

NATIONAL NUTRITION INFORMATION SYSTEM

The
Fundamentals
Series

Module 01

**What is a
national nutrition
information
system?**



Acknowledgements

This technical guide on National Nutrition Information Systems is a product of the WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring (TEAM) and is supported by the Bill & Melinda Gates Foundation.

A core group comprised of David Hales (Consultant), Chika Hayashi (UNICEF Headquarters), Rebecca Heidkamp (TEAM Working Group Lead), Louise Mwirigi (UNICEF Headquarters) and Kuntal Saha (WHO Headquarters), conceptualized and led the production of this document, including its writing and revision. Other members of the TEAM Working Group on Nutrition Information Systems provided technical inputs and guidance throughout the process, including Jennifer Coates, Edward Frongillo, Purnima Menon, Faith Thuita, Zhao Wenhua and Sara Wuehler.

The guide was coordinated by the Data & Analytics Section, Division of Data, Analytics, Planning and Monitoring, UNICEF, and the Monitoring Nutrition Status and Food Safety Events Unit, Department of Nutrition and Food Safety, World Health Organization (WHO).

The Working Group acknowledges the contributions of Julia D'Aloisio (Editor) and Nona Reuter (Designer, UNICEF). The Working Group is grateful to numerous colleagues who reviewed the draft and shared specific experiences and insights.

Suggested Citation: *National nutrition information system – the fundamental series, module 1: what is a national nutrition information system?* New York: United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), 2021 (The Fundamental Series).

PDF versions of the modules can be downloaded from the following website:

<https://data.unicef.org/resources/nutrition-nnis-guides/>

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ISBN (UNICEF): 978-92-806-5338-0

WHO Reference Number: WHO/HEP/NFS/22.1

November 2021

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Module 01

What is a national nutrition information system?

Countries continuously generate data relevant to their national and subnational nutrition programmes. In addition to vital data generated by the nutrition programmes themselves, data can also come from other sources across different sectors, including agriculture, education, environment, finance, health, industry and social welfare. One of the most important ways to ensure nutrition-related data are collected, integrated and used by decision makers is to build and maintain a strong national nutrition information system (NNIS).

Question:

What is a national nutrition information system?

Answer: An NNIS is an integrated set of principles, practices and processes guiding the prioritization, collection, storage, organization, analysis and dissemination of essential nutrition-related data drawn from multiple sectors and sources. The core function of the system is to provide data to monitor the status of nutrition priorities and the performance of nutrition-related programmes and projects linked to those priorities at national and subnational levels. Its primary value is to provide accurate and timely information to support informed, evidence-based decision-making that will help countries improve nutrition outcomes.

Question:

What is the strategic value of better information on nutrition?

Answer: Better information can strengthen the ability of nutrition to contribute to the health and wellbeing of individuals, families and communities. Historically, many countries have limited data on critical nutrition issues, especially on activities to improve nutrition in different sectors. This undermines the ability of countries to track progress on nutrition and to strengthen coverage, quality and continuity of nutrition programmes. It also makes it difficult to increase the resources available for nutrition in all the relevant sectors. A robust NNIS gives advocates and decision makers the information needed to expand and strengthen nutrition programmes within and across multiple sectors.



KEY COMPONENTS

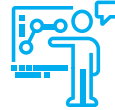
OF A NATIONAL NUTRITION INFORMATION SYSTEM



People. The most important component of an NNIS is the human element. It is the people who build, run and use the system that ensure it a valuable asset for the country. These people range from the nurses and community workers who collect primary data to the programmers and analysts who process the data to the implementers and decision makers who use the data. Their diverse knowledge, skills and perspectives should be carefully considered in the design and operation of the NNIS. They should also receive the necessary support (e.g., training, supervision and equipment) to ensure they contribute to and benefit from the system.



Data. At the heart of a nutrition information system are the facts and figures that are collected and processed. These facts and figures can range from specific (e.g., number of stunted children, disaggregated by age and gender) to aggregate (e.g., national coverage of antenatal iron supplementation). A mix of quantitative and qualitative data are needed to provide valuable insights on the state of nutrition in the country and the performance of its nutrition programmes. However, these data are only part of an integrated data infrastructure, which includes vital issues related to their collection, sources, ethics, quality, organization, analysis, dissemination, visualization and use.



