JMP Methodology

for global monitoring of water, sanitation, hygiene, environmental cleaning and health care waste management in health care facilities

WHO/UNICEF Joint Monitoring Programme for water supply, sanitation and hygiene

World Health Organization

WHO UNICEF **JMP**

unicef

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of water, sanitation,
hygiene, environmental
cleaning and health care
waste management in
health care facilities

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* https://washdata.org/data/downloads

Illustrative example of JMP ladders in health care facilities

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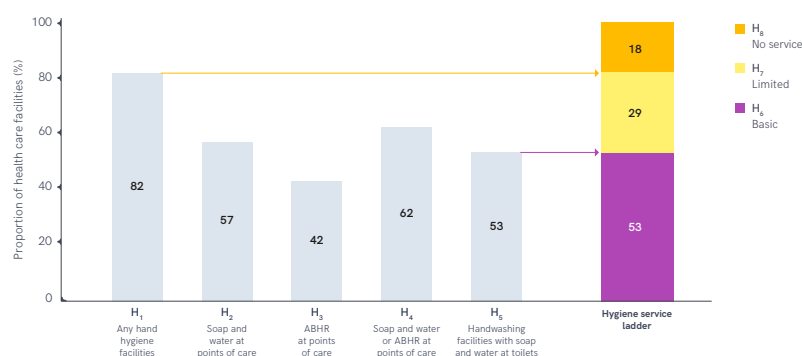
Illustrative example of JMP estimation rules

Data points: 25, 30, 50

— Interpolation ···· Extrapolation ···· Extension ○ Data

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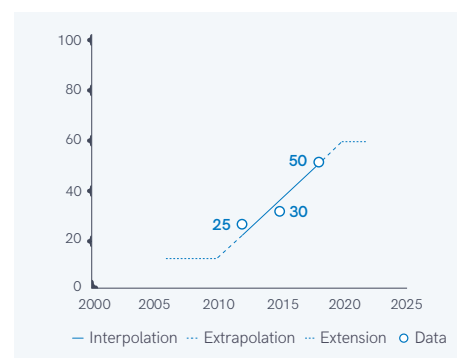
Introduction

The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) was established in 1990 and has developed and refined methods for global monitoring of drinking water, sanitation and hygiene (WASH) in households (WHO and UNICEF, 2018a). In 2018, the JMP developed core questions and indicators for monitoring WASH in health care facilities (WHO and UNICEF, 2018b). The JMP published a global baseline report in 2019 (WHO and UNICEF, 2019), and since then has updated the global database in even years (WHO and UNICEF, 2020; WHO and UNICEF, 2022; WHO and UNICEF, 2024). The 2022 report was a full progress report, while the 2024 report was a lighter 'data update'[1].

The **purpose** of this document is to explain the methods used by the JMP to compile and harmonize available data on "basic" WASH services (including water, sanitation, hygiene, environmental cleaning and health care waste management services) in health care facilities

1 JMP reports on WASH in health care facilities are available at: https://washdata.org/monitoring/health-care-facilities.

| TABLE 1 | SDG targets and indicators related to WASH in health care facilities |

Goals	Targets
6: Ensure availability and sustainable management of water and sanitation for all	6.1: By 2030, achieve **universal** and equitable access to safe and affordable drinking water for all
	6.2: By 2030 achieve access to adequate and equitable sanitation and hygiene **for all** and end open defecation, paying special attention to the needs of women and **girls and those in vulnerable situations**
3: Ensure healthy lives and promote well-being for all at all ages	3.1: By 2030, reduce the global **maternal mortality ratio** to less than 70 per 100,000 live births
	3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce **neonatal mortality** to at least as low as 12 per 1,000 live births and **under-5 mortality** to at least as low as 25 per 1,000 live births
	3.8: Achieve **universal health coverage**, including financial risk protection, access to quality essential health care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

and establish comparable total (national) estimates for global reporting and monitoring. As with global monitoring of WASH in other settings, JMP methods for estimating progress on WASH in health care facilities will continue to be refined over time as more data become available.

Background

The terms "universal" and "for all" in Targets 6.1 and 6.2 highlight the need for monitoring WASH beyond the household,

including institutions such as health care facilities (Table 1). While there are no specific SDG indicators for WASH services in health care facilities, basic WASH services in health care facilities are essential in order to achieve many of the targets under Sustainable Development Goal 3, particularly targets 3.1, 3.2 and 3.8.

