the sample was allocated a weekend day, which was selected randomly (i.e. a Saturday or Sunday from the previous or following weekend).

4. Methods for sampling days

There are different approaches that can be used in selecting the reference day or date for which the time-use activities will be reported. This is discussed in greater detail in chapter II.

Designated day

One method for sampling days is for selected households to be allocated a particular day (or days) of the week. Regardless of when contact is made with the respondents, they will be asked to complete the diary for the allocated day (the previous day in retrospective surveys or the following one in prospective surveys). This approach ensures that the right distribution of days will be achieved. Some countries, for example Australia and Chile, allocate diary dates to selected households.

Another approach is to contact the households in advance to complete the background questionnaire, that is a few days before the allocated diary commencement date, so that respondents are prepared and ready to commence the diary on their designated day. This approach relies on contact being made ahead of the diary commencement date. If not, the household is treated as a non-contact. Close field management is required to ensure that non-contact is minimized. The expected degree of non-contact should also be considered at the sample design stage, so the sample size can be adjusted accordingly.

When choosing a designated date approach, non-contact may be higher if communication is not established with respondents ahead of their allocated diary commencement date.

Yesterday

In the yesterday approach, households are not assigned to a specific day, but rather report on the day before the survey. The field phase when using the yesterday approach

needs to be managed carefully to ensure that there is an appropriate representation of days across the week. This may require interviewers to work on days that are generally treated as non-workdays, such as Saturdays and Sundays.

Convenience day

If the survey is in the field for an extended time and the survey manager is confident that a good distribution of days can be achieved in that time, the reference day can then be aligned with when the background questionnaire is completed. For example, if the background questionnaire is completed on a Monday, the yesterday diary or stylized questions can refer to the Sunday, that is to say the previous day. If, however, the tomorrow approach is being used, the respondent is instructed to complete the instrument for the next day, that is the Tuesday.

Survey managers must be confident that a suitable distribution of days will be achieved and that there are no biases associated with different days. For example, in households where the occupants are at work from Monday to Friday, interviewers may only be able to make contact with them at the weekend. That means that if the yesterday method is used, there will be a higher representation of Fridays and Saturdays among the employed group.

Substitute or postponement day

The unavailability of respondents on designated days poses the problem of whether to substitute days. If substitute days are allowed, this could reduce survey non-response. Survey managers will need to consider the approach for dealing with respondents who wish to alter their allocated diary dates, who forget or otherwise fail to complete the diary on the designated day or for whom contact could not be made ahead of the allocated day.

If respondents feel that the designated day is unsuitable, they may simply not respond. Whether or not a substitute day is selected should not be left to the discretion of either the interviewer or the respondent, as this might affect the sampling design and introduce bias. If respondents are allowed to select the day, they may choose a "less busy" day to reduce the burden of completing the diary or they may choose a day when they were engaged in more socially desirable activities.

To maintain the representation of days in the sample and avoid bias, it is advisable to select the same day the following week (i.e. a postponement day). If this is not an option, empirically similar days may be substituted. These may be weekdays for weekdays, or weekends for weekends.

If the initial diary day is not suitable, it is preferred that a postponement day is used rather than a substitute day.

D. Sampling for time-use data collection in multipurpose surveys

When using a sample designed for another household survey, careful consideration is required to ensure that it aligns as closely as possible with the time-use survey requirements. The sample requirements include the age of the respondents, number of people selected per household (e.g. all adults, one randomly selected adult) and geographic coverage (representative of urban and rural areas), among others. The enumeration profile of the base survey vehicle may have an impact on the time-use survey requirements, such as the length of time in the field, follow-up, requirement for interviewers to return to the household to collect diaries and the ability to achieve a representative distribution of days, seasons and holidays. Another major concern is whether it is possible to create an efficient dual-purpose sampling design in which the

objectives of the time dimension are properly represented. Given that this sampling design typically reflects the objectives of the base survey, it will help if the time-use module has matching objectives. Few other household surveys need to spread their data collections over a 12-month period – or over any period – in a balanced way in the same way as time-use surveys.

Representing the time dimension appropriately in a combined survey usually requires modifying the data-collection procedures that would be used for the base survey if it were a stand-alone survey. Since the modification will almost certainly impose restrictions on the timing of interviews, it will increase the field costs. It may lead to a lower response rate for the combined survey than would be achieved if the other survey was conducted alone.

A time-use survey will most readily fit together with another survey that also involves spreading data collection over time. The other survey may itself require a similar representation of the time dimension as, for example, is often the case with a nutrition or household budget survey. The main concern here is that of the response burden. The response burden in such surveys is often substantial so that, when combined with the high burden of a time-use survey, the overall burden may become excessive and affect quality.

Another type of survey that involves data collection over time is a continuous survey that is repeated at regular intervals to chart changes in population characteristics over time. A labour-force survey is the most obvious example. If a continuous survey is conducted at short intervals, say, monthly, it may give a good representation of the time period. Even a quarterly survey may give adequate time representation. If a continuous survey is used, the issue of selecting the days for collecting time-use data within each round of the survey will still need to be addressed. Other challenges are relating to the number of respondents per household that will participate, the type of respondents (with proxy respondents being common in some surveys) and the age of the target population, among others.

If a time-use survey is to be combined with a single cross-sectional survey, the timing for the combined survey is an important consideration. Can data collection for the combined survey be conducted during a period that is thought to be reasonably "typical" for a year? If it can, then issues of arranging the data collection to give proper representation to days and perhaps weeks for time-use data across the sample will need to be resolved. Given the high response burden involved in collecting time-use data, combining a time-use survey with another survey that has a low burden is preferable, other things being equal.

Key areas of compatibility that should be assessed when selecting the sample design from available parent surveys or evaluating the feasibility of including a time-use module in a particular parent survey include:

- Temporal coverage
- Reference periods and diary days
- Target population
- Respondent selection

Temporal coverage

The temporal coverage of the parent survey may form a key consideration when assessing the options available for modular time-use measurement. As discussed earlier, while deviations in practice are not uncommon, owing to practical considerations, independent time-use surveys are ideally organized over the 365 days of the year on

a continuous basis. This design makes it possible to generate indicators at the activity domain level that account for seasonal variations in participation, volume and intensity over the course of a calendar year. It also (ideally) negates or (at least) minimizes reliance or dependency on model-based assumptions to support "satellite" or "extended" valuation exercises, whereby non-market orientated "productive activities" accorded shadow monetary values are analogous to gross domestic product contributions.

In practice, however, this design feature (continuous sample distribution across the 365 days of the year) may be absent from, and implausible to implement in, candidate parent surveys. In this scenario, it may be necessary to compromise on the temporal coverage of the time-use component to consider (in order of preference, based on sensitivity to seasonal effects) candidate surveys with (a) monthly, (b) quarterly, (c) biannual or (d) annual/less than annual temporal coverage.

While this consideration is not unique to modular time-use measurement (the same considerations will often apply to independent time-use surveys in more resource-constrained contexts), it may serve as a decisive factor – all else held constant – in ranking exercises to select candidate parent surveys for modular time-use measurement.

Reference periods and diary days (including number of diary days)

A second temporal consideration relates to the compatibility of the parent survey and time-use module reference periods. The relevance of this consideration is amplified for light diary or stylized formats based on an actual 24-hour reference period, in particular in contexts where face-to-face interviewer-administered survey modes are favoured.

As discussed earlier, this design feature implies the randomized pre-assignment of each sample unit to one or more designated "diary days". The random assignment of respondents to designated diary days directly conditions the survey participation day (i.e. the day immediately following the diary day).

While it is relatively straightforward to extend the sample design of a parent survey to obtain a probability sample of days of the week (supported by adjusted sample weights), the designation of a specific diary day presents challenges for survey operations. Maintaining the same sample design as the parent survey increases the time and effort required to obtain a complete response, since a proportion of sampled individuals will be unavailable, unable or unwilling to participate in the survey on their assigned day.

This feature of time-use design can present a particular challenge for modular time-use measurement, thus posing risks for data quality, by introducing or increasing non-response bias. In a modular design, this could undermine response rates for the parent survey as well as the time-use module.

Given that response rates for time-use surveys tend to be lower than those of other nationally representative household sample surveys, in this scenario, semi-separate administration of the time-use module may serve to insulate the parent survey from this heightened risk.

Target population (and eligibility criteria)

The target population and eligibility criteria for the parent survey may deviate from that preferred for the time-use component. Nationally representative household surveys will typically specify the target population as being the resident population of the country living in private households (therefore excluding persons who reside in collec-

tive or institutional settings). This will normally be compatible with general population time-use content, although there may be instances where the target populations deviate.

In addition, the parent survey may set eligibility criteria for some, or all, of the core survey content. In scenarios where the standard eligibility criteria for the parent survey are too narrowly bounded to support the measurement objectives for the time-use content (e.g. regarding lower/upper age limits), adjustments may be considered on a limited basis. A key consideration will be the extent to which widening the eligibility criteria for the time-use content can occur in isolation, that is without imposing a parallel expansion of the eligibility criteria for the parent survey as a whole.

While the basic demographics of all the members of the households surveyed will be recorded in the parent survey household roster form, more detailed information at the individual level will be limited to that which meets the parent survey eligibility criteria. In such cases, expanding the eligibility criteria may not be feasible owing to logistical and/or variable cost constraints.

Respondent selection (within household)

In section B, subsection 1 "Number of respondents per household" above, the within-household sampling strategies that are available for time-use surveys are described, as well as the trade-offs associated with each of them in terms of sampling efficiencies, measurement objectives, analysis capabilities and variable costs. In the most comprehensive within-household respondent selection scenario, all eligible household members complete the time-use content. In the lightest scenario, a single, probabilistically selected, eligible household member completes the time-use content. Between these poles are alternative scenarios in which multiple household members are probabilistically selected.

In a modular approach, within-household respondent selection will usually require scrutiny and careful planning at the design and budgeting stage. While not an obvious feature that can result in incompatibility, an important consideration is whether, and to what extent, the parent survey utilizes proxy reporting to collect data at the individual level. Proxy reporting refers to situations in which individual data are reported indirectly. Usually, this means that one "reference person", chosen for convenience, provides information for all eligible residents within their household. The suitability of using proxy respondents, as opposed to direct respondents, varies depending on the survey topic. For some topics, including time use, proxy reporting is generally regarded as unsuitable. Exceptions, however, may be made for young children or other persons who are unable to report directly themselves.

Where a candidate parent survey is characterized by the extensive use of proxy reporting, the addition of time-use content has the potential to inflate the variable costs by intensifying and/or extending the data-collection period, especially if coupled with the probabilistic assignment of respondents to days of the week, as discussed above. In this context, several factors, including the size and composition of the household and the accessibility/cooperativeness of eligible persons, may prove decisive in determining the feasibility of a particular within-household respondent selection scenario. However, this decision may also by limited by the reporting approach used in the parent survey.

Box V.2
Quality checklist: sample design

- Consider the representativeness of the enumeration periods across the year (seasons, holidays, school terms).
- Understand the implications of the timing of different aspects of the data-collection process, such as the length of the enumeration period, the lag between completion of the background questionnaire and the time-use component, and whether and how to allow the substitution of designated days for a selected household.
- Consider how many days respondents will recall and how much information is collected.
- Consider the population required to meet the data needs (one adult or every adult in the household), whether children will be included and the age at which a respondent is treated as an adult.
- Consider the number of diary days on which data will be collected from each respondent while balancing the respondent burden against any improvements in accuracy.
- Consider, if a new collection mode is being introduced, selecting independent samples to offer each mode, so that statistically valid tests can determine whether there is a mode effect.

Part III.
Collecting and processing time-use data

VI. Enumeration procedures for time-u se surveys

Basic considerations in the design and implementation of field procedures for conventional household surveys apply to time-use surveys as well. These include pretests and pilot tests; survey publicity; field organization and recruitment of interviewers and supervisors; training and supervision of field staff; determining workload and remuneration; interview scheduling and procedures; quality control over fieldwork; control of non-response; and considerations regarding the use of incentives for respondents.

In the present chapter, some of these aspects are discussed as they relate specifically to time-use surveys. Of special concern are the known difficulties in inducing respondents to accurately describe their activities and in translating these verbal descriptions into the chosen classification system. Time-use surveys typically involve a household questionnaire and a personal questionnaire or diary, sometimes for multiple household members or multiple days. This may lead to a high respondent burden and refusals, which may in turn jeopardize the quality of data. However, willing respondents should not report on the time use of another household member who has not consented to participate. Only in exceptional circumstances, or for young children, should proxy respondents be allowed. If interviewers are used, they may have to make multiple visits to households on specified days to collect all the required data.

A. Main considerations in planning field procedures

Interviewers and their supervisors are critical to the success of data collection in interviewer-administered surveys and should thus have appropriate training and be provided with effective tools to complete their tasks. The amount of training to be given depends on the complexity of the survey and the background and experience of the field staff with surveys in general, and with time-use surveys in particular. Even enumerators with extensive survey experience who have not conducted time-use surveys before will need thorough training in the time-use instrument, as the process of eliciting accurate information is less structured and more like a conversation than in many household surveys. Recommendations on training practices for household surveys are found in several United Nations publications.[25] Training for time-use surveys should additionally cover how people remember and report their time, probing techniques and, for stylized questions, how to aggregate time over multiple episodes of an activity.

[25] See, for example, United Nations (2008).

Other difficult tasks such as sampling of respondents and maintaining the required allocation of reference days should be covered in training. These processes may be different from other surveys in which enumerators have participated, and may determine the quality of the survey.

Detailed instructional and training materials must be developed for supervisors and interviewers. Instruction manuals, coding tools, survey instruments translated

into local languages, home study materials and materials for group training are the basic types of materials usually needed by the field staff.

Prior to training, all field staff should be required to complete their own time-use diary or stylized questionnaire. They should also be asked to complete diaries or questionnaires with household members, friends or others, so that they understand the issues experienced by respondents with different time-use patterns from their own. These completed instruments can then be brought to the training sessions and used as a basis for discussing the difficulties and problems involved in collecting time-use data and for coding and editing exercises.

Field staff should also be trained so that they can properly respond to questions raised by reluctant respondents. In discussing the importance and uses of time-use data, various responses may need to be prepared depending on the characteristics of the respondents, for example whether they are families with children, older persons or young people, or people from lower or higher socioeconomic classes. In its 2017 survey, the National Institute of Statistics and Censuses of Costa Rica found that interviewers did a better job after being trained on gender and human rights, as well as on using the survey tools. The gender and human rights training helped them to better understand the purpose of the survey and explain it to respondents, and also encouraged interviewers to take more care when dealing with difficult areas, such as simultaneous activities.

Interviewers should have a good understanding of how people normally report their daily activities, the difficulties in translating these verbatim reports into the diary or stylized question format and the errors that may arise when activities are not recorded accurately. Training should include intensive practice sessions for both interviewing and coding. Collecting time-use data, whether in a diary or through stylized questions, requires more going back and forth with respondents than many structured surveys. Interviewers who are accustomed to simply reading questions and recording answers might be uncomfortable engaging in conversations with respondents, asking probing questions to elicit complete descriptions or correcting the order of activities. Practice interviews should include not only mock interviews designed for illustrating specific situations, but also actual field interviews. Box VI.1 provides an explanation of the approach that was used to build rapport with respondents in Bangladesh.

Box VI.1
Building rapport with respondents in the 2021 Bangladesh time-use survey

At the training session for its 2021 survey, the Bangladesh Bureau of Statistics placed special emphasis on building rapport with respondents. Interviewers were instructed to use the local language so that respondents could easily understand and communicate. Interviewers were encouraged to behave positively under all circumstances. They began each interview by introducing themselves and describing the objectives of the survey to the household members. If any household member showed reluctance to participate, the interviewers tried to persuade them by explaining the usefulness of time-use data and how the data would benefit them as well as the country, including by helping policymakers to design specific laws, policies and programmes to address unpaid care and domestic work. During the informed consent process and throughout the interview, interviewers guaranteed that responses provided would be treated as confidential.

B. Field procedures for interviews

Face-to-face interviews, whether using paper or electronic devices, continue to be the main form of data collection in many low- and middle-income countries, as well as for subpopulations with limited literacy, numeracy or access to the Internet. Interviewers can correctly record what respondents tell them as they do in any survey. They can also help respondents to remember and report their activities accurately, which is one of the specific challenges of time-use surveys.

1. Understanding how people report their daily activities

One way to help respondents to recall their activities on the reference day is to start with some context-setting questions. These context-setting questions are part of the process of building rapport with respondents. In its first national diary survey in 2021, Argentina found that interviewers who were comfortable adopting a less formal, more conversational tone often elicited more information. Interviewers can employ the interpersonal communication skills that they practised in training to ask appropriate context-setting questions. In the case of diaries in particular, but also stylized questions, it can be useful to ask what time the respondent woke up, ate meals or was at work or school, if relevant. These activities tend to occur at regular times and other activities are often structured around them, so they are called "anchor points". If respondents have trouble recalling how long an activity took, the interviewer can help them to locate the start and finish relative to the anchor points, by narrowing down the time window.

Another context-setting question, which is also useful for the analysis and interpretation of results, is whether the reference day was a normal day and, if not, what happened out of the ordinary. This can explain unexpected activities that might otherwise be considered errors, such as sleeping for over 12 hours. In the interview, it can help respondents to focus on the particular reference day. Thinking about whether anything unusual happened can refresh their memory of the whole day, as can asking about other small details.

Encouraging respondents to remember and report their activities in detail, including irregular or simultaneous activities, is a challenge with time-use surveys. The greater the detail, the greater the cognitive burden and the longer the interview lasts. If respondents feel under pressure, or that the interviewer is becoming impatient, they may be more likely to skim over activities or report less precisely in order to finish more quickly. In the 2021 survey in Bangladesh, interviewers were trained to keep respondents engaged in the questions. They were encouraged to use different kinds of probing or follow-up questions to obtain complete information. Small interview breaks sometimes helped respondents to recall events to respond to difficult questions. The Bangladesh team also found that women were sometimes reluctant to speak freely about their activities if someone else was present. Although it was standard procedure to discourage the presence of a third person during interviews to maintain the respondent's privacy, the COVID-19 safety protocols requiring physical distancing was a further justification for doing so.

2. Measuring time without a clock

In some societies or areas of a country, people may relate their activities not to clock hours but to other "markers", such as fluctuations of nature (sunrise, sunset), religious activities during the day (calls to prayer) or other traditional cultural practices, productive activities, schedules of daily radio and television programmes, and routine

activities included in their daily schedules. In order to collect time-use data in such societies or households, survey designers need to give special attention to translating the local perception of time into a standard 24-hour timetable. In this case, it is necessary to understand how the society identifies the hours of the day and how its members calculate the amount of time it takes them to perform an activity. This understanding of time can be integrated into the time diary and used to develop individual question and answer codes. Table VI.1 illustrates how time markers used by local households were translated into hours in a study in southern Ghana (Grosh and Glewwe, 2000).

It is also necessary to determine how respondents might answer questions regarding the duration of an activity, such as "How much time did you spend fetching water?", and how to convert certain answers into time, for example what it would mean for a given activity to have taken "all morning" to be completed. Interviewers must be trained on standard conversions to minimize subjective interpretations.

Table VI.1
Illustration of time terminology and corresponding "clock time"

Standard time	Time indication used by farmers (English translation)
Midnight	Deep darkness
1 a.m.	First cockcrow
4.30 a.m.	Third cockcrow or inability to recognize other faces
6 a.m.	Morning
6.30 a.m.	Farm-going period or day is on
9 a.m.	Sky is dry
10.30 a.m.	Sun about to be still
Noon	Sun still
1 p.m.	Sun turning
2 p.m.	Sun has turned
3 p.m.	Closing time
4 p.m.	Palm wine tapping period
5 p.m.	Sun about to set
6 p.m.	Sunset
7 p.m.	Sleeping agent
9 p.m.	Day is over
11 p.m.	Night is advanced, town is dead silent

Source: Grosh and Glewwe (2000).

Since the literacy rate in some regions of Bangladesh is low, in particular in rural areas, it was thought that it would not be feasible to use short time intervals in the Bangladesh Bureau of Statistics diary. It was thus decided to use a 30-minute interval instead. Respondents could report up to three activities in an interval. The diary began at 4 a.m., when most people were sleeping. The majority of the population is Muslim and even those who are not can hear the regular calls to prayer. People may relate their morning activities, such as waking up, self-care and religious activities, to the call to prayer. Interviewers helped respondents to divide the day around such events as sunrise, sunset, work times, prayer times, television programmes, natural or weather changes or their habitual breakfast, lunch and dinner times.

3. Probing techniques

Certain types of activities tend to be underreported in both diaries and answers to stylized questions, in particular activities that are brief or that are done passively or while doing other activities. Probing questions can help respondents to remember activities that they may have forgotten (see chapter II). As a key objective of all time-use surveys is to measure unpaid work, including care, it is recommended to ask probing questions about simultaneous activities, or even specifically about care, to all respondents. Box VI.2 provides some examples of probing questions used in Bangladesh, Colombia and Paraguay. These questions can be included in both interviewer-administered and self-administered surveys. Mexico includes a question about childcare that is similar to the one used by Paraguay, but it does not collect data on other simultaneous activities.

Box VI.2
Examples of probing questions

- **Probing question at the end of the diary used in Bangladesh in 2021**

  Did you spend time taking care of children/an older person/person with a disability or a sick person?

  Yes, but not filled out properly or not mentioned all...1

  Yes, mentioned all the time…2

  No...3

  If 1, please go back and fill out the time diary again using the asterisk symbol.

- **Probing question after every activity in stylized instruments used in Colombia in 2012/13 and 2016/17**

  Of the activities you undertook on [...], did you do some of them simultaneously?

  Yes, if so, which and for how long?

  No.

- **Probing questions at the end of the section on care for other household members used in Paraguay in 2016**

  1. During the past week, did you provide care to any household member who is subject to permanent dependency and difficulty, while doing other things?
  2. During the past week, did you look after any household member who is 5 years of age or under while doing other things?
  3. During the past week, did you look after any household member between 6 and 14 years of age while doing other things?

Other probing questions are more individualized and thus better suited to interviews. These techniques can help respondents who have trouble reporting detailed descriptions and specific activities or who report activities that are inconsistent (e.g. incompatible or overlapping). In comparison with most structured questionnaires where interviewers stick closely to a script, a time-use interview can be more like a conversation. Interviewers often need to ask follow-up questions in order to correctly classify activities, but they need to do so in such a way that respondents do not feel that their privacy is being invaded or become suspicious.

4. Field checks

Certain checks can help to improve quality assurance before the time-use questionnaire is finalized. Digital tools can be programmed to perform automatic checks if probable errors are detected. Interviewers can do checks and respondents can also be asked to carry out limited checks of self-completed diaries. If the diary or stylized questionnaire fails these checks at the time of the interview, and the respondent is cooperative, the enumerator can go back through the instrument and attempt to add activities or correct time estimates as needed.

Some basic checks include:

- Ensuring that the instrument contains at least 12 hours of activities, excluding activities not specified. Instruments should cover 24 hours, but respondents may choose not to report activities in specific time slots. See chapter VII for the thresholds that various countries use to determine whether a day is complete enough to accept.
- Ensuring that the instrument contains at least three activities (for stylized questions) or three activity episodes (for diaries), excluding activities not specified.
- Making sure that no essential activities are missing, such as eating or sleeping.

Some checks specific to diaries include:

- Ensuring that there are no time slots without activities (if fixed intervals) or gaps between the end time of one activity episode and the start of the next (if open intervals).
- Making sure that simultaneous activities are recorded (if the instrument was designed to collect data on them).
- Ensuring that the instrument includes appropriate contextual variables (e.g. location or mode of travel, with whom, for whom, use of ICTs).

Some checks specific to stylized questionnaires include:

- Making sure that the total number of hours reported does not exceed (by much) over 24 daily hours or 168 weekly hours, except for simultaneous activities, such as supervisory care. There may also be a time counter that serves to report cumulative time as each question is answered, rather than only at the end.

C. Design and administration of digital and mixed-mode data collection

Field procedures are determined by the type of survey, mode of data collection, survey instruments and sample design. In this section, the enumeration procedures for digital and mixed-mode approaches are highlighted.[26]

[26] Countries in which face-to-face interviews are conducted using paper forms are encouraged to refer to the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

1. Identifying respondents and scheduling data collection for computer-assisted web interviewing

Initial communication may be more challenging with modernized time-use data collection if email address lists are unavailable or Internet access is restricted. Very few countries have a sampling frame that includes email addresses. Some online survey programmes continue to reach out to the members of a household using their address, before providing them with login information, thus bypassing the requirement for an email address or even permanent Internet access. Initial contact may be made by post-

ing a letter to a physical address or by visiting the household. Letters require less effort but are also associated with lower response rates. If a sampling frame includes phone numbers or email addresses, they can also be used to make contact. In Canada, initial contact with households to be sampled is made by letter, but respondents are invited to participate in the time-use survey by email or phone. In both Japan (2021) and Mongolia (2019), enumerators visited households and conducted background surveys in person. They then gave respondents the option of completing a paper or a web-based diary. Most developing countries use household visits as a first point of contact.

2. Anticipating technology challenges

There are potential technology-related challenges during enumeration. If digital modes are used, it is presumed that respondents have adequate access to a device and the Internet. Even if respondents (in the case of CAWI) or interviewers (in the case of CAPI) normally have access to the technology needed, contingency plans should be made to deal with the possibility of a lack of network services, technical failures, the loss of mobile devices or other circumstances that could prevent the survey from being completed on a mobile device. Unlike most other surveys, a time-use interview team cannot just postpone a field visit by a day (see chapter V for a discussion on how to accommodate schedule adjustments and assign postponement/substitute days). For self-administered instruments, broken links or changes in the look and feel of web pages can also confuse respondents. Given that most surveys do not take place over a long period of time, changes in operating systems are not normally a concern. The likelihood is greater, however, with time-use surveys conducted over a year, which means taking into account possible updates or upgrades. Digital tools should also be functional on earlier operating systems, as participants may not have access to the latest devices.

Other technology-related challenges include accessibility considerations when using online tools and data protection requirements to make sure that individuals' access is specific to them and their data cannot be seen by others. This is the case if all the members of a household provide their individual information. These issues are discussed in chapter IV.

D. Coding

The process of coding responses is only relevant to diaries, as in stylized questions respondents are asked about specific precoded activities or groups of activities. That said, a coding index and coding rules are required for all types of instruments. This is because a coding index is necessary for the following:

- Developing stylized questions or categories for self-administered instruments.
- Programming automatic checks or question flow (e.g. different follow-up questions depending on a response) in digital instruments.
- Coding on the fly. When asking stylized questions, interviewers also need to be able to tell respondents whether their activity is in line with the definition.
- Aftercoding free-text diaries.
- Classifying or editing, in particular of self-administered instruments or diaries that are coded on the fly.

Coding rules should:

- Consist of a basic set of instructions on how to apply tools for coding and what actions to take when situations arise that are not covered by these instructions.
- Be easy to understand and be applied consistently, regardless of who does the coding and when.

1. When to code: on the fly versus aftercoding

When collecting time-use data in a respondent's own words (verbatim), activities can be aftercoded or coded on the fly. With digital tools and some paper diaries, activities are coded on the basis of a list of activities or classification of activities by interviewers at the time of the interview or self-coded by the respondents (usually using an abbreviated list). This is known as on-the-fly coding, and it is part of the enumeration process. In aftercoding, activities are coded as part of the data-processing phase, usually by a centralized team of coders or experts, but the process may also be decentralized.

However it is done, coding requires the development of an appropriate coding index for activities and for contextual information. Provisions for developing and testing the index must be built into the survey timetable. The coding index and coding rules should be developed in parallel with the data-collection instrument. Coding rules also need to articulate the use of residual categories for unidentifiable or hard-to-code responses.

(a) Aftercoding

Aftercoding occurs when information that is collected in a respondent's own words is coded at a later stage by experienced coders who choose codes from a coding index. This is the usual coding process for paper diaries and sometimes for other modes (e.g. self-completed electronic diaries with free-text fields).

In manual coding, a coder reads the activity description and selects a code. Manual coding is described extensively in the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*. An alternative for digital data collection is to use an automatic or semi-automatic coding tool to select the relevant code from the coding index. Automatic coding reduces the potential for bias in the interpretation of responses.

Automatic or semi-automatic coding may, however, be supplemented by manual coding. It is possible to record the verbatim information provided in diaries as well as the code selected or to record only the code chosen by the coder. The first option is more expensive, but means that the text can be used during the editing phase (Italy is an example of a country that uses this option for its time-use survey). It is also important to consider the value of manual coding if it is carried out to supplement automatic coding. When automatic coding is supplemented by manual coding, the value of manual coding is often limited. However, when activities cannot be coded automatically, because they may not have been reported in enough detail to be coded reliably, manual coders can fix data entry errors that prevent automatic systems from assigning a code or review assigned codes.

In order to ensure identical work habits, aftercoding should preferably be arranged centrally. Bangladesh used this approach for its 2021 survey, by employing a team of five coders. If central coding is not possible, consistent training and supervising of the coding staff are crucial. If a system is in place for sharing more complex coding cases by email or a central help desk is available, this can also support the consistent application of coding rules. Aftercoding, in all cases, is constrained by the

description provided by respondents, which may be lacking enough detail to allow for the correct assignment of a code.

(b) On-the-fly coding

On-the-fly coding is when the respondent or interviewer codes the respondent's activities directly on the basis of the survey categories. This is one of the methods used for self-completed electronic diaries. In chapters III and IV, the different formats for providing instructions and helping respondents to correctly code their activities into the categories are discussed. In interviews, respondents describe the activity in their own words and the interviewer selects the correct code from an activity list, or uses an activity classification provided by the tool. This type of coding process allows interviewers to confirm their understanding of the meaning of the activity by asking the respondent directly, if there is any doubt.

In the past, one drawback of coding on the fly was the lack of a paper trail, in case something needed to be checked against the questionnaire. Given the coding software and capabilities that now exist, the ability to code on the fly should pose fewer risks than in the past. As-you-type lists enable respondents to be more specific; robust coding indexes using open-source or well-established coding software or web services can make coding on the fly very efficient, and it can be done on any device. There are sufficient metrics/analytics that can be used by the tools to mitigate the loss of a paper trail.

Even surveys that are coded on the fly will require some aftercoding if there is a free-text "Other, specify" category. Aftercoding is covered briefly in chapter VII, and more extensively in paragraphs 449 to 473 of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

2. Developing a coding index and procedures

Coding affects the quality of time-use survey data and the usability of the results, owing to the multiple dimensions referred to in the diary activity descriptions. To produce high-quality data, a coding index and procedures are required to harmonize coding techniques and ensure identical work habits. A coding index is a key document that serves as the basis for translating activity descriptions into the appropriate codes, as defined by the survey activity classification. The coder is guided by the coding index, which contains information (e.g. keywords) that can be found in the responses. The coding index indicates how different responses are coded in detailed or more aggregate classifications, depending on the nature of the information in the response. A coding index can also contain spelling variations. Coding tools have the functionality to apply filters, character or word replacement, as well as fuzzy or exact matching. New Zealand is an example of a country that has developed a coding index, which is maintained by Statistics New Zealand and used by a web coding service.

Figure VI.1
Statistics New Zealand's concept and classification management system

In the past, coding was one of the most expensive and time-consuming processes involved in time-use surveys. Data-processing experts had to collaborate with subject-matter analysts to formulate the coding rules and construct the coding index, and insert them into the processing procedures and system. Today, the wording in the minimum harmonized instrument activity list serves as a starting point for a coding index, saving considerable time for statistical agencies embarking on their first survey or wanting to produce internationally comparable data. The coding index should be adapted to the way people describe their activities in a particular setting. It should be possible to update the index, instructions and procedures, not only in future surveys, but also in the field as the survey is conducted. With digital tools, in particular light diaries with limited activities in drop-down menus, on-the-fly coding can greatly simplify the process.

In order to correctly assign a code, it is very important to accurately understand the context in which the activities took place, and the sequence, purpose, place and time of the day, week or season in which they took place. The coding rules should reflect the survey objectives. For example, the 2021 survey on time use and on leisure activities[27] conducted in Japan was designed to provide information for formulating "policy aimed at promoting better work-life balance, maintaining a vital aging society, improving the childcare environment, facilitating gender equality, etc., taking the current social background (e.g., aging society with fewer children, and diversification of lifestyles) into account".[28] The concern was, therefore, not only with measuring paid and unpaid work, but also with accurately capturing participation in sports, as well as cultural and other activities, and with understanding time spent on travel and sleep.

Training on coding should be timed to take place as closely as possible with the commencement of survey processing. There should also be refresher training, as well as periodic coding meetings regarding modifications to the coding list, addi-

27 Although data on time use and leisure activities were collected during the same period, the results were tabulated separately.

28 Statistics Bureau of Japan, "Outline of the 2021 survey on time use and leisure activities". Available at www.stat.go.jp/english/data/shakai/2021/gaiyo.html.

tional rules and examples, or problems that have arisen. For specific queries, it is best if the coders can receive prompt answers. Query resolution, however, often requires subject-matter expertise and an immediate response may not always be possible. It is important to embed any determinations into the coding rules or index and make them available to the entire team of coders, and data collectors if appropriate.

Decisions made about coding will influence international comparability. To improve comparability, the coding solutions should follow similar rules, and categories should be interpreted in the same way.

E. Coding rules

The coding of most activities is relatively straightforward, but there are many situations in which the correct code is not obvious. Sometimes the consequence of coding an activity as one thing or another will be minor. This is especially true when choosing between two three-digit codes in ICATUS 2016, as the results are often reported at the major division level or division level and the three-digit activity codes would therefore be aggregated into the same category. However, at times choosing one activity code over another could have implications for the survey objectives, such is the case of activities that may or may not be correctly classified as unpaid work.

As the experiences of some countries have shown, there are several scenarios in which coding has proved to be challenging. These challenges can be described as follows:

- *Activities that could be classified under more than one code.* The activity reported by the respondent could be classified under more than one ICATUS 2016 code. Background information and contextual variables might assist with determining the right code. Rules are, however, needed to help to ensure consistency in the classification of activities.
- *Several activities that are reported as one activity.* The respondent did multiple things but reported them as one activity. The activities might be simultaneous (they were both done at the same time, such as eating while watching television) or consecutive (one activity was carried out and then another, with the respondent possibly alternating between the two, such as working at a paid job and taking a break, or spending time waiting and engaging in an activity).
- *Other challenging scenarios.* A residual category which includes many activities related to the use of technology (e.g. virtual activities and developing digital content) or self-administered surveys (where inconsistent or insufficiently detailed responses create the need to edit or impute data).

Members of the subcommittee on coding of the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics identified key themes, issues or activities that can be difficult or ambiguous when assigning ICATUS 2016 codes. In addition to standard coding rules, this section provides a set of coding rules and decisions to facilitate the harmonization of coding decisions for selected themes, issues or activities, chosen based on the following prioritization criteria:

- Importance for accomplishing the survey objectives.
- Relevance to multiple countries or contexts.
- Relevance to countries that may not have existing coding tools or guidance to make decisions on this topic (i.e. that may be embarking on their first time-use survey).

Different local contexts present different challenges, so each country will need to develop its own coding guide.[29] NSOs can incorporate the rules and guidance presented here into a national coding guide, taking care to use language and examples that are appropriate to the context and that can be understood by survey staff and respondents.

In developing the minimum harmonized instrument, the Expert Group agreed on a set of background questions and contextual variables to ensure the international comparability of coding, as described in chapter II. The background questions and contextual questions are described briefly below, as some of the coding rules presented depend on them.