Processes and procedures. The operation of a nutrition information system depends on having a basic set of processes and procedures to ensure the quality and consistency of the system and its contents. Basically, processes address the 'what' (i.e., what do you want to do) versus procedures, which address the 'how' (i.e., how are we going to do it). Processes tend to be higher level: ensure the integrity of the data collection process, maintain the flow and quality of the data, give users easy access to the information system. Procedures are more precise descriptions of how each process will be done and who is responsible for doing it. Processes and procedures should be aligned with the overarching principles and practices of a solid nutrition information system (see below).



Technology. Three core technologies drive electronic information systems: hardware, software and telecommunications. Hardware includes a range of equipment, from smart phones to personal computers to cloud-based data storage systems. Software tells the hardware to perform the different tasks required by the information system; one of the most fundamental software tasks is database management (i.e., integrating the capture and processing of data). Telecommunications technologies (e.g., local area networks and mobile networks) connect the different hardware included in the information system and connect the system to the people building, running and using it

CORE PRINCIPLES AND GOOD PRACTICES OF A NATIONAL NUTRITION INFORMATION SYSTEM

There are a small number of **core principles** and **good practices** that should be considered when thinking about an NNIS. The purpose of these principles and practices is to provide a solid framework for designing, building, reviewing and/or refining the information system.

CORE PRINCIPLES

1. Pay attention to priorities. The data included in the NNIS should align with the priorities in the national, subnational and sectoral nutrition plans that are being implemented, analysed and monitored.

2. Use well-defined indicators. A set of well-defined indicators, which correspond to the priorities in the nutrition plan, will help guide the selection and analysis of data used in the NNIS.

3. Focus on practical, high-quality data. Data in the information system must be accurate, relevant, understandable and timely if they are going to be useful. Disaggregation of the data can help in analysing and understanding the data. Any disaggregation (e.g., by age, gender, economic status/income or geographic location) should be factored into how data are collected and captured in the system.

4. Design and build a flexible system. The nutrition information system should be sufficiently flexible to adapt to changing circumstances and requirements, including new priorities, new indicators, new data sources, new technologies to collect data and new ways to analyse and present the data.

5. Ensure the system is cost-effective. The level of investment in the NNIS must correspond to its value; the system is a tool to strengthen nutrition programmes, not an end unto itself.

BASIC INSIGHTS ABOUT INFORMATION SYSTEMS

When thinking about a national nutrition information system, it is important to **keep in mind a few basic insights about information systems more broadly:**

- **Information systems are typically structured around a set of indicators that capture data on essential issues.** Where appropriate, the data in the system are disaggregated to make them more relevant and useful (e.g., by age, gender, economic status/income, geographic location).
- **Information systems are a collection of data stored in one or more databases.** It is a common misconception that an information system consolidates all relevant data in a single database. Most information systems use multiple, unlinked databases to generate an integrated or comprehensive perspective on the issues, indicators and performance being tracked.
- **A robust information system addresses how users will work with the data.** Easy access is essential if data are going to be used regularly and effectively. Simple, intuitive interfaces enable a wide range of users to analyse, synthesize and present the data in meaningful ways. In recent years, *dashboards* and *scorecards* have been a popular way to present key data points. Dashboard and scorecards typically include a defined subset of data points and use different visualizations (e.g., charts, graphs and maps) to highlight current status and trends. Currently, there is a move to use interactive *data notebooks*, which allow for more flexible and exploratory data analysis and visualization.
- **Information systems are increasingly dependent on technology,** specifically computer hardware and database software. However, many information systems around the world continue to use paper-based data. For example, keeping track of patient information in healthcare settings often relies on paper records and registers stored in elaborate filing systems. Paper-based systems are practical in some settings, but there are many advantages to electronic information systems, including the ability to more easily access, back-up, aggregate, configure, analyse and present data. In addition, electronic systems have become simpler and more affordable to acquire, implement and maintain.
- **Most electronic information systems are straightforward to set up and operate.** They are built to run on various devices (e.g., personal computers, tablets and smart phones) using widely available database and/or spreadsheet software. There is an extensive global infrastructure to support the development and maintenance of these systems, including hardware and software companies, developers, data storage options, training courses and technical experts.