As it has done for monitoring of WASH in households, the JMP has established service ladders for monitoring WASH

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in health care facilities (Figure 1) to enable countries at different stages of development to track and compare progress in reducing inequalities. There are separate ladders for water,[2] sanitation, hygiene, environmental cleaning, and health care waste management services. Within each category, the service ladder includes three levels: no service, limited service, and basic service.[3]

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2 While global monitoring of water in households and schools is centred on drinking water, monitoring of water services in health care facilities refers to broader accessibility of water for multiple purposes, including cleaning, cooking, and laundry. However, the global 'basic water services' indicator does not cover medical uses of water (e.g. for dialysis).
3 See section 4.2 for more details on service level classifications.

Because of the lack of agreed indicators and definitions, as well as of comparable data, the JMP does not systematically monitor higher levels of WASH services in health care facilities at the global level. However, many countries, areas and territories have defined national indicators that go beyond the global set of basic services, especially in settings where basic services are widespread and not considered aspirational. The JMP does highlight examples of monitoring of higher levels of services, where data permit.

The WASH in health care facilities service ladder estimates and all relevant data for each country, area, or territory are compiled in JMP country files. See Annex 1 for a summary of the organization of the country files.

Regional and global estimates are generated by using those country estimates and are presented in JMP regional snapshots. All estimates can be downloaded and visualized through the JMP website.

FIGURE **1** JMP service ladders for global monitoring of WASH in health care facilities

Service level	Water	Sanitation	Hygiene	Environmental cleaning	Health care waste management
Basic service	Water is available from an improved source[a] on the premises.	Improved sanitation facilities[b] are usable, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility.	Functional hand hygiene facilities[c] (with water and soap and/or alcohol-based hand rub) are available at points of care, and within five metres of toilets.	Protocols for cleaning are available, and staff with cleaning responsibilities have all received training.	Waste is safely segregated into at least three bins, and sharps and infectious waste are treated and disposed of safely.
Limited service	An improved water source is available within 500 metres of the premises, but not all requirements for a basic service are met.	At least one improved sanitation facility is available, but not all requirements for a basic service are met.	Functional hand hygiene facilities are available either at points of care or toilets but not both.	There are cleaning protocols and/or at least some staff have received training on cleaning.	There is limited separation and/or treatment and disposal of sharps and infectious waste, but not all requirements for a basic service are met.
No service	Water is taken from unprotected dug wells, springs or surface water sources, an improved source that is more than 500 metres from the premises, or there is no water source.	Toilet facilities are unimproved (e.g. pit latrines without a slab or platform, hanging latrines, bucket latrines) or there are no toilets.	No functional hand hygiene facilities are available either at points of care or toilets.	No cleaning protocols are available and no staff have received training on cleaning.	There are no separate bins for sharps or infectious waste, and sharps and/or infectious waste are not treated/disposed of.

a) Improved water sources are those which by nature of their design and construction have the potential to deliver safe water. These include piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, packaged or delivered water, and water kiosks.
b) Improved sanitation facilities are those designed to hygienically separate human excreta from human contact. These include wet sanitation technologies such as flush and pour-flush toilets connecting to sewers, septic tanks or pit latrines, and dry sanitation technologies such as dry pit latrines with slabs, and composting toilets.
c) A hand hygiene facility is any device that enables staff and patients to clean their hands effectively, such as a sink with tap, water tank with tap, bucket with tap or other similar device. Alcohol-based hand rub (ABHR) dispensers are also hand hygiene facilities, whether they are fixed or portable. However, alcohol-based rub is not considered adequate for hand hygiene at sanitation facilities as it does not remove faecal matter from hands.

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Method overview

The JMP produces estimates for a total of 25 primary indicators related to five service areas: water (4), sanitation (7), hygiene (5), environmental cleaning (4) and health care waste management (5) in health care facilities. Estimates are produced using linear regression on all available data sources, and subsequently aggregated to the regional and global levels. The linear regression model selected is very similar to that used for producing JMP estimates of WASH services in households. For more details, see (WHO and UNICEF, 2014) and (WHO and UNICEF, 2018a).

All estimates are expressed as the proportion of health care facilities with a type of water, sanitation, hygiene, environmental cleaning, or health care waste management level of service (Table 2). Estimates are reported as a proportion of all health care facilities, not as proportions of sub-sets of health care facilities (e.g. the proportion with improved sanitation facilities is out of the total number of health care facilities surveyed, not out of those with any sanitation facility).