Under the guidance of its ILO members, the Expert Group identified the "essential" labour-force characteristics that were necessary for the operationalization of ICATUS 2016 and coding of activities under ICATUS 2016 major division 1 "Employment and related activities" and major division 2 "Production of goods for own final use". As described in chapters II and III of the present *Guide*, characteristics such as labour-force status or the presence of dependent household members should be collected through a background questionnaire about the individual and household. Model questions and sequences that may be used to capture those characteristics are provided for illustrative purposes in annex III. Countries are recommended to (a) use the approach that is already established at the national level to capture those characteristics in surveys, in particular labour-force surveys, provided that the details required for coding time-use activities can be captured, or (b) adapt the national approach in line with the essential characteristics identified in the minimum harmonized instrument, in order to be suitable for time-use surveys.

While labour-force characteristics are collected at the respondent level, other contextual information will vary according to the activity episode and so should be collected in the time-use component to correctly code the activities. The context variables recommended in the minimum harmonized instrument are listed in chapter II. The coding rules in this section will indicate how this additional information and/or responses to less standardized probing questions can be combined with activity descriptions to correctly code activities, generally at the three-digit level.

1. General coding rules and challenging scenarios

This part of the document is aimed at providing guidance on how to code ambiguous activities reported in a time-use survey, in particular those that could be classified under more than one code in different divisions.

Waiting

In ICATUS 2016, there is no category for "waiting". If "waiting" time is reported, it should be coded under the associated activity. For example, waiting at the doctor's office should be coded as 942 "Receiving health/medical care from others". The only exception is the time that someone is waiting while accompanying other household or family members, in which case the activity should be classified under division 44, using one of the relevant codes listed below:

Group 442 "Accompanying own children"

Group 443 "Accompanying dependent adults"

Group 444 "Accompanying non-dependent adult household and family members"

[29] Some examples include the Statistics New Zealand activity classification, available at https://aria.stats.govt.nz/aria/?_ga=2.191524842.1927534781.1674763139-2154737339.1667334009#ClassificationView:uri=http://stats.govt.nz/cms/ClassificationVersion/CARS6977; the 2021 American Time Use Survey coding rules, available at www.bls.gov/tus/coderules/tu2021coderules.pdf; the Harmonised European Time Use Surveys (HETUS) 2018 Guidelines; and the National Statistics Institute of Spain's 2009/10 time-use survey methodology, at available www.ine.es/en/metodologia/t25/t25304471_en.pdf.

Travel

Given the importance of gathering information on the purpose of travel and mode of transportation, all the ICATUS 2016 major divisions contain codes for travel related to the activities thereunder.

There are several options for coding travel, depending on the type of instrument and level of detail that is required.

In full diariexs, travel may be coded according to its purpose at the three-digit level. On the basis of this approach, travelling to take children to and from school should be coded as 441 "Travelling related to caregiving services for household and family members". Codes for other travel purposes are listed below:

Group 181 "Employment-related travel"

Group 182 "Commuting"

Group 250 "Travelling, moving, transporting or accompanying goods or persons related to own-use production of goods"

Group 380 "Travelling, moving, transporting or accompanying goods or persons related to unpaid domestic services for household and family members"

Group 441 "Travelling related to caregiving services for household and family members"

Group 540 "Travelling time related to unpaid volunteer, trainee and other unpaid work"

Group 640 "Travelling time related to learning"

Group 750 "Travelling time related to socializing and communication, community participation and religious practice"

Group 860 "Travelling time related to culture, leisure, mass media and sports practices"

Group 950 "Travelling time related to self-care and maintenance activities"

Basic rules for travel

(1) As described on page 116 of ICATUS 2016, travel is coded based on the purpose. If the respondent specifies the purpose, this is used for coding.

(2) If the purpose is not specified in the response, the purpose may be determined by the destination of the travel episode and the activity following travel.

Examples:

- Drove to a different office/location related to my job (driving is not part of the job) → 181 "Employment-related travel"
- Drove from home to work → 182 "Commuting"
- Took the school bus → 640 "Travelling time related to learning"
- Drove to concert → 860 "Travelling time related to culture, leisure, mass media and sports practices"
- Took taxi to pick up my son → 441 "Travelling related to caregiving services for household and family members"
- Travelled home from school or work in the middle of the day for lunch → 950 "Travelling time related to self-care and maintenance activities" (time spent eating, however, is coded as 921 "Eating meals/snack").

(3) If a respondent reports travelling home, but there is not enough information on the following activity to determine the purpose of travel, it is determined by the starting point of the journey home. The starting point is the location of the activity prior to the travel episode. For example, going back home from the workplace at the end of the workday should be coded as 182 "Commuting".

(4) If the travel episode consists of several legs (with the same purpose), all the legs should be coded according to the purpose of travel. For example, if the respondent walks, waits for the bus, takes the bus and then walks to school, all the legs should be coded as 640 "Travelling time related to learning".

(5) If travel involves multiple episodes, each episode should be coded according to its purpose. For example, if a respondent reports driving to the supermarket (380 "Travelling, moving, transporting or accompanying goods or persons related to unpaid domestic services for household and family members"), then to school to pick up children (441 "Travelling related to caregiving services for household and family members") and then back home (441 "Travelling related to caregiving services for household and family members").

(6) If, for example, the respondent drives a vehicle for pay or profit, the activity should be coded as 110 "Employment in corporations, government and non-profit institutions" or 134 "Transporting goods and passengers for pay or profit in households and household enterprises", as opposed to travel. It is important that, in such cases, the contextual variable "location" should be "workplace", because the respondent is in the place of work, not travelling to a place of work. It is important to note that respondents in some occupations, such as truck drivers and train guards, will spend all or almost all of their work time travelling. Respondents in other occupations, such as salespersons or providers of household services (e.g. electricians, plumbers, cleaners), travel from one appointment to another and may spend much of their time in a means of transportation. In both cases, the purpose of the activity is employment and related activities; however, the location, in the first case, will always involve a mode of transportation, while in the second case, the location will switch from transport mode for travel activities to workplace for activities reported at a fixed location.

(7) Waiting related to travel should be coded as part of the travel episode. For example, waiting for the bus or train to go to work should be coded as 182 "Commuting".

(8) Walking is considered travel if the intention is to get from one place to another. If the primary purpose is exercising, the activity should be coded as 832 "Exercising". Walking the dog should be coded as 361 "Daily pet care".

(9) In self-completed instruments, the purpose will be determined by the respondent. It can, however, be recoded during processing if the travel reported is inconsistent with the type of activity.

Box VI.3
Challenges related to the coding of travel

In some cases, multiple travel episodes, occurring one after the other, might be reported without a clear purpose for each one, for example when a respondent reports leaving home to pick up an adult family member, followed by going to a health clinic and then going to a restaurant, shopping or going to work. In this example, there is no clear purpose for picking someone up, which is the first travel episode. The rule is to code the travel episode based on the first activity for which there is a clear purpose. The first travel episode, therefore, should be grouped with going to a health clinic and both of the travel episodes should be coded as 441 "Travelling related to caregiving services for household and family members". The "with whom" contextual information would indicate the type of relationship between the respondent and the other person. This may help to determine whether the travel should be coded as 441 "Travelling related to caregiving services for household and family members" if the person is a family member or 540 "Travelling time related to unpaid volunteer, trainee and other unpaid work", if the person being picked up is not a family member.

The use of light instruments that provide only one option for all activities related to travel presents another challenge. In such cases, it is not possible to code travel for specific purposes on the basis of the activity description. If this level of detail is needed, it may be possible to impute the purpose of travel during the editing stage, based on the activity done before and after the travel episode.

Similarly, the use of self-administered surveys could result in less granular episodes, with, for example, travel with multiple stops being reported as a single activity. This is an inherent limitation of self-administered surveys and light diaries. The steps that can be taken to review and possibly recode diaries with missing travel episodes are discussed in chapter VII, but they are more effective for imputing regular travel between two points, such as commuting, rather than short trips.

Use of information and communications technologies

If a respondent reports using a computer, mobile phone or other ICT devices, the activity should be coded on the basis of the activity that the respondent is doing on the computer, mobile phone or other ICT device or on a digital platform. For example, if the respondent mentions using a computer for homework, the activity should be coded as 620 "Homework, being tutored, course review, research and activities related to formal education".

The same applies to time spent on social media, which should be coded on the basis of the activity on which time is spent or purpose. For example, if a person is shopping on a social media platform, the activity should be coded as 371 "Shopping for/purchasing of goods and related activities" or 372 "Shopping for/availing of services and related activity". Posting photographs of a holiday on a social media platform should be coded as 713 "Reading and writing mail, including email". Many people use social media to promote a business or respond to queries about a business. These activities should be classified under the corresponding group in major division 1 "Employment and related activities".

Box VI.4

Challenges related to the coding of activities involving the use of information and communications technologies

People are spending an increasing amount of time doing activities virtually that were previously done in person. Some examples include shopping, attending meetings or seminars, watching live performances, attending funerals, attending school and online classes, carrying out employment-related activities and household management activities, and volunteering. The use of computer/ICTs/social media are contextual variables, but do not correspond to activities themselves.

The degree of active engagement that using a computer/ICTs/social media requires (listening to an online concert in contrast with teaching online) varies. The level of engagement can, however, help to determine the right code for the activity. For example, attending virtual concerts or music performances, virtual theatre or dance performances or virtual art exhibitions and festivals, and going on a virtual museum tour or watching online sports or esports as a spectator, are all done passively. Therefore, they should be coded as 84 "Mass media use" and/or 842 "Watching/listening to television and videos". However, if the respondent is actively engaged in the activity, it should be coded according to the purpose of the activity. For example, taking part in an online/virtual exercise class, meaning that the respondent is actively engaged in the activity, should be coded as 832 "Exercising". Playing organized multiplayer video games (esports) should be coded as 823 "Playing games and other pastime activities". Virtual community celebrations, virtual community rites (weddings, funerals, births and similar rites of passage) and virtual religious practices should be coded under divisions 72–74, as appropriate.

Since 2016, education has evolved with changes in technology and society, making it more difficult to distinguish between some codes that fall under division 61 "Formal education".

In ICATUS 2016, there is a distinction between group 611 "School/university attendance" and group 614 "Self-study for distance education course work (video, audio, online)". The latter includes all activities that involve watching videos or online resources, attending virtual classes or lectures, reviewing examples, notes and videos, taking examinations related to distance education and online formal education. In ICATUS 2016, distance education is defined as "the use of specific instructional techniques, resources and media to facilitate learning of people who are separated by time or place from the teacher". However, attending formal classes online is a more established and accepted mode of learning now. Classes may be synchronous (or live), with students and teachers interacting via videoconference or audio conference in real time. Examinations may be proctored. Students may meet with instructors for guidance on the course. Although these examples meet the definition of students being separated by place from the teacher, they cannot be described as "self-study", which is generally understood to be independent, self-paced and without direct supervision. That is why the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics recommends that live or synchronous remote learning sessions with the potential for interaction between students and the instructor should be coded as 611 "School/university attendance". Time spent by students watching prerecorded lectures or other materials for such classes can be coded as 620 "Homework, being tutored, course review, research and activities related to formal education". Watching recorded materials for courses that are entirely remote and asynchronous, and can therefore be defined as self-study, should be coded as 614 "Self-study for distance education course work (video, audio, online)".

The coding of some remote educational activities as 611 "School/university attendance" introduces another complication. Since the COVID-19 pandemic, there has been an increasing interest in distinguishing educational activities that require in-person presence from those that are virtual. This distinction between going to school (i.e. being physically

Box VI.4 (*continued*)

present at school) and virtual schooling or homeschooling also affects parents' responsibilities relating to assistance or supervision (if the students are young children), transportation and use of instructional techniques, among others.

If the "location" context variable is collected, "home" can be used to correctly classify these activities. The "use of ICTs" context variable, however, cannot be used to distinguish between homeschooling and in-person schooling, as ICT is often used in classrooms. If countries do not collect context variables (e.g. if they use stylized questions or a light diary) or if data users require detailed information on the topic, they may wish to add a virtual schooling code/question. It is important that any codes added should be aggregated into group 611 "School/university attendance".

The issue of how to code the development of digital content is an emerging area on which there is no consensus as yet. Content may be developed for paid work or an own business. Making video tutorials, writing blog posts or reviews, developing apps and writing Wikipedia entries are examples of activities that may be done for enjoyment, may benefit others without personal gain or may lead to employment or income generation in the long term, even if not directly. This is an area that requires further study before any recommendations can be made.

Major division 1 "Employment and related activities"

The aim of this major division is to capture activities done to produce goods or provide services for pay or profit and other activities directly related to employment, such as travelling and commuting for employment, breaks during working time, training and studies in relation to employment, seeking employment and other related activities outside working time.

If the respondent indicates that an activity was done "for pay or profit" or "for the market", it should be coded under major division 1 "Employment and related activities". Additional information should be collected so that the activity can be classified in the correct division or group under major division 1 (e.g. division 11 "Employment in corporations, government and non-profit institutions" or division 12 "Employment in household enterprises to produce goods").

To correctly classify activities at the two-digit and three-digit levels, background questionnaires on the economic characteristics of the respondents need to be included in the survey. For model questionnaires, see annex III to the present *Guide*.

Breaks during working time within employment

As described in ICATUS 2016, when simultaneous activities are recorded, each activity should be recorded. If the activities are prioritized, that is to say as the main activity, secondary activity and so on, the specific activity being performed during the break should be treated as the primary activity. The secondary activity is, therefore, coded as 142 "Breaks during working time within employment". If simultaneous activities are not recorded, a prioritization rule needs to be defined.

Lunch break

If the respondent reports having lunch during the employment-related time, then the activity should be coded as 921 "Eating meals/snack".

If the respondent reports being in a working lunch, then the activity should be coded as appropriate under major division 1 "Employment and related activities".

Travel as part of a job

Time spent travelling during work, for example in the case of drivers, chauffeurs and other workers for whom travel is part of the tasks and duties of their job, or "direct hours", should be coded as appropriate under major division 1 "Employment and related activities". Some possible codes are 110 "Employment in corporations, government and non-profit institutions" and 134 "Transporting goods and passengers for pay or profit in households and household enterprises".

Reading for work

Reading for work should be coded as appropriate under major division 1 "Employment and related activities".

Training and studies as part of a job

If the respondent reports that training and studies are part of working time or official time and directly related to the job, then the activity should be coded as 150 "Training and studies in relation to employment". Otherwise, the activity should be coded as appropriate under major division 6 "Learning". If the activity involves physical or sports-related activities, it should be classified as 831 "Participating in sports" or 832 "Exercising".

Trainee work

If the respondent reports "working" without receiving any remuneration, it should not be coded under major division 1. If the intention is to acquire workplace experience or skills, then the activity should be coded as 530 "Unpaid trainee work and related activities". If the respondent reports having done volunteering, the activity should be coded as appropriate under division 51 "Unpaid direct volunteering for other households" or 52 "Unpaid community- and organization-based volunteering". It may be necessary to probe the respondent to determine whether work without pay is to acquire workplace skills or to help family or non-family members.

Hobbies

If the respondent indicates that they expect to receive pay or profit from a hobby, the activity should be coded as appropriate under major division 1 "Employment and related activities". If the activity/hobby is done purely for recreational purposes, then it should be coded under major division 8 "Culture, leisure, mass media and sports practices". Some possible codes are 821 "Visual, literary and performing arts (as hobby)", 822 "Hobbies", 823 "Playing games and other pastime activities" and 829 "Other activities related to cultural participation, hobbies, games".

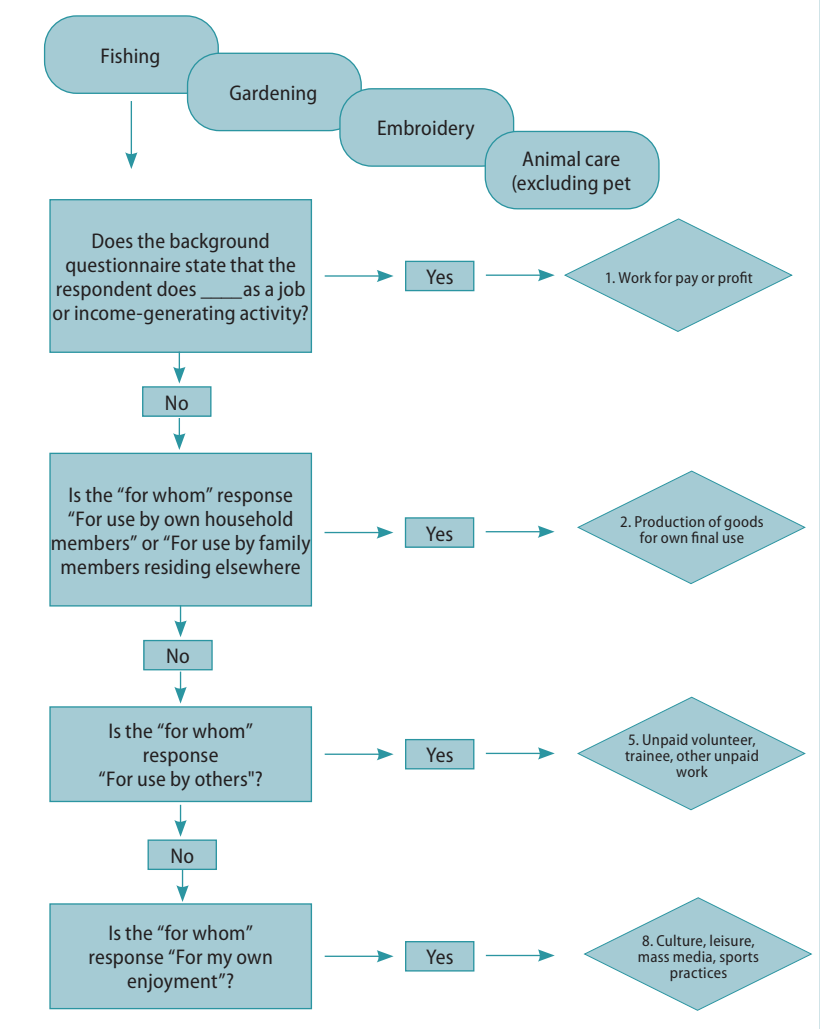
Box VI.5

Challenges of distinguishing between paid work, unpaid work and leisure activities

Sometimes a description of an activity does not provide enough information to determine which major division it falls under. For example, in the case of such activities as gardening, fishing, berry picking, caring for animals, doing needlework/making textiles, preparing food, reading and doing paperwork, it may not be automatically clear whether they were done for pay or profit, for own-use production of goods, to benefit others or for leisure.

The "for whom" contextual variable provides information that can assist with classification. To reduce the respondent burden, the questionnaire might be designed not to ask "for whom" questions about every activity, but only those that clearly involve producing a good or providing a service. A list of relevant activities can be programmed into CAPI or CAWI instruments or enumerators can be trained to recognize them. For example, an activity such as reading may or may not be providing a service. In cases where an activity may have more than one purpose, thus leading to a different code, the enumerator can informally probe the respondent, even if the "for whom" question is not automatically asked.

Diagram: use of the "for whom" context variable to classify activities



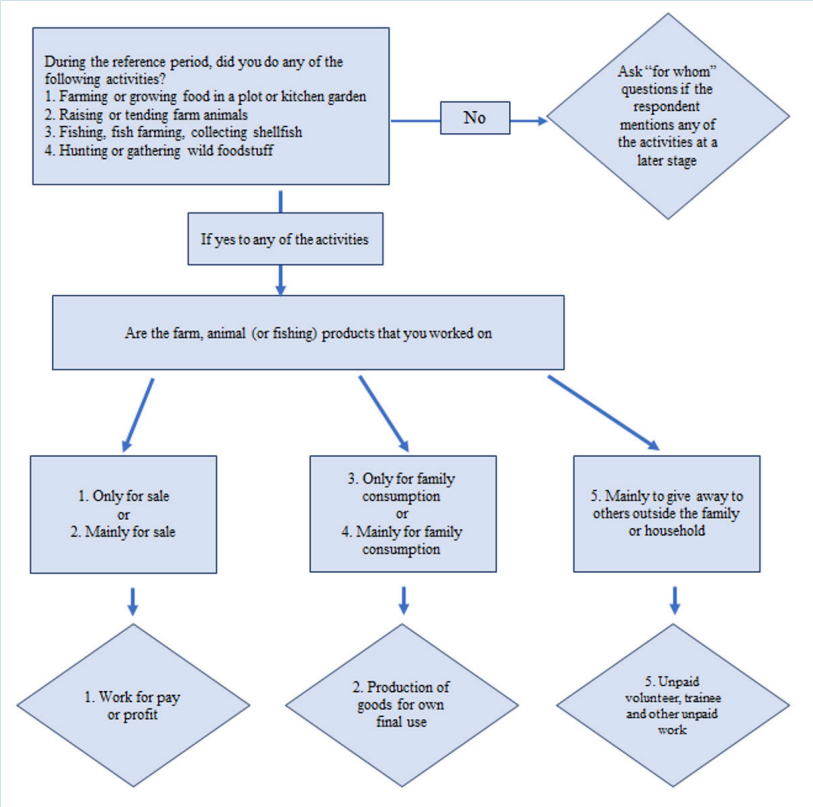
Major division 2 "Production of goods for own final use"

The aim of this major division is to capture activities carried out to produce goods for own final use where the intended destination of the output is mainly for final use by the producer in the form of capital formation or final consumption by household members or by family members living in other households.

To correctly code activities for the production of goods for own final use, information from the background questionnaire on employment characteristics, background information on own-use production of goods (see box VI.6 for optional questions recommended for countries with high levels of own-use production) and information from the diary (including contextual variables) or informal probing questions are used. Alternatively, respondents can be asked follow-up questions any time they mention doing the activity on the reference day.

Box VI.6
Applying background questions on own-use production

The following diagram shows the questions that may be asked to determine whether activities were performed on respondents' own account or to help their family.



Major division 3 "Unpaid domestic services for household and family members"

The aim of this major division is to capture domestic work, such as food preparation, cleaning of dwelling and surroundings, pet care, shopping and repairs, among others.

Box VI.7
Challenges when respondents report domestic or caregiving services for household and family members in exchange for money or goods

Domestic and caregiving services can be classified under paid or unpaid work. Sometimes a person does domestic or care work that does not constitute paid employment, but there is an exchange of money or goods involved, for example when a teenager washes the family vehicle and is given money or a person takes care of an older person and receives a cake as a thank you.

According to the nineteenth International Conference of Labour Statisticians resolution concerning statistics of work, employment and labour underutilization, "unpaid" is interpreted as the "absence of remuneration in cash or in kind for work done or hours worked; nevertheless, volunteer workers may receive some small form of support or stipend in cash, when below one third of local market wages (e.g. for out-of-pocket expenses or to cover living expenses incurred for the activity), or in kind (e.g. meals, transportation, symbolic gifts)". One key aspect that helps to distinguish between paid and unpaid work is the expectation of receiving payment (e.g. through a previous agreement). Therefore, the rule is to consider the above-mentioned activities as unpaid domestic or care work (major division 3, 4 or 5, depending on whether the care recipient is a household or family member), even if cash or in-kind gifts are exchanged, if:

- There is no expectation of receiving payment, or
- The amount of money is significantly below the market wage.

In the "cake" example, there is no expectation of receiving an exchange of goods for payment. In the "car washing" example, the payment works as an incentive for doing household work and it should not be considered as employment, as the transaction was a small amount within the household (pocket money).

Preparing food

Preparing food for children should be coded as 311 "Preparing meals/snacks".

If the respondent prepares food for someone other than own household or family members, then the activity should be coded as volunteer work under 511 "Unpaid volunteer household maintenance, management, construction, renovation and repair". If the respondent prepares food for the community (or an organization) without receiving pay, it should be coded as 522 "Unpaid volunteer preparing/serving meals, cleaning up".

Activities coded under division 31 "Food and meals management and preparation" should be distinguished from those under group 221 "Making, processing food products, beverages and tobacco for own final use".[30]

[30] ICATUS 2016 group 221 includes the activities described under section C, divisions 10, 11 and 12, of the fourth revision of the International Standard Industrial Classification of All Economic Activities. See page 47 of ICATUS 2016 for a detailed description of group 221.

Cleaning the kitchen

Cleaning the kitchen should be coded as 313 "Cleaning up after food preparation/meals/snacks". If an activity is done for someone other than own household or family members, then the activity should be coded as 511 "Unpaid volunteer household maintenance, management, construction, renovation and repair". If the respondent prepares food for the community (or an organization) without receiving payment, it should be coded as 522 "Unpaid volunteer preparing/serving meals, cleaning up".

Plants

Care of plants (other than agriculture or gardening for produce that will be sold, consumed by the household or given away) is normally coded as 324 "Upkeep of indoor/outdoor plants, hedges, garden, grounds, landscape and so on". If coding is at the three-digit level, it is possible to distinguish between taking care of the plant itself, such as transplanting it into a new pot (specific activity group 324), and cleaning up the mess after knocking over a house plant (321 "Indoor cleaning"). At the division (two-digit) level, both would be coded as 32 "Cleaning and maintaining of own dwelling and surroundings". In the minimum harmonized instrument, both activities would fall under activity 5 "Cleaning inside or outside the dwelling, disposing of garbage or recycling, or watering plants".

Pet care

Pet care should not be confused with activities that are intended to produce goods, either for pay or profit or for own final use. Examples of activities that should not be coded as pet care include:

- Group 122 "Raising of animals for the market in household enterprises"
- Group 125 "Aquaculture for the market in household enterprises"
- Group 212 "Farming of animals and production of animal products for own final use"
- Group 217 "Aquaculture for own final use"

All pet care for the respondent's family or household pets should be coded under division 36 "Pet care". Pet care for someone other than own household or family members as a favour should be coded as 511 "Unpaid volunteer household maintenance, management, construction, renovation and repair".

Pet care includes activities such as "cleaning", in the sense of "washing", but could also be understood as cleaning up after a pet. If cleaning is related to the health of the animal (such as scooping or picking up the animal's waste or washing a muddy dog), this should be coded as 361 "Daily pet care" (in the minimum harmonized instrument, pet care corresponds to activity 9).

If the animal runs into a table and breaks a vase, this should be coded as 321 "Indoor cleaning", as the dwelling is being cleaned, not the animal (in the minimum harmonized instrument, it corresponds to activity 5, cleaning inside or outside the dwelling, disposing of garbage or recycling, or watering plants). As code 321 and code 361 are found under the same major division and all the activities under this major division are usually aggregated to produce the unpaid domestic work indicator, the impact of classifying the episode under one or the other is minimal.

Having a pet groomed by someone else should be coded as 362 "Using veterinary care or other pet care services (grooming, stabling, holiday or day care)".

Shopping

Shopping over the phone or Internet should be coded as 371 "Shopping for/purchasing of goods and related activities" or 372 "Shopping for/availing of services and related activity".

Purchasing food for pets should be coded as 371 "Shopping for/purchasing of goods and related activities".

If the respondent goes shopping for someone other than own household or family members, then the activity should be coded as volunteer work under 512 "Unpaid volunteer shopping/purchasing goods and services".

Paying for bills should be coded as 351 "Paying household bills". This activity should not be confused with group 229 "Acquiring supplies, disposing of products, and other activities related to making and processing goods for own final use".

Packing or unpacking

Packing or unpacking related to moving should be coded as 359 "Other activities related to household management".

Paperwork

If paperwork is done for oneself, one's children or other household or family members, it should be coded as 359 "Other activities related to household management". If the respondent specifies that it was done for another adult as help, it should be coded as 423 "Assisting dependent adults with forms, administration and accounts" (for household or family members) or as 514 "Unpaid volunteer care for adults" (for someone other than household or family members).

Major division 4 "Unpaid caregiving services for household and family members"

The aim of this major division is to capture activities related to caregiving services for own final use. It excludes unpaid domestic services for household and family members classified under major division 3.

Meetings and arrangements with care service providers

If the meetings and arrangements are for a child, then the activity should be coded as 417 "Meetings and arrangements with schools and childcare service providers". If they are for a dependent adult, the activity should be coded as 426 "Meetings and arrangements with adult care service providers".

Box VI.8
Challenges of coding an activity carried out in the presence of a dependent person

If the respondent does a leisure activity, for example swimming or watching television, in the presence of a dependent person, the interviewer should proceed as follows:

1. Ask probing questions to determine whether the activity was for self-enjoyment (codes under major divisions 6, 7, 8 and 9) or for the benefit of others (codes under major divisions 4 and 5). For example:

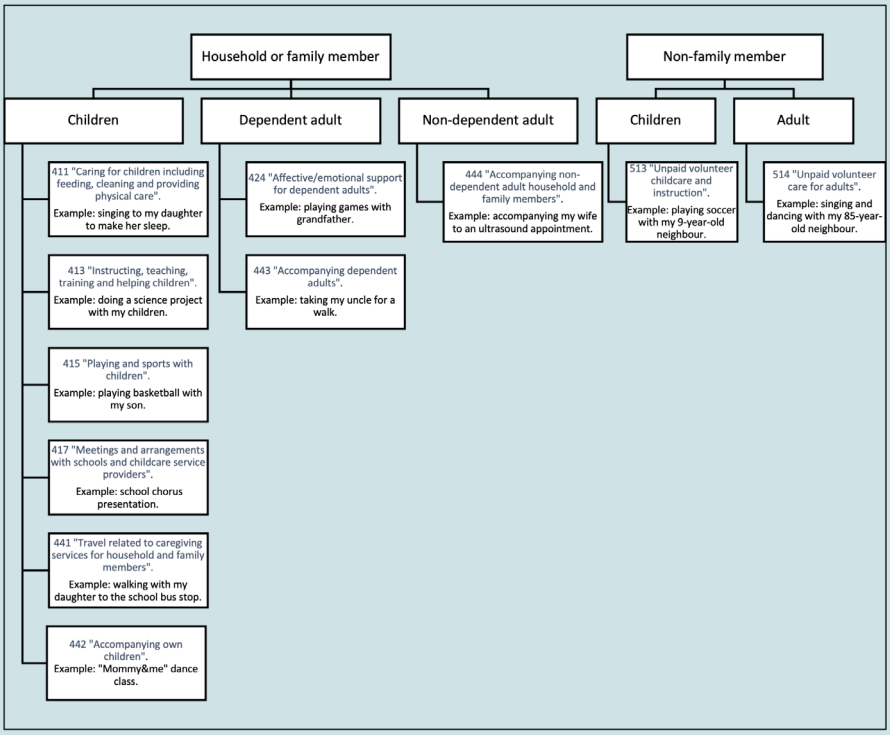
- If a respondent takes a child to the hairdresser's, but also has a haircut at the same time, then the activity should be coded as 941 "Receiving personal care from others". However, if the haircuts are done one after the other, then this will correspond to two sequential activities, which should be coded as 442 "Accompanying own children" for the time when the child has the haircut and as 941 "Receiving personal care from others" for the time when the respondent has the haircut. A similar situation happens if the respondent takes his or her parents shopping, but also buys groceries for own household. In that case, the activity should be coded as 371 "Shopping for/purchasing of goods and related activities" if the respondent and parents are shopping at the same time, but as 444 "Accompanying non-dependent adult household and family members" for the portion of time that the respondent's parents are shopping but the respondent is not.
- If a respondent goes swimming with children and actively participates in the activity, it should be coded as 832 "Exercising". If, however, the main activity is watching children swim, it should be coded as 416 "Minding children (passive care)".

Box VI.8 (*continued*)

- If a respondent goes swimming with children and actively participates in the activity, it should be coded as 832 "Exercising". If, however, the main activity is watching children swim, it should be coded as 416 "Minding children (passive care)".

2. Ask "Who was with you?" and code the activity according to the response.

The following diagram shows how the interviewer can determine the activity code:



Major division 5 "Unpaid volunteer, trainee and other unpaid work"

The aim of this major division is to capture forms of work that are not captured in previous major divisions, such as volunteer work (unpaid activities done by the respondent for others, the community or institutions), trainee work (to obtain work experience) and other unpaid work (e.g. compulsory work).

Any unpaid activity undertaken for someone other than the respondent's household or family members should be coded as appropriate under division 51 "Unpaid direct volunteering for other households" or 52 "Unpaid community- and organization-based volunteering". The distinction between divisions 51 and 52 is determined on the basis of how the volunteer work was organized, rather than what the respondent was doing as volunteer work.

Major division 6 "Learning"

This major division refers to activities related to learning, excluding work education/training/learning and trainee work.

Work-related training/education

Work-related training/education should be coded as 150 "Training and studies in relation to employment".

Trainee work

If the respondent indicates having worked without receiving any remuneration and with the intention of acquiring workplace experience or skills, then the activity should be coded as 530 "Unpaid trainee work and related activities".

Online learning

If the respondent reports activities related to watching videos or online resources, attending virtual classes or lectures (unless they are live or synchronous sessions with the possibility of interaction with the instructor), reviewing examples, notes and videos, taking examinations related to distance education and online formal education as part of learning activities, they should be coded as 614 "Self-study for distance education course work (video, audio, online)". This includes formal courses (e.g. an online college degree), non-credit courses on such platforms as Coursera and academic tutorials (e.g. Khan Academy). Watching hobby-related tutorials (such as crafts) on video platforms, such as YouTube or TikTok, should be coded as 822 "Hobbies". Watching video tutorials on decorating, maintaining or repairing the home or vehicle (e.g. how to repair a washing machine or change oil in a car) should be coded to the correct group under division 33 "Do-it-yourself decoration, maintenance and repair".

Reading for school

If the respondent reports reading for school, the activity should be coded as 620 "Homework, being tutored, course review, research and activities related to formal education".

Extracurricular activities

Extracurricular activities include the activities of speech and drama clubs, choirs, computer or science clubs and school publications, and should be coded as 612 "Extracurricular activities". Extracurricular activities that involve physical activity or are sports-related should be coded as 831 "Participating in sports" or 832 "Exercising".

Attending school ceremonies, including graduations

If the respondent reports attending own graduation ceremony, the activity should be coded as 690 "Other activities related to learning".

Hobby courses or lessons

All hobby-related courses or lessons (such as art or sewing lessons) should be coded as 630 "Additional study, non-formal education and courses".

Sports and other physical activity courses or lessons

If the respondent reports taking sports lessons or other physical activity courses or lessons, the activity should be coded as 831 "Participating in sports" or 832 "Exercising".

Major division 7 "Socializing and communication, community participation and religious practice"

Talking with household child

Talking with a household child (e.g. son or daughter) should be coded as 414 "Talking with and reading to children". This should not be coded as 711 "Talking, conversing, chatting".

Talking to people while having lunch

Talking to people while having lunch should be coded as 711 "Talking, conversing, chatting" or 712 "Socializing, getting together and gathering activities".

Talking to care service providers

Talking to care service providers should be coded as 417 "Meetings and arrangements with schools and childcare service providers" for a child or 426 "Meetings and arrangements with adult care service providers" for a dependent adult. If, however, the respondent talks to care service providers about oneself, it should be coded as 941 "Receiving personal care from others" or 942 "Receiving health/medical care from others".

Chatting via the Internet

Chatting via the Internet (e.g. via WhatsApp) should be coded as 711 "Talking, conversing, chatting", which includes face-to-face and virtual activities.

Phone calls

Phone calls should be coded according to the purpose of the call. For example, social phone calls should be coded as 711 "Talking, conversing, chatting". If, however, the phone call is related to employment, it should be coded under major division 1 "Employment and related activities". If it is related to care, it should be coded under division 41 "Childcare and instruction" or 42 "Care for dependent adults".