GOOD PRACTICES

1. Think about who is involved has what connection they have with the information system.

It is useful to have an up-to-date understanding of which institutional and individual stakeholders have a role in the operation of the NNIS to ensure it is aligned with their issues and perspectives. Stakeholders can come from many different sectors or institutions, including government, civil society, multilateral organizations, private sector, philanthropic organizations, academia and research institutions. Given the range of stakeholders, it can be useful to categorize them by their specific roles in the information system, knowing that some of them may have multiple and/or cross-cutting roles.

Most stakeholders in an information system fall into four categories:

- Governance and management.** A core set of stakeholders, including policymakers and programme managers, are involved in the overarching decision-making related to the information system. Their responsibilities may include strategic planning, budgeting, multisectoral coordination, national and subnational coordination, data agreements and accountability. Governance and management can include various structures and/or assignments, including a steering committee, a technical advisory committee, a senior management team and dedicated line managers.
- Technology.** There are a wide range of technical experts required to build and maintain an electronic nutrition information system, including engineers, programmers, database administrators, security experts, systems operators and project managers. Specific personnel needs will be determined by the parameters of the design and operation of the country's nutrition information system. It is important to recognize that the various roles are often filled by a combination of permanent/in-house staff and specialized external service providers.
- Data sourcing.** Because data are at the heart of a nutrition information system, the people and organizations that collect and aggregate data have an essential role in its operation and ultimate value. Data sources can range from government ministries to community-based organizations to international organizations to private sector companies; typically, most data sources provide both quantitative and qualitative data.
- Data use.** The people who use an NNIS are the largest and most diverse group of stakeholders. The primary users tend to be from government, civil society, private sector, academia and donor organizations as well as designers and implementers of nutrition programmes and projects. Depending on how access to the system is granted, the number and diversity of users can be large. However, the common denominator is their interest in using the data to get a better understanding of the nutrition situation in the country.

2. Leverage existing systems and resources.

In most countries, there are existing systems and resources that should be leveraged to contribute to the content and operations of the NNIS. Many of the systems and resources are likely to be associated with stakeholders in various sectors who have an interest in the NNIS (e.g., agriculture, education, health and social welfare). Identifying and collaborating with these stakeholders can be a cost-effective way to build on existing knowledge and skills to strengthen the NNIS. This collaboration is also an opportunity to mobilize the resources required to build and operate a robust information system.

3. Maintain productive relationships with data sources.

The individuals and organizations providing data are essential partners in the nutrition information system and it is important to maintain strong and productive relationships with them. These organizations are likely to include national statistical offices, sectoral planning departments, research institutes, implementing organizations and information management offices in different sectors.

One of the primary reasons to partner with reliable data sources is to have access to current and accurate data to ensure the continuing relevance of the information system. In addition, the sources have a detailed understanding of the data they collect, including its different strengths and weaknesses (e.g., representativeness, precision and quality). They can also provide practical insights on the opportunities and challenges of interpreting the data, identify how these data might link with data from other sources and suggest additional data that could be collected through their systems. The partnership with data sources can also be enhanced by making technical assistance available to them as needed to support the ongoing development of their systems, including issues related to the quality, scope and availability of the data.

4. Regularly assess the content of the NNIS to ensure it captures existing and emerging issues.

A national nutrition information system can and should track priority issues over time. Longitudinal data provide perspective on different trends, including the status of a particular issue (e.g., anaemia status among pregnant women) and the performance of a particular programme (e.g., increasing/decreasing coverage of vitamin A supplementation). It is also important to regularly assess the content of the information system itself to ensure it includes the right data on the right issues. For example, collaborating with different analysts and user groups can yield critical insights on the function and value of the data and the system. In addition, it is important to ensure the information system is aligned with any new national and international nutrition priorities (e.g., rising rates of overweight and obesity).

5. Use technology that is practical, adaptable and affordable.

Steady improvements in technology make it increasingly easy to build and maintain a robust and cost-effective nutrition information system. Consequently, as a country's level of digitization and connectivity improves, it is important to think carefully about the technology being used and/or proposed for the information system. A good nutrition information system is highly practical; it must be designed for use in the real world. A good system is also adaptable; it must be able to be modified and expanded without being completely rebuilt. And a good system is affordable; it should not require expensive, cutting-edge technology to be valuable.

6. Ensure the NNIS is widely and readily available to users.

A national nutrition information system is only valuable if and when the information in it is used. Making the system widely and readily available to users should therefore be a priority. While there may be security issues and/or information-sharing concerns to address, experience in the health sector, for example, shows that open access to data generally leads to better analysis, better decisions and better outcomes. Practical and affordable technology options are available to protect the system while providing good access to users.