Secondary indicators are then calculated either by arithmetic combinations of primary indicators, or directly using

TABLE 2 Primary indicators for WASH in health care facilities

		The proportion of health care facilities with…
Water	W_1	any water source
	W_2	an improved water source
	W_3	an improved water source from which water is available
	W_4	an improved water source located on premises
Sanitation	S_1	any sanitation facility
	S_2	improved sanitation facilities
	S_3	improved sanitation facilities which are usable
	S_4	improved sanitation facilities which are dedicated for staff
	S_5	improved sanitation facilities with sex-separated toilets
	S_6	improved sanitation facilities with menstrual hygiene facilities
	S_7	improved sanitation facilities accessible for users with limited mobility
Hygiene	H_1	any hand hygiene facility
	H_2	functional hand hygiene facilities with soap and water at points of care
	H_3	functional hand hygiene facilities with alcohol-based handrub at points of care
	H_4	functional hand hygiene facilities with alcohol-based handrub and/or soap and water at points of care
	H_5	functional hand hygiene facilities with soap and water within five metres of toilets
Environmental cleaning	C_1	cleaning measures in place
	C_2	written policies and protocols for cleaning
	C_3	non-health care providers with cleaning responsibilities trained on cleaning
	C_4	health care providers with cleaning responsibilities trained on cleaning
Health care waste management	WM_1	any health care waste segregation or treatment
	WM_2	health care waste segregated in consultation areas
	WM_3	infectious waste treated and disposed of safely
	WM_4	sharps waste treated and disposed of safely
	WM_5	sharps and infectious waste treated and disposed of safely

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linear regression, as shown in Table 3. All of the basic service level indicators are composite indicators, and in many cases data on the sub-indicators that contribute to the composite indicator are available separately. In these cases, estimates for the sub-indicators are calculated directly through linear regression, as primary indicators (see Table 2). Since data on different sub-indicators may come from different data sources, it is not always possible to combine the different elements at the level of an individual health care facility, and instead the basic service level is taken as the minimum value of the component primary indicators.

Some data sources report the basic service level indicators directly, without disaggregation into the sub-indicators. In this case linear regression can be made on the basic service level, but estimates are constrained to not be larger than estimates for any of the constituent sub-indicators. The "limited service" and "no service" level indicators are calculated by applying subtraction of primary and secondary indicators (see means of calculation column in Table 3). The detailed explanations about these calculations are provided in the following sections, especially in sections 4.2.1-4.2.5.

Wherever possible, estimates are disaggregated by urban and rural area, by health care facility level (hospitals and non-hospital facilities), and by management type (government and non-government). Regressions for each of these settings are done

separately, and they are not combined to produce total (national) estimates.

Annex 2 provides a listing of all primary (25) and secondary (15) indicators and the short variable names that are used in the country files.

Production of the estimates follows a consistent series of steps, including:
1. identification of appropriate data sources;
2. extraction of data from data sources into harmonised tables of data inputs after data cleaning and pre-processing;
3. use of the data inputs to model country estimates;
4. consultation with countries to review the estimates; and
5. aggregation of country estimates to create regional and global estimates.

This document describes each of these steps in detail.

TABLE 3   Service level indicators (secondary indicators) for WASH in health care facilities

		The proportion of health care facilities with…	Means of calculation
Water	W_5	an improved water source located on premises, from which water is available (basic water service)	Minimum of (W_3, W_4) or linear regression
	W_6	limited water service	$W_2 - W_5$
	W_7	no water service	$100 - W_2$
Sanitation	S_8	improved and usable sanitation facilities, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for users with limited mobility (basic sanitation service)	Minimum of $(S_3, S_4, S_5, S_6, S_7)$ or linear regression
	S_9	limited sanitation service	$S_2 - S_8$
	S_{10}	no sanitation service	$100 - S_2$
Hygiene	H_6	functional hand hygiene facilities available at one or more points of care and within 5 metres of toilets (basic hygiene service)	Minimum of (H_4, H_5) or linear regression
	H_7	limited hygiene service	$H_1 - H_6$
	H_8	no hygiene service	$100 - H_1$
Environmental cleaning	C_5	protocols for cleaning, and staff with cleaning responsibilities have all received training on cleaning procedures (basic environmental cleaning service)	Minimum of (C_2, C_3, C_4) or linear regression
	C_6	limited environmental cleaning service	$C_1 - C_5$
	C_7	no environmental cleaning service	$100 - C_1$
Health care waste management	WM_6	health care waste safely segregated in consultation areas and sharps and infectious waste treated and disposed of safely (basic health care waste management service)	Minimum of (WM_2, WM_5) or linear regression
	WM_7	limited health care waste management service	$WM_1 - WM_6$
	WM_8	no health care waste management service	$100 - WM_1$