Court-related activities

Court-related activities, such as jury duty, should be coded as 730 "Involvement in civic and related responsibilities".

Attending meetings

If the activity is for personal interest, attending meetings should be coded as 712 "Socializing, getting together and gathering activities". If it is in relation to volunteer work, it should be coded to the respective activity under major division 5 "Unpaid volunteer, trainee and other unpaid work".

Singing/karaoke/videoke

Singing should be coded as 821 "Visual, literary and performing arts (as hobby)".

Reading

Reading for leisure or personal purposes should be coded as 841 "Reading for leisure".

Reading the Bible or other sacred books should normally be coded as 841 "Reading for leisure". If it is clear that the activity is part of a religious practice, then the activity should be coded as 741 "Private prayer, meditation and other spiritual activities" or 742 "Participating in collective religious practice".

Listening to an audiobook

Listening to an audiobook or podcast should be coded as 843 "Listening to the radio and audio devices".

Unpaid performance art activities

Unpaid performance art activities should be coded as 523 "Unpaid volunteer cultural activities, recreation and sports activities".

Attending weddings

Attending a religious wedding ceremony should be coded as 742 "Participating in collective religious practice". Attending a wedding reception should be coded as 712 "Socializing/getting together/gathering activities".

Attending funerals and memorial services

Attending funerals and memorial services should be coded as 722 "Participating in community rites/events (non-religious) of weddings, funerals, births and similar rites of passage".

Meditating

If the respondent mentions meditating, resting, reflecting or relaxing, it should be coded as 850 "Activities associated with reflecting, resting, relaxing". Religious meditation should be coded as 741 "Private prayer, meditation and other spiritual activities".

Attending religious lessons

Attending religious lessons (e.g. a Bible study) should be coded as 630 "Additional study, non-formal education and courses".

Major division 8 "Culture, leisure, mass media and sports practices"

Attending a performance or event of a household or family child

Attending a performance or event, including those related to sports, of a household or family child should be coded as 419 "Other activities related to childcare and instruction".

Watching sports on television

Watching sports on television should be coded as 842 "Watching/listening to television and videos".

Exercising for medical conditions/physical therapy

If exercising is done because of a medical condition or for physical therapy, it should be coded as 932 "Health/medical care for oneself" or 942 "Receiving health/medical care from others".

Walking

Walking is considered to be travel if the intention is to get from one place to another. If the primary purpose is exercising, it should be coded as 832 "Exercising". Walking the dog should be coded as 361 "Daily pet care".

Camping

If the respondent reports having gone camping, further questions should be asked to obtain information on all the activities undertaken during the camping trip.

Major division 9 "Self-care and maintenance"

The activities under this major division are those required by the individual in relation to biological needs, such as sleeping and eating, including performing own personal and health care and maintenance or receiving this type of care.

Receiving personal or health/medical care from others

If the respondent receives personal or health/medical care from others, the activity should be coded as 941 "Receiving personal care from others" or 942 "Receiving health/medical care from others".

Having a massage

If the respondent has a massage, the activity should be coded as 941 "Receiving personal care from others".

Insomnia

Insomnia should be coded as 913 "Sleeplessness". If the respondent reports meditating, resting, reflecting or relaxing, it should be coded as 850 "Activities associated with reflecting, resting, relaxing". Religious meditation should be coded as 741 "Private prayer, meditation and other spiritual activities".

Resting

Resting should be coded as 850 "Activities associated with reflecting, resting, relaxing". Resting because of illness, however, should be coded as 932 "Health/medical care for oneself".

Box VI.9
Quality checklist: enumeration procedures

- Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion; for more details, see box XI.1) and monitor them throughout enumeration.
- Consider how to implement sample top-up and deselection to calibrate the sample based on observed response rates in the field. This can be more difficult for time-use surveys, depending on the survey design, for example if diary dates are restricted to a specific week in each month or quarter.
- Consider when enumeration can be discontinued to save costs (e.g. if targets are met earlier than forecast, in particular in geographic regions or overall).
- Provide interviewers with training for efficient and consistent data collection.
- Provide interviewers with training on maintaining security and confidentiality.
- Offer different modes to allow respondents to choose their preferred response style.
- Offer interviews at a wide range of times of the day to suit respondents.
- Design questions that may be easily understood and answered by a broad range of respondents. Avoid overreliance on instructions to explain ambiguous questions or form completion.

Box VI.9 (*Continued*)

- Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load.
- Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.
- Consider the data entry and processing requirements for the content and the impact on timely data dissemination.
- Understand the implications of the timing of different aspects of the data-collection process, such as the length of the enumeration period, the lag between completion of the questionnaire and the diary, and whether and how to allow the substitution of diary days for a selected household.

VII. Processing of time-use survey data

Data processing begins after data are collected, but how it happens depends on decisions made at an earlier stage, in particular with respect to the mode of data collection and type of instrument design. With paper questionnaires, data processing consists of separate steps for coding, data capture, quality assurance, editing and validation. All these steps are, at least in part, incorporated into the data-collection process when using digital tools. That is why digital tools reduce the overall survey time, despite requiring a longer lead time.

The purpose of data processing is to turn completed questionnaires into data files that can be used for core tabulations and analysis. The efficiency of data processing determines how quickly survey results are available for dissemination and affects the timeliness of the data.

To develop an efficient data-processing system, NSOs embarking on a time-use survey should involve survey experts, subject-matter specialists and information technology staff. Strategies for the processing phase need to be established early in survey planning. As a general recommendation, decisions on the processing methodology and technology to be adopted for the time-use survey should take into account the existing data-processing system of the statistical office. This means utilization of both regular processing staff and infrastructure, that is both hardware and software.

The principal aspects of the development of a data-processing strategy for time-use surveys include the following:

Developing tabulation plans early. Tabulation plans specify the variables that need to be edited and coded, the variables that must be derived and the logical relationships among those variables. This information is needed for editing and imputation specifications, as well as for preparing the table formats. Assessing the consistency between the data specifications as they appear in the survey instruments and those required by the analytical tabulations is an important part of questionnaire design.

Determining the basic processing methodology. NSOs must decide how various processing steps will be carried out. They must determine the extent to which data processing will be centralized or decentralized. They must decide whether data editing and coding will be done by clerical staff (or manual processing), by computers, or through some combination of both methods. They must decide how errors detected will be handled. They must decide whether missing items will be imputed and, if so, how.

Developing instructions, manuals and other tools for coding and editing, and other clerical operations. This should be done in parallel with instrument design.

Deciding on the technology to be used. This should be done to determine the technology (both hardware and software) to be utilized for processing, estimation and tabulation and for subsequent data storage, preservation and sharing. This decision determines how data will be captured or transferred from questionnaires to create computer data files.

The issues related to the processing of household and personal background questionnaires in time-use surveys are similar to those for typical household surveys and are expected to be resolved following current standards, such as those prescribed in United Nations handbooks on surveys and censuses.[31] The present *Guide* is focused on the processing of time-use survey questionnaires and diaries.

[31] See, for example, United Nations (1984, chap. VI) and United Nations (2001a, chap. IV). For editing and processing common demographic and economic characteristics and coding of occupation and industry, see United Nations (2001b) and Hoffmann (2001).

A. Aftercoding

It is important to pay attention to the quality of activity coding in time-use studies. Coding (including the development of a coding index and coding rules) is addressed in chapter VI. In the case of paper diaries, where data are input to a computer after collection from the field, or other diaries that are aftercoded, quality controls should be conducted before coding and during manual data entry or coding processes. Quality controls that are conducted after coding or for digital tools with on-the-fly coding are discussed later in this chapter.

If paper diaries are used, the data must be entered into the processing system. Decisions need to be made about whether they are checked and edited before data entry or after the data have been entered verbatim into the system. For interviewer-completed diaries, the expectation is that fewer corrections will be required since interviewers are trained to ensure that they capture the main activity in sufficient detail and that there are no activities missing or missing or illogical contextual responses. The quality of free-text self-completed questionnaires is likely to be more variable. The amount of editing must be balanced in accordance with the time available and staffing resources. The work of data-entry staff should be checked to ensure that they apply the coding rules as expected.

For more information on aftercoding, see paragraphs 449 to 473 of the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

B. Editing

1. General considerations in editing

Data editing is the application of checks that identify missing, invalid or inconsistent entries in the survey instruments or that point to data records that are potentially in error. Some of these checks involve logical relationships that follow directly from the concepts and definitions. Others are more empirical in nature or are achieved by conducting statistical tests or procedures (e.g. outlier analysis techniques) or external consistency checks from previous collections of the same survey or from other sources.

There are three main goals of editing: (a) to tidy up the data; (b) to provide information about the quality of the survey data; and (c) to provide the basis for improvement of future surveys. Traditionally, the focus of editing has been on cleaning the data and not on the much more useful aim of providing information about the survey process, either to serve as quality measures for the current survey or to suggest improvements for future surveys. In this role, editing can be invaluable in sharpening definitions, improving the activity classification and survey instruments, evaluating the quality of data and identifying sources of non-sampling error. Control forms are necessary for recording queries and for quality assurance later. One special concern in coding and editing of time-use data is documenting editing and coding problems and solutions tried. The information thus obtained is essential for further developing and improving the activity classification or instrument.

2. Edit checks

For electronic surveys, edits can be embedded in the data-collection instrument so that error messages are triggered if incorrect or missing information has been detected. Respondents should not, however, be overburdened with too many error messages, which may lead them to abandon the survey. Once electronic diaries have been sub-

mitted, automated data checks can be run to ensure that the quality thresholds are met, for example that a minimum number of hours and activities have been recorded.

(a) Completeness

The first edit check is to assess whether respondents have provided sufficient information. Before editing begins, survey managers must decide on a minimum threshold that must be met for the diary to be accepted.

Total time. If the reference period is one day, the total time for activities should add up to 24 hours or 1,440 minutes. While 12 hours is sometimes the threshold, other levels are also used.

Minimum number of activities. Respondents typically do many activities in a day. A minimum number of activities, such as three, should be set. Even if someone is sick and in bed all day, it is still likely that they will sleep, eat and talk.

A diary or questionnaire that fails to meet the minimum threshold can only be rejected, not edited.

(b) Diary-only checks

These edit checks are relevant only to diaries, not stylized questions.

(i) No entries in a particular time slot

Diaries should not contain gaps or time intervals where there are no activities reported. This means that the ending time of a main activity should be the beginning time of the next main activity. A digital diary can automatically populate the field for start time with the end time of the previous activity to minimize this possibility, while allowing the respondent or interviewer to leave a gap if they actively choose to.

How to edit gaps. A blank time slot may be coded as missing (i.e. "no activity specified") or imputed. Many countries, however, do not impute activities or do not do so very often to avoid biasing the data.

(ii) Overlaps

In an open interval diary, there should be no overlaps in the beginning times of consecutive main activities. Overlapping beginning times of consecutive main activities need to be edited to eliminate the overlap.

How to edit overlaps. The ending time of the previous activity can be changed to the beginning time of the next activity.

(iii) Omitted activities

Many activities are likely to be omitted from diaries and thus underestimated. Among these are background activities, such as passive childcare, smoking, drinking, eating and travel.

There are some activities that should obviously have occurred but are not reflected in the diary. For example, it might reasonably be expected that everyone would have at least one episode of sleeping, of eating or of a personal care activity each day.

How to edit omitted activities. To edit omitted activities, clear rules are needed; it should not be left to the editor's interpretation. NSOs should have clearly defined editing procedures and document the process. An editing procedure for not reporting night sleep used in the 1997 Australian time-use survey is described in box VII.1.

Box VII.1
Editing procedure for not reporting night sleep used in the 1997 Australian time-use survey

Are all times accounted for?

- Yes: do the activities in the diary seem reasonable (e.g. studying all night for an exam) or is there an explanatory comment by the interviewer?
  - Yes: accept the recorded activities.
  - No: flag as missing (for resolution by supervisor).
- No: if there is any indication of going to bed or getting up, then code a sleep episode.

Source: Australian Bureau of Statistics (1997).

In the 2020/21 Australian survey, almost no imputation was used.

(iv) Essential intermediate step missing

Respondents may report a sequence of activities for which there may be a logical gap because of a missing activity that should have followed or preceded another.

How to edit missing steps. Sometimes it is possible to impute missing steps based on other variables. For example, the respondent reports preparing a meal but does not report eating it. Or a respondent may report "reading a book" and then "taking medication" with a substantial gap in time until the next entry. In the past, it might have been assumed that the respondent continued to read after taking medication. If, however, the location changes between two subsequent activities, it is likely that a period of travel took place in between but was not reported. However, strict rules should be followed here. Adding time to activities based on assumptions can cause bias. NSOs should avoid making assumptions that might introduce bias. In recent studies, NSOs tend to add a "not stated activity" rather than make assumptions.

(v) Multiple entries

Descriptions of activities reported by respondents may actually not be a single activity but several activities, in particular when giving free-text answers. Examples of such activities include travelling, socializing or entertainment that involves going to a venue, visiting or receiving visitors for more than a few hours. Sometimes respondents report simultaneous activities that are actually sequential. With fixed interval diaries, longer intervals may lead to more errors of this nature.

How to edit multiple activities. It is necessary to decide whether to code the activities as simultaneous or sequential. Depending on how time is allocated between simultaneous activities, the effect of this decision may vary to a greater or lesser extent. The effect is less if time is divided equally between simultaneous activities and more if one simultaneous activity is assigned as the primary activity and the other as the secondary activity. This is a difficult scenario as substantive expert knowledge is required to interpret it. Should the activities be coded to different ICATUS 2016 divisions? NSOs must have clear rules on how to allocate time for multiple activities and, if the decision is to treat them as simultaneous activities, on the criteria for selecting which one is the primary activity.

(vi) Contextual information

Activity episodes reported in a diary may be missing location or other contextual variables.

How to edit missing contextual information. Sometimes it will be possible to impute some variables. For example, cooking is likely to occur at home, a childcare

activity is likely to occur in the presence of the respondent's own children, and travel on a return trip may be the same as on the outward trip. Other times, the variable may be coded as missing.

(vii) Simultaneous activities

A respondent may be engaged in an activity for a long interval of time but does not report this consistently in the diary. For example, childcare/childminding may take place over the course of a day while the respondent is engaged in various other specific activities; the other activities might be reported as they occur, but childcare might only be reported sporadically in the diary. In such cases, it is important to be careful and to use all contextual information available before making edits. It is difficult or impossible to provide generic guidance in this respect. Some further considerations are discussed in chapter II.

(c) Stylized questions-only checks

These edit checks are only relevant to stylized questions, not diaries.

(i) Total time

When using a stylized questionnaire, interviewer checks or automated calculation should ensure that the total number of hours reported does not exceed (by much) 24 hours in a day or 168 hours in a week when excluding simultaneous activities, such as supervisory care. In interviewer-administered surveys, interviewers should do their best to assist respondents in reconstructing the day in order to obtain more accurate estimates of time use, without creating an undue burden.

If activity categories are exhaustive, the total time should not be (much) less than 24 hours in a day or 168 hours in a week. If activity categories are not exhaustive, the total time accounted for may be less; survey managers should decide on an appropriate minimum amount of time.

How to edit total time that is too high or low. Rather than rejecting all the questionnaires that are not exactly 24 or 168 hours, the survey should set a threshold or a margin of time above or below those total times that is acceptable. Chile is currently studying the idea of adopting a maximum of 48 hours per day, including simultaneous activities. See table XI.2 for other country examples.

(ii) Omitted activities

A questionnaire that fails to meet the minimum threshold of activities can only be rejected, not edited.

C. Imputation

Imputation is the process used to resolve the problem of missing or invalid information and inconsistent responses identified during editing. Imputation is then used to handle remaining edit failures at the processing stage, since it is desirable to produce a complete and consistent file containing imputed data. The general principles for imputing missing or invalid survey data are outlined in the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

In general, standard imputation specifications and quality indicators for evaluating missing, invalid or inconsistent time-use data need to be specified. Two important quality issues related to imputation are:

- Which variables should be imputed in the time-use survey?

Imputation should be used with caution to avoid introducing bias into the data. While imputation was used more extensively in Australia in the past, the country has moved away from this process. For its 2020/21 survey, a very small number of variables

were imputed, such as sleep. It was made clear in the survey outputs that the results were based on what people had reported. As for the American Time Use Survey, background demographic and labour-force variables were imputed, but missing time diary data were not, with the exception of minor editing of location codes. Missing time diary data were coded as "Refused" or "Don't know/Can't remember". Interviews were dropped from the sample if too much time was uncoded (see table XI.2 for the thresholds used in the United States and other countries to determine whether a diary is sufficiently complete).

- Is there enough information to use for imputing the missing information?

Choosing an appropriate imputation methodology is important, as some methods of imputation do not preserve the relationships between variables or can distort underlying distributions. For example, if the location changes but travel time is not included, decisions will have to be made, in order to impute travel, about how much travel to impute and which activity on either side of the location change will have a decrease in time.

The imputation procedures may be automated or computerized, manual or a combination of both. Implementing automated imputation methods can improve accessibility and reduce processing costs. Imputation will, however, add extra time to the data-processing stage.

All imputations should be flagged.

D. Data preparation and management

1. Preparation of analysis files

(a) File formats for time data

Individual and household background information is organized into data files in the same way as any household survey. The household-level file contains all data items from the household questionnaire and the estimation weights corresponding to the household level. The person-level file contains the data items from the individual questionnaire and the estimation weights. If there is only one individual per household, all background information may be in one file. If there are multiple individuals per household, there may be a single household file and multiple individual files.

Time data are organized into data files in different ways, depending on the format in which the data were collected.

Stylized questions yield one set of values per person-day. These can be organized into a person-day file, where each row or record corresponds to a person-day, with a duration variable for each activity and a person-day estimation weight. This kind of data file would have as many records as person-days. If time data are collected for only one day per respondent, time and background data can go into the same record.

Fixed interval diary data may also be organized into a person-day file, with variables for each time interval and a diary-day weight. If the interval is 15 minutes, each row or record is a person-day with 96 main activity variables, 96 secondary activity variables and 96 location variables, among other variables. It is easy to sum these variables to create a duration variable for each activity, in much the same way as the stylized question file. An alternative is to use start and end times to create an episode file.

Open interval diary data are organized into an episode file, where each row or record corresponds to an episode. The episode record includes data on the start and end times of the episode and the items that delineate an episode – the main, secondary and other activities and context variables – as well as the diary day weights. This type

of data file would have as many records as there are episodes, with a varying number of records for each diary day and for each respondent.

Table VII.1 provides examples of variable names and definitions from the 2015 general social survey on time use conducted by Statistics Canada, and table VII.2 shows an extract from the episode file of the same survey. In the survey, respondents were asked where they were, whom they were with, if they were doing something else at the same time and if they were using technology at the same time, for each activity lasting 10 minutes or longer. For two random episodes, respondents were also asked about their level of subjective well-being during the activity. The reference day was the day of the week assigned.

Table VII.1
Extract from the list of episode file variables from the 2015 Statistics Canada general social survey on time use

Variables	Definition
TUI_01	Activity code of the episode
TUI_06A to TUI_06J	Indicates with whom the respondent was during the activity mentioned in TUI_01 (up to 10 people)
TUI_03A and TUI_03B	First and second simultaneous activities (maximum of two)
TUI_07	Indicates whether or not technology was used during the activity mentioned in TUI_01
TUI_10	Level of subjective well-being during the activity mentioned in TUI_01 (asked for only two activities in the day)
DURATION	Duration, in minutes, of the episode (derived from the variables STARTIME, ENDTIME, STARTMIN and ENDMIN)
LOCATION	Location where the activity took place
DDAY	Diary reference day
WGHT_EPI	Weight of episode mentioned in TUI_01
PUMFID	Record identification number (not related to the episode)

Table VII.2
Extract from the episode file from the 2015 Statistics Canada general social survey on time use

PUMFID	TUI_01	DURATION	LOCATION	TUI_06A	TUI_06B	TUI_06C	TUI_06D	TUI_06E	TUI_06F	TUI_06G	TUI_06H	TUI_06I	TUI_06J
10000	1	120	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	6	60	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	60	30	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	1	180	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	7	10	Travel - Car (Driver)	Yes	No	No	No	No	No	No	No	No	No
10000	7	80	Travel - Car (Driver)	Yes	No	No	No	No	No	No	No	No	No
10000	7	15	Travel - Car (Passenger)	No	No	No	No	No	No	No	Yes	No	No
10000	6	60	Restaurant, bar or club	No	No	No	No	No	No	No	Yes	No	No
10000	7	45	Travel - Car (Passenger)	No	No	No	No	No	No	No	Yes	No	No
10000	60	120	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	21	120	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	2	30	At home or on property	Yes	No	No	No	No	No	No	No	No	No
10000	5	60	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	50	30	Outdoors	Yes	No	No	No	No	No	No	No	No	No
10000	50	20	Outdoors	Yes	No	No	No	No	No	No	No	No	No
10000	60	100	At home or on property	No	No	No	No	No	No	No	No	No	Yes
10000	1	210	At home or on property	Yes	No	No	No	No	No	No	No	No	No

(b) Analysis files

As with other hierarchical household surveys, data files with the individual and household background information will need to be merged with time data in order to conduct analyses by population subgroups. The type of analysis determines the type of data file needed.

For most analyses, such as calculating the average time or participation rate for activities for specific subpopulations (see chapter IX), the person-day is the unit of interest. Stylized questions and some diaries will already be organized into a person-day file. For other diaries, it may be necessary to derive variables from the episode file to merge into the person-day file. Vézina (2019), available in the hub, provides an example of how to derive variables for total duration and number of episodes for an activity category from the episode file to merge into the "main" or person-day file. This creates variables summing the duration of each of the activities and the number of episodes of each activity, as shown in figure VII.1. The example includes the SAS and Stata code.

Figure VII.1
Extract from the main file of the 2015 Statistics Canada general social survey on time use

PUMFID	DUR01	DUR2	DUR5	DUR6	DUR7	DUR21	DUR0	DUR60
10000	510	30	60	120	150	120	50	400

PUMFID	EPI01	EPI2	EPI5	EPI06	EPI7	EPI21	EPI50	EPI60
10000	3	1	1	2	4	1	2	4

Note: DUR01 is the duration of activity 1 and EPI01 is the number of episodes of activity 1. In this example, the respondent had three episodes of activity 1, for a combined total of 510 minutes; one episode of activity 2 totalling 30 minutes; and four episodes of activity 60 totalling 400 minutes.

In the person-day file, diary data are no more complex to analyse than data from stylized questions, but the person-day file makes it possible to analyse not just averages but also daily rhythm and create interesting visualizations depicting sequence and timing (described in chapters IX and X).

Many analyses can be conducted with either the person-day file or the episode file (after merging the person-level variables). Other analyses, involving a combination of episode attributes, such as where the respondent was when they were working or what else they were doing while watching television, can be done only from an episode file.

Other file structures may be appropriate, depending on the goal of the analysis. Combining person-level characteristics with the episode file is necessary to determine, for example, whether men or women spend more time doing a specific activity in the presence of children or whether men or women are interrupted more often to do other things when working from home. If data are collected from multiple household members with the aim of examining intrahousehold dynamics, it will be necessary to create a household-level analysis file.

One of the ultimate goals of data processing is to prepare the planned tabulations for the survey. For this purpose, careful preparation of specifications is required for each proposed table. Among other things, the specifications must spell out the codes or values of each analysis variable and classification variable in the table, the data file to be processed and the location of the information in the data file. A useful tool is the "table format" or a "dummy" table that spells out the specifications. The processing system should also be set up so that the statistical office is able to prepare special tabulations to meet emerging needs for data analysis.

Box VII.2
Quality checklist: processing

- Create a clear set of rules and principles to be used when editing and cleaning diary data and ensure that the implications thereof are understood. For example, determine to what extent the editing principles will prioritize the completeness or internal consistency of a diary over maintaining the data as reported. When imputation is used, flag the data.
- Consider the level of detail to be achieved in data entry and minimize this where possible.
- Consider the different options available for data entry and coding, the resources required for each and the effect on data quality (such as manual coding/amendments, at the time of data entry or partially automated through statistical programming, precoded forms, machine learning).
- Consider the cost of proposed data editing actions compared with the value added to the data set.
- Consider whether there are statistically significant impacts of proposed data amendments.
- Implement a quality assurance process for manual data entry, coding or editing.
- Ensure the security and integrity of the data integration and processing system, such as the physical security of forms, and ensure that data are not overwritten.
- Review the data quality of responses and identify gaps in data collected to determine whether needs will be met. For example, to what extent the data can be used without editing or amendment or whether certain diary fields have more missing data than others.
- Determine the criteria for the inclusion of diaries in the final data set, based on the level of quality required. For example, consider the number of activities reported per day or the number of hours for which data are missing.
- Validate data through each processing step.
- Validate the link between questionnaire and diary data.
- Plan processing tasks to improve efficiency and minimize the impact on the data release timetable.
- Consider the file structure and how to set up data sets that are as easy as possible to use (such as combining data items across different levels of the data set).

VIII. Weighting and estimation for time-use surveys

A. Issues in weighting and estimating of time-use statistics

After the survey data are collected and edited, estimation weights are attached to respondent records to produce the estimates of the population. The estimation process accounts for sampling by creating weights that are the inverse of the probability of selection (base weights). In most household surveys, a base weight is a measure of the approximate number of people that the sampled person represents, because there is a sample population of persons for most household surveys. Time-use surveys sample person-days, not people (see chapter V for further discussion on sample designs for time-use surveys). Since the unit sampled is a person-day, each person-day has its own base weight.

These base weights are then adjusted to account for sampled units that do not respond (non-response adjusted weights) and may be further adjusted to make the estimates consistent with known population totals, such as the number of persons in the country, by age and sex. For time-diary surveys, the weights should add up to the number of person-days and should be adjusted to ensure correct day-of-week representation. Incorporating weights to account for sampling over time is a unique feature of time-use surveys.

In the discussion that follows, it is assumed that a probability sample of households, and possibly persons within those households, has been selected using a multistage sample design. First the sample of households is selected. Within a household, either all eligible persons are included or a sample of household members is selected. The time use of the sampled persons is measured for a limited period of time, usually one or two days or a week during the year. How days are sampled will affect how weighting is done. If particular days of the week are oversampled or undersampled, the weights will need to account for this.

For person-day analysis, such as is needed to produce estimates for accounts of household production, SNA or satellite accounts, the proportion of time spent on paid work, or the proportion of time spent by women on childcare, a single weight for each interview is all that is needed. For other units of analysis, multiple weights might be needed. For example, if multiple members of the same household were surveyed, separate weights would be developed for person-level and household-level analysis.

A major issue in the estimation scheme for a time-use survey is the treatment of the time dimension. Since every estimation procedure is heavily dependent on the sample design, the way the sample treats the time dimension should be reflected in the weighting scheme. For example, if the design calls for a sample of weekdays and a sample of weekend days, then the estimation scheme should account for this explicitly. If weights are properly designed, then weighting should be straightforward.

Weighting methods are best understood when the structure of the data file and terms, such as a respondent or a record in the file, are clearly defined. In time-use surveys in which a person is sampled for one time period, one data record suffices both for the person and the time period. The situation is more complex when persons are sampled for more than one time period. A person sampled and responding for two days would have two records on the data file. Each record would have one estimation weight, but the weights might not be the same. More than one weight may be required if statistics for more than one unit of analysis (e.g. person-days, persons, households) are computed from the survey.

The ability to create weights that produce approximately unbiased estimates of population characteristics requires careful coordination between the survey's operations and analysis teams. For weighting, the probabilities of selection must be tracked for every record so that the data needed may be properly captured and associated with the data records. Similarly, non-response adjustments require that data from the sampling frame or another source be linked to all the records. For post-stratification type of adjustments, care in the design of the data-collection instrument is essential so that the survey and the source of the data for the post-stratification are consistent. The link between the operations and the statistical methods is essential to making any survey successful.

B. Imputation versus non-response adjustments

As with other surveys, there are several types of non-response in time-use surveys. Weighting is the best method of adjusting for unit or person non-response, whereas imputation is the best method of adjusting for item non-response (see chapter VII for more information on imputation). The complexity of time-use surveys is when some, but not all, selected household members provide data or the selected individuals provide data for some days and not others. Weighting, not imputation, should be used in these situations.

Suppose that two people in a selected household are asked to report on one weekend day and one weekday. One person provides data for both days, but the other for the weekday only. Weighting is the recommended approach for handling the missing diary day. One option that may appear attractive is to impute the missing day by filling it in with the reported data from the same person, since the data "donor" and "recipient" certainly match on the key variables that would be used to define imputation classes. However, there are two problems with this imputation approach. First, it is equivalent to doubling the weight of the reported time period. Second, and more importantly, since the missing period is a weekend day and the reported period is a weekday, simply imputing the missing period will provide very misleading information, including probably more paid work and less unpaid work or leisure. A better procedure might be to create weighting classes that distribute the weight for the missing time period more smoothly over a group of records that have the same characteristics.

The same issues arise when multiple persons are sampled within a household and one does not respond. The approach of imputing the missing data using donors from the same household is problematic, as their activities may be complementary. For example, if one parent spends a lot of time caring for the children, it is likely that the other parent will spend less time providing care. Weighting is a better way of dealing with person non-response than imputing.

C. Weighting

1. Base weights

In time-use surveys, the base weight is a measure of the approximate number of person-days that the sampled person-day represents. The standard procedure for producing base weights in a household sample survey is to constitute the weight as the inverse of the probability of selection of the unit. In multistage samples, the weights are created at each stage and then multiplied to produce an overall weight for a sampled unit.

As an example, suppose that a sample of PSUs is selected, that within the sampled PSUs a sample of households is selected, and that within the sampled households a sample of persons is selected. The overall person weight is the product of three terms,

with each term being the inverse of the probability of selection at the respective stage. The weight for a sampled person is

$$w_{(hi)j} = w_h \cdot w_{hi} \cdot w_{hij} \quad (1)$$

where w_h is the inverse of the probability of selecting PSU h, w_{hi} is the inverse of the probability of selecting household i within PSU h and w_{hij} is the probability of selecting person j from household i in PSU h.

For example, if PSU h is sampled with a probability proportional to size that is equal to 0.10, then its weight is . Suppose further that within PSU h, 50 households are listed and 4 are selected. The weight for any of these sampled households in PSU h, , is 12.5 (= 50 divided by 4). If every eligible person in the household is sampled, then . In this case, the overall weight, $w_{(hij)}$ =125 (=10 × 12.5 × 1). If, however, only one person is sampled per household, and household i has three persons, then w_{hij} =3 for sampled person j. More generally, if every eligible person in the household has the same probability of selection, then w_{hij} = is the number of eligible persons in the household divided by the number of persons sampled.

The weight given in equation (1) is the typical household survey weight, but it does not explicitly deal with the time dimension. In a time-use survey, this weight would be sufficient if data for the sampled person were collected for the entire time period of the survey. An additional weighting factor must be introduced to account for the sampling of time periods. In general, the time weighting factor, w_{hijk} , is the number of eligible time units in the period divided by the number of these units for which the person is sampled. The overall weight for estimating person-days (or any other unit of time) is

$$w_{(hij)k} = w_h \cdot w_{hi} \cdot w_{hijk} \quad (2)$$

This formulation of the time-dimension weight allows time periods to be sampled using different selection criteria. For example, if one weekday and one weekend day are sampled for a person, then the two periods have different weights. The appropriate weight, w_{hijk} , for a weekday would be the number of weekdays in the year, while the corresponding weight for the weekend day, w*hijk*, would be the number of weekend days in the year. Each record on the person-day data file would have the single weight that is appropriate for that day.

This formulation also allows for variations in the number of sampled time periods for sampled individuals. For example, since w_{hijk} is specific to the sampled person, it accommodates designs in which some persons are sampled for one day, others for two days and others for a full week.

The basic weight given in equation (2) is appropriate for producing person-day estimates. For household estimates, the same process could be followed, eliminating, however, the factor associated with sampling persons within a household.

2. Non-response adjustments

The weight given in equation (2) assumes that complete data are collected for every sampled unit at each stage. While this is clearly the ideal situation, unit non-response is almost always encountered in practice. For example, a sampled household is not contacted or refuses to participate in the survey and as a result no time-use data are collected for that particular household. A variety of adjustment methods exist to offset the losses due to non-response,[32] but only weighting class adjustments are discussed here. Weighting class adjustments are relatively easy to implement and are effective for handling unit non-response.

[32] There are many articles on adjusting for non-response in sample surveys. Elliot (1991) provides a very readable introduction to the topic. Bailar, Bailey and Corby (1978), Chapman, Bailey and Kasprzyk (1986) and Tremblay (1986) cover practical methods of non-response adjustment with emphasis on weighting class adjustment methods.

(a) Weighting class adjustments

The first step in forming weighting class adjustments is to form groups or classes of sampled units that are expected to be similar with respect to their probability of responding to the survey or with respect to other key variables in the survey. To do this, the variables used to form the classes must be known for all sampled units, not just the responding ones. The second step is to divide the ratio of the sum of the weights of the sampled units by the sum of the weights of the responding units in each class. If all the units in the class have the same weight, the ratio is simply the ratio of the number of sampled units to the number of responding units. The ratio is the non-response adjustment factor that is applied to all the responding units in the class. The non-responding units are either assigned a zero weight or simply dropped from the analysis file.

For example, suppose some households did not respond to the time-use survey and the non-response adjustment classes are regions of the country ($r = 1, 2, \ldots, R$). Equation (2) should be modified by multiplying , the weight of selecting household i within PSU h, by the appropriate regional non-response adjustment factor given by

$$\mathrm{NR}_{hh,r} = \frac{\sum_{i \in r} \mathrm{w}_{hi}}{\sum_{i \in r} \mathrm{w}_{hi} \delta_i} \qquad (3)$$

where the sum is over all the sampled households in region r and δ_i is equal to 1 if the unit responds and to 0 otherwise. The numerator of the adjustment factor is the sum of the weights for the records in a specific region (r). The denominator is the sum of the weights over the same set of records, but only the weights for respondents are included in the summation. The same procedure can be used at each stage of weighting to account for unit non-response at that stage. The base weight for that stage is replaced by the product of the base weight and the non-response adjustment. The result is still an overall weight like equation (2), but the weights are the non-response adjusted weights at each stage and only the records for the respondents are included in the analysis file.

(b) Issues in the development of non-response adjustments

In the development of non-response adjustments, several issues deserve special attention. One issue is the number of respondents in each class; the number should be large enough so that the adjustment factor is stable. A common choice is a minimum of between 20 and 30 respondents in each class, although classes with more respondents are recommended. Another consideration is the size of the non-response adjustment. A useful rule of thumb is that the non-response adjustment for a class should not exceed two times the overall average adjustment. Classes may be combined or redefined to avoid these two situations. The choice of variable to be used in forming the classes is another key decision. Often, only a few variables are known for both respondents and non-respondents so the choice is very limited. For example, it may not be possible to go beyond classes that separate units into urban and rural cases. When many variables are available, more sophisticated methods, such as search algorithms or logistic regression analysis, might be used to identify the classes.[33]

[33] Brick and Kalton (1996) describe some of these options.