7. Maintain strong quality controls for the data and the system.

The quality of the data and the information system are directly linked to the trust that stakeholders have in the system and its outputs. Without this trust, the value of the information system will be undermined. A serious commitment to data quality is essential in building and maintaining the necessary credibility; this commitment should be an integral part of productive relationships with data sources, including ongoing feedback on and investment in activities such as training, mentoring and supportive supervision. There should also be an equivalent commitment to the quality of other critical NNIS components, including the technology and the team supporting the information system.

8. Communicate regularly with the NNIS stakeholders.

Building and maintaining a dialogue with stakeholders about the NNIS can have a direct impact on its visibility, viability and value. This dialogue should be structured as a two-way communication to ensure it provides stakeholders with useful and up-to-date information about the system, its contents and its operation as well as providing them with the ability to provide input on how they engage with the system and how it can be improved. The communications tools used to facilitate the dialogue should be simple, straightforward and easy to manage (e.g., an email feedback system, a quarterly e-bulletin, notifications to registered users of software and/or content updates or periodic surveys for key stakeholder groups). If possible, the communications loop should include both existing and prospective stakeholders.

MAIN TYPES OF DATA

FOR A NATIONAL NUTRITION INFORMATION SYSTEM

More detailed information about data sources is available in Module 5 of the NNIS Fundamentals series.

An NNIS relies on three main types of data: **1) routine data; 2) survey data and 3) surveillance data.** Using different types of data collected by multiple sources across sectors helps provide a comprehensive and integrated picture of the situation, enabling stakeholders to track the status of nutrition priorities and the performance of nutrition-related programmes and projects linked to those priorities.

Health facilities are a primary source of **routine data** (i.e., data that are collected on a regular or recurrent basis). Programmes implementing nutrition-related interventions are another important source of these data. Health facilities typically report both individual patient data and aggregate data on critical issues. Routine health-facility data are captured in various ways, including on patient cards, in registers and in health management information systems (HMIS), such as the District Health Information Software 2 (DHIS2). Data from nutrition-related programmes and projects, including those implemented by government and development partners, reflect their activities (e.g., breastfeeding counselling, treatment of anaemia, treatment of acute malnutrition, micronutrient supplementation, dietary diversity programmes, food fortification, food distribution) and can be captured using different paper or electronic methods. Other sectors, such as education and social welfare, may also collect and report routine data about the populations they serve.

Survey data are the most varied type of data used in an NNIS. Data can be generated using a wide range of instruments, from periodic, large-scale population-based surveys to one-off, targeted surveys designed to collect specific information at a specific point in time. Two examples of well-established household survey programmes used in countries around the world to collect nutrition data are the Demographic and Health Survey (DHS), which collects data on nutrition as one part of a larger survey on various health-related issues, and the Multiple Indicator Cluster Surveys (MICS), which collect household-level data on various issues affecting mothers and children, including nutrition. In addition, the SMART methodology (Standardized Monitoring and Assessment of Relief and Transitions) is increasingly used for national and subnational nutrition surveys to collect data for development and emergency/humanitarian purposes.

Surveillance data are collected and reviewed at specific time intervals as part of an ongoing process in a country to track trends and identify actual or potential changes in priority indicators. The ongoing or repeated nature of the data collection — typically at the same location over time — is the cornerstone of an effective surveillance system. Many countries have surveillance systems in place to monitor food security and/or emergency nutrition in ‘hot spots’. In general, surveillance data are collected using two methods: 1) repeated cross-sectional representative surveys; and 2) recurrent monitoring at selected locations (e.g., health facilities, schools and demographic surveillance sites).

Question:

Which type of data are more important: quantitative or qualitative?

Answer: Both are important. Most data collected for and used by an NNIS are quantitative (i.e., data that can be measured and quantified with numbers). However, qualitative data provide valuable context and help explain what the numbers mean. For example, quantitative data may show that a high percentage of mothers stop exclusive breastfeeding earlier than recommended, with the qualitative data capturing the reasons why this happens. Qualitative data may also capture the status of policy development or the functioning of coordination mechanisms in ways that quantitative data cannot.