Identification of data sources

The JMP has developed a global database on WASH in health care facilities to support reporting and monitoring of global indicators. To this end, the JMP collects and compiles data from data sources dating from 2000 onwards. The JMP team conducts regular data searches by systematically visiting the websites of national statistical offices, key sector institutions such as ministries of health, water, and sanitation, regulators of water and sanitation services, and regional and global databases and survey programmes. UNICEF and WHO regional and country offices also play a key role in identifying and accessing appropriate data sources through their work and collaboration with national and regional stakeholders. The JMP global database on WASH in health care facilities includes several types of data sources.

- **Administrative data** can include various systems listed below that compile relevant information. Like in all administrative data use, care should be given to potential data quality issues such as inaccuracies, inconsistencies, and missing information.

  - **Health Management Information Systems (HMIS)**, sometimes called Routine Health Information Systems (RHIS), typically collect basic information from all health care facilities within a country on an annual basis. HMIS are managed by health ministries of health and include data from public health care facilities and, in some countries, private, religious and community-run health care facilities.
  - **Regulatory databases** may collect self-reported data from health care facilities, and/or conduct independent inspections.
  - Some countries maintain **accreditation databases**, which can include data on basic infrastructure and services required for health care facilities to be given permission to operate.

- **Health care facility censuses** aim to collect basic information from all health care facilities in a country but are administered irregularly and outside of the HMIS.

- **Health care facility surveys** collect detailed information from a subset of health care facilities. These may target national, rural, or urban health care facilities, or a specific health care facility levels (e.g. facilities with in-patient care or delivery services).

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An appropriate sample design is necessary for survey results to be representative, and surveys are often led by or reviewed and approved by national statistical organizations or health ministries. Some global survey programmes that collect WASH data include Harmonized Health Facility Assessments (HHFA), Service Availability and Readiness Assessments (SARA), Service Provision Assessments (SPA), Service Delivery Indicators (SDI), Performance Monitoring and Accountability 2020 (PMA), and Infection Prevention and Control Assessment Framework (IPCAF) initiatives. In smaller countries, these surveys may target all health care facilities, and could be considered as censuses.

- **Other data sources** include secondary data sources such as journal articles, or reports to international institutions, which document good data coverage and quality assessment. These data sources are only used to calculate JMP country estimates when primary national datasets with supporting documentation are unavailable.

Data sources in some cases focus specifically on WASH indicators, but more commonly collect a wide range of indicators related to health care service availability and readiness.

Some data sources reviewed by the JMP are not representative of total, rural or urban health care facilities, or specific types of health care facilities (e.g. government or non-government facilities). The JMP includes data sources in its database when they include data from at least 50 health care facilities in a relevant domain (e.g. total, urban, rural, hospital, non-hospital, government, non-government), or if they represent at least 30% of health care facilities in a relevant domain. Health care facility censuses with at least one-third (or a 33%) response rate are included. JMP records all relevant official data sources in its database but not all data sources in the database are used in the production of estimates (see section 4.4, Data acceptance).

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Data extraction, cleaning and pre-processing

Once data sources are identified, data on WASH services in health care facilities are extracted from the original sources, mapped to standard SDG definitions and recorded in standardized data extraction templates. All available data for each country, area, or territory (CAT) are compiled in individual spreadsheets (the JMP 'country files'), with water, sanitation, hygiene, environmental cleaning and health care waste management data recorded on separate sheets (see Annex 1 for details). The JMP global database includes data for the CATs included in the UN Population Division's World Population Prospects tables.[4] However, not all of these have available data on WASH in health care facilities. Country files for all countries with data available on WASH in health care facilities can be downloaded from the JMP website.[5]

4.1 DATA COMPILATION

The JMP compiles data from a wide range of data sources and formats. Where possible, the JMP uses original microdata to produce its own tabulations using standard definitions, which are then transferred to the country files. However, in many cases microdata are not readily