In the typical time-use survey design, sampled persons are asked to complete a basic questionnaire and to record time use for sampled time slots (often a full day) in a diary or some other data-collection instrument. Given this design, there is the risk that some persons may respond to the basic questionnaire but not complete the time-use diary. A weighting class adjustment of w_{hijk} for the missing time-use data has the potential to substantially reduce non-response bias in this case. Substantial bias reduction is possible if data from the basic questionnaire have variables highly correlated with time use that can be used to form the weighting classes. When many variables are

available, the investigation of the most important ones by use of a search algorithm or similar technique as outlined earlier may be profitable.

Non-response adjustment classes, designed to compensate for persons who are sampled for multiple time units (e.g. days) but respond only for some of these units, are an important case. One option is to form weekday and weekend day classes so that the adjustments are separate for these classes. An extension of this option might be to form classes by day of the week and season of the year, if the sample sizes in each of the classes are sufficient. If substitute days are allowed in the survey, then these substitutes should be treated as if they were observed values in the weighting so as to avoid over-adjustment for the missed periods.

D. Generating estimates of time use

In the present section, a simplified illustration is presented of how the weighting and estimation procedures discussed above can be utilized in the analysis of time-use survey data. In the discussion that follows, assume that the estimation methods outlined earlier have been implemented and that an analysis file contains the items collected in the survey, imputed as needed, as well as the adjusted survey weights and the data needed for computing variances. For the purpose of estimating time use using data collected on reported time periods, the analysis file should be constructed so that each time period corresponds to a record on the file.[34]

[34] A detailed discussion of file structures is covered in chapter VII.

1. Estimation at the person-day level

For ease of presentation, the fully adjusted weight for person j and time period k is written as w_{jk} – the subscripts for PSU and household are suppressed. It is also assumed that each sample time period is of a fixed duration, for example one day. With this structure, survey estimates can similarly be produced in most common sample designs.

Estimation of totals. Estimates of totals for the entire population or for subgroups of the population are easily produced from a file with the structure described above. For example, the total time spent by all eligible persons working for pay may be estimated as

$$\hat{y} = \Sigma_{j,k} w_{jk} y_{jk} \qquad (4)$$

where is equal to the number of hours per day spent working for pay by person *j*. The total (y-hat) is then equal to the total number of hours spent in the activity.

An estimate of a total for a subgroup, for example the total time spent by all eligible persons working for pay in region *r* of the country, is

$$\hat{y}_r = \Sigma_{j,k} w_{jk} y_{jk} \delta_j \qquad (\text{region} = r) \qquad (5)$$

where

$$\hat{y}_r = \begin{cases} 1, \text{ if person } _j \text{ lives in region r} \\ 0, \text{ otherwise} \end{cases}$$

2. Estimation of means, proportions and ratios

Given the file structure described above, estimates of means, proportions and ratios can also be easily developed with a file of this structure. Continuing the previous example, an estimate of the mean time spent working for pay by eligible persons in region *r* is given by

$$\hat{y} = \frac{\sum_{j,k} w_{jk} y_{jk} \delta_j \text{ (region=r)}}{\sum_{j,k} w_{jk} \delta_j \text{ (region=}r\text{)}} \qquad (6)$$

This statistic is also an estimate of the proportion of time spent working for pay by persons in region *r*. It is valuable to remember that a proportion is a special case of estimating a mean. In fact, a mean is a special case of estimating a more general ratio in most multistage samples. An example is the ratio of the mean time spent by men working for pay to the mean time spent by women working for pay in region *r*. An estimate of the ratio is given by

$$\hat{q}_r = \frac{\dfrac{\sum_{j,k} w_{jk} y_{jk} \delta_j \text{ (region=}r\text{) } \delta_j \text{ (male)}}{\sum_{j,k} w_{jk} \delta_j \text{ (region=}r\text{) } \delta_j \text{ (male)}}}{\dfrac{\sum_{j,k} w_{jk} y_{jk} \delta_j \text{ (region=}r\text{) } \delta_j \text{ (female)}}{\sum_{j,k} w_{jk} \delta_j \text{ (region=}r\text{) } \delta_j \text{ (female)}}} \qquad (7)$$

When estimating means, proportions and ratios, the effect of missing item responses is not as simple as with estimates of totals. For example, consider estimating the mean time spent working for pay by eligible persons in region r where y_{jk} is the proportion of all the reported time slot data. This estimate of the mean may be either an overestimate or an underestimate. If the missing time slot data are imputed with as good predictors as the imputation class variables, then the bias due to the item non-response may be smaller than if the data were left missing. The same issues arise with other estimates of proportions and ratios.

3. Estimation at the person and household levels

In time-use surveys with both a basic questionnaire and a diary, it is not uncommon to produce estimates of both persons and person-days. The description above relates to person-days but can be easily transformed to apply to estimates of characteristics of persons by using data from the basic questionnaire, and a person weight, rather than a person-day weight. The analysis file in this case should contain one record for each responding person with the adjusted person weight, irrespective of the number of time periods the person reports. The same procedure also applies for household-level estimates if a household-level file and weight are created.

For example, an estimate of the total number of persons who work for pay in region *r* of the country is

$$\hat{t} = \sum w_j'' \, \delta_j \text{ (region = } r\text{) } \delta_j \text{ (work for pay)} \qquad (8)$$

where w_j'' is the adjusted weight for person $_j$ (not person-day) and

$$\delta_j\text{(work for pay)} = \begin{cases} 1, \text{ if person } j \text{ works for pay} \\ 0, \text{ otherwise} \end{cases}$$

Confusion occurs in some analyses when data are collected at multiple levels, such as household, person and time period. The problem occurs when analysts try to characterize an entire unit using data reported from a subset. For example, it is clearly incorrect to state that the household has no persons who are female because the only sampled person is male. The same problem occurs if estimates of the percentage of persons who engage in a time-use category are characterized by virtue of an activity they performed on a specific day. In other words, it is incorrect to state that a sampled woman does not spend any time caring for children just because she did not report

this activity for the sampled day. An appropriate analysis for this should be at the unit of analysis for which the data are collected. In this case, the statistic should be at the person-day level and the estimate is the percentage of time women spend on childcare.

To avoid this type of problem, it is suggested that only the weight that is appropriate at a certain level of analysis be included. Therefore, only a person-day weight would be included in the analysis file that contains the data for each sampled day. Another file with a person weight could be developed for estimating person-level characteristics. This suggestion also helps to eliminate the confusion that sometimes occurs when a data file has more than one weight.

Box VIII.1
Quality checklist: weighting and estimation

- Design a weighting strategy to create accurate estimates based on time-use data (in particular, to ensure that the days of the week are weighted proportionally) and data requirements.
- Consider whether there are statistically significant impacts of proposed data amendments.
- If more than one collection mode has been used, check for mode effects (note that if any statistically significant difference is detected, independent samples are required for each mode).
- If more than one collection mode has been used, consider whether they will be treated separately during weighting.

IX. Preparation of survey outputs

A. Key survey outputs

Information collected from time-use surveys is organized and summarized in comprehensive statistical tables as the first survey outputs. These tables shed light on people's activities over the course of the 24 hours in a day or sometimes a week, for example which activities they participate in and for how long, disaggregated by a few basic variables such as sex, age and location. Typically, estimates are expressed as functions of population totals, for example total number of hours spent on an activity, proportion of persons participating in an activity (participants), average number of hours spent on an activity by participants and proportion of time spent on an activity per day. While stylized questions permit reporting on total time and participation, data from diaries can also be used to present information on the timing and sequence of each episode of the activity, as well as activity-related contextual variables. In addition to tables, visualizations help analysts to understand the data. Visualizations are discussed in chapter X, as they are generally used to communicate results to others, but they can be helpful at an earlier stage for identifying trends that could be explored further.

Specifications for the statistical tables can be described in terms of analysis variables (e.g. activity, location, other context variables), classification variables (e.g. sex, age) and key statistics (e.g. total time spent by the population on an activity). The choice of variables and statistics, as well as the level of detail, depends on the analytical objectives of the survey. Such analysis may be at the household level, person level or person-day level.

In this section, the key statistics needed for most general types of analyses on how people spend their time are discussed and a basic tabulation plan for generating these statistics is then suggested.

1. Key time-use statistics

The basic units of analysis of time-use measures are the activity and the episode. Key indicators should be disaggregated by sex and age group at least, as well as location and any other variables that are considered important in the national context, if the sample size permits (i.e. those domains considered important at the sampling stage). Indicators should specify the temporal unit. While they most often refer to an "average" day, they may also refer to an average weekday, average weekend day or average week. For some activities (e.g. those related to agriculture), they may even refer to a season, quarter or year.

All time-use surveys, whether based on full or light diaries or stylized questions, should provide data to calculate the following key indicators on activities:

Participation rate. This is the percentage of the population that reported doing the activity. It is calculated by dividing the total number of persons who reported doing the activity by the total number of persons in a given (sub)population. A participant in an activity is a person who has reported as least one occurrence of the activity per reference period.

$$\text{Participation rate} = \frac{\text{Number of persons who reported doing the activity}}{\text{Number of people in (sub)population}}$$

Average time spent on activities by participants. This is obtained by dividing the estimated total time spent on the activity per reference period by the total number of persons who reported doing the activity.

$$\text{Average time spent on activities by participants} = \frac{\Sigma \text{ time spent on activity by total (sub)population}}{\text{Number of persons who reported doing the activity}}$$

Average time spent on activities by total (sub)population. This is computed by dividing the estimated total time spent on the activity per reference period by the total number of persons in a given (sub)population.

$$\text{Average time spent on activities by total (sub)population} = \frac{\Sigma \text{ time spent on activity by total (sub)population}}{\text{Number of people in (sub)population}}$$

Differences among groups or over time may be due to a difference (or change) in the proportion of those participating in the specific activity or a difference (or change) in the amount of time spent by participants, or both.

Diary-based surveys also serve to provide data on episode characteristics and activity-related contextual variables. The following are key indicators on episodes:

Average duration of an episode. This indicator is calculated by dividing the estimated total time spent on a specified activity per reference period by the total number of episodes of the activity.

$$\text{Average duration of episode} = \frac{\Sigma \text{ time spent on activity by total (sub)population}}{\text{Number of episodes of the activity}}$$

Average number of episodes. This indicator is computed by dividing the total number of episodes of a specified activity by the total number of persons in a given (sub)population.

$$\text{Average duration of episode} = \frac{\Sigma \text{ episodes of the activity}}{\text{Number of people in the (sub)population}}$$

Average number of episodes per participant. This is obtained by dividing the total number of episodes of a specified activity by the total number of persons who reported doing the activity.

$$\text{Average number of episodes per participant} = \frac{\Sigma \text{ episodes of the activity}}{\text{Number of persons who reported doing the activity}}$$

These indicators are calculated using an episode data file. The number and length of episodes provide information on time pressure and the extent to which time is fragmented. This is important from a gender perspective, as women's time is typically more fragmented than that of men. Research conducted in the United States of America and Belgium shows that fragmented leisure time can be perceived as being of a lower quality (Mullens and Glorieux, 2020; Mattingly and Bianchi, 2003).

The above measures are essentially means or proportions taken over either the entire survey (sub)population or a subset of the (sub)population that engaged in the specified activity (participants). The total number in the survey population remains constant while the total number of participants changes depending on the activity. Table IX.1 shows the differences in the resulting statistics by presenting the measures in terms of their numerators and denominators. Indicators should be calculated using the appropriate weights (see chapter VIII for more information).

Table IX.1
Six key time-use measures

Denominator	Numerator		
	Total duration of activity	Total number of episodes of activity	Total number of persons performing activity
Total number of persons (population)	**Average time** duration / (all persons)	**Average number of episodes** episodes / (all persons)	**Participation rate** doers / (all persons)
Total number of persons performing activity (participants)	**Average time among participants** duration / doers	**Average episodes among participants** episodes / (all persons)	Not applicable
Total number of episodes of activity	**Average duration of episode** duration / episodes	Not applicable	Not applicable

Source: United Nations (2005).

Figure IX.1 shows how time-use measures from the 2013 time-use survey by Statistics Belgium appear in an analysis table. The figure shows that approximately 14 per cent of the population studied or went to school (the participation rate for education) on weekdays. Of those who studied or went to school, the average time that they spent doing so was six hours (average time per participant), while the average time spent by the whole survey population was only 50 minutes (average time per respondent). A table like this can be produced from a very light diary or aggregated from a diary with more categories.[35]

[35] A more detailed summary table of the same data before they were aggregated can be downloaded as a spreadsheet from https://statbel.fgov.be/en/themes/households/time-use-survey#figures.

Figure IX.1
Summary table for the 2013 Statistics Belgium time-use survey

Day of the week	Weekdays			Saturday			Sunday		
	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate	Duration per respondent (h/day)	Duration per participant (h/day)	Participation rate
Paid work	02:44	07:21	37.2 %	00:47	06:06	12.8 %	00:25	04:53	8.5 %
Household work	02:29	02:53	86.0 %	03:01	03:25	88.3 %	02:18	02:42	85.1 %
Childcare and raising children	00:22	01:32	23.6 %	00:20	01:47	18.8 %	00:21	01:45	19.6 %
Personal care	02:23	02:23	100.0 %	02:38	02:38	100.0 %	02:35	02:35	100.0 %
Sleep and rest	08:48	08:48	100.0 %	09:14	09:14	100.0 %	10:08	10:08	100.0 %
Education	00:50	06:02	13.6 %	00:18	03:46	7.8 %	00:18	03:25	8.6 %
Social participation	01:15	01:47	69.4 %	02:02	02:38	77.1 %	01:53	02:24	78.8 %
Free time	03:46	03:58	94.9 %	04:21	04:37	94.3 %	04:59	05:09	96.9 %
Transportation	01:18	01:29	87.4 %	01:15	01:28	84.4 %	00:59	01:20	74.5 %
Other	00:05	00:39	12.4 %	00:05	00:45	11.2 %	00:05	00:39	12.0 %

The daily rhythm of the population can be presented in a table, with a column for each time increment.[36] However, information on the daily rhythm of the population is usually presented in graphs. Some examples are provided in section C of the present chapter.

[36] For an example of a table showing the percentage of the population that engaged in selected activities by time of day from the 2021 American Time Use Survey, see www.bls.gov/tus/tables/a3-2021.htm.

Internationally agreed indicators

The international community has agreed on a set of indicators to monitor progress towards the achievement of sustainable development and gender equality. Three internationally agreed indicators based on time use are described below.

Sustainable Development Goal indicator 5.4.1: proportion of time spent on unpaid domestic and care work, by sex, age and location

This indicator is defined as the proportion of time spent in a day on unpaid domestic and care work by men and women. Unpaid domestic and care work refers to activities related to the provision of services for own final use by household members or by family members living in other households. These activities are listed in ICATUS 2016 under major division 3 "Unpaid domestic services for household and family members" and major division 4 "Unpaid caregiving services for household and family members". The proportion of time spent on unpaid domestic and care work is calculated by dividing the daily average number of hours spent on unpaid domestic and care work by 24.

$$\text{Indicator 5.4.1} = \frac{\text{Daily number of hours spent on unpaid domestic work} + \text{daily number of hours spent on unpaid care work}}{24 * 100}$$

where

$$\text{Daily number of hours spent on unpaid domestic work} = \frac{\text{Total number of daily hours spent by the population on activities under major division 3}}{\text{Total population (regardless of whether they participated in the activity)}}$$

$$\text{Daily number of hours spent on unpaid care work} = \frac{\text{Total number of daily hours spent by the population on activities under major division 4}}{\text{Total population (regardless of whether they participated in the activity)}}$$

If the reference period is a week, a daily average is obtained by dividing the weekly average by seven, without differentiating between weekdays and weekend days.

Sustainable Development Goal indicator 5.4.1 includes unpaid work for household members and for family members who do not live in the household, as described in the metadata file.[37] This would include, for example, caring for older parents who live on their own. ICATUS 2016 major divisions 3 and 4 also include both household and non-household family members. Some activity classifications, however, such as CAUTAL, do not include non-household family members in unpaid care work (under CAUTAL major division 3). If this is the case, the measure of indicator 5.4.1 will be underestimated if unpaid care work performed for family members living in other households is not included. For this reason, it is recommended that countries not using ICATUS 2016 include all unpaid care and domestic work for household and family members when computing indicator 5.4.1.

[37] See https://gender-data-hub-2-undesa.hub.arcgis.com/pages/5cd5a6b4dbb04247bfa4984bde47882a.

For countries using the minimum harmonized instrument, activity categories 4–12 should be included in the computation of indicator 5.4.1 (see table IX.2). To ensure international comparability and alignment with ICATUS 2016, contextual variables, as well as previous and next episodes, should be used to capture travel related to unpaid domestic and care work activities, and this time should be included in the estimate of indicator 5.4.1.

Table IX.2
Activity categories to be included in the computation of Sustainable Development Goal indicator 5.4.1

No.	Activity	Type of work
4	Preparing and serving food and meals for own household or family members	Unpaid domestic work
5	Cleaning own or family dwelling	
6	Maintaining and making small repairs in own or family dwelling	
7	Cleaning and care of clothing and footwear of own household or family members	
8	Managing own household	
9	Taking care of pet of own household or family	
10	Shopping for own household or family	
11	Taking care of child (own household or family) (use country definition of child)	Unpaid care work
12	Taking care of or helping adults (own household or family) (use country definition of adult)	
24	Travel	Use contextual variables, as well as previous and next episodes, to capture travel related to unpaid domestic and care work activities

Indicator I.1 of the minimum set of gender indicators: average number of hours spent on unpaid domestic and care work, by sex, age and location

As a complement to indicator 5.4.1, indicator I.1 of the minimum set of gender indicators is a measure of the average number of hours spent on unpaid domestic and care work, by sex, age and location.[38] This indicator is expressed in daily hours and calculated as follows:

$$\text{Average number of hours spent on unpaid domestic work} = \frac{\text{Total number of daily hours spent by the population unpaid domestic and care work}}{\text{Total population (regardless of whether they participated in the activity)}}$$

[38] For more information on the rationale for reporting this indicator, see https://gender-data-hub-2-undesa.hub.arcgis.com/pages/5cd5a6b4dbb-04247bfa4984bde47882a.

Indicator I.2 of the minimum set of gender indicators: average number of hours spent on total work (paid and unpaid), by sex

This indicator is defined as the time spent in a day on paid and unpaid work by women and men for the production of goods and services for own final use or for the use of others. It includes all the activities within the SNA general production boundary.

Paid work refers to employment and related activities classified under ICATUS 2016 division 11 "Employment in corporations, government and non-profit institutions", division 12 "Employment in household enterprises to produce goods", division 13 "Employment in households and household enterprises to provide services", division 14 "Ancillary activities and breaks related to employment", division 15 "Training and studies in relation to employment", division 17 "Setting up a business" and employment-related travel. Employment-related travel is any travel for work purposes, such as making deliveries or driving a bus, that is not part of the commute to and from one's place of employment.

Unpaid work includes activities classified under ICATUS 2016 major division 2 "Production of goods for own final use", major division 3 "Unpaid domestic services for household and family members", major division 4 "Unpaid caregiving services for household and family members" and major division 5 "Unpaid volunteer, trainee and other unpaid work".[39]

[39] For metadata on indicator I.2, see https://gender-data-hub-2-undesa.hub.arcgis.com/pages/55aed10c12b04f2c99f5787a653b69c3.

$$\text{Total work} = \frac{\begin{array}{c}\text{Total hours spent on employment and related activities (divisions 11,12,13,14,15 and 17)} \\ + \text{total hours spent on employment-related travel (group 181)} \\ + \text{total hours spent on production of goods for own final use (major division 2)} \\ + \text{total hours spent on unpaid domestic work (major division 3)} \\ + \text{total hours spent on unpaid care work (major division 4)} \\ + \text{total hours spent on unpaid volunteer,trainee and other unpaid work (major division 5)}\end{array}}{\text{Total population (regardless of whether they participated in the activity)}}$$

More data on the minimum set of gender indicators can be found on the Gender Data Hub, and there are specific examples of how to compute time-use indicators on the time-use resources hub.[40] For an example of how to calculate participation rates and the average time spent on activities using Stata, see chapter 6 of *Harnessing Time-Use Data for Evidence-based Policy, the 2030 Agenda for Sustainable Development and the Beijing Platform for Action: A Resource for Data Analysis*. Vézina (2019), available in the hub, also provides an example of how these indicators can be calculated using SAS and Statistics Canada data.

[40] See https://gender-data-hub-2-undesa.hub.arcgis.com and https://unstats.un.org/UNSD-Website/demographic-social/time-use/resources-hub.

Box IX.1
Indicators on supervisory care

Data on supervisory care can help to inform a variety of gender-transformative actions and policies, in particular those targeting gender equality and the economic empowerment of women, as well as work-life balance policies and regulatory frameworks and policies on care. Data on unpaid supervisory care can play an important role in improving the measurement of unpaid household service work for the production of SNA extended accounts. Data serve not only to shed light on the constraints on supervisory care, but also to complement evidence on labour underutilization among women workers and to inform policies and actions that are aimed at enabling women workers to fully participate in employment. Data on supervisory care may be used to support advocacy efforts to develop regulatory frameworks on parental leave. Furthermore, in order to implement policies and programmes to provide care services (for children, older populations and persons with disabilities), a full understanding of the constraints on supervisory care is needed.

The subcommittee on supervisory care of the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics recommends that the following indicators be generated to disseminate relevant data on supervisory care:

1. **Supervisory care participation rate**: proportion of individuals in the total population that spends any amount of time in a day on supervisory care, disaggregated by sex, age group and location.
2. **Average time spent on supervisory care by total population**: average time spent on supervisory care in a day, by sex, age group and location.
3. **Average time spent on supervisory care by participant population**: this indicator, disaggregated by sex, age group and location, is expected to better illustrate gender gaps in the provision of supervisory care, as the denominator for its computation is the number of individuals who provide supervisory care (in any amount of time) during the reference period (excluding those who did not provide any supervisory care services).

As stressed in box II.4, the computation of the above-mentioned indicators includes only the time spent on activities that are in ICATUS 2016 group 416 and group 425, and does not include time spent on other activities that fall under major division 4 "Unpaid caregiving services for household and family members". It is also recommended to exclude the time when the respondent was engaged in activities that fall under division 91 "Sleep and related activities".

Box IX.1 (*continued*)

Depending on the availability of resources and feasibility of presenting data on simultaneity, NSOs are encouraged to disseminate data on supervisory care that are disaggregated by type of primary activity using the ICATUS 2016 major divisions (except for major division 4).

2. Basic tabulation plan for analysing time-use data

(a) Specifications for analysis and classification variables

Basic tables for analysis are specified in terms of (a) analysis variables; (b) classification variables; and (c) time-use measures.

The key analysis variable is, of course, the activity. Most standard statistical reports on time use present tables on time spent in main activities. It is, however, recommended that respondents should also be asked about simultaneous activities in time-use surveys. How simultaneous activities should be presented in tables is addressed briefly below.

Context variables may be analysed in combination with duration and activity (e.g. leisure time spent using ICTs or work time spent in the presence of children) or only with duration (time spent in the house).

Classification variables are used for defining the domains of study. These variables may be at the person level or at the household or family level. Relevant classification variables are those that define subgroups that are expected to differ substantially with regard to their use of time and those that are highly relevant in the policy issues under study. As most time-use studies are designed to inform policies on gender inequalities and on labour division, sex is an obvious classification variable. Age groupings should constitute basic domains of study. Other classification variables should also be considered, as long as the sample size allows, in particular to provide evidence of the situation of those that have historically been excluded from statistics. See section B of the present chapter entitled "Computation of sampling variances" for guidance on when standard errors are considered too large for estimates to be considered reliable. The characteristics that will be used as classification variables should be considered when deciding which background variables to collect (for more information on background variables, see chapter II).

The minimum harmonized instrument recommends collecting the following classification variables: age, sex, marital status, level of education, current school attendance, current employment and labour-force status, residence (urban/rural), household composition and household income.

Time use is known to vary across a person's life cycle. Populations should be divided into age groups that make sense for the survey objectives, the country context and the variable in question. Five-year or broader age groups may be appropriate. Depending on the country context and sample size, tables may serve for reporting broad age groups, such as young people (between 15 and 24 years of age), prime-age workers (between 25 and 64 years of age) and older persons (65 years of age and older). However, for analyses concerned specifically with issues of ageing, the age groups can be further subdivided into a group representing individuals who are relatively active and self-sufficient (between 60 and 69 years of age) and a group representing individuals experiencing the onset of disability, greater ill health and smaller incomes (70 years of age and older).

(b) Table specifications

It is useful to distinguish between three types of tables: working tables, simultaneous activity tables and thematic tables.

Working tables

Working tables are the core tabulations from which various analytical tables may be derived. These tables serve to report the duration or proportion of time spent in each category of a comprehensive list of activities. Duration can be expressed in terms of total time or average time.

Figure IX.2 illustrates the format of a core working table with main activity as the analysis variable from the 2021 American Time Use Survey. Working tables should utilize the most detailed level of the activity classification. The tables should show both the time-use measure and the number of persons in the population (for population-based tables) or the number of participants (for participant-based tables). Published tables of aggregate statistics may be derived by aggregating time-use measures in terms of higher levels of the activity classification.

Figure IX.2

Extract from table showing time spent on detailed primary activities and percentage of the civilian population engaging in each activity, averages per day by sex, 2021 annual averages

Activity	Average hours per day, civilian population			Average percent engaged in the activity per day			Average hours per day for persons who engaged in the activity		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Total, all activities	24.00	24.00	24.00	100.0	100.0	100.0	–	–	–
Personal care activities	9.70	9.51	9.88	99.9	99.9	100.0	9.71	9.52	9.88
Sleeping[1]	8.95	8.86	9.04	99.9	99.9	99.9	8.96	8.87	9.04
Grooming	0.65	0.56	0.74	78.1	75.3	80.7	0.83	0.74	0.92
Health-related self care	0.08	0.06	0.09	7.1	6.3	7.8	1.06	1.03	1.09
Personal activities	0.01	0.01	–[2]	0.3	0.3	0.3	2.78	4.01	1.48
Travel related to personal care	0.01	0.02	0.01	1.8	1.9	1.7	0.76	0.81	0.70
Eating and drinking	1.19	1.20	1.17	97.0	96.9	97.1	1.22	1.24	1.20
Eating and drinking	1.11	1.12	1.09	97.0	96.9	97.1	1.14	1.16	1.12
Travel related to eating and drinking	0.08	0.08	0.08	14.1	15.0	13.2	0.55	0.52	0.58
Household activities	1.95	1.54	2.33	78.9	71.1	86.2	2.47	2.16	2.70
Housework	0.58	0.30	0.84	35.6	21.4	49.1	1.62	1.38	1.71
Interior cleaning	0.35	0.20	0.49	23.8	14.0	33.0	1.48	1.46	1.48
Laundry	0.17	0.08	0.27	15.5	6.6	23.9	1.12	1.15	1.11
Storing interior household items, including food	0.02	0.01	0.03	6.5	4.7	8.3	0.34	0.31	0.35
Food preparation and cleanup	0.64	0.42	0.86	61.9	50.8	72.4	1.04	0.82	1.19
Food and drink preparation	0.50	0.34	0.65	58.4	47.8	68.3	0.85	0.71	0.95
Kitchen and food cleanup	0.14	0.07	0.20	23.9	14.3	33.0	0.59	0.52	0.62
Lawn and garden care	0.20	0.27	0.14	10.1	11.3	9.0	2.02	2.38	1.60
Household management	0.14	0.11	0.17	17.9	15.1	20.6	0.79	0.74	0.83
Financial management	0.03	0.03	0.04	2.9	2.7	3.2	1.10	1.01	1.18
Household and personal organization and planning	0.11	0.08	0.13	15.1	12.1	17.9	0.71	0.68	0.74
Interior maintenance, repair, and decoration	0.07	0.09	0.05	3.1	3.4	2.8	2.27	2.77	1.70
Exterior maintenance, repair, and decoration	0.05	0.08	0.03	2.6	3.5	1.8	1.98	2.26	1.48
Animals and pets	0.15	0.13	0.17	19.7	16.4	22.8	0.77	0.82	0.74
Care for animals and pets, not veterinary care	0.07	0.06	0.08	14.2	11.2	17.0	0.52	0.55	0.49
Walking, exercising, and playing with animals	0.08	0.07	0.08	9.2	8.4	9.9	0.85	0.85	0.85
Vehicles	0.04	0.07	0.01	2.3	3.6	1.0	1.65	1.91	0.82
Appliances, tools, and toys	0.02	0.02	0.01	1.4	1.8	1.1	1.12	1.34	0.80
Travel related to household activities	0.05	0.04	0.05	7.8	6.8	8.6	0.60	0.60	0.59
Purchasing goods and services	0.68	0.57	0.78	40.5	37.1	43.7	1.68	1.55	1.79
Consumer goods purchases	0.32	0.25	0.38	36.6	33.7	39.4	0.87	0.75	0.96
Grocery shopping	0.10	0.08	0.12	12.5	10.6	14.2	0.80	0.74	0.84
Professional and personal care services	0.09	0.06	0.11	7.5	5.9	8.9	1.16	1.07	1.22
Financial services and banking	0.01	–[2]	0.01	1.7	1.5	1.9	0.31	0.29	0.33
Medical and care services	0.06	0.05	0.07	4.2	3.1	5.3	1.37	1.50	1.30

a Includes naps and spells of sleeplessness.
b Estimate is approximately zero.
- Not applicable.

Source: United States Bureau of Labor Statistics, "American Time Use Survey". Available at www.bls.gov/tus/home.htm

A series of tabulations with this basic format can be generated for various classification variables, both person and household, including demographic and employment characteristics. Working tables using other analysis variables (e.g. context variables) can also be produced using this basic format. In such tables, categories of the context or other analysis variables replace the activity list.

Simultaneous activity tables

Traditionally, countries create a set of tables for primary activities and then a separate set of tables for secondary activities. The primary activities should add up to 24 hours and secondary activities to something less, although there is no expected value. While including only primary activities in the main tables ensures that a day does not exceed 24 hours, activities that are often considered as secondary, such as unpaid care, are overlooked. It may be preferable to present tables illustrating the total time spent on both primary and secondary activities, but time still needs to be allocated to the activities in some way to prevent a day from exceeding 24 hours. As there is no clear best practice on how to allocate time between simultaneous activities that fits all situations (Houle, Benes and Vaca Trigo, 2022, annex 5), the present *Guide* presents the most common alternatives. Diary data are discussed first, followed by stylized questions.

One option is to assign a single activity as the primary activity. Interviewers could ask respondents to clarify which activity they consider to be their primary activity. For self-administered diaries, however, researchers can only assume that the activity listed first is the respondent's primary one. If only time spent on the primary activity is presented, this can result in the underestimation of activities that are usually done in conjunction with others, such as the time spent on unpaid work, in particular supervisory care. With stylized questions, it is possible to specify whether the question refers to time spent on a primary activity or a secondary activity, but it is important to make sure respondents understand this.

Alternatively, analysts can develop their own system for assigning priority. It is necessary to develop clear, explicit rules and apply them consistently. This, however, introduces potential bias into the analysis, as what NSOs deem more important may not be what respondents consider more important or spend more energy on.

Another option is to divide the time equally between activities. This is computationally simple and reduces the effect of leaving out all secondary activities, but it still biases time spent on secondary activities downward, thus artificially diminishing gender gaps in unpaid work.

It is also possible to create compound activities, such as "cooking while caring for children". In addition to potentially creating many new categories, this approach may be problematic if the activities cross major division boundaries.

Table IX.3
The most common combinations of two simultaneous activities, 2010 South African time-use survey

First activity	Second activity	Number of 30-minute time slots	Percentage of two simultaneous activities
Watch television	Socialize with family	9 327	16.0
Eat and drink	Watch television	7 427	12.8
Eat and drink	Socialize with friends	2 904	5.0
Eat and drink	Socialize with family	2 576	4.4
Cooking	Eat and drink	1 988	3.4

Table IX.3 (*continued*)

First activity	Second activity	Number of 30-minute time slots	Percentage of two simultaneous activities
Watch television	Socialize with friends	1 882	3.2
Cooking	Watch television	1 807	3.1
Cleaning	Listen to radio	1 350	2.3
Cooking	Listen to radio	1 257	2.2
Socialize with family	Listen to radio	1 159	2.0
Socialize with friends	Listen to radio	1 090	1.9
Cooking	Socialize with family	1 085	1.9
Eat and drink	Listen to radio	1 015	1.7

Source: Statistics South Africa (2013).

A final possibility that is not often used is to assign a weight to the time spent on each activity. For an example of how to assign weight on the basis of the amount of time spent on those activities as sole (not simultaneous) activities, see box 7 in the *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*.

As each approach has its limitations, it is important to consider which will best meet the objectives of a particular analysis. For example, if an analysis is focused on education, "studying" might be considered the primary activity, even if it occurred while commuting to work on the train. An analysis of the same data for transportation policies might, however, prioritize commuting. If the study is relating to care, care activities might be considered the primary activities. Although this approach is fine for certain analyses, it is not appropriate for describing the full array of activities in which a population engages. To describe the full array of activities, NSOs may wish to create tables with compound activities. Tables and all dissemination materials should clearly state what the composite indicators consist of and explain all the methodological choices made so that users are aware of the limitations.

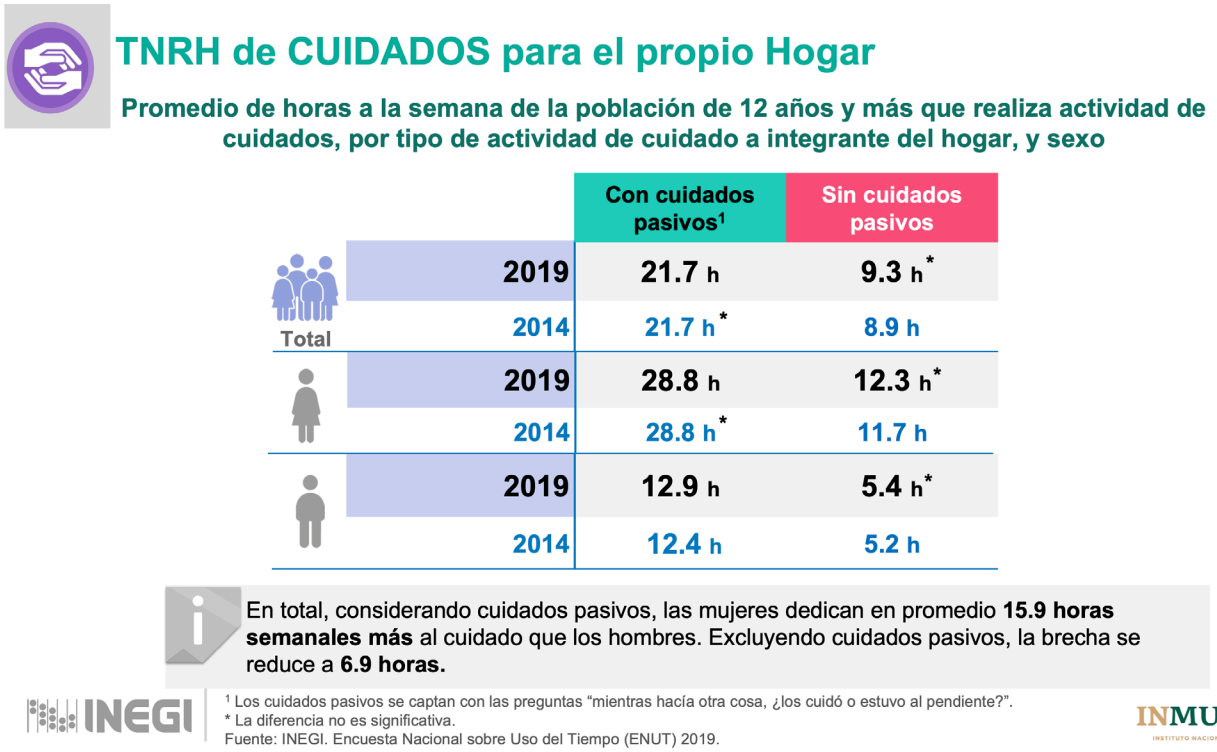
With stylized questions, it is possible to ask about time spent on a particular activity "while you were doing something else". However, unless questions are asked about specific pairings of activities, it is not possible to know what the other activity was. One option is to present tables in which the primary activities are reported, as well as a couple of relevant activities (i.e. relevant to the objective of the study) that were done at the same time as the primary activity.