Question:**How does the multisectoral nature of nutrition affect an NNIS?**

Answer: Nutrition is intrinsically multisectoral. The causes and determinants of malnutrition as well as the pathways to better nutrition are always linked to multiple sectors, including agriculture, education, food processing, health, social welfare, water and sanitation.

Although the multisectoral nature of nutrition is widely acknowledged and agreed by stakeholders, many of the programmes to address malnutrition — both undernutrition and overnutrition — remain narrowly focused within individual sectors.

On a practical level, including data from multiple sectors in an NNIS is a productive way to promote an integrated approach to analysis and problem-solving. For example, core data on the prevalence of anaemia in women of childbearing age could be supplemented with relevant data on key causes and determinants such as the birth size of the child, quality of diets, sanitation, access to clean water, access to healthcare, mother's schooling and household economic status.

Additional programmatic data on the reach and quality of interventions such as counselling on breastfeeding practices, efforts to increase the availability and affordability of nutrient-rich foods, access to

clean water and social safety nets strengthens the ability of the NNIS to produce more and better insights.

One of the main challenges with including multisectoral data in an NNIS is securing them from different sectors. Some sectors can be tightly protective of their data, preferring not to share it widely. Other sectors will have their own information systems and may not see the value of including their data in an NNIS. And in some sectors, there may be a lack of relevant and/or quality data. But whenever possible, integrating data from multiple sectors in an NNIS is likely to provide decision makers with a better picture of both the situation and the opportunities to improve nutrition outcomes.

Question:**What nutrition data should be included in an NNIS?**

Answer: The data included in the NNIS should align with the country's nutrition priorities, which are typically captured in joint and sector-specific nutrition policies, strategies and plans. In many countries, the nutrition priorities may also reflect issues being monitored at a global level. The goal is to incorporate data that will give key stakeholders a better understanding of priority issues and to help them identify opportunities to improve nutrition-related policies, programmes and ultimately outcomes.

A critical challenge is to identify the various data that are relevant to a given issue and to access the sources from which they are currently – or potentially – available. One of the primary benefits of an NNIS is its ability to bring together multiple data points from different sectors to give all stakeholders — from frontline implementers to national policymakers — a more thorough and integrated perspective on the situation.

For example, if it is a priority in a country to reduce stunting in children under 5 years of age — by improving pregnancy outcomes, ensuring appropriate infant and young child feeding practices and addressing related environmental, health and poverty factors — relevant data points can be brought together in the NNIS to help understand and address the situation. *Possible data in the NNIS could include:*

Nutritional status

- Low birthweight (ideally with rates of preterm/small for gestational age)
- Stunting
- Wasting

Access to food and child diet quality

- Household food security
- Infant and young child feeding practice indicators (e.g., minimum dietary diversity, exclusive breastfeeding)
- Food fortification indicators (e.g., Availability of age-appropriate fortified foods)

Underlying determinants

- Household socioeconomic status
- Access to appropriate sanitation
- Access to safe water

Coverage of services related to maternal nutrition

- Antenatal care and associated nutrition interventions (supplementation with iron and folic acid or multiple micronutrients; balanced energy supplementation)

Early childhood nutrition

- Growth monitoring programmes
- Infant and young child feeding counselling for caregivers
- Micronutrient supplementation (e.g., vitamin A)

Coverage of interventions from other sectors

- Participation of pregnant women and/or children in social protection programmes (food/cash transfer)
- Agriculture sector programmes (e.g., home gardening)

Budget and financing data for priority programmes by sector

Functionality of coordination bodies (e.g., district-level committees for nutrition)

EXISTING INFORMATION SYSTEMS WITH NUTRITION DATA

The multisectoral nature of nutrition means that relevant data may be captured in other information systems used in different sectors and by various government ministries and departments. Drawing on the data in these other systems can be an efficient way to help build and maintain a robust NNIS.

As mentioned above, the health sector will be a primary source of data for the NNIS. Within this sector, a country's electronic HMIS will supply much of these data. An increasing number of countries have routine information systems in other sectors, which can be tapped as sources of data for the nutrition information system. In some countries, sectors have their own information systems (e.g., AIS: Agricultural Information System; EMIS/EIS: Education Management Information System or Education Information System).

There are also many different global information systems that can provide supplemental data for an NNIS. These systems can also be a source of indicators to use in an NNIS.