The survey results disseminated should always clearly state the methodological choices made so that users are aware of the limitations.

Thematic tables

Thematic tables are focused on specific activities of interest, such as SNA work, unpaid housework, childcare, travelling and waiting time. A thematic table on childcare would sum the time spent on childcare activities by adding the time spent doing childcare as a sole activity, as well as time spent doing childcare in combination with any other activities. Figure IX.3 shows a thematic table for care. It illustrates the amount of time spent on unpaid care work. The red column (right) shows the amount of time spent only on unpaid care work as the primary activity, and the green column (left) shows the amount of time spent on unpaid care work including supervisory care. The data show that in 2019 women spent 16.5 hours per week on supervisory care. If only the figures in the right-hand column were shown, the amount of time that women in Mexico spent on passive care activities would be disregarded.

Figure IX.3
Average hours per week spent on care activities by individuals 12 years of age or over in Mexico, by type of care activity and sex



Source: National Institute of Statistics and Geography of Mexico, "Encuesta nacional sobre el uso del tiempo (ENUT) 2019", presentation of results. Available at www.inegi.org.mx/contenidos/programas/enut/2019/doc/enut_2019_presentacion_resultados.pdf.

B. Computation of sampling variances

Regardless of whether estimates are computed for a sample, it is also important to estimate the precision or variance of the estimates. Time-use surveys are very similar to most other national household surveys with respect to variance estimation. The literature on variance estimation for these types of surveys is considerable and each NSO will already have preferred methods for estimating sampling variances.

Sampling error is a measure of how much the estimate from a sample may deviate from the population quantity. It is the square root of the variance of the estimate and is used to form confidence intervals that provide practical bounds for the likely range within which the population characteristic is likely to fall. In simple random samples, the sampling error of a mean or total decreases with the square root of the sample size. With the more complex designs and estimates, this simple relationship between size of the sample and the sampling error does not hold. Sample design features such as deviations from equal probabilities of selection and clustering typically cause the sampling errors to be larger than they would be in simple random samples. Time-use surveys differ from most household surveys in that their sampling approach is even more complex than most multistage sampling designs, as discussed in chapter V. The complexity of time-use sample designs also makes it more difficult to compute sampling errors analytically and increases the need for generalized variance estimation techniques, as well as the use of specialized variance estimation software. The *Guide*

to Producing Statistics on Time Use: Measuring Paid and Unpaid Work covers linearization and replication variance estimation methods, as well as generalized variance estimation (modelling design effects and rel-variances).

C. Statistical estimation software

NSOs use different statistical estimation software packages. The most common are R, SAS, Stata and SPSS. Some NSOs use one package for processing data and merging files, such as SAS, and another package for analysis, such as R or Stata.

Of these packages, R is the only one that is open-source. Using open-source software can reduce costs and save NSOs from having to maintain expensive licences in the future. It can also facilitate the sharing of code and promote replication. However, it is important to use the software that NSO analysts are proficient in and have access to. When used correctly, all these packages can produce the estimates needed and the variances thereof.

Time-use surveys have complex sampling designs in order to balance the sample days of the week and account for the selection of individuals at the household level, as discussed in chapter V. All software for variance estimation require that key data about the sample design should be included in the analysis file. Otherwise, variance estimates will not be reliable.

One issue to keep in mind when working with imputed data is that the variance of the estimates derived from these packages will treat the imputed data as if they were real observations. The effect is to underestimate the variance of the estimate. The bias tends to be larger when more data are imputed. This is another reason to ensure that the data collected are as complete as possible.

Box IX.2
Quality checklist: survey outputs

- Undertake relevant analysis to meet key data needs.
- Develop dissemination products with key data needs in mind. For example, consider how users can easily derive data required, such as data on the average time spent on each activity.
- Consider the design of outputs for ease of use (e.g. using appropriate units of measure).
- Validate data using comparable data sources (e.g. a previous time-use survey, other time-use surveys at the international level, other survey or administrative data sources).
- If more than one collection mode has been used, check for mode effects (note that if any statistically significant difference is detected, independent samples are required for each mode).
- Include a description of the methodology as part of the outputs.
- Make sure, if comparisons with previous iterations are planned, that all aspects are comparable and where they are not, report these in the outputs.

Part IV.
Review and dissemination of time-use data

X. Dissemination of time-use data

While dissemination occurs at the end of the time-use statistics production cycle, it should be planned from the beginning. Dissemination should be linked to the survey objectives and users' needs. For time-use statistics to feed into evidence-based policies, they must be disseminated at the right point in the policy cycle. Even the best data will not be used if they are not available at the right time. This is particularly important to consider if a time-use survey is conducted only every 5 to 10 years.

Another reason to plan dissemination early is to ensure that all variables needed are collected and that the sampling approach allows the resulting data to meet users' needs. It is not possible to go back at the end of the cycle to add an important variable, to disaggregate results or to ensure an adequate sample of a particular subpopulation. When the design team is determining the scope and coverage of the survey (see chapter II), it should consider who will use the results and how they will be used. This analysis should inform how the results will be disseminated.

As part of the planning for its 2017 national time-use survey, the National Institute of Statistics and Censuses of Costa Rica convened three separate groups of stakeholders to discuss their needs. The technical group consisted of representatives of the National Institute of Statistics and Censuses of Costa Rica, the National Institute for Women and the Central Bank of Costa Rica (the agency responsible for calculating satellite accounts for unpaid domestic and care work). The institutional group included members of government ministries, such as the Ministry of Labour and Social Security, the Ministry of Health and the Ministry of National Planning and Economic Policy, as well as international organizations such as the United Nations Development Programme. The research group included members of universities and regional and international statistical agencies. The technical group worked to plan and carry out the survey, while the institutional and research groups were key users of the data. The involvement of the latter groups in the planning stage of the survey meant that the National Institute of Statistics and Censuses was able to ensure that the survey would meet their needs. As a result of those needs, the National Institute of Statistics and Censuses allowed for a more extensive level of disaggregation (by planning region and vulnerable populations) than in previous surveys, and it included questions on remote education and telework, attempted to measure time poverty and maintained a consistent design to enable comparison with previous surveys.

A. Dissemination products

Users and their information needs should determine the most appropriate modes, format and content for dissemination. A basic set of tables, user guide summarizing the methodology and a comprehensive report covering the methodology and all variables are standard data dissemination products and can serve as a long-term reference. They are, however, not enough to ensure that time-use statistics collected will be utilized to

their fullest extent and will feed into policy. Communications specialists can help to segment users and guide an audience analysis to determine what each segment needs to know and how best to communicate it. Some key questions that should be considered in an audience analysis are presented in box X.1.

Box X.1
Audience analysis and targeted dissemination

1. Who is the target audience?

   Divide the audience into segments. Descriptions of each segment should be as specific as possible in order to tailor what is communicated and how it is communicated. "Policymakers", "researchers" and "the general public" are very broad categories. For example, what kind of policies do policymakers make. Are they care-, family leave-, education- or urban development-related policies, and at what level?

2. What do users want to know? What do they care about the most?

   The best way to find out what users care about is to engage them in dialogue from an early stage in the research process. This helps to ensure that data needed are collected and communicated in time to support decision-making.

3. What level of expertise does the audience have?

   - What does the audience already know about the topic? The audience's level of knowledge and awareness of the topic should guide how simple or technical the data communicated should be. Gender specialists may already understand the implications of time spent on unpaid work, whereas economists in ministries of finance might need the pathways to be explained.
   - How well does the audience understand time-use statistics? To help those who are less familiar with the topic, findings should be conveyed in a meaningful way, such as how much unpaid work men and women do on an average day. When describing differences, be careful not to perpetuate gender stereotypes or other stereotypes.

4. How does the audience like to receive information?

   Policymakers will want to receive the main results and the implications thereof for specific policies written in clear, specific language. Academic researchers specializing in time use will want to do their own analysis, often using microdata. They will want detailed methodological information, metadata and other information. Researchers in other disciplines (e.g. economics, sociology, gender studies) who do not specialize in time use may consider data in tables to be sufficient, but will still want a user guide or methodological information. Visualizations, infographics and human-interest stories can be effective ways to communicate with the public, who may be interested in the topic more superficially and want only to spend a short time on it.

5. In what order does the audience need to receive the information?

   In general, concentrate on communicating between two and four of the most important points. For most audiences, use an "inverted pyramid" style, with the most important results first. This is the opposite of how researchers and analysts typically communicate.

6. Why will users read what is written?

   Early engagement with potential users followed by targeted dissemination means that statistical products respond to the specific demands of different audiences. Decision makers will have greater trust in information from NSO that is known for producing quality statistics in a timely manner. The general public responds to engaging headlines and compelling stories, but this is also subject to the level of trust in and credibility of official statistics in the country.

Box X.1 (*continued*)

7. How will the audience be made aware that data are available?

   Releasing a report or microdata on a website or issuing a press release is not enough. NSOs increasingly use social media as well as traditional media to share stories and generate interest in data. Existing relationships and regular communication with users and with the media facilitate the sharing of dissemination products.

Note: This box is based on an article about understanding and writing for the appropriate audience, from the Writing Center of the University of North Carolina at Chapel Hill website (https://writingcenter.unc.edu/tips-and-tools/audience). For more detailed guidance on the dissemination of gender statistics, see the Gender Statistics Training Curriculum developed by UN-Women and the Statistical Institute for Asia and the Pacific, available at https://data.unwomen.org/resources/gender-statistics-training-curriculum; and Economic Commission for Europe (2009), which is available in English, Chinese, Croatian, Italian, Russian and Spanish.

Policymakers working on issues related to unpaid work will require the information in a different format to that needed by statisticians and researchers. Voluntary national reviews for the Sustainable Development Goals might contain a few specific time-use indicators. In Latin America and the Caribbean, government policymakers and advocates use time-use statistics as part of project documents to promote care systems. For example, Colombia released an annex containing separate tables of care indicators from the 2016/17 and 2020/21 surveys, that is excluding basic indicators. Government policymakers and advocates who use the findings to promote care systems will want the most relevant data analysed and presented clearly, beginning with the most important results, whereas academic researchers exploring intrahousehold trade-offs in care might prefer to have access to the microdata and conduct their own analysis.

Box X.2
Example of targeted dissemination products: Morocco

The dissemination strategy used by Morocco encompasses a range of products and activities that are designed to reach specific audiences. Most of the products available on its gender data platform are listed below.

For specialists and researchers:

- Data, displayed in tables and graphs
- Analytical reports, reports, notes, executive summaries, in-depth analyses
- Methodological material, including questionnaires, diaries, classifications and glossaries
- Anonymized microdata

For public users:

- Interactive data simulators
- Infographics (examples are provided later in this chapter)

Other products or activities:

- Events, including seminars or webinars, radio/television debates and interviews
- Thematic notes timed to coincide with gender-thematic days or special events (e.g. Ramadan, international/African/national women's days)
- Statistical one-stop shop (guichet statistique unique) of the High Commission for Planning.

1. Basic outputs

The first step in dissemination should be to share the survey results in the form of basic tables, a methodological summary that includes information on the quality review and a narrative summary that highlights a limited set of key findings, using clear non-technical language and graphs. This will enable the timely release of the results and allow NSOs to call attention to the most important findings. A full report and a user guide describing the methodology in detail should be prepared at a later stage, but this can take time. It is not necessary to postpone dissemination until they are ready.

As described in chapter IX, key survey outputs include a set of tables for the time-use variables (activities, contextual variables) and the composite indicators, disaggregated at least by sex and age group. Tables are typically shared as downloadable files in spreadsheet format, either an Excel file or a comma-separated values (CSV) file, but may also be shared as a PDF file. Summaries may be described in a news item or blog post, but should also be available for users to download.

2. Specialized reports

While a general report, summary and set of tables are useful references, analyses that are focused on a single topic in more depth can be more effective for communicating results to the most relevant audiences. People working in the environment or agriculture sector might be interested in own-account production, time use by people in areas with differing levels of infrastructure or time spent on different types of travel, for example. Time spent on exercise, social and cultural activities and time spent with other people could be especially relevant for those working in health and well-being. In general, national samples do not enable small area estimates, but geographic comparisons can be compelling and informative.

In order for data to serve in policy formulation and monitoring, dissemination products should show the link between the time-use statistics and specific policies or proposals, thus making the conclusions and implications clear while remaining objective. The analysis of unpaid work in the Dominican Republic[41], based on data from the time-use module in the 2016 national household survey, is an example of a specialized report on care. In addition to presenting the survey findings, it describes the State's response to the unequal distribution of unpaid labour, by presenting examples of existing policies and making recommendations for others.

[41] See Rodriguez and others (2018) (available in Spanish only).

Liaising with data users directly can help communications staff to better understand their policy issues and data needs, thus supporting data "storytelling".[42] Data should be presented in a way that makes sense to non-experts, for example by serving to describe an average weekday or weekend day or the time that people spend per week on an activity. If the average number of minutes spent on an activity per day is low because people did not do it every day, it might be more instructive to convert it to time per week or month. Even policy analysts that are accustomed to interpreting statistics may be less proficient in time-use statistics than other types, so they may not be able to just look at tables and understand what they mean; they need the results to be explained to them.

[42] The Economic Commission for Europe (2009) provides a description of statistical storytelling and examples from NSOs in Europe and North America.

Given their narrower focus, these sorts of analyses are suitable for short publications, such as research briefs or blog posts, as well as presentations, interviews and press releases.

While gender differences in unpaid work are prioritized in the present *Guide*, specialized analyses can highlight the potential for time-use statistics to inform policies and decision-making related to other groups and topics. One example is health,

well-being and socioeconomic issues for Indigenous groups, such as the Māori in New Zealand. While the same information may be relevant to policymakers, service providers and the community, it might be communicated more successfully by presenting it in different ways for each audience.

3. Visualizations

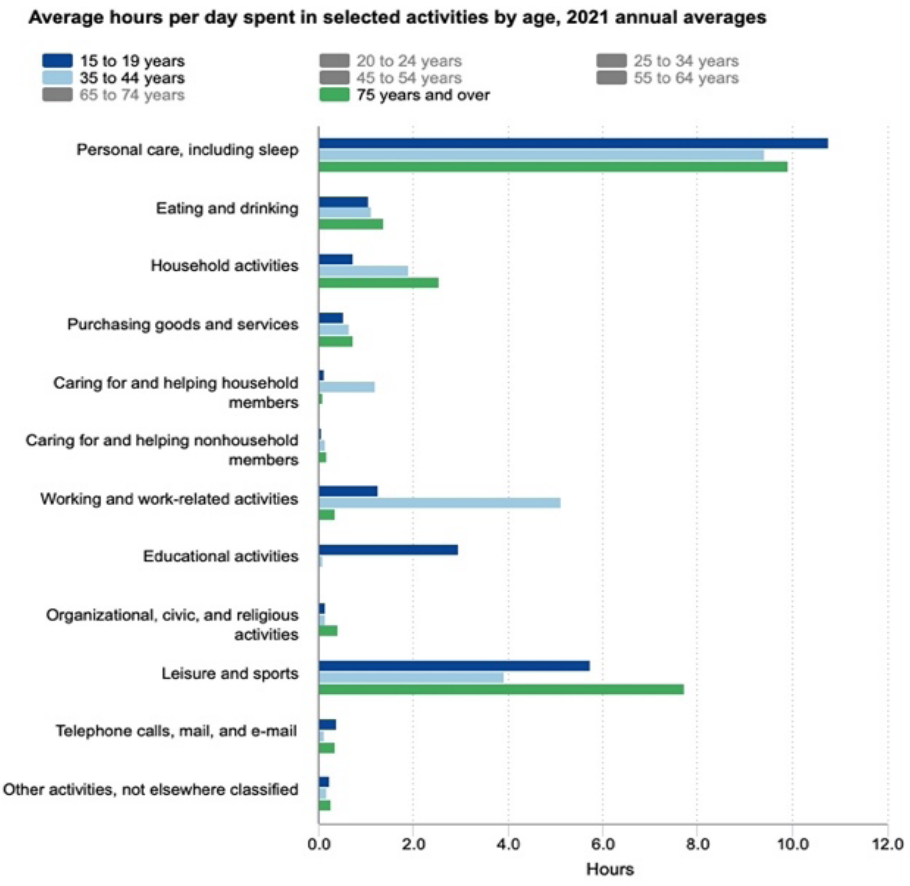
Visualizations are an important tool for disseminating time-use statistics. They are especially useful for communicating statistics simply and for highlighting comparisons and contrasts. Infographics are combinations of data visualizations, images and text to communicate more information than can be expressed in a single graph.[43]

[43] It is important to emphasize that visualizations should avoid representations that induce gender biases.

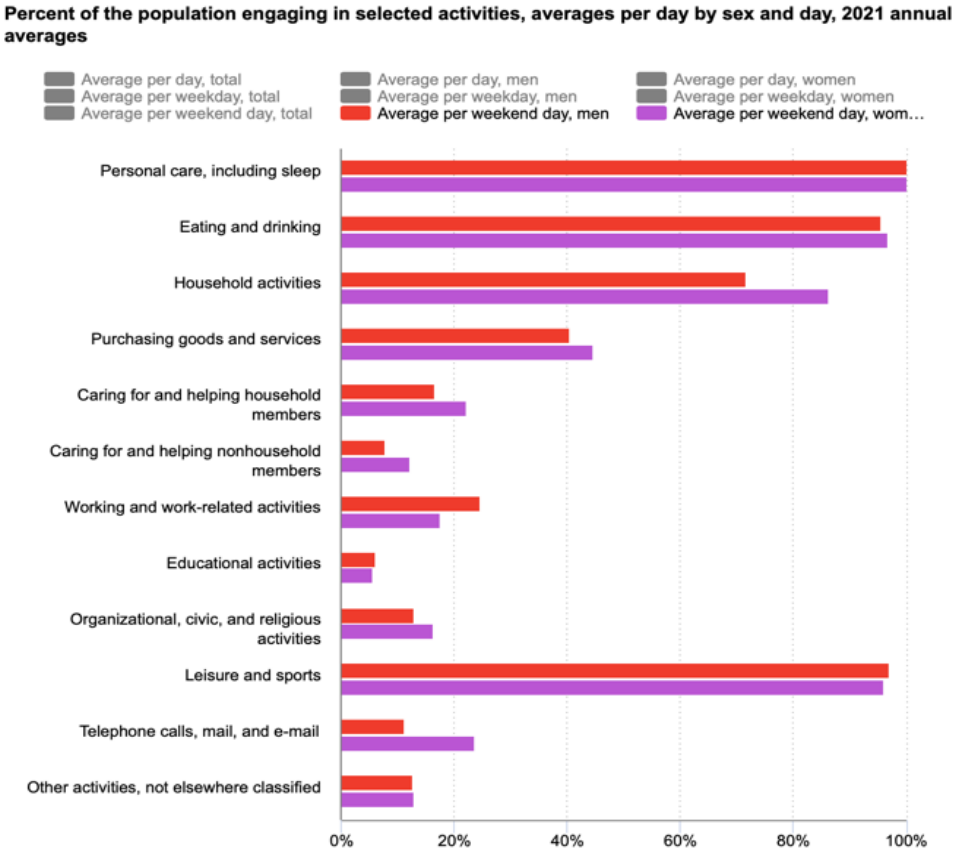
(a) Graphs

Standard bar graphs are widely used for showing average time and participation rates. They are easily understood and can summarize a large amount of data, and clearly show differences between groups or change over time. Figure X.1 shows the average time and participation rates for the main activity categories in the 2021 American Time Use Survey. The United States Bureau of Labor Statistics website allows users to choose which bars to display by selecting the desired groups at the top of the page. Figure X.1, however, presents static images showing a breakdown of activities by age and sex.

Figure X.1
Bar graphs from the 2021 American Time Use Survey



Data refer to all days of the week.
Source: U.S. Bureau of Labor Statistics.

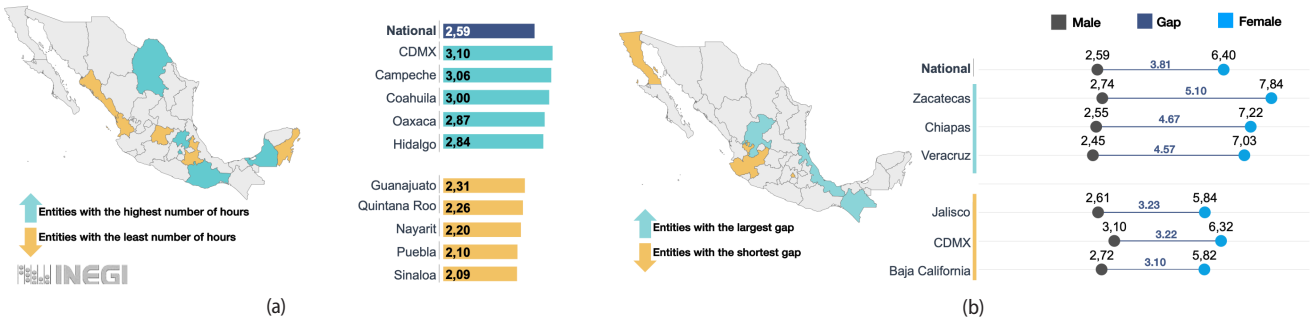


Source: United States Bureau of Labor Statistics, "Graphics for economic news releases". Available at www.bls.gov/charts/american-time-use/civ-pop-by-sex-and-day.htm.

As with written publications, narrowing the scope of visualizations can help to communicate a more targeted message. In figure X.2, the graphs highlight the Mexican states with the highest and lowest values related to Sustainable Development Goal indicator 5.4.1, based on the 2019 time-use survey. These figures could facilitate discussion on policies or other factors that might contribute to geographic differences. Maps showing differences by administrative area can make a compelling case for the need to design and implement local policies.

In figure X.2, chart (a) shows the time that men spent on domestic and care work; chart (b) shows the gender gap in hours of unpaid work. Although bar chart (a) is clear, the connected dot plot in chart (b) conveys the gender gap by highlighting the difference as well as the absolute values for each group.

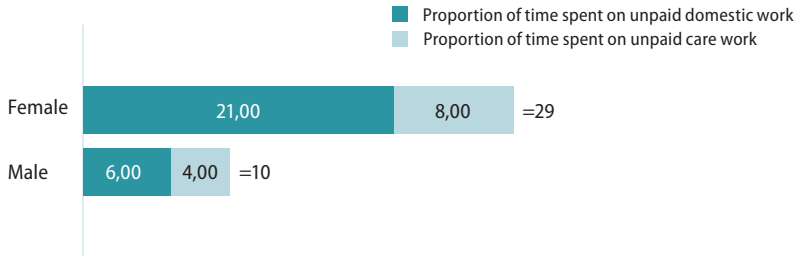
Figure X.2
Total time spent on unpaid domestic and care work by federative entity, 2019 Mexican time-use survey



Source: National Institute of Statistics and Geography of Mexico, "Encuesta nacional sobre el uso del tiempo (ENUT) 2019".
Abbreviations: CDMX, Mexico City.

Stacked bar graphs serve to present differences in broader categories, as well as in the component parts that make up those categories, as shown in figure X.3. This graph shows that in rural areas, women spent 29 per cent of their time on unpaid domestic and care work, while men spent only 10 per cent. Women spent twice as much time as men on unpaid care work, and 3.5 times as much time on unpaid domestic work.

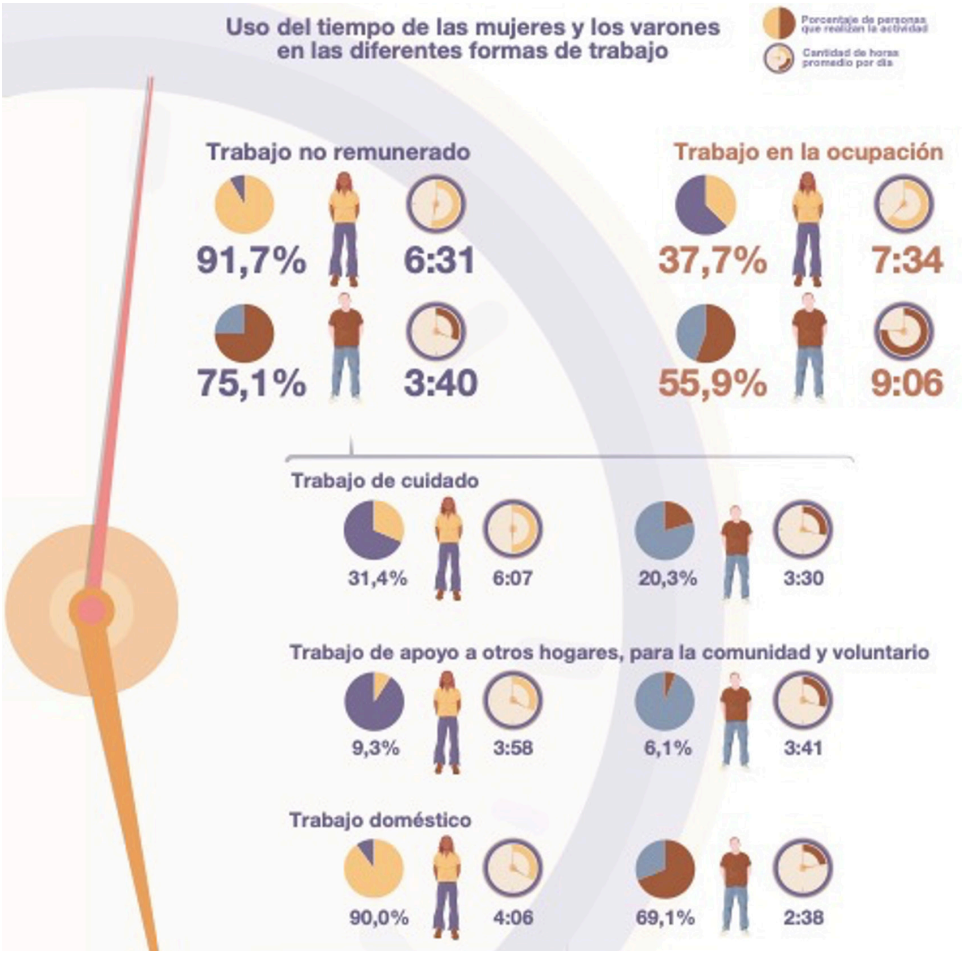
Figure X.3
Proportion of time spent on unpaid domestic and care work, by sex, in rural areas of Mexico in 2019



Source: National Institute of Statistics and Geography of Mexico, "Encuesta nacional sobre el uso del tiempo (ENUT) 2019".

Pie or donut charts are also common ways of expressing proportions. Pie charts can be useful for demonstrating the approximate relationship of a proportion to the whole, but they are not as effective for expressing specific values. Many people find these graphs harder to absorb and compare than bars or lines, in particular when multiple categories are used. While axes are often marked and labelled in line and bar graphs, it can be difficult to gauge the value of a segment (or slice) if it is not corresponding to half or a quarter of the circle. There is, however, a unique advantage of using circles to depict hours. Incorporating clock faces – as shown in the examples in figure X.4 for Argentina and figure X.5 for the Republic of Moldova – makes it easier to conceptualize the numbers as passing time, because people who can read a clock have an intuitive idea of the scale. These graphs cannot show figures that are greater than 12 hours, however. With all graphs, the scale should be considered carefully so that data are not misrepresented.

Figure X.4
Time use by women and men in different forms of work, 2021 Argentine time-use survey



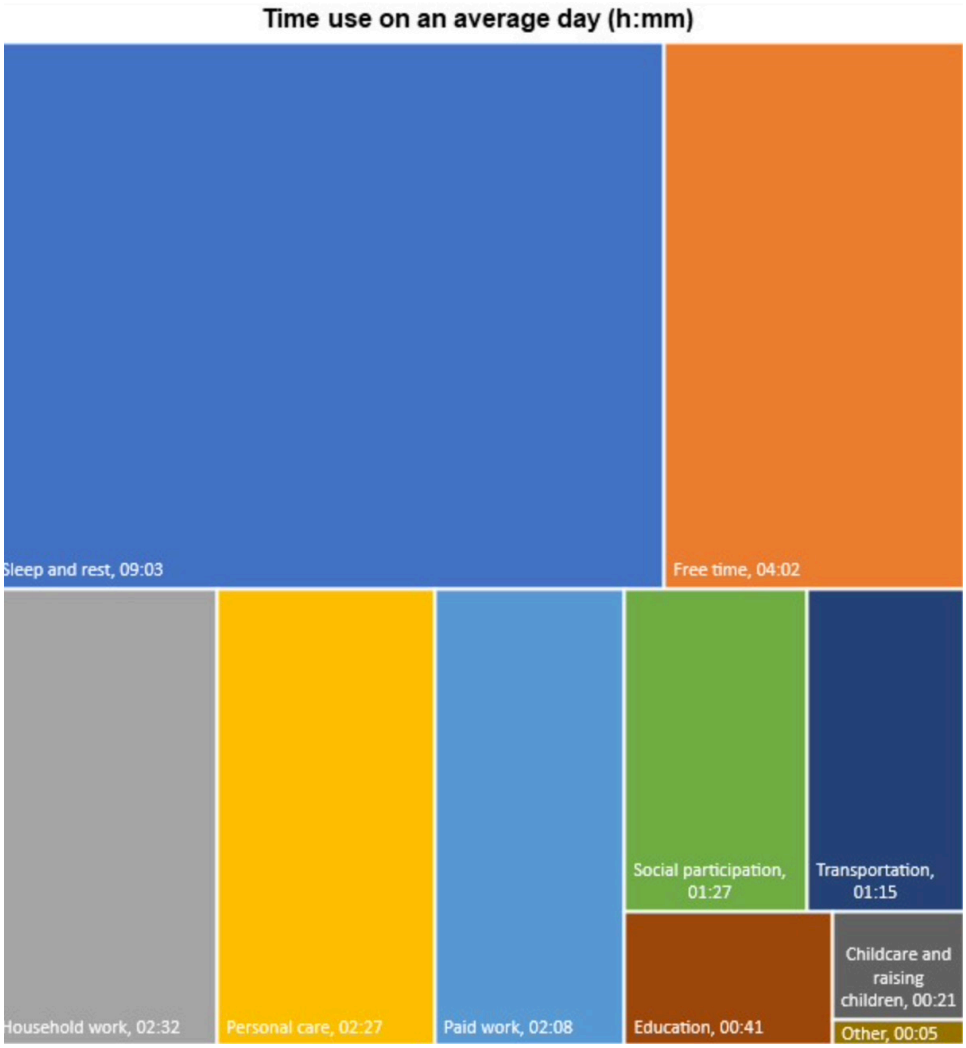
Source: Farias and others (2022).

Figure X.5
Daily average duration of paid work and domestic work, by sex and age group, in hours per day, 2012 Moldovan time-use survey

Source: GenderPulse, "Daily average duration of paid work and domestic work". Available at https://genderpulse.md/en/economic-empowerment/paid-work-and-domestic-work/daily-average-duration-of-paid-work-and-domestic-work.

Another alternative to a pie graph, this time for expressing many values adding up to 100 per cent, is a proportional area graph. It can be used to present data from a diary or stylized questions for which an exhaustive activity list is used. Figure X.6 shows such a graph presenting overall average time use based on the 2013 Belgian time-use survey. Proportional area graphs are eye-catching in comparison with a set of bars, and the rectangular shapes and right angles make comparing relative sizes easier than wedges on a circle. There is also more space to position labels directly in the segments, rather than in a legend.

Figure X.6
Average time spent on activity categories, 2013 Belgian time-use survey

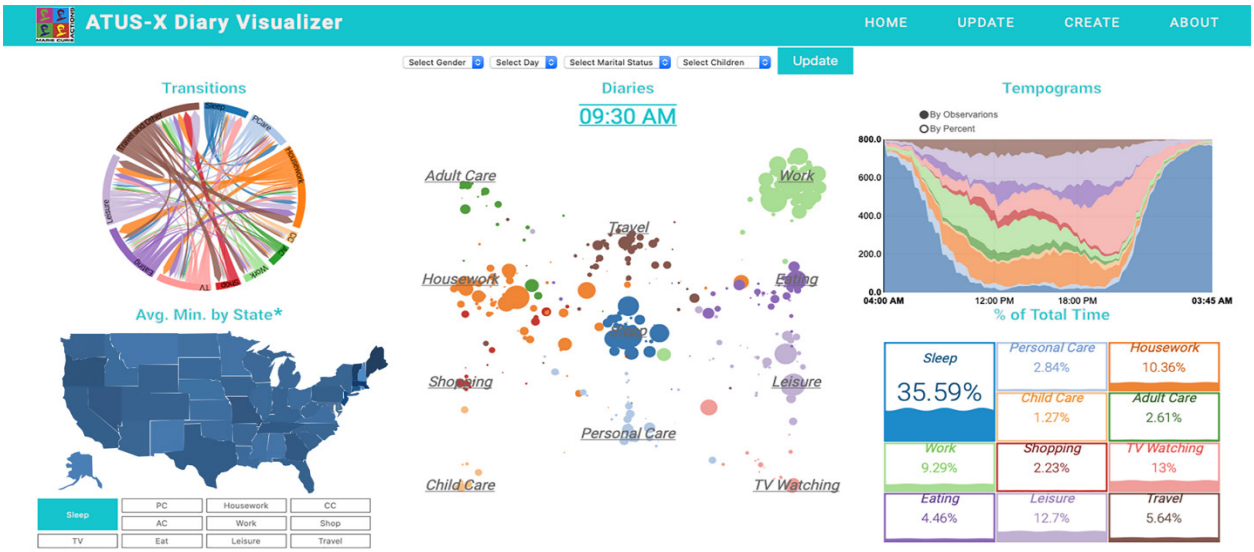


Source: Statbel (2015).

The above figures can be created with data from diaries or stylized questions, but the sequence and timing data in diaries can be used for additional visualizations. Figure X.7 shows several visualizations that can be generated using the ATUS-X Diary Visualizer online tool (Kolpashnikova and others, 2021) and are, therefore, feasible for other diary data.[44]

[44] R packages that can be used to construct these visualizations with data from the American Time Use Survey are available at https://github.com/Kolpashnikova/package_R_timeuse. They will work with other diary data with the same file structure as ATUS-X data extracts or can be adapted.

Figure X.7
Types of figures generated by ATUS-X Diary Visualizer tool



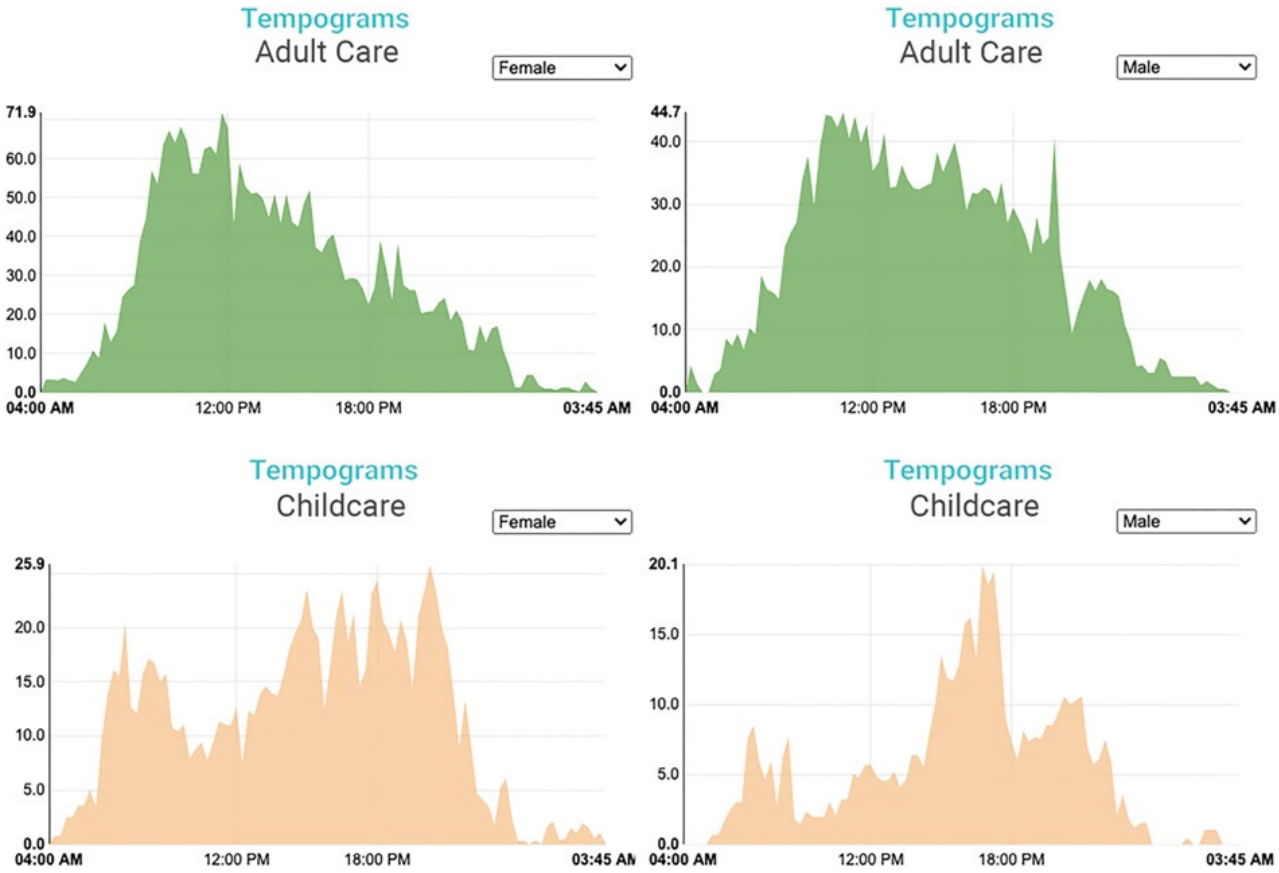
Source: Kolpashnikova and others (2021).

Note: The map of the United States was created by tracing a United States Geological Survey snapshot and is not identical to the original image. It is, therefore, for illustrative purposes only.

Tempograms are a type of area graph that summarizes the daily rhythm of a population. The x-axis shows time, usually across 24 hours, in fixed increments. The y-axis shows the proportion of respondents engaged in the activity. A tempogram allows users to compare the overall time spent (the total area below the bar line) as well as the temporal location or time of day. In essence, a tempogram is a set of bar graphs, with very thin bars that have no space between them. If a 10-minute interval is used, a 24-hour tempogram of one variable will have 144 data points.

The tempograms in figure X.8 show the number of women and men that provide care for adults and for children throughout the day. They are based on a sample of family caregivers between 2011 and 2019 (Kolpashnikova and others, 2021). The top graphs show that the timing of care for adults is similar for men and women, although more women provided care (note the significant difference in the scales on the y-axes). Childcare shows a gendered pattern; female carers provide care throughout the day, with a lull in care provided late morning, whereas male carers provide most of their childcare in the morning or evening. The comparison in the bottom graphs is much more compelling than simply comparing average time, as it expresses various dimensions of time use. Tempograms contextualize data and tell stories that people can relate to.

Figure X.8
Tempograms of care time (by per cent) based on American Time Use Survey data

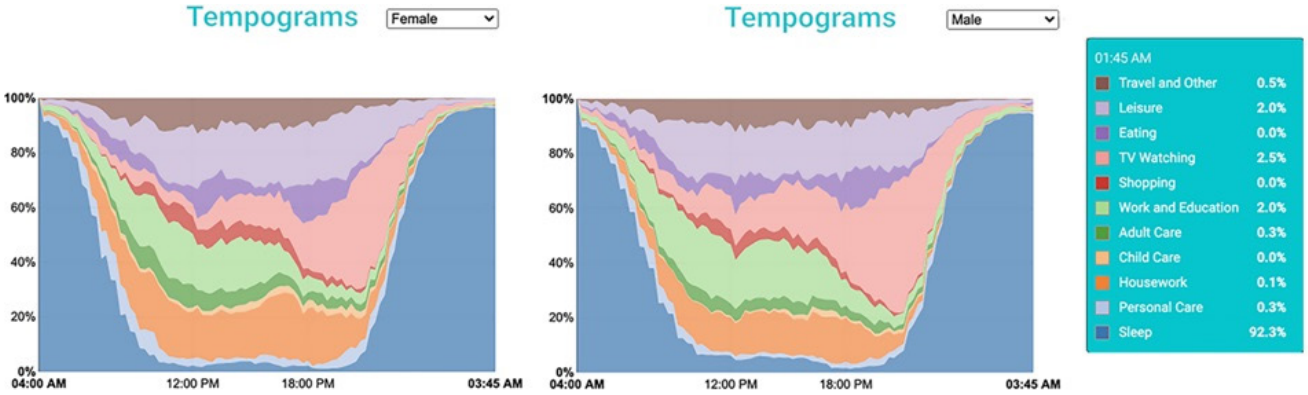


Source: Kolpashnikova and others (2021).

The above tempograms are based on one activity. Another type of tempogram is one that shows all the activities that a sample performed. The underlying statistics for these are cumulative percentages. For example, for a particular time of the day, the percentage of the population recorded as eating is added to the percentage of the population that was sleeping, and so on until all the activities that are recorded for that particular time are accounted for. In the analogy of a tempogram as a set of skinny bars, these tempograms are sets of skinny stacked bars.

To compare two tempograms, the number of categories should be limited. The tempograms in figure X.9 show 11 categories and provide a complete view of what the population is doing throughout the day. While fewer categories – that is, no more than five or six – make it easier to compare patterns for individual categories between two graphs, many categories can provide a comprehensive view of how a population uses time.

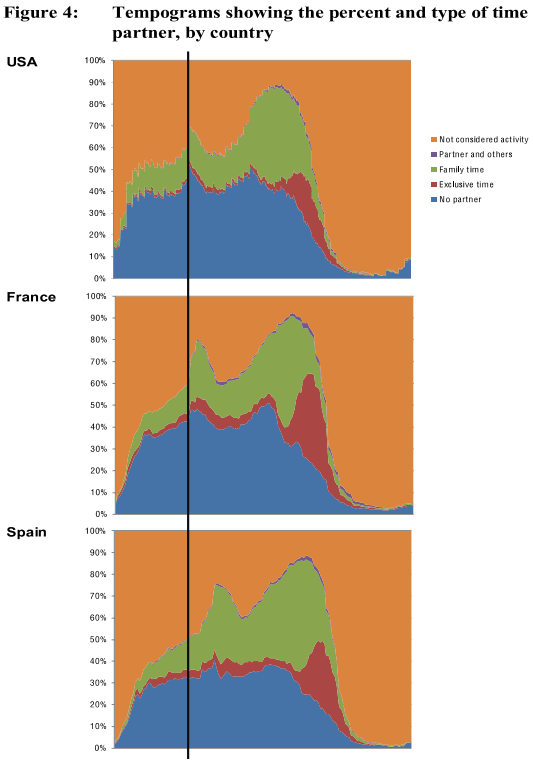
Figure X.9
Tempograms of comprehensive time use by women and men caregivers



Source: Kolpashnikova and others (2021).

Tempograms serve not only to show activities, but also contextual variables and activities, for example, the co-presence of different people. The tempograms in figure X.10 show the proportion of respondents with different people over a 24-hour period in the United States, France and Spain. The graphs show that the three countries have broadly similar patterns, with many families together at midday and evening mealtimes, and couples together without children in the evenings.

Figure X.10
Tempograms of time shared with respondents' partner, by country



Source: Adapted from García-Román, Flood and Genadek (2017).

Note: Orange represents time spent on paid work and personal care, including sleeping, which was considered "not eligible" as partnered time. Blue is time that respondents could have been with their partner but was not, red represents time the respondent spent alone with their partner (no children) and green is time the respondent spent with their partner and children.

Kolpashnikova (2020 and 2022b) published Stata and R code for creating tempograms using American Time Use Survey data that can be adapted for other diary data.

(b) Infographics

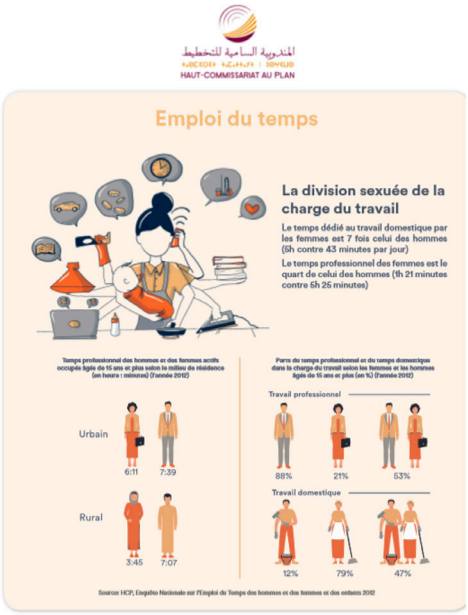
Multiple visualizations can be combined into infographics. Infographics are increasingly used to communicate data to the public as they are visually appealing, can convey data to people with low data literacy (when designed well) and can tell a story.

Figure X.11 shows infographics prepared by the High Commission for Planning of Morocco. The infographics can also be viewed online as a set of slides.[45]

[45] Available at www.hcp.ma/Genre-et-impact-Covid-19-sur-les-menages_a2890.html.

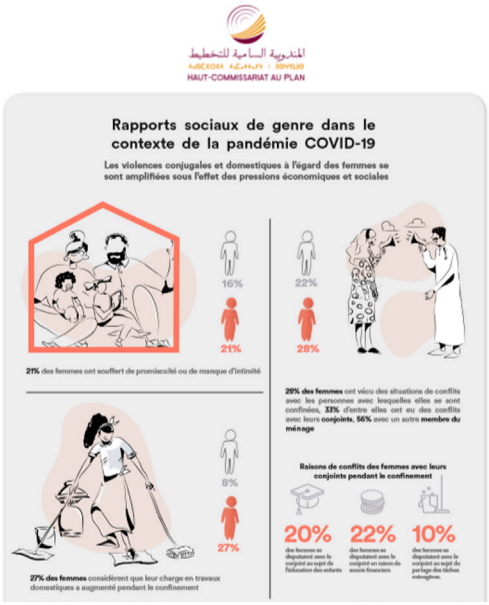
Figure X.11
Infographics of time use in Morocco

(a) Gender differences in time use in 2012

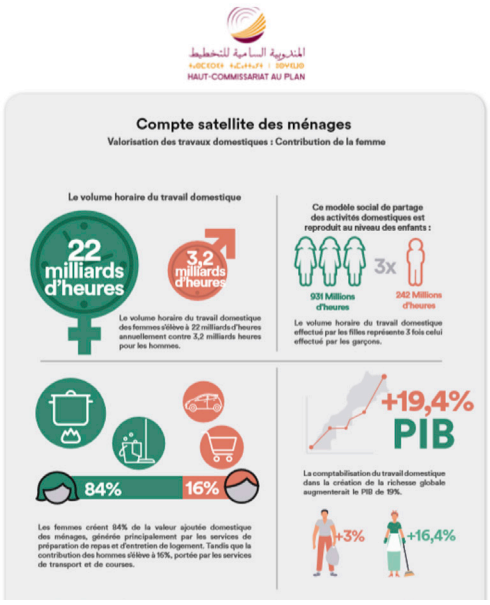


(b) Gender relations in the context of the COVID-19 pandemic

(c) Gender relations in the context of the COVID-19 pandemic



(d) Satellite accounts for unpaid domestic and care work



There are many software packages and guidelines for producing effective infographics.[46]

[46] See, for example, Stones and Gent (2015).

4. Interactive and mixed-media products

One of the advantages of using electronic formats for dissemination is the possibility of including interactive or mixed-media products. In this section, some interactive or mixed-media products are described and some links are provided. Owing to their interactive nature, the products are best viewed online.

NSO of Thailand uses dynamic statistical tables and bar graphs. The user can choose whether to view the municipal (urban), non-municipal (rural) or total population corresponding to the 2009 or 2014 survey.

The Hungarian Central Statistical Office uses an animated path graph to show data on the daily rhythm of the sample.[47] This type of graph shows how people move from one activity category to another over the course of a day, which allows the viewer to see what the population is doing at a given point in time. The graph allows users to select population subgroups (men, women, retired or economically active) or to view the entire population; the different population groups and activities can be distinguished by colour. The time-use package for R developed by Kolpashnikova (2022a) can be used to create a similar type of graph.

[47] See Hungarian Central Statistical Office, "Timeuse 2009/2010". Available at www.ksh.hu/interaktiv/idomerleg/animacio.html#?lang=en&colors=act&dataset=FULL_POPULATION.

The High Commission for Planning of Morocco created a dynamic visualization targeting the general public, called "Simulate your time budget".[48] Users can enter their age and sex and then their own time use for different categories to see how it compares with the time use of the general population and others from their demographic group.

[48] See Haut-Commissariat au Plan, "Simuler votre emploi du temps". Available at www.hcp.ma/Simuler-votre-emploi-du-temps_a2889.html (available in French only).

In Colombia, the National Administrative Department of Statistics developed a simulator of unpaid domestic and care work at home and in the community.[49] First, users are asked to enter their own weekly time budget for seven categories of unpaid domestic and care work. The simulator then computes how much time this adds up to in a year, as well as how much money the individual would earn per week if unpaid domestic and care work was compensated at the minimum wage rate. It then shows graphs of how the user's time compares with that of men and women from different regions and age groups. The National Institute of Statistics and Geography of Mexico offers a similar simulator that can be used to calculate the economic value of domestic and care work, but without regional and age breakdowns.[50]

[49] See Departamento Administrativo Nacional de Estadística, "Simulador del trabajo doméstico y de cuidado no remunerado para el hogar y la comunidad". Available at https://sitios.dane.gov.co/SimuladorTDCNR (available in Spanish only).

[50] See Instituto Nacional de Estadística y Geografía, "Simulador del valor económico de las labores domésticas y de cuidados". Available at www.inegi.org.mx/app/simuladortnrh.

In contrast with standard graphs, an interdisciplinary team is required to develop interactive products. Morocco put together a multidisciplinary team composed of time-use survey and gender statisticians, computer scientists, sociologists and graphic designers from the gender, coordination/visibility and information technology teams. They developed a gender data platform in collaboration with MEDSTAT IV. The overall goal of this visualization data platform is to ensure better dissemination of the time-use statistics produced. Presenting the statistics in an attractive way and making them more available and accessible to the general public are expected to expand their use.

B. Data

1. Open by default data

The information in this section applies not only to time-use statistics, but also to other types of data that NSOs collect and process. It is presented in brief to assist NSOs that

are using time-use statistics as part of a modernization process. In this section, reference is made to the work by Open Data Watch, as well as to that of a number of its partner organizations, including Data2X and the World Wide Web Foundation.[51] As laws and technology relating to data change rapidly, NSOs are encouraged to refer to these works or other resources for more up-to-date information.

[51] See, for example, Open Data Watch (2019 and 2022); see also Badiee and others (2022) and Brandusescu and Nwakanma (2018).

According to the first principle of the Fundamental Principles of Official Statistics, "official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honour citizens' entitlement to public information" (General Assembly resolution 68/261). This is increasingly understood to mean not just statistical tables but also microdata. As at 2021, 132 countries had "access to information" laws, under which Governments are required to proactively disclose information (United Nations Educational, Scientific and Cultural Organization, 2022). In accordance with these laws and principles, data should be open by default. At its fifty-third session, the Statistical Commission endorsed the principle of data "open by default" in the report of the Working Group on Open Data (E/CN.3/2022/27). The report stated the following:

> The open by default principle serves as the foundation for a set of policies that make a Government's or an organization's data publicly available and in accordance with open data guidelines, with only a limited number of specific exceptions (for reasons of security, for example, or privacy protection). Under the principle, it is recognized that government data, produced with public resources, are valuable and have many different users and uses and should therefore be expected to be available to the public (that is, by default).

Figure X.12 shows the benefits of open public data and how the responsible sharing of data can increase the value of data.

Figure X.12
Benefits of open public data

Source: Open Data Watch (2019).

Data that are open by default should be characterized as being:

- Timely and comprehensive: data should be published as soon as possible after being collected, on a regular basis. Data should include sufficient background information to allow for the responsible use thereof.
- Accessible and usable: data should be stored somewhere that is easy to find and accessible. Data should be available in a machine-readable but open (non-proprietary) format, for example, a CSV file rather than (or in addition to) an SPSS or Stata data file.
- Comparable and interoperable: the classifications and definitions used should allow data to be compared with and linked to other data sets. González Morales and Orrell (2018) provide not only background and resources for NSOs that wish to learn more about why the interoperability of data should be increased and how to do so, but also the following definition: "Interoperability is the ability to join-up and merge data without losing meaning. In practice, data is said to be interoperable when it can be easily re-used and processed in different applications, allowing different information systems to work together. Interoperability is a key enabler for the development sector to become more data-driven."
- Attributable and sharable: metadata should include a source or author that may be cited by users. Users should also be able to share data, but should be required to do so on the same terms (i.e. on an open licence, free of charge).
- Responsive to users' needs: NSOs should engage with potential data users and provide feedback mechanisms to ensure that data meet their needs.

2. Data protection

(c) Planning for data protection

Data collection, storage, processing and dissemination must respect data protection laws, regulations and rules, as described in national laws, such as the regulations concerning data protection in New Zealand set out in its Privacy Act 2020[52] and Data and Statistics Act 2022,[53] and the National System of Statistical and Geographical Information Law in Mexico.[54] European Union countries must adhere to GDPR, and African Union countries to the African Union Convention on Cyber Security and Personal Data Protection. The African Union and Internet Society jointly developed a set of guidelines for implementing the Convention,[55] which outlines the roles of different stakeholders, including government agencies.

Data protection laws require that a data protection plan be completed to assess any measures proposed that pose particular risks relating to how personal data are used. A full data protection impact assessment may also need to be carried out.

While the method that should be used to perform a data protection impact assessment is not provided in GDPR, the European Data Protection Supervisor points to the Bieker and others (2016) method as a reference. Hoorn and Montagner (2018) use the Bieker and others method as a starting point because it serves as a parsimonious model with privacy and security protection goals (confidentiality, integrity, availability, un-linkability, intervenability and transparency). These protection goals are aligned with the data protection principles defined in article 5 of GDPR, namely lawfulness, fairness and transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, confidentiality and accountability. Hoorn and Montagner (2018) also include data minimization as a protection goal. Table X.1 outlines some

[52] Parliamentary Counsel Office, "Privacy Act 2020". Available at www.legislation.govt.nz/act/public/2020/0031/latest/LMS23223.html.

[53] Parliamentary Counsel Office, "Data and Statistics Act 2022". Available at www.legislation.govt.nz/act/public/2022/0039/latest/LMS418574.html.

[54] Sistema Nacional de Información Estadística y Geográfica, "Marco jurídico". Available at www.snieg.mx/scn-marco-juridico (available in Spanish only).

[55] Available at www.internetsociety.org/wp-content/uploads/2018/05/AUCPrivacyGuidelines_2018508_EN.pdf.

protection goals and generic measures for implementing them. This table could be used as a starting point to further discussion on issues relating to data protection and privacy in the digitalization of time-use studies.

Table X.1
Sample data protection goals and measures

Protection goals	Generic measures for the implementation of the protection goals
Data minimization is the requirement that personal data should be collected, processed and used only where necessary for the achievement of the purpose of that processing.	Reduce the attributes of the data subject collected. Choose automated processing operations (rather than decision-making processes), which limit the possibility of interference in comparison with dialogue-controlled processes. Apply pseudonymization and anonymization.
Availability is the requirement that personal data should be available and used properly in the intended process. The data must, therefore, be accessible to authorized parties and the methods intended for their processing must be applied.	Prepare data backups, process states, configurations, data structures. Protect against external influences. Implement repair strategies and alternative processes.
Integrity refers to the requirement that (a) information technology processes and systems continuously comply with the specifications that have been determined for the execution of their intended functions and (b) the data to be processed remain intact, complete and up-to-date.	Restrict writing and modification permissions. Assign document rights and roles. Specify the intended behaviour of workflows or processes and perform regular tests to determine the current state thereof.
Confidentiality refers to the requirement that no person should be allowed to gain access to personal data without authorization. It ensures that data are protected against unauthorized and unlawful processing.	Define a rights and role concept based on the principle of necessity and identity management by the controller. Implement a secure authentication process. Limit authorized personnel to persons who are verifiably responsible. Specify and control organizational procedures (obligation to ensure data secrecy, confidentiality agreements, etc.). Encrypt stored or transferred data.
Unlink ability refers to the requirement that data should be processed and analysed only for the purpose for which they were collected.	Restrict processing, utilization and transfer rights. Set organizational/departmental boundaries. Approve user-controlled identity management by the data processor. Use purpose-specific pseudonyms, anonymization services, anonymous credentials; process pseudonymous or anonymous data.
Transparency is necessary for the monitoring and control of data, processes and systems from their creation to their erasure and is a prerequisite for lawful data processing. Transparency of the entire data-processing operation and of the parties involved can help to ensure that data subjects and supervisory authorities can identify deficiencies and, if needed, demand appropriate procedural changes.	Document procedures, in particular business processes, data stocks, data flows and the information technology systems used, operating procedures, a description of procedures and interaction with other procedures. Document contracts with external service providers and third parties, from which data are collected or to which they are transferred. Document consent and objections.
Intervenability refers to the requirement that data subjects should be effectively granted their rights to notification, information, rectification, blocking and erasure at any time, and that the controller is obliged to implement the appropriate measures.	Apply differentiated options for consent, withdrawal and objection. Create the data fields necessary for, for example, blocking indicators, notifications, consents, objections, rights of reply. Provide options to disable individual functionalities without affecting the entire system. Ensure the traceability of the activities of the controller for granting the data subject's rights. Establish a single point of contact for data subjects. Provide options to compile, consistently correct, block and erase all data stored regarding any one person.

Source: Hoorn and Montagner (2018).

(d) De-identifying microdata

While there are benefits of sharing data, there are also challenges. One important challenge arises when there are legitimate reasons for not making some data public. The most important legitimate exemption from disclosing time-use data is the obligation to protect personal identifiable and sensitive personal information.[56] Data can be made open without sharing personal identifiable information or sensitive personal information through a process called de-identification. This involves removing or obscuring the information so that it cannot be linked to individuals and harm them, even when it is combined with other data sets. While de-identification reduces the risk of an individual being identified and harmed, it rarely eliminates completely the possibility that that could occur. Reidentification becomes more of a concern with higher dimension data sets (including with multiple linked data sets), with small samples and with outliers or unique values.

[56] Additional exemptions relate to national security and confidential commercial information, but these are less relevant to time-use statistics than to some other types of statistics.

Most time-use data are less sensitive than some other types of data that are handled by NSOs, such as health or income data, but the same techniques are used for de-identification. In general, data are de-identified by means of suppression, reducing the precision of the data and masking or replacing some data values, or a combination of these techniques.

Suppression. Data suppression involves removing specified fields or values from the data set. The drawback of this technique is that if used extensively, it may limit the usefulness of the data. Direct identifiers, such as the data subject's address or national identification number, should always be suppressed or transformed.

Abstraction. This reduces the precision of data as a result of grouping values into categories, such as five-year age groups or geographic regions. Aggregation is similar to abstraction, but instead of a category or range being assigned, the value is replaced with a descriptive statistic, such as the average of those in the category. Abstraction and aggregation are both useful for hiding outliers, by top-coding income for example.

Perturbation. This technique masks the data by randomly replacing specific values with other specific values while maintaining the key statistical properties of the data set. This may involve replacing a value with another actual value (e.g. from within a specified category or range) or by adding random noise to all points. Perturbation may be called "jittering" when applied to geographic data. Geolocation data in time-use surveys are personal identifiable information as it is possible to see where respondents sleep and spend their day. Even with jittering or perturbation, reidentification may be possible. The greater the perturbation, the lower the risk, but also the less meaningful any analysis will be. NSOs should carefully consider whether and how to make geolocation data open.

Pseudonymization. Pseudonymization, or assigning a unique identifier, is a way to de-identify data while still allowing the data to be linked to other data sets that use the same unique identifier. For example, if the sample used for a time-use survey is the same as that used for another household survey, the variables from the two different data sets could be linked. All personal identifiable information must first be removed from the data set using one of the previous techniques. If the data are assigned direct identifiers and indirect identifiers, it will be possible to reidentify the data once the data sets are linked.

NSOs should adhere to the current best practices on de-identification techniques.

3. Microdata

Public use microdata files substantially enhance the analytical value of data, in particular time-use diary data. Much of the analysis of contextual variables is conducted by researchers outside NSOs. NSOs may lack the time and resources to conduct all the analyses they wish to, or the resources to commission an analysis. Making data available to researchers means that survey data will be more fully explored.

There are different systems for providing access to microdata. These include public use files, where data files are distributed to users, or remote access. In remote access, users send a statistical code to NSO. NSO then runs the code and provides the results to the user, rather than providing the data. The main reason for using remote access is to protect privacy and confidentiality, in particular if time-use data are linked to other survey microdata that might be more sensitive or restricted. Protecting the confidentiality of responses is a major consideration for the dissemination of data.

There are an increasing number of programs that allow limited online tabulation, to create tables of time-use variables, disaggregated by background variables. There are, for example, online tabulation systems on the websites of the Multinational Time Use Study (MTUS) and HETUS, described below, and the American Time Use Survey.

Within the framework of the minimum set of gender indicators, the Gender Data Hub[57] provides information on unpaid domestic and care work by sex, age and location to monitor Sustainable Development Goal indicator 5.4.1.

Two projects provide harmonized time-use microdata for multiple countries: MTUS and HETUS.

MTUS is a collaborative project that involved collecting diary samples over a period of six decades across 30 countries and bringing them together in a single standardized format. The data set includes harmonized variables on background, activity, location, mode of transport and co-presence. The sample includes 1.5 million diary days from over 100 randomly sampled national-scale surveys. MTUS is managed by the Centre for Time Use Research at University College London. Users can apply for access[58] to data from MTUS or use the MTUS data extract builder, known as MTUS-X.[59] MTUS-X is a collaborative project between the Maryland Population Research Center, the Minnesota Population Center and the Centre for Time Use Research at University College London.

HETUS are national surveys conducted in European Union countries using standardized survey designs and statistical classifications to the greatest extent possible. At present, data are available from two rounds of surveys: HETUS 2000 (conducted between 1998 and 2006 in 15 European Union countries) and HETUS 2010 (conducted between 2008 and 2015 in 18 European Union countries). HETUS 2020 is currently ongoing, but many countries that planned to participate in that round have had to postpone their surveys owing to the COVID-19 pandemic. In some countries, surveys have been conducted or are scheduled to take place, while in others, no arrangements have been made yet.[60]

4. Metadata

The procedures for documenting and disseminating metadata from time-use surveys should follow those for other household surveys. NSOs should provide comprehensive metadata along with any data released in any format. The *United Nations National Quality Assurance Frameworks Manual for Official Statistics* provides basic recommendations on the management and provision of metadata and on the use of data

[57] See United Nations, Department of Economic and Social Affairs, "Time-use". Available at https://gender-data-hub-2-undesa.hub.arcgis.com/pages/time-use (accessed on 13 February 2023).

[58] Centre for Time Use Research, "Multinational Time Use Study". Available at www.timeuse.org/index.php/mtus.

[59] IPUMS Time Use, "Multinational time use study extract builder". Available at www.mtusdata.org/mtus.

[60] Microdata from HETUS 2010 are available at https://ec.europa.eu/eurostat/web/microdata/harmonised-european-time-use-surveys and tables can be accessed at https://ec.europa.eu/eurostat/web/time-use-surveys/database.

transmission standards and tools, such as the Statistical Data and Metadata Exchange. According to principle 19 of the *Manual*, which concerns managing metadata, statistical agencies should:

> Provide information covering the underlying concepts and definitions of the data collected and statistics produced, the variables and classifications used, the methodology of data collection and processing, and indications of the quality of the statistical information – in general, sufficient information to enable the user to understand all of the attributes of the statistics, including their limitations.

A user guide for microdata should also contain detailed information on variable and value definitions, naming conventions, weights and values that were imputed.

Box X.3

Quality checklist: dissemination

- Develop dissemination products with key data needs in mind. For example, consider how users can easily derive data required, such as data on the average time spent on each activity.
- Develop detailed documentation to describe the data set and facilitate use (e.g. a user guide). Include a description of the editing practices and rules used, which may help data users to interpret the results.
- Time-use data sets can be complicated to use; consider training high-level users or other methods to ensure that they can produce valid outputs from microdata.
- Publish classifications. If the classification has changed between survey iterations, consider whether a concordance should be published.
- Publish data set documentation to facilitate comparison with other data sets.
- Plan processing tasks to improve efficiency and minimize the impact on the data release timetable.
- Consider staged release to allow the early dissemination of key statistics.
- Consider the file structure and how to set up data sets that are as easy as possible to use (e.g. combining data items across different levels of the data set).
- Consider the design of tables for ease of use (e.g. using appropriate units of measure).
- Incorporate some international comparisons into the survey evaluation.
- Publish the evaluation or share with peer organizations.

XI. Ensuring quality of time-use data and surveys

A. Unique quality considerations for time-use surveys: a checklist

1. Aim

The purpose of this checklist is to present the quality considerations that should be taken into account when undertaking a time-use survey. While not all of them will be relevant to every time-use survey, together they form a suite of considerations that will assist organizations in building quality into their surveys from development through to dissemination. This chapter consolidates the quality checklists presented at the end of each chapter into a coherent quality assurance framework.

2. How to use this checklist

This checklist should be read together with the Generic Statistical Business Process Model and the *United Nations National Quality Assurance Frameworks Manual for Official Statistics*. Given that it is assumed that organizations are aware of and implementing good quality survey practices in general, this chapter is focused only on considerations that are of special or unique relevance to the subject matter and methods.

Figure XI.1
Generic Statistical Business Process Model

The Generic Statistical Business Process Model serves to describe and define the set of business processes necessary to produce official statistics. It comprises eight phases of the survey process, each with associated subprocesses. Although the presentation of the model follows the logical sequence of steps in most statistical business processes, the elements of the model may occur in different orders in different circumstances. Also, some subprocesses will be revisited, forming iterative loops (Economic Commission for Europe, 2019).

In this section, the quality considerations are arranged according to the phases. As a general principle, each consideration is listed only once, that is for the phase where the related decision or action mostly takes place. In some cases, closely related considerations appear in separate phases.

The quality considerations for each phase are classified according to the process and product quality dimensions derived from the *United Nations National Quality Assurance Frameworks Manual for Official Statistics*.

The process quality principles include:

- Methodological soundness
- Cost-effectiveness
- Appropriate statistical procedures
- Managing respondent burden

The product quality principles include:

- Relevance
- Accuracy and reliability
- Timeliness and punctuality
- Accessibility and clarity
- Coherence and comparability

While there is another set of quality dimensions relating to the institutional environment in which the survey is organized, those dimensions are chiefly beyond the scope of a time-use survey specifically and have, therefore, not been discussed in this chapter.

Table XI.1
Key quality considerations for time-use surveys, by process

Specify needs	
Quality dimension	**Key considerations**
Relevance	Consider whether the key users have been identified and included in consultations. In determining the data requirements: › Identify the data requirements to the highest possible level of specificity. › Document the proposed use of the data required. › Identify any conflicts between requirements. › Ensure that the data requirements are prioritized.
Accuracy and reliability	Consider whether the data needs can be accurately delivered using the proposed survey vehicle.
Design	
Quality dimension	**Key considerations**
Relevance	Consider the extent to which the survey content addresses the data needs identified. Ensure that the highest priority needs are addressed. Consider the level of detail that is required in the activity classification to meet the data needs, but balance this against how easily responses can be coded to that level. Where data collection is new or has been substantially redeveloped, consider keeping the activity classification flexible enough to be iterated in response to issues encountered when coding diary entries (e.g. removing a category if very few responses are coded to it).
Accuracy and reliability	Undertake cognitive testing to determine whether questions accurately measure the intended concepts. Consider the mode of data collection: self-administered diary, interviewer-administered recall diary or stylized questions. Consider the length of diary time periods (which are usually 10, 15 or 30 minutes), while balancing the respondent burden against the desired level of precision in measurement. Consider the number of reference days sampled per respondent, while balancing the respondent burden against any improvements in accuracy. Consider providing examples of a completed diary to increase the respondent's understanding of the expected responses and level of detail. Consider retaining and using personal details to check that information collected in background questionnaires matches diary records. Determine whether and how this can be done in compliance with applicable legislative and privacy frameworks.
Timeliness and punctuality	Consider the data entry and processing requirements for the survey content and the impact on timely data dissemination.

Table XI.1 (*continued*)

Design	
Accessibility and clarity	Consider the activity classification from the perspective of data users to determine whether category groupings make instinctive sense.
Coherence and comparability	Consider whether the survey content is coherent with other data sources available. Ensure that data-collection modes are coherent (e.g. paper diary versus electronic diary). Design a method for reliably matching background questionnaire records with time-use records. Consider the comparability of the instrument with previous iterations of the survey and with international time-use surveys.
Methodological soundness	Consider the representativeness of enumeration periods across the year (seasons, holidays, school terms). Understand the implications of the timing of different aspects of the data-collection process, such as the length of the enumeration period, the lag between the completion of the questionnaire and the time-use component and consider whether and how to allow the substitution of reference days for a selected household. Consider the implications of the diary design on data cleaning tasks. For example, in the case of self-administered diaries, consider whether respondents can enter more than one activity for a given time period and how this will be dealt with in processing to preserve fidelity, consistency and quality. For retrospective instruments, consider how many days respondents will be required to recall and how much information is collected. Consider the population required to meet the data needs (only one or every adult in the household), whether children are included and what age a respondent is treated as an adult. Consider, if a new data-collection mode is being introduced, selecting independent samples to offer each mode, so that statistically valid tests can be used to determine whether there is a mode effect.
Cost-effectiveness	Consider implementing electronic data-collection methods to improve accessibility and reduce collection costs.
Appropriate statistical procedures	Design questions that are easy to understand and answer by a broad range of respondents. Avoid overreliance on instructions to explain ambiguous questions or survey completion. Design questions to directly produce data items that meet specific data needs, rather than relying on interpretation during data entry and processing.
Managing respondent burden	Consider whether any content included in previous collections can be removed. Undertake cognitive testing to identify any aspects of the diary that create a particularly high cognitive load. Consider whether to use a stand-alone time-use survey or to include a time-use module in another survey vehicle to maximize participation and reduce the respondent burden. Consider the usability and respondent experience associated with time-use instruments. Make use of visual features and layout to alleviate the cognitive load and help respondents to think in a natural way about how they spend their time.
Build	
Quality dimension	**Key considerations**
Cost-effectiveness	Weigh the cost of building and testing different collection instruments, in particular electronic instruments, against any savings made as a result of a reduced data-collection effort.
Appropriate statistical procedures	Ensure that appropriate security and privacy provisions are applied in both electronic and paper collection.
Managing respondent burden	Reduce the complexity of the user interface and form completion process, to reduce the cognitive load and respondent burden. Plan to build the instrument iteratively, to allow time for usability testing and resulting improvements.
Collect	
Quality dimension	**Key considerations**
Methodological soundness	Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion) and monitor them throughout enumeration.