Examples of these other systems include (in alphabetical order):

- ☞ **FEWS NET: Famine Early Warning Systems Network (United States Agency for International Development).** The system brings together a range of data on acute food security, particularly related to food emergencies (e.g., famine). It uses data on climate, agriculture production, prices, trade, nutrition and other factors, as well as information on local livelihoods, to make 6–12-month forecasts on outcomes and changes in the situation at regional level and in specific countries.
Link: <https://fews.net>
- ☞ **GDD: Global Dietary Database (Tufts University).** The system compiles data on food and nutrient consumption levels from countries around the world. It collects, validates and disseminates data on the dietary intakes of major foods and nutrients for children and adults by age, sex, pregnancy/nursing status, location/residence, and level of education.
Link: <https://www.globaldietarydatabase.org>
- ☞ **Joint Malnutrition Estimates (UNICEF, WHO, World Bank Group).** This system includes regularly updated estimates of global and regional child malnutrition (stunting, overweight, wasting and severe wasting), including prevalence and numbers affected. Estimates are produced by an inter-agency team and are based on national survey data, which are reviewed for quality as part of the process.
Link: <https://www.who.int/nutgrowthdb/estimates/en/>
- ☞ **NutriDash (UNICEF).** This system captures, stores, analyses and visualizes information on key nutrition interventions and programmes at the country, regional and global levels, including data on the coverage of maternal and child nutrition interventions. Data are available from over 100 countries.
Link: <https://www.unicefnutridash.org>
- ☞ **NLIS: Nutrition Landscape Information System (WHO).** The system uses country profiles to provide nutrition and nutrition-related health and development data. Data in the country profiles are structured around the UNICEF Conceptual Framework on the Determinants of Maternal and Child Nutrition (2020) and are designed to give an overview snapshot of nutrition, health and development at the national level.
Link: <https://www.who.int/nutrition/nlis/en/>
- ☞ **UNICEF Data & Analytics.** The system includes extensive data sets on multiple issues related to children. Data are available by both topic and country. The core data are supplemented with data analysis, data visualizations, references, notes and links to other relevant resources. The analysis generates disaggregated estimates for nutrition indicators by gender and age of the child, wealth status, maternal education, geographic location and residence. In addition, users can build their own customized data sets, including the ability to disaggregate by key factors.
Links: <https://data.unicef.org/about-us/>
<https://data.unicef.org/topic/nutrition/child-nutrition/>
- ☞ **VMNIS: Vitamin and Mineral Nutrition Information System (WHO).** The system tracks data on vitamin and mineral status of populations and provides countries with current national, regional and global assessments on the scale and scope of vitamin and mineral deficiencies.
Link: <https://www.who.int/vmnis/en/>

KEY TERMINOLOGY

Data	Facts and/or figures; pieces of quantitative or qualitative information
Database	An organized collection of data stored electronically for rapid search and retrieval
Data provider	An organization that produces data; may be referred to as a data generator; see also data source
Data source	Type of data and/or modality of data collection (e.g., routine data, survey data); can also be synonymous with data provider
Data value chain	A framework used to guide the transformation of raw data into a valuable resource to better understand situations and improve decision-making
Disaggregated data	Data that have been broken down into detailed sub-categories (e.g., by age, gender)
Indicator	Indicators make collected data understandable and useful for monitoring performance, assessing achievement and determining accountability. They can be used to determine a proportion (e.g., prevalence) and are often designed to track inputs, outputs, outcomes and impact.
National data	Data that are common to or characteristic of a whole nation; see also subnational data
Qualitative data	Data collected using qualitative methods, such as interviews, focus groups, observation and key informant interviews; generally expressed in narrative form, pictures or objects (i.e., not numerically)
Quantitative data	Data that are measured on a numerical scale, can be analysed using statistical methods and can be displayed using tables, charts, histograms and graphs
Routine data	Data continuously collected as part of a regular activity/procedure
Sentinel site	A dedicated location (e.g., facility, community) where surveillance data are collected
Subnational data	Data disaggregated by administrative units below the national level (e.g., provinces, districts, counties); may also include other breakdowns below the national level (e.g., urban, peri-urban, rural)
Surveillance data	Data collected on a recurring basis from designated locations (see sentinel sites) to provide insights on trends into a broader area and/or larger population

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November 2021

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Published by:
UNICEF
Data Analytics and Innovation
Division of Data, Analytics, Planning and Monitoring
3 United Nations Plaza
New York, NY 10017, USA