Table XI.1 (*continued*)

Collect	
	Consider how to implement sample top-up and deselection to calibrate the sample based on observed response rates in the field. This can be more difficult for time-use surveys, depending on the survey design, for example if diary dates are restricted to a specific week in each month or quarter.
Cost-effectiveness	Consider when enumeration can be discontinued to save costs (if targets are met earlier than forecast in particular geographic regions or overall).
Appropriate statistical procedures	Provide interviewers with training for efficient and consistent data collection. Provide interviewers with training on maintaining security and confidentiality.
Managing respondent burden	Offer different modes to allow respondents to choose their preferred response style. Consider the mode effect on comparability across respondents. Offer interviews at a wide range of times of day to suit respondents.
Process	
Quality dimension	**Key considerations**
Relevance	Review the quality of responses and identify gaps in data collected to determine whether needs will be met. For example, to what extent the data can be used without editing or amendment or whether certain diary fields have more missing data than others.
Accuracy and reliability	Determine the criteria for inclusion of the data collected in diaries or stylized questionnaires in the final data set, based on the required level of quality. For example, consider the number of activities reported per day or the number of hours for which data are missing. Validate data through each processing step. Validate the link between the background questionnaire and time data.
Timeliness and punctuality	Plan processing tasks to improve efficiency and minimize the impact on the data release timetable. Consider staged release to allow the early dissemination of key statistics.
Accessibility and clarity	Consider the file structure and how to set up data sets that are as easy as possible to use (e.g. combining data items across different levels of the data set).
Methodological soundness	Design the weighting strategy to create estimates that are as accurate as possible based on the time-use data (in particular, to ensure the days of the week are weighted proportionally). Create a clear set of rules and principles to be used when editing and cleaning diary data and ensure that the implications thereof are understood. For example, determine to what extent the editing principles will prioritize the completeness or internal consistency of a diary, as opposed to maintaining the data as reported.
Cost-effectiveness	Consider the level of detail to be achieved in data entry and minimize this where possible. Consider the different options for data entry and coding (such as manual coding/amendments, at the time of data entry or partially automated through statistical programming, precoded forms, machine learning), the resources required for each and the effect on data quality. Consider the cost of proposed data editing actions compared with the value added to the data set. Consider whether there are statistically significant impacts of proposed data amendments.
Appropriate statistical procedures	Where data entry, coding or editing is manual, implement a quality assurance process. Ensure the security and integrity of the data integration and processing system, such as the physical security of forms, and ensure that data are not overwritten.
Analyse	
Quality dimension	**Key considerations**
Relevance	Undertake a relevant analysis to meet key data needs.
Accessibility and clarity	Consider the design of tables for ease of use (e.g. using appropriate units of measure).
Coherence and comparability	Validate data using comparable data sources (e.g. a previous time-use survey, other time-use surveys at the international level, other survey or administrative data sources). If more than one collection mode has been used, check for mode effects (note that if any statistically significant difference is detected, it is necessary to verify independent samples for each mode).

Table XI.1 (*continued*)

Analyse	
Methodological soundness	Use a method of measuring and reporting the response rate that is transparent and consistent with previous surveys. Provide enough information on the response rate to permit international comparison. This could include the questionnaire response rate, diary return rate, proportion of selected households where all questionnaires and diaries were completed and the proportion of collected diaries that were sufficiently complete to be retained in the final output data set.
Disseminate	
Quality dimension	**Key considerations**
Relevance	Develop dissemination products for different types of users (e.g. policymakers, researchers, the general public, the press). Develop dissemination products with key data needs in mind. For example, how users can easily derive the data required, such as data on the average time spent on each activity.
Accessibility and clarity	Develop detailed documentation to describe the data set and facilitate use (e.g. a user guide). Include a description of the editing practices and rules used, which may help data users to interpret the results. Consider, given that time-use data sets can be complicated to use, training high-level users or using other methods to ensure they can produce valid outputs from microdata.
Coherence and comparability	Publish classifications. If the classification has changed between survey iterations, consider whether a concordance should be published. Publish data set documentation to facilitate comparison with other data sets.
Cost-effectiveness	Consider how much data to publish and the microdata that can be made available to best address known data needs.
Evaluate	
Quality dimension	**Key considerations**
Coherence and comparability	Incorporate some international comparison into the survey evaluation. Publish the evaluation or share with peer organizations.

B. Assurance of data quality of time-use survey results

1. Planning for a quality review

The review process to assess data quality involves evaluating the final survey product in terms of the accuracy, reliability and general usability of the data, in the light of the objectives of the survey. The desired result is a balanced and informative discussion on specific sources of error and bias. Data quality statements are important in that they allow users to make more informed interpretations of the survey results and to understand the limitations; they also help NSOs to improve future surveys. Issuing statements relating to the quality of the data produced should be standard statistical practice.

It is essential to plan the quality review during the overall survey planning process rather than at a later stage, because much of the information needed to evaluate data quality must be collected while the survey is being implemented. Data users should be involved at the planning stage as well. Most users are not able to assess the quality of the data themselves and so will rely on the quality review to understand the degree to which errors limit their use of the data.

The quality review cannot cover all the potential sources of error and bias. It should be focused on the most important sources and provide quantitative measures where possible and qualitative measures where not. To determine the appropriate level and intensity of evaluation for the survey, survey managers should consider:

- Uses and users of the data
- Potential error and its impact on the use of the data
- Variation in quality over time
- Cost of the evaluation relative to the overall cost of the survey
- Potential for improvement in the quality, efficiency or productivity of statistical operations
- Utility of data quality measures to users and the ease of interpretation
- Possibility of repeating the survey

2. Data quality issues

As in any survey, sources of error in a time-use survey are described in terms of the components of total survey error, namely sampling and non-sampling errors. There is extensive technical literature on survey errors. The present *Guide* does not go into a detailed discussion of the topic in general, but rather serves to highlight quality issues specific to time-use data.

(a) Sampling error

Sampling error (or sampling variability) occurs when the results of the data collection are based on a sample of the population rather than the entire population. Statistics from time-use surveys may differ from population characteristics because only a sample of all the persons and time periods is surveyed. Factors that affect the magnitude of sampling error include the sample design, sample size, population variability and types of days.

Standard error and relative standard error are useful measures of sampling error. The relative standard error expresses the standard error as a percentage of the estimate:

$$\text{Relative standard error (\%)} = \frac{\text{Standard error}}{\text{Estimate}} * 100$$

The Australian Bureau of Statistics uses 25 per cent as the upper limit for estimates to be considered reliable for most purposes. Estimates with relative standard errors of between 25 and 50 per cent are flagged to indicate that they should be used with caution. Estimates with relative standard errors of greater than 50 per cent are also flagged to indicate that the standard error is too unreliable for general use. Relative standard error measures are published except where greater than 50 per cent (Australian Bureau of Statistics, 2022b). Canada uses a lower threshold: estimates with relative standard errors of greater than 33.3 per cent are considered too high, estimates with relative standard errors of between 16.7 and 33 per cent should be interpreted with caution, and only those with relative standard errors of below 16.7 per cent are considered reliable.

(b) Non-sampling error

The major sources of non-sampling error are (a) missing data due to coverage errors and both unit and item non-response and (b) measurement errors derived from response errors and processing (coding and data entry) errors. It is often difficult to detect and to quantify the extent of these errors.

Coverage errors

In general, coverage errors arise when a sampling frame does not reflect the target population. The sample of a time-use survey includes people and time periods (see chapters II and V), with the target population of days often including all the days in

the year. A sample that does not reflect the target time can also lead to coverage errors. For practical reasons, such as difficulty in obtaining time-use data from the population, some days might be excluded, for example holidays or the rainy season. Other surveys are conducted in only one short timespan, rather than throughout the year. Since coverage errors affect every estimate produced from the survey, they are one of the most important types of error. These errors may lead to either a positive or negative bias in the data, and the effect can vary for different subgroups of the population.

When the number of units excluded from the population is small, the biases introduced in the estimates will generally also be small in magnitude. However, when responses to some of the survey questions are highly correlated with characteristics of the groups or times excluded, the magnitude of the biases may be more significant. For example, single parents or people with two jobs may be too busy to respond to questionnaires. Their time use will be systematically different from those who have time to respond.

Coverage ratios obtained by comparing survey estimates of population subgroups (e.g. defined by age, race or sex) with population estimates from an independent source (e.g. census or post-enumeration surveys) provide indicators of the extent of non-coverage. If a survey objective is to provide information on a specific subpopulation, such as working parents, it can be useful to calculate coverage ratios for those population groups. However, studies that measure only the level of non-coverage provide no information on the bias for individual survey estimates. Adjusting estimates by post-stratification or calibration is aimed at reducing non-coverage bias but does not eliminate it. Studies of subsamples can provide evidence of non-coverage bias, but their sizes are generally too small to use for estimation (Kalton, 2000).

Non-response error

In most time-use surveys, households and reference days are selected randomly, as are respondents within households.

Unit non-response may occur when a household fails to respond or an individual fails to respond at all or on the assigned day. Response rates should be reported at the household, individual and diary (or stylized questionnaire) day levels. In box XI.1, an approach is suggested for calculating response rates in a way that is internationally comparable. This approach should be used when reporting on Sustainable Development Goal indicator 5.4.1, even if NSO has other ways of reporting response rates for national publications.

Box XI.1
Determining and reporting response rates

Concepts

Discussions on response rates should not be focused solely on formulas, but also the specifications for concepts.

Higher response rates are often considered to be an indication of higher quality. Before making that assumption, however, it is important to consider how the sample was selected and how different inputs into the calculation are reported.

In reporting the response rates, researchers should be clear and transparent on the following issues:

Sample. Is the responding sample representative of the target population? How was the initial sample drawn?

Box XI.1 (*continued*)

- A random sample from the population register or any other list of persons, addresses, telephone numbers. If yes, which list? What is the quality of the sampling frame?
- An existing panel. If yes, how was the panel formed and selected?
- The sample was selected in another way, for example self-selection of respondents, which is when they choose to participate in response to advertisements.

With quota samples, for example, interviewers might keep calling telephone numbers until they reach their survey quota. These surveys might report a 100 per cent response rate because everyone contacted completed the survey; however, instances where there was no answer when a number was called or a number was not valid were not included in the calculation.

Replacement. Is non-response handled by means of substitution? If yes, which procedure is used? How is substitution included in calculating the non-response rate?

Any contact that does not lead to an acceptable result should be counted as a non-response, even if successfully replaced (e.g. by someone else with similar characteristics, someone from the same street or someone from the same household).

Eligible persons, sample loss. A clear definition of who is eligible to take part in the survey should be available. Persons who do not meet these criteria (e.g. outside the age range) are not considered as part of the sample and are, therefore, not considered as a non-response.[a]

There should also be a clear definition of what is considered as sample loss. Sample loss refers to the part of the sample that cannot be enumerated. For example, in the case of telephone list-based samples, the sample loss would be the telephone numbers on the list that are no longer in use and, therefore, it would be impossible to elicit a response by calling that number.

Eligible diaries/questionnaires, acceptable diaries/questionnaires. A clear definition should be available of what is considered as an eligible diary or questionnaire for stylized questions. What criteria are used (e.g. minimum number of activities or amount of unspecified time)? What are the acceptable thresholds? See table XI.2 for some country-specific examples of thresholds.

Placed diaries/questionnaires. It should be clear what is expected from respondents. If they are asked to complete two diary days and only one day meets the acceptable thresholds, the diary response rate for the respondent is 50 per cent.

Calculating response rates

Response rates for probability samples are calculated as the total number of interviews completed divided by the total number of eligible sampled units. Depending on the survey design, the following are different response rates that can be reported for time-use surveys:

Sample response rate = completed sample/(approached sample minus sample loss)

Person response rate = number of persons who completed the survey/persons eligible for the survey

Diary/stylized questionnaire response rate = number of acceptable returned diaries/placed diaries

Diary/stylized questionnaire days = number of days that met the acceptable thresholds/total eligible diary days

Box XI.1 (*continued*)

If children are included in the survey, a separate child-level response rate can also be calculated with the denominator representing the eligible number of child diaries placed and the numerator representing the actual number of diaries from children included in the data file.

In the American Time Use Survey (United States Bureau of Labor Statistics, 2022), the response rate was calculated as follows:

$$\frac{\text{Complete}}{\text{(Complete+Refusal+Non-contact+Other+Unknown eligibility)}}$$

Complete: complete or sufficient partial interview[b]

Refusal: contacted, declined to participate

Non-contact: uncompleted callbacks or never contacted

Other: respondent absent, ill or hospitalized, language barrier or other

Unknown eligibility: phone number incorrect for household, unconfirmed number or other.

[a] With prior estimates of non-response or estimates of non-response from similar surveys, oversampling can be attempted.

[b] In the American Time Use Survey, a diary with a minimum of 21 hours and five activities was considered to be complete.

Item non-response occurs when a sufficiently accurate response is obtained for only some of the data items required for a respondent. For time-use surveys, it is necessary to define what constitutes a "completed interview", that is how much of the diary or questionnaire needs to be completed for it to be used for analysis. This may be expressed in hours of completed activities, or as the number of activities entered. Where the reference period is more than one day, consideration should be given to the treatment of diaries containing only one complete day. A balance needs to be achieved between setting the acceptance threshold too high, which could result in not having enough diaries to complete the analysis, or too low, which could affect the quality of the data. Table XI.2 provides thresholds used by some countries.

Table XI.2
Threshold for diaries or stylized questionnaires to be considered complete

Country	Threshold for "completeness"
Australia	A minimum of 14 hours of information and a minimum of three activities over a 24-hour period. At least one day completed of the two days.
Canada	Diary has at least three activities in a 24-hour period.
Chile	A proposal that is currently being studied for the 2023 time-use survey is that: At least 80 per cent of the core questionnaire is answered (questions on whether the respondent participated in an activity and the amount of time spent); At least 85 per cent of questions related to work activities are answered (questions on whether the respondent participated in an activity, the amount of time spent and, for care work, the identification of the care recipient); At least four activities, including eating and/or sleeping, are reported with the amount of off time; A minimum (11 hours) or maximum (48 hours) total time per day is reported (including simultaneous activities).
China	At least three consecutive activities.
Finland	At least 12 hours and reporting of specific activities.

Table XI.2 (Continued)

Italy	At least seven episodes and 17 hours of activity.
Japan	At least four activities and at least 18 hours reported in a 24-hour period. Both designated days completed.
Mexico	All stylized questions answered.
United States	At least 21 hours and five activities.

As with all surveys, differences between respondents and non-respondents can cause biases in the survey results. There are, in general, two methods of compensating for non-response: sampling weight adjustment and imputation (Kalton and Kasprzyk, 1986). Weighting adjustments are aimed at reducing non-response bias but do not eliminate the bias. When weighting is used to adjust for non-response, estimates of the variances of survey estimates should incorporate the effects thereof.

Imputation may reduce non-response bias but cannot eliminate it. Imputation effects should be incorporated into variance estimation. Weighting adjustments and imputation are discussed further in chapter VII.

Measurement error

Two types of measurement error are response errors and processing errors. Response errors occur when the response received differs from the "true" value. These errors may be caused by the respondent, the interviewer, the questionnaire or the mode of data collection. Processing errors may occur at the data capture, coding, editing, imputation and tabulation stages. Measurement errors may be random in nature, or they may introduce a systematic bias into the results.

Digital tools have the potential to reduce processing errors, as they allow respondents or interviewers to enter the data directly (so separate coding or data entry by other people is not required), and permit automatic validation checks that flag out-of-range responses. However, range checks cannot guarantee that the values entered are correct; they can only guarantee that they are not implausible. Self-report tools can also increase the likelihood of response errors. Respondents are more likely than well-trained interviewers to:

- Misclassify activities (especially if the lists are long)
- Report sequential activities as simultaneous activities
- Omit activities, especially those that are done throughout the day while doing other activities, such as supervisory care

The main way to measure response error is by conducting validity and reliability studies, for example by reinterviewing a subsample of respondents.[61] It is best to minimize error to begin with by carefully designing survey tools and procedures and investing adequate time in thoroughly piloting them.

[61] NSOs need to plan and budget for these studies in the design phase, considering whether and how personal details can be retained for the purpose of validating the match between questionnaire and diary records, within applicable legislative and privacy frameworks.

3. Some quality review procedures

In addition to standard measures of quality, such as coverage ratios, response rates, edit and imputation rates and measures of sampling error, some indicators of quality specific to time-use survey data include:

- Number of activities or episodes/events reported (episodes for diaries only)
- Variety of activities reported
- Number of simultaneous activities reported (diaries only)

- Number of time intervals accounted for (diaries only)
- Number of starting times that are rounded up (open interval diaries only)

More detail is usually an indicator of better reporting. Survey quality is assessed by taking the averages over all diaries and comparing them with known results from similar surveys. Broader activity categories will lead to fewer episodes being recorded because separate activities falling into the same broad category will be coded in the same way as a single activity. As for the number of simultaneous activities, the focus should be on typically omitted or pervasive activities.

The number of time intervals accounted for is an indicator of accuracy in reporting. It is possible to compare these values across subpopulations, but also important to consider the extent to which differences reflect differences in reporting or differences in actual behaviour. For example, people who earn low wages may have to work longer hours, which would lead to fewer non-work activity episodes. This is a difference in behaviour, not an indication of poorer quality reporting.

As with all surveys, it is important to check the internal consistency and validity of data across the tables produced. The total time should add up to 1,440 minutes per day or 168 hours per week (including missing activities or "no activity recorded"). External consistency checks could involve comparing the results with those from previous studies or to similar populations. Mean duration of time allocated to major activity groups over the population, mean duration for participants and participation rates are three measures that could be compared (disaggregated by sex, age group, day of the week and other relevant analysis variables). In comparing the data, it is important to account for differences in the methodology, coverage, concepts and definitions, and classifications between surveys.

Sometimes it is too expensive, time-consuming or not technically feasible to conduct intensive data quality evaluations or generate quantitative measures of errors. In that case, the statistical office and time-use experts can work together to attempt a subjective analysis or data quality rating based on expert judgment.

4. Using results of data quality review

Quantitative measures and qualitative assessments from the review of data quality can be used to adjust survey estimates, guide users in the analysis and interpretation of survey data, and improve the quality of succeeding surveys.

The question often arises whether adjustments should be made in survey results to correct obvious deficiencies. As discussed above and in chapter VIII, it may be possible to a limited extent to reduce bias due to coverage and non-response errors by adjusting estimates using appropriate adjustment factors. For example, adjustment factors for non-response bias can sometimes be developed from reinterview studies or record checks. These factors can theoretically be applied to the original survey results to reduce evident biases.

Another procedure is to allow the unadjusted survey estimates to stand but to provide as much information as possible in the technical appendices of publications on the estimated magnitudes of various kinds of errors based on the results of data review studies. An alternative to applying adjustment factors to survey estimates that are considered unreliable is to suppress the information with an explanation as to why it is being withheld.

Information on item errors can affect various publication decisions. For example, if the errors are especially numerous in a given item, that item can be suppressed in the publication (i.e. not shown), with a note explaining the reason for suppression.

In its statement on the methodology for the 2020/21 time-use survey, the Australian Bureau of Statistics (2022c) stated that the following items were collected in the diaries and had not been published due to data quality concerns:

- Whether a smartphone, tablet or computer was used to do the activity
- Who was present during the activity.

Where imputation is used, the extent of imputation can also be specified through explanatory notes in statistical tables.

Quality reviews are also important for informing the next cycle of the survey. The review or evaluation should address all aspects of the survey, from survey design to data dissemination. In Australia, an evaluation report is prepared for every survey. This is a document for internal use only, which covers the entire survey cycle process and includes recommendations for improvements in the next cycle.

Box XI.2
Quality checklist: quality of time-use data and surveys

- Set targets for the different measures of response (questionnaire response rate, diary return rate, household-level completion) and monitor them throughout enumeration.
- Provide interviewers with training for efficient and consistent data collection.
- Provide interviewers with training on maintaining security and confidentiality.
- Review the data quality of responses and identify gaps in data collected to determine whether needs will be met. For example, to what extent the data can be used without editing or amendment or whether certain diary fields have more missing data than others.
- Determine the criteria for inclusion of diaries in the final data set, based on the level of quality required. For example, consider the number of activities reported per day or the number of hours for which data are missing.
- Validate data through each processing step.
- Validate the link between questionnaire and diary data.
- Validate data using comparable data sources (e.g. previous time-use surveys, other time-use surveys at the international level, other survey or administrative data sources).
- Check for mode effects, if more than one collection mode have been used.
- Use a method of measuring and reporting the response rate that is transparent and consistent with previous surveys. Provide enough information on response to allow for international comparison. This could include questionnaire response rate, diary return rate, proportion of selected households where all questionnaires and diaries were completed, proportion of collected diaries that were sufficiently complete to retain in the final output data set.
- Incorporate some international comparison into the survey evaluation.
- Publish the evaluation or share with peer organizations.

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Annex I.
Minimum harmonized instrument: model diary

The model diary and wording presented in the present annex are intended for use in digital modes of data collection, such as a computer-based web application or smartphone application. Any digitized mode should offer a low-tech option, such as telephone interviewing, to accommodate respondents who do not have digital communication technologies. The minimum activities list in the present annex should be offered in colloquial language, as shown below, in drop-down menus as required. It should be noted that the order in which the activities are listed may vary depending on the application used. The order of presentation is, therefore, not determined by the minimum harmonized instrument activity category number.

Minimum harmonized instrument activity categories

No.	Category
1	Working for pay or doing activities to generate an income for yourself or your family.
2	Unpaid activities done to produce goods for use by your household or family.
3	Helping neighbours, friends or others without receiving payment.
4	Cooking, preparing or heating meals, setting or clearing the table, or washing the dishes.
5	Cleaning inside or outside the dwelling, disposing of garbage or recycling, or watering plants.
6	Making minor repairs to the dwelling or repairing or maintaining furniture, appliances or household vehicles.
7	Washing, ironing, hanging clothes to dry, mending clothes or cleaning footwear.
8	Budgeting, paying bills, organizing or planning household-related activities or completing administrative forms such as passports, contracts and applications, or collecting benefits from a social programme.
9	Taking care of a family pet, feeding it, bathing it, taking it for walks, cleaning its space or using veterinary or pet services.
10	Buying household supplies, food or clothing for family members, when done in person or online.
11	Taking care of children in your household or family by feeding them, dressing them, putting them to bed, talking or playing with them, assisting them or supervising homework or a school activity, accompanying them to appointments or providing health care.
12	Taking care of adults in your household or family by feeding them, bathing them, dressing them, putting them to bed, talking with them, listening to them, providing or planning for health care, or helping them with personal business management.
13	Attending education-related classes or courses on-site or online or doing education-related assignments or homework.
14	Getting together with others for social purposes, talking, chatting, writing or reading personal emails or texts.
15	Joining in community festivities or events, fulfilling civil duties or participating in religious celebrations or practices.
16	Attending cultural, entertainment or sports events.
17	Participating in hobbies, such as painting, music or photography, playing games or relaxing.
18	Participating in a sport or exercising.
19	Reading for leisure (e.g. newspapers, books, e-books, social media, magazines).
20	Watching television, listening to the radio or streaming.
21	Sleeping.
22	Eating or drinking.
23	Own personal hygiene, such as showering, getting dressed, getting a haircut or personal health care, including resting, sick or visiting doctors or specialists.
24	Travelling to or from places.
25	Other (activities not listed or unknown).

With this model, it is assumed that the diary is based on open format episodes with exact start and end times. Statistical organizations may use fixed intervals (for example 10-, 15- or 20-minute blocks) for timing activities, but this option is not discussed in the present annex.

Examples of simplified categories for answers to contextual questions – including "where?", "with whom?", "for whom?" and "use of ICTs?" – are also provided. These categories should, however, be customized for local application. Members of the Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics can provide alternative categories used in existing survey programmes, on request.

Model open interval diary questionnaire

In open interval diaries, respondents report their daily activities from a start time, often 4 a.m., and their best estimates of the end times. In the model, "Q_Act1" refers to the question about the first activity episode, while "Act1" refers to the answer, and a similar format is used for the contextual questions. The cycle of questions is repeated from the first activity episode to the number of the final episode reported. "Q_Where12", therefore, is the question regarding the location of the twelfth activity, if applicable. The second and following start times are computed as the summation of the sequence of duration times. Alternatively, respondents could be asked in the duration question for the end time and the duration would then be calculated as the difference between the start and the end.

As an alternative to asking context questions about the relevant episode, a series of supplementary questions about the context or secondary activity could be asked at the end of the questionnaire, using an interview mode or programming the supplementary questions into the software. This would require a fairly high level of methodological capacity.

The time-use diary starts with the following question:

Q_Act1. What were you doing at 4 a.m.?

Act1. *Answer is selected from the drop-down list of 25 activities.*

Drop-down list for primary activity
(25 minimum harmonized instrument activities)

Q_ Duration1. How long did this activity last?

Duration1. *HOURS.MINUTES*

Q_Where1. Where were you?

Where1. *Answer selected from the drop-down list. If Act1 is travel, this list shows transport modes rather than locations.*

Drop-down list for "Where were you?"
1. At home
2. At place of work or school
3. At another residence
4. Outdoors (away from home)
5. At store or place of service
6. Other (non-travel)
If "Travelling to or from places" is selected, the "Where were you?" question should be "Which mode of transportation did you use?" The answers shown are specific to mode of transportation such as:
7. Car, van, truck as a driver
8. Car, van, truck as a passenger
9. Public transportation such as bus, tramway, subway, light train, ferry
10. Bicycle
11. Walking
12. Taxi, limousine service
13. Plane
14. Other transport
99. Refusal, no answer

Q_Who1. Who was with you?

Who1. *Respondent selects all persons from the drop-down list. This creates a field of variables, one for each possible person type.*

Drop-down list for "Who was with you?"
1. Alone
2. Spouse or partner
3. Household children
4. Other household or family adult
5. Friends
6. Workmates, colleagues, classmates
7. Other

Q_ForWhom1. For whom did you mainly do/undertake this activity?

For_Whom1. *Answer selected from drop-down list* (answer set depends on activity reported in the episode).

Drop-down list for minimum harmonized instrument activities 1, 2, 4, 5, 6, 7, 8, 9, 10, 25

1. For paid job or own or family business
2. For use by household members or yourself
3. For use by family members residing elsewhere
4. For use by others

Drop-down list for minimum harmonized instrument activities 11 and 12

1. For use by household members
2. For use by family members residing elsewhere
3. For use by unrelated persons living in your household

Drop-down list for minimum harmonized instrument activity 3

1. Friends
2. Neighbours
3. Colleagues from work, school or community organization
4. Acquaintances
5. Other

Q_Use of ICT1. Were you using any type of technology for this activity?

Use_ICT1. *Answer yes or no.*

Q_Secondary_act1. Please indicate if you were doing any of these activities at the same time.

Secondary_act1. *Answer is selected from abridged list or complete minimum harmonized instrument list of 25 activities.*

Drop-down list for secondary activities (abridged)

Unpaid domestic and care work activity:

- Housework (such as washing dishes, cleaning the table, taking out garbage, laundry)
- Childcare (such as supervising homework, watching child swimming, minding)
- Adult care (such as supervising someone else's medication consumption/or treatment)
- Organizing, planning or paying bills
- Pet care

Additional activities:

- Eating or drinking
- Socializing or communicating in person, for example talking, conversing
- Socializing or communicating using any type of technology, for example phone, email, social media, video call, text messaging
- Reading
- Watching television or videos
- Listening to music or the radio
- General computer use
- Hobbies

Examples of probing questions for secondary activity

Intro Many of our daily activities involve helping persons from or outside our household. The following question is asked to determine how much informal support people provide for one another.

##Q1 Of the activities that you reported in the diary, which one(s) did you do to help another person? Please select all that apply. Note to programmer: bring full list of activities from the diary with checkboxes. For each activity identified, have a loop of questions (Q2 to Q6).

##Q2 Did (this activity) help a person from your own household, another household or an organization?

<1> Person from your own household..... Go to ##Q3
<2> Person from another household..... Go to ##Q3
<3> Organization.....Go to ##Q6
<4> No.....(Go to next episode)
<x> Don't know.....(Go to next episode)
<r> Refused .....(Go to next episode)

##Q3 Was the person helped 65 years of age or older? (If more than one, answer on the basis of the principal person helped.)

<1> Yes
<2> No
<x> Don't know
<r> Refused

##Q4 Does the person that you helped have a long-term health or physical limitation?

(Any condition lasting or expected to last more than six months and which may be either chronic or permanent.)

<1> Yes
<2> No
<r> Refused

##Q5 What is this person's relationship to you?

<1> Husband/wife/partner
<2> Child under 5 years of age
<3> Child between 5 and 13 years of age
<4> Child over 13 years of age
<5> Parent(s) or parent(s)-in-law
<6> Child of respondent living outside the household
<7> Other member(s) of the family outside the household
<8> Friend(s)
<9> Neighbour(s)
<10> Co-worker(s)
<11> Others
<x> Don't know
<r> Refused

[Go to next episode]

##Q6 Was this organization mostly concerned with older persons, children, persons with disabilities or other?

<1> Older persons
<2> Children
<3> Persons with disabilities
<4> Other
<x> Don't know
<r> Refused

[Go to next selected activity]

End of diary instrument

Of all the activities you did on (diary day), were any of them performed to help the following persons?

Children 14 years of age or under living in your household Yes No

Adult 65 years of age or older living in your household Yes No

Children 14 years of age or under not living in your household Yes No

Adult 65 years of age or older not living in your household Yes No

Friends, acquaintances Yes No

Annex II.
Minimum harmonized instrument: stylized questionnaire

Annex II provides an illustration of the sets of stylized questions that can be used to collect time-use data on the minimum harmonized instrument list of 25 activities.

The instrument is administered using eight sections or modules that are tailored to specific groups of activities that make up the 25 minimum harmonized instrument activities. The groupings are:

- Self-care and learning activities
- Employment and production of goods for own final use
- Unpaid domestic work activities for own household members
- Unpaid care activities for own household members
- Unpaid domestic and care activities for non-household family members
- Volunteering
- Socializing and leisure activities
- Other activities

Captions for a better understanding of the instrument are explained below:

- The wording in *italics* serves as an aid (i.e. the interviewer should not read it aloud).
- Words, questions and sections marked in grey are optional, so each country can decide whether to include them or not.

SECTION A: SELF-CARE AND LEARNING ACTIVITIES

Now I am going to ask you about the time you dedicated to personal activities.

NOTES	For persons N+ (countries need to define age of respondents)		
	Reference period: day	Reference period: week	
Essential ICATUS[62] division 91	A1. [Yesterday/Assigned day/Last week] how much time did you sleep?		
	[ ] hours and [ ] minutes		Hours and minutes
		Monday to Friday	[ ] and [ ]
		Saturday and Sunday	[ ] and [ ]
Essential ICATUS divisions 93 and 94	A2. [Yesterday/Assigned day/Last week] how much time did you spend on personal hygiene *(taking showers, getting dressed, getting a haircut)* or personal health care *(resting, sick, visiting doctors)*?		
	[ ] hours and [ ] minutes		Hours and minutes
		Monday to Friday	[ ] and [ ]
		Saturday and Sunday	[ ] and [ ]
Essential ICATUS division 92	A3. [Yesterday/Assigned day/Last week] how much time did you spend eating or drinking?		
	[ ] hours and [ ] minutes		Hours and minutes
		Monday to Friday	[ ] and [ ]
		Saturday and Sunday	[ ] and [ ]

[62] The 2016 International Classification of Activities for Time-Use Statistics.

Essential ICATUS major division 6	A4.a. [Yesterday/Assigned day/Last week] did you attend any education classes, participate in an online course or work on education-related assignments? 1. Yes→A4.b 2. No→A5.a
	A4.b. How much time did you spend on it? [ ] hours and [ ] minutes Monday to Friday — Hours and minutes [ ] and [ ] Saturday and Sunday — Hours and minutes [ ] and [ ]
	A5.a. [Yesterday/Assigned day/Last week] did you commute to and from school, college or university? 1. Yes→A5.b 2. No→B1
	A5.b. How much time did you spend on it? [ ] hours and [ ] minutes Monday to Friday — Hours and minutes [ ] and [ ] Saturday and Sunday — Hours and minutes [ ] and [ ]

SECTION B: EMPLOYMENT AND PRODUCTION OF GOODS FOR OWN FINAL USE

Now I am going to ask you about the time you dedicated to working for pay or to doing activities to generate an income for yourself or your family.

NOTES	Only for persons employed in reference week	
	Reference period: day	**Reference period: week**
Essential ICATUS divisions 11, 12 and 13	B1. How many hours did you work in your (main/other) job on [*specify the day* (yesterday/assigned day)]? *(Repeat this question for each job reported)* [ ] hours and [ ] minutes	B1. What days and how many hours did you work last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	For all persons aged N+	
Essential ICATUS divisions 11, 12 and 13	B2.a. Aside from what you told me already, [yesterday/last seven days/assigned day/reference week] did you do any (other) activity to generate income, even for a short period? (*To be asked to respondents identified as not employed in the background questionnaire.)* 1. Yes→B2.b 2. No→B3.a	
	B2.b. How much time did you spend on it? [ ] hours and [ ] minutes Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]	

Essential ICATUS division 18	B3.a. [Yesterday/Assigned day/Last week] did you spend any time travelling to and from your (main/other) job(s)? 1. Yes→3.b 2. No→B4.a
	B3.b. How much time did you spend on it? [ ] hours and [ ] minutes Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
NOTES	**For all persons aged N+**
Essential ICATUS division 16	B4.a. [Yesterday/Assigned day/Last week] did you do anything to find a paid job or to start a business? 1. Yes→B4.b 2. No→B5.a
	B4.b. Including commuting and waiting times, how much time did you spend searching for a job or starting a business? [ ] hours and [ ] minutes Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
Essential ICATUS major division 2	B5.a. [Yesterday/Assigned day/Last week] did you grow produce, raise animals or fish, preserve food, make textiles, work on construction for own household or family use or manufacture household items? 1. Yes→B5.b 2. No→C1.a
	B5.b. How much time did you spend on it? [ ] hours and [ ] minutes B5.b. On which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]

SECTION C: UNPAID DOMESTIC WORK ACTIVITIES FOR OWN HOUSEHOLD AND FAMILY MEMBERS[63]

[63] If section C is limited to domestic work activities for household members, section E needs to be added and wording marked in grey needs to be deleted.

Now I am going to ask you about the time you dedicated to domestic work activities for your household and/or for family members not living with you for which you did not receive payment. Where relevant, include travel and waiting times.

NOTES	For persons N+ (countries need to define age of respondents)	
	Reference period: day	Reference period: week
Essential ICATUS division 31	C1.a. [Yesterday/Assigned day/Last week] did you cook, prepare or heat meals, set or clear the table or wash the dishes? 1. Yes→C1.b 2. No→C2.a	
	C1.b. How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 32	C2.a. [Yesterday/Assigned day/Last week] did you clean inside or outside the dwelling; dispose of, separate or recycle the garbage; or water plants in your garden? 1. Yes→C2.b 2. No→C3.a	
	C2.b. How much time did you spend on it? Please include commuting and waiting times for waste recycling, if applicable.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 36	C3.a. [Yesterday/Assigned day/Last week] did you take care of a family pet *(feeding, bathing, taking them for walks or cleaning their space)* or use veterinary or pet services? 1. Yes→C3.b 2. No→C4.a	
	C3.b. Including commuting and waiting times, how much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 34	C4.a. [Yesterday/Assigned day/Last week] did you wash, iron, hang, dry or mend clothes or clean footwear? 1. Yes→C4.b 2. No→C5.a	
	C4.b. Including commuting and waiting times, how much time did you spend doing these tasks? Please exclude the time the washing machine was running while you were engaged in other activities.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 33	C5.a. [Yesterday/Assigned day/Last week] did you make minor repairs to your dwelling, repair or maintain furniture, appliances or a household vehicle? 1. Yes→C5.b 2. No→C6.a	
	C5.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Essential ICATUS division 35	C6.a. [Yesterday/Assigned day/Last week] did you budget, organize or plan household-related activities; pay household bills *(utilities, mortgage, loans, rent)* or carry out administrative or legal procedures *(passports, contract or cancel services, collect benefits from social programmes)*? Include activities performed online. 1. Yes→C6.b 2. No→C7.a
	C6.b. Including commuting and waiting times, how much time did you spend on these tasks?
	[ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 37	C7.a. [Yesterday/Assigned day/Last week] did you buy household supplies, food or clothing for family members in person or online? 1. Yes→C7.b 2. No→D1.a
	C7.b. Including commuting and waiting times, how much time did you spend on these tasks?
	[ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION D: UNPAID CARE ACTIVITIES FOR OWN HOUSEHOLD OR FAMILY MEMBERS[64]

Now I am going to ask you about the time you dedicated to caring for children aged 0 to X (use country definition of child) in your household and/or for family not living with you for which you did not receive payment.

[64] If section D is limited to unpaid care work activities for household members, section E needs to be added and wording marked in grey needs to be deleted.

NOTES	For persons N+ (countries need to define age of respondents) with children (use country definition of child) in their households or family Reference period: day Reference period: week
Essential ICATUS groups 411, 414, 415 and 416	D1.a. [Yesterday/Assigned day/Last week] did you feed, bathe, change diapers, dress, put to bed, talk to or play with a child in your household or family? 1. Yes→D1.b 2. No→D2.a
	D1.b. How much time did you spend on it? Exclude time that you care for children while performing other activities.
	[ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS groups 413 and 417	D2.a. [Yesterday/Assigned day/Last week] did you assist children in your household or family with schoolwork or participate in meetings with school or care service providers? 1. Yes→D2.b 2. No→D3.a
	D2.b. Including commuting and waiting times, how much time did you spend on these tasks?
	[ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS group 412	D3.a. [Yesterday/Assigned day/Last week] did you provide health care to children in your household or family *(giving medicines, taking temperature, applying bandages, assisting with physical therapy, taking children to medical appointment)*? 1. Yes→D3.b 2. No→D4.a
	D3.b. Including commuting and waiting times, how much time did you spend on these tasks?
	[ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Now I am going to ask you about the time you dedicated to care work activities for adults aged X+1 or above (use country definition) in your household and/or for family members not living with you for which you did not receive payment.

NOTES	For persons N+ (countries need to define age of respondents)	
	Reference period: day	Reference period: week
Essential ICATUS groups 421, 424, 425, 431 and 432	D4.a. [Yesterday/Assigned day/Last week] did you feed, bathe, dress, put to bed, talk and listen to a household or family members aged X+1 or above? 1. Yes→D4.b 2. No→D5.a	
	D4.b. How much time did you spend on it? Exclude time that you care for persons aged X+1 or above while performing other activities.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS groups 422 and 426	D5.a. [Yesterday/Assigned day/Last week] did you provide health care or plan for health-care services for a dependent or sick household or family member aged X+1 or above *(giving medicines, taking temperature, applying bandages, assisting with physical therapy, taking adults to medical appointments)*? 1. Yes→D5.b 2. No→D6.a	
	D5.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS group 423	D6.a. [Yesterday/Assigned day/Last week] did you help household or family members aged X+1 or above with personal forms or accounts *(assisting with bank transactions or reading or completing forms)*? 1. Yes→D6.b 2. No→E1.a (or F1.a)	
	D6.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION E: UNPAID DOMESTIC AND CARE ACTIVITIES FOR NON-HOUSEHOLD FAMILY MEMBERS

Now I am going to ask you about the time you dedicated to domestic and care work activities for family members who did not live with you for which you did not receive payment.

NOTES	For persons N+ (countries need to define age of respondents)	
	Reference period: day	Reference period: week
Optional / Include this section if questions from sections C and D were asked only about services for household members	E1.a. [Yesterday/Assigned day/Last week] did you do any kind of domestic work *(clean and tidy indoors, cook meals, set the table or clear away dishes)* for family members who do not live with you without receiving payment? 1. Yes→E1.b 2. No→E2.a	
	E1.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	E2.a. [Yesterday/Assigned day/Last week] did you spend any time caring for children from your family not living with you *(feed, bathe, change diapers, dress, assist with schoolwork, provide or plan for health care)* without receiving payment? 1. Yes→E2.b 2. No→E3.a	
	E2.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	E3.a. [Yesterday/Assigned day/Last week] did you do any kind of care work without receiving payment for family members aged X+1 or above who do not live with you? 1. Yes→E3.b 2. No→F1.a	
	E3.b. Including commuting and waiting times, how much time did you spend on these tasks?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION F: VOLUNTEERING

Now I am going to ask you about the time you dedicated to volunteer activities for your community or organizations or helping others.

NOTES	For persons N+ (countries need to define age of respondents)	
	Reference period: day	Reference period: week
Essential ICATUS divisions 51 and 52	F1.a. [Yesterday/Assigned day/Last week] did you dedicate any time to helping neighbours, friends or others without receiving payment or did you do volunteer work for the community or for an organization? 1. Yes→F1.b 2. No→G1.a	
	F1.b. How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

SECTION G: SOCIALIZING AND LEISURE ACTIVITIES

Now I am going to ask you about the time you dedicated to socializing and leisure activities.

NOTES	For persons N+ (countries need to define age of respondents)	
	Reference period: day	Reference period: week
Essential ICATUS division 83	G1.a. [Yesterday/Assigned day/Last week] did you participate in a sport or exercise? 1. Yes→G1.b 2. No→G2.a	
	G1.b. Including commuting and waiting times, how much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 82	G2.a. [Yesterday/Assigned day/Last week] did you participate in any form of art *(painting, music, theatre, dance, photography)*, spend time on a hobby or play games? 1. Yes→G2.b 2. No→G3.a	
	G2.b. Including commuting and waiting times, how much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 81	G3.a. [Yesterday/Assigned day/Last week] did you go to a cultural, entertainment or sports event? 1. Yes→G3.b 2. No→G4.a	
	G3.b. Including commuting and waiting times, how much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS divisions 72, 73 and 74	G4.a. [Yesterday/Assigned day/Last week] did you take part in community festivities or events, attend civil obligations or participate in religious celebrations or practices? 1. Yes→G4.b 2. No→G5.a	
	G4.b. Including commuting and waiting times, how much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS division 71	G5.a. [Yesterday/Assigned day/Last week] did you get together with others for social purposes, chat, write or read a social letter or email? 1. Yes→G5.b 2. No→G6.a	
	G5.b. How much time did you spend on it?	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
Essential ICATUS group 841	G6.a. [Yesterday/Assigned day/Last week] did you read for leisure *(newspapers, books, e-books, social media, magazines)* without performing other activities simultaneously? 1. Yes→G6.b 2. No→G7.a	
	G6.b. How much time did you spend on it? Exclude time that you read for leisure while performing other activities already mentioned.	
	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Essential ICATUS groups 842 and 843	G7.a. [Yesterday/Assigned day/Last week) did you watch television, listen to the radio or use streaming services without performing other activities simultaneously? 1. Yes→G7.b 2. No→End of time-use module (or H1.a)
	G7.b. How much time did you spend on it? Exclude time that you watched television, listened to the radio or used streaming services while performing other activities already mentioned. [ ] hours and [ ] minutes End of time-use module (or H1.a) Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ] End of time-use module (or H1.a)

SECTION H: OTHER ACTIVITIES[65]

Now I am going to ask you about the time you dedicated to other activities not already mentioned.

NOTES	For persons N+ (countries need to define age of respondents) Reference period: day / Reference period: week
Optional	H1.a. [Yesterday/Assigned day/Last week] did you carry out any other activity that I have not asked you about? 1. Yes→ _____ Specify activity →H1.b 2. No→ End of time-use module H1.b. How much time did you spend on it? [ ] hours and [ ] minutes Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ] End of time-use module

[65] Optional question to identify cognition problems in terms of how activities should be allocated (i.e. reporting of other activities that should have been reported in the prior domains).

Optional section for recollecting broader information about the production of goods for own final use[66]

[66] Optional section based on the own-use production of agriculture goods among employed persons and own-use production of other goods modules of the International Labour Organization questionnaire entitled "LFS questionnaire for PAPI: core modules for working age persons - job-type start (v4)", available at https://ilostat.ilo.org/resources/lfs-toolkit.

SECTION B*: production of goods for own final use.

OPTION 1

Now I am going to ask you about the time you dedicated to unpaid activities that you may have done to produce different goods for use by your household or family, that is, goods not for sale.

NOTES	For all persons aged N+ Reference period: day	Reference period: week
Optional / ICATUS major division 2	B*.1.a. [Yesterday/Assigned day/Last week] did you (mark all that apply): [ ] Work or help with any farming activities to produce food for the family? [ ] Keep or help the family (kitchen garden or orchard)? [ ] Rear or tend farm animals kept by the family? [ ] Work or help with family fishing (or fish farming) activities? [ ] None of the above →B*.3.a	

B*.1.b. How much time did you spend on it?
[ ] hours and [ ] minutes

B*.1.b. Which days and how much time did you spend on it last week?

	Hours and minutes
Monday	[ ] and [ ]
Tuesday	[ ] and [ ]
Wednesday	[ ] and [ ]
Thursday	[ ] and [ ]
Friday	[ ] and [ ]
Saturday	[ ] and [ ]
Sunday	[ ] and [ ]

B*.2.a. What were the main products (animals, farm products and/or fish) that you were working on for the family (such as citrus fruits, vegetables, freshwater fish, cattle, chicken, rice)?

_____
MAIN CROPS

B*.2.b. International Standard Industrial Classification of All Economic Activities code:
_____

B*.3.a. [Yesterday/Assigned day/Last week] did you gather wild food (such as mushrooms, berries or herbs)?
1. Yes→B*.3.b
2. No→B*.4.a

B*.3.b. How much time did you spend on it?
[ ] hours and [ ] minutes

B*.3.b. Which days and how much time did you spend on it last week?

	Hours and minutes
Monday	[ ] and [ ]
Tuesday	[ ] and [ ]
Wednesday	[ ] and [ ]
Thursday	[ ] and [ ]
Friday	[ ] and [ ]
Saturday	[ ] and [ ]
Sunday	[ ] and [ ]

B*.4.a. [Yesterday/Assigned day/Last week] did you go hunting (for bushmeat, etc.)?
1. Yes→B*.4.b
2. No→B*.5.a

B*.4.b. How much time did you spend on it?
[ ] hours and [ ] minutes

B*.4.b. Which days and how much time did you spend on it last week?

	Hours and minutes
Monday	[ ] and [ ]
Tuesday	[ ] and [ ]
Wednesday	[ ] and [ ]
Thursday	[ ] and [ ]
Friday	[ ] and [ ]
Saturday	[ ] and [ ]
Sunday	[ ] and [ ]

B*.5.a. [Yesterday/Assigned day/Last week], did you prepare preserved food or drinks for storage (such as flour, dried fish, butter or cheese)?
1. Yes→B*.5.b
2. No→B*.6.a

	B*.5.b. How much time did you spend on it? [ ] hours and [ ] minutes	B*.5.b. Which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.6.a. [Yesterday/Assigned day/Last week] did you do any construction work to build, renovate or extend the family home or help a family member with similar work? 1. Yes→B*.6.b 2. No→B*.7.a	
	B*.6.b. How much time did you spend on it? [ ] hours and [ ] minutes	B*.6.b. Which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.7.a. [Yesterday/Assigned day/Last week] did you spend any time making goods for use by your household or family (such as mats, baskets, furniture, clothing)? 1. Yes→B*.7.b 2. No→B*.8.a	
	B*.7.b. How much time did you spend on it? [ ] hours and [ ] minutes	B*.7.b. Which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.8.a. [Yesterday/Assigned day/Last week] did you fetch water from natural or public sources for use by your household or family? 1. Yes→B*.8.b 2. No→B*.9.a	
	B*.8.b. How much time did you spend on it? [ ] hours and [ ] minutes	B*.8.b. Which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]
	B*.9.a. [Yesterday/Assigned day/Last week] did you collect any firewood or other natural products for use as fuel by your household or family? 1. Yes→B*.9.b 2. No→ C1.a	

	B*.9.b. How much time did you spend on it? [ ] hours and [ ] minutes	B*.9.b. Which days and how much time did you spend on it last week? Hours and minutes Monday [ ] and [ ] Tuesday [ ] and [ ] Wednesday [ ] and [ ] Thursday [ ] and [ ] Friday [ ] and [ ] Saturday [ ] and [ ] Sunday [ ] and [ ]

OPTION 2

Now I am going to ask you about the time you dedicated to unpaid activities that you may have done to produce different goods for use by your household or family, that is, goods not for sale.

NOTES	For all persons aged N+	Reference period: day	Reference period: week
Optional / ICATUS major division 2	B*.1. [Yesterday/Assigned day/Last week] did you do any of the following activities for your household or for family members living in other households? Please indicate the time you spent on each of the activities you did.		
	[ ] Farming and fishing.	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Gather wild food (such as mushrooms, berries and herbs).	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Go hunting.	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Prepare preserved food or drinks for storage (such as flour, dried fish, butter or cheese).	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Do any construction work to build, renovate or extend the family home or help a family member with similar work.	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Spend any time making goods (such as mats, baskets, furniture or clothing).	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Fetch water from natural or public sources.	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]
	[ ] Collect any firewood or other natural products for use as fuel.	[ ] hours and [ ] minutes	Hours and minutes Monday to Friday [ ] and [ ] Saturday and Sunday [ ] and [ ]

Relationship between the minimum harmonized instrument diary format and stylized questionnaire format					
Diary			Stylized questionnaire		
No.	Activity	ICATUS 2016	Section	No. of questions	Prioritization
1	Working in paid job or income-generating activities	Divisions 11, 12, 13, 15, 16 and 18	B. Employment and production of goods for own final use	5	Essential
2	Making goods for own household or family use	Major division 2			
3	Volunteer work	Divisions 51 and 52	F. Volunteering	1	Essential
4	Preparing and serving food and meals for own household or family members	Division 31	C. Unpaid domestic work activities for own household and family members	1	Essential
5	Cleaning own or family dwelling	Division 32		1	
6	Maintaining and making small repairs in own or family dwelling	Division 33		1	
7	Cleaning and care of clothing and footwear of own household or family members	Division 34		1	
8	Managing own household	Division 35		1	
9	Taking care of pet of own household or family	Division 36		1	
10	Shopping for own household or family	Division 37		1	
11	Taking care of child (own household or family) (use country definition of child)	Division 41	D. Unpaid care activities for own household or family members	3	Essential
12	Taking care of or helping adults (own household or family) (use country definition of adult)	Divisions 42 and 43		3	Essential
4–12	Unpaid domestic services and unpaid caregiving for non-household family members	Divisions 3 and 4	E. Unpaid domestic and care activities for non-household family members	3	Optional - Include this section if previous questions from sections C and D were asked about services for household members.
13	Education	Major division 6	A. Self-care and learning activities	2	Essential
14	Socializing and communication	Division 71	G. Socializing and leisure activities	7	Essential
15	Community participation, civic and related responsibilities and religious practices	Divisions 72, 73 and 74			
16	Cultural, entertainment and sports events	Division 81			
17	Hobbies, games and other pastime activities	Division 82			
18	Sports participation and exercising	Division 83			
19	Reading for leisure	Group 841			
20	Watching television, listening to the radio or streaming	Groups 842 and 843			
21	Sleep	Division 91	A. Self-care and learning activities	1	Essential
22	Eating and drinking	Division 92		1	Essential
23	Personal hygiene and care	Divisions 93 and 94		1	Essential

24	Travel	Travel and waiting times are included in previous activities, except for commuting to work and education-related activities where travel times are asked under sections A and B.		
25	Other activities	H. Other activities	1	Optional

Annex III.
Questions capturing the economic and labour characteristics of the respondent

To maintain the "light" nature of the recommended instrument, care should be taken to limit the topics covered in the background module to those needed to code the time-use data and to create variables of analytical interest.

Countries may, however, choose to capture additional economic characteristics from respondents to enable further analysis of the time-use data. Additional topics that might be of analytical interest include:

- Identification of unemployed persons
  - Job search during specified time (four weeks/30 days/calendar month)
  - Availability to work over a specified time period (week/seven days) and/or (subsequent two weeks/14 days)
  - Reasons for not seeking work
- For persons employed during the specified week
  - Additional characteristics of their main/second job
    - Working time (hours usually worked or hours actually worked)
    - Full-time/part-time employment status
- Main activity status as self-declared

Two alternative model question sequences covering the essential and optional recommended topics are presented below for illustrative purposes only.

Model labour-force questions sequence

SECTION A contains questions to identify persons employed during the reference week. SECTION B contains questions related to the employment characteristics. SECTION C contains a question about the main activity status as self-perceived.

Alternative labour-force questions sequence

The alternative model for SECTION A contains a sequence of questions to identify persons who were employed during the reference week, which should be used by countries where small-scale family farming and fishing activities are prevalent (starting with own-account agriculture work).

SECTION D contains questions to be asked during and after the diary.

Model questions necessary for coding are labelled "essential", and questions that countries may want to ask depending on their analytical goals are labelled "optional".

It should be noted that the proposed sequences are abridged in keeping with the light nature of the instrument, and the interviewer is, therefore, required to follow the skip patterns. However, the sequences can be modified according to the objectives of the study, and countries are recommended to use the approach that is already established at the national level to capture those characteristics in surveys.[67] For example, in the first model sequence, persons who have paid jobs or businesses will not be asked

[67] For model labour-force survey questionnaires and tools, see https://ilostat.ilo.org/resources/lfs-toolkit/.

to report if they also do own-account farming (as a secondary activity). Time spent on own-use production of goods will be captured with the dedicated activity in the diary component of the instrument. In comparison, the alternative model for SECTION A, which is predominantly suitable for countries where small-scale family farming and fishing activities are prevalent, captures data on people engaged in those activities.

Model labour-force question sequence (for illustrative purposes only)

The wording in italics serves as an aid (i.e. the wording should not be read aloud by the interviewer).

SECTION A: Identification of persons employed during reference week

QUESTIONS	NOTES
A1.[68] Last week, from [day] to [day], did you do any of the following? Work for pay [as employee, labourer, etc.] → B1 Work in your own or family farming or fishing activities Work in any other kind of business activity → B1 None of the above → A4	Essential - Part of sequence to identify employed persons
A2. Are the farming or animal products that you worked on intended…? Only for sale → B1 Mainly for sale → B1 Mainly for family consumption Only for family consumption	Essential - To distinguish employment from own-use production in agriculture/ fishing
A3a. What are the main products/animals that you were working on/ with? *(Write main goods, e.g. maize, rice, apples, oranges, cattle, sheep, freshwater fish)* _____	Essential - To assign ICATUS 2016[69] code 21, and to code the occupation and industry for own-use producers in agriculture
A3b. Last week, how many hours did you work in these farming or fishing activities?	Optional
A4. Last week, did you…? Do any (other) activity to generate an income, even for one hour (e.g. casual work, make things to sell, provide services for pay) → B1 Help without pay in a family business → B1 Not do any income-generating activity, not even for an hour	Essential - Part of sequence to identify employed persons (Employment activities that may be underreported would be prompted under this question)
A5a. Last week, even though you did not work, did you have a paid job or business to which you expect to return? Yes No → A6	Essential - Part of sequence to identify employed persons
A5b. Why did you not work last week? Shift work, flexitime, nature of work → B1 Vacation, holidays → B1 Own illness, injury, accident → B1 Maternity or paternity leave → B1 Low or off season Work-related reasons (dispute, layoff, work break) Other reasons (please specify): _____	Essential - Part of sequence to identify employed persons
A5c. Including the time that you have been absent, will you return to that same job or business in three months or less? Yes → B1 No	Essential - Part of sequence to identify employed persons
A6. In the last four weeks, from [date] up to [day last week], did you look for a paid job or try to start a business? Yes No	Optional - Part of sequence to identify unemployed persons

[68] Question A1 is worded in more detail to reduce the under-identification of helpers in farming activities. The wording of question A3b is more concise once persons have self-identified as doing this type of work, based on experience showing that it is better to keep the wording of questions shorter and focused.

[69] The 2016 International Classification of Activities for Time-Use Statistics.

A7. If a job or business opportunity became available, could you start working? [last week/within the next two weeks] Yes → C1 No → C1	Optional - Part of sequence to identify unemployed persons

SECTION B: Employment characteristics

For persons employed during the reference week	**NOTES**
B1. Last week, did you have more than one job or [business/income-generating activity]? Only one job/business → B2 More than one job/business	Essential
READ: **The next questions are about the job or income-generating activity in which you usually work the most hours.** *THE QUESTIONS BELOW SHOULD BE REPEATED FOR MAIN AND SECOND JOBS*	Essential
B2.[70] In your (main/other) job, what kind of work do you do? *(Write the occupation title and main tasks and duties [e.g. cattle farmer – breed, raise and sell cattle; police officer – patrol the streets; primary schoolteacher – teach children to read and write])* Occupation title: _____ Main tasks and duties: _____	Essential - Occupation
B3. Do you work? As an employee On your own account, as a freelancer *(without hired employees)* → B5 As an employer *(with hired employees)* → B5 Helping without pay in a family business or farm → B5 As a paid apprentice/intern Other (please specify): _____	Essential - Status in employment
B4.[71] Do you work in…? A government agency or State-owned enterprise → B7a A private business or farm A non-governmental organization, non-profit or religious institution → B7a A household as a domestic worker → B8 An international organization or a foreign embassy → B7a	Essential - Institutional sector
B5. Is (your business/the business or farm where you work) …? An incorporated company ([e.g. Ltd, co.]) → B7a An independent, personal or family (business/farm) Don't know	Essential - Business incorporation
B6.[72] Is the (business/farm) where you work registered (in/with) [national business register or responsible agency]? 1. Yes 2. No 9. Don't know	Essential - As proxy information for the identification of employment in unincorporated household market enterprises
B7a. What is the name of (your business/the place where you work)? Name: _____ → No name	Essential - Industry of establishment

[70] The International Standard Classification of Occupations or an equivalent national classification should be used for coding the answers. Both fields are needed to be able to support coding to the International Standard or the relevant national occupation classification.

[71] Some countries separate businesses from farms in the response options. The sectors listed do not correspond to the System of National Accounts institutional sectors on a one-to-one basis. It would not be feasible to capture System of National Accounts institutional sectors through a household survey. From a household perspective, question B4 serves as a filter to determine whether question B5 should be asked.

[72] The fact that most farms will not be registered poses, in general, a problem for the treatment of farms and the issue of trying to collect information to identify unincorporated household market enterprises in a household survey. Therefore, question B6 can only be adapted further with a particular national context in mind.

B7b.[73] What is the main activity of the place where you work? *(Write the type of establishment and main products or services provided, e.g. restaurant where meals are served; street stall where fruit is sold; taxi bike for transporting passengers; farm for growing maize and raising cattle)* Establishment type: _____ Main goods/services: _____	Essential - Industry of establishment
B8. In this [job/business] do you work…? Full-time Part-time	Optional - Self-perceived full-time/ part-time status
B9. How many hours per week do you usually work in your (main/other) job? Number of hours (please specify): _____ Hours vary 9. Don't know	Optional - Hours usually worked

SECTION C: Main activity status as self-perceived

For all persons aged N+	
C1. Which of the following best describes what you are doing at present? Working (for pay/to generate an income) Taking care of the home or family Studying Doing an unpaid apprenticeship, internship [Farming or fishing to produce food for the family] Looking for work [Doing military or civilian service] Doing unpaid voluntary, community, charity work Retired, pensioner With a long-term illness, injury, disability Other (please specify: _____) END OF MODULE	Optional - Main activity status

ALTERNATIVE MODEL FOR SECTION A: OWN-ACCOUNT AGRICULTURE WORK

For countries where small-scale family farming and fishing activities are prevalent.

	NOTES
A1. Last week, from [day] to [day], did you do any of the following activities on your own account or to help the family? (Mark all that apply) 1. Farming or growing food in a plot or kitchen garden 2. Raising or tending farm animals [3. Fishing, fish farming, collecting shellfish] [4. Hunting or gathering wild foodstuff] If none applies → A4. Otherwise continue.	Essential - To capture data on all persons working in own-account agriculture activities
A2. Are the farming, animal [or fishing] products that you worked on intended…? Only for sale → B1 Mainly for sale → B1 Mainly for family consumption Only for family consumption	Essential - To distinguish employment in agriculture from own-use production in agriculture
A3a. What are the main products/animals that you are working on/with? *(Write main goods, [e.g. maize, rice, apples, oranges, cattle, sheep, freshwater fish])* _____	Essential - To assign ICATUS 2016 code 21, and to code the occupation and industry for own-use producers in agriculture

[73] The International Standard Industrial Classification of All Economic Activities should be used for coding the answers.

A3b. Last week, how many hours did you work in these farming or fishing activities?	Optional
A4.[74] Last week, did you…? Do any (other) work for pay or as part of a business activity? → B1 Do any activity to generate an income, even for one hour (e.g. casual work, odd jobs, make things to sell, provide services for pay)? → B1 Help without pay in a family business? → B1 Not do any income-generating activity, not even for an hour?	Essential - Part of sequence to identify employed persons
A5a. Last week, even though you did not work, did you have a paid job (or income-generating activity) or business to which you expect to return? Yes No → A6	Essential - Part of sequence to identify employed persons
A5b. Why did you not work last week? Work time arrangements, nature of work, compensation for overtime → b1 Vacation, holidays → b1 Own illness, injury, accident → b1 Maternity or paternity leave → b1 Low or off season Work-related reasons (dispute, layoff, work break) Other reasons (please specify): _____	Essential - Part of sequence to identify employed persons
A5c. Including the time that you have been absent, will you return to that same job or business in three months or less? YES → B1 NO	Essential
A6. In the last four weeks, from [date] up to [day last week], did you look for a paid job or try to start a business? Yes No	Optional - Part of sequence to identify unemployed persons
A7. If a job or business opportunity became available, could you start working? [last week/within the next two weeks] Yes → C1 No → C1	Optional - Part of sequence to identify unemployed persons

[74] Option 2 is a recovery question for persons who do not consider what they do as work for pay or a business, which is relatively common and, therefore, alternative terms should be used to recover those activities.

SECTION D: Questions asked during and after the diary

- These questions aim to link diary information on employment and own-use production of goods to the relevant information captured in the background questionnaire.
- The wording will require adaptation depending on the data-collection mode (PAPI, CATI, CAPI or CAWI/app).

Clarifying questions, asked during diary	NOTES
D1. *(If "working" is reported in the diary, but the respondent has been classified as not employed)* I need to verify some information with you. I recorded earlier that you do not own a business or a farm, that you did not do any work for pay in the last week and that you did not have a job, including a job from which you were absent. Is this correct? Yes → Continue with diary No → Correct responses to relevant labour-force questions	This clarifying question would pop up when inconsistency occurs.
D2. *(If a multiple job holder reports working, but does not specify at which job)* Was that for your main job or your other job?	To link diary responses to specific jobs.
Summary questions, asked after completion of the diary, to learn more about specific activities.	Useful for identifying and coding activities done for pay or profit.

SUM1. *(For employed respondents)* You said that you were working from [start and stop time for diary reports of work associated with the main/only job] [at your main job]. Were there any [other] activities that were done as part of your [main] job or business? Please do not include getting ready for work or commuting.	If diary does not include a report of work associated with the main/only job, skip the first sentence. If needed, review or show reported diary activities.
SUM2. *(For respondents with more than one job)* You said that you were working at your other job from [start and stop time for diary reports of work associated with a second job]. Were there any [other] activities that were done as part of your other job or business?	If diary does not include a report of work associated with a second job, skip the first sentence. Repeat and tweak the question to ask about work for each of the respondent's jobs/businesses.
SUM3. *(Asked to respondents with own-account farming/fishing activities)* Were there any activities done as part of your [own/household/family] farming/fishing activities? Which ones?	
SUM4. *(Asked to all respondents)* Were there any [other] activities that you were paid for or will be paid for?	

Annex IV.
Correspondence table for comparing the minimum harmonized instrument activity categories with the activity list codes for the *Harmonised European Time Use Surveys (HETUS) 2018 Guidelines*

No.	Minimum harmonized instrument activity category	Activity list codes for HETUS 2018 3-digit codes
1.	Working in paid job or income-generating activities	111
2.	Making goods for own household or family use	314,[a] 323, 342, 345,[b] 351, 353, 621, 713
3.	Volunteer work	411, 412[c]
4.	Preparing and serving food and meals for own household or family members	311, 312, 313
5.	Cleaning own or family dwelling	321, 322, 324, 325, 329, 341
6.	Maintaining and making small repairs in own or family dwelling	352, 354, 355,[d] 359
7.	Cleaning and care of clothing and footwear of own household or family members	331, 332, 339
8.	Managing own household	362, 371, 300
9.	Taking care of pet of own household or family	343, 344, 349
10.	Shopping for own household or family	361, 369
11.	Taking care of child (own household or family) (use country definition of child)	381, 382, 383, 384, 389, 423, 424
12.	Taking care of or helping adults (own household or family) (use country definition of adult)	391, 392, 421, 422, 425, 426,[e] 429
13.	Education	211, 212, 214, 215, 219, 221
14.	Socializing and communication	511, 512, 514, 515, 516, 519
15.	Community participation, civic and related responsibilities and religious practices	431, 432, 433, 439, 513, 995
16.	Cultural, entertainment and sports events	521, 522, 523, 524, 525, 526, 529
17.	Hobbies, games and other pastime activities	531, 711, 712, 719, 721, 722, 729, 731, 732, 733, 734, 735, 739, 998, 999
18.	Sports participation and exercising	611, 612, 613, 614, 615, 616, 619, 631
19.	Reading for leisure	811, 812, 819
20.	Watching television, listening to the radio or streaming	821, 831
21.	Sleep	011
22.	Eating and drinking	021, 121
23.	Personal hygiene and care	031, 032, 039, 012
24.	Travel	910, 920, 936, 938, 939, 940, 950, 960, 980, 900
25.	Other (please specify)	129, 213

[a] Proposed new HETUS 2018 activity code: 314 = Baking and other manufacturing of food and beverages.
[b] Proposed new HETUS 2018 activity code: 345 = Growing crops, kitchen gardening, forestry and logging.
[c] Proposed new HETUS 2018 activity code: 412 = Direct help to people living in other households, the community and environment (direct volunteering for non-family members).
[d] Proposed new HETUS 2018 activity code: 355 = Repairing and maintaining household equipment.
[e] Proposed new HETUS 2018 activity code: 426 = Helping non-cohabitant family with domestic tasks.

Classification of Time-Use Activities for Latin America and the Caribbean (CAUTAL)

Minimum harmonized instrument of the United Nations Statistical Commission			Proposed harmonized minimum list of time-use activities for Latin America and the Caribbean		
No.	Activity	ICATUS 2016[75]	CAUTAL	Activity	No.
1	Working in paid job or income-generating activities	Major division 1	Major division 1	Employment and related activities	1
2	Making goods for own household or family use	Major division 2	Major division 2	Own-use goods production	2
3	Volunteer work	Divisions 51 and 52	Divisions 52 and 53	Unpaid work for the community and volunteer work	3
4	Preparing and serving food and meals for own household or family members	Division 31	Division 31	Food preparation and serving for household members	4
5	Cleaning own or family dwelling	Division 32	Division 32	Cleaning of the home	5
6	Maintaining and making small repairs in own or family dwelling	Division 33	Division 34	Maintenance and minor repairs for own household	6
7	Cleaning and care of clothing and footwear of own household or family members	Division 34	Division 33	Cleaning and care of clothes and footwear	7
8	Managing own household	Division 35	Division 35	Household management	8
9	Taking care of pet of own household or family	Division 36	Division 37	Pets and plants care	9
10	Shopping for own household or family	Division 37	Division 36	Shopping for the household	10
			Group 511	Unpaid domestic tasks for other households	11
11	Taking care of child (own household or family) (use country definition of child)	Division 41	Groups 411 and 441	Caregiving and support for household members aged 0 to 14	12
			Groups 412 and 442 Subgroups 4142 and 4431	Temporary health care for household members aged 0 to 14	13
			Group 413 Subgroup 4141	School or learning support for household members aged 0 to 14	14
12	Taking care of or helping adults (own household or family) (use country definition of adult)	Divisions 42 and 43	Groups 421, 431 and 441 Subgroups 4230, 4330 and 4430	Caregiving and support of adult household members	15
			Groups 422, 432 and 442 Subgroups 4231, 4331 and 4431	Health care for adult household members	16
			Group 420, Subgroup 4231 Subgroups 4230, 4430 and 4332	Support activities for adult household members with legal, administrative and financial errands	17
			Group 512	Unpaid care of people from other households	18
13	Education	Major division 6	Major division 6	Learning and studying	19
14	Socializing and communication	Division 71	Group 711	Socializing with family, friends or others	20

[75] The 2016 International Classification of Activities for Time-Use Statistics.

15	Community participation, civic and related responsibilities and religious practices	Divisions 72, 73 and 74	Group 712	Attending community, civic or religious celebrations	21
16	Cultural, entertainment and sports events	Division 81	Division 72	Attending cultural, entertainment and sports events	22
17	Hobbies, games and other pastime activities	Division 82	Division 73	Art and hobbies	23
18	Sports participation and exercising	Division 83	Division 74	Sports and physical exercise	24
19	Reading for leisure	Group 841	Division 81	Reading for leisure	25
20	Watching television, listening to the radio or streaming	Groups 842 and 843	Divisions 82, 83 and 84	Watching television or videos or listening to radio or other audio media	26
21	Sleep	Division 91	Group 922	Sleeping	27
22	Eating and drinking	Division 92	Group 921	Eating and drinking	28
23	Personal hygiene and care	Divisions 93 and 94	Division 91	Self-care	29
24	Travel		Divisions 14 and 62	Commuting to and from work and travel for study activities (other travel is included in the activity)	30
25	Other (please specify)			Other activities	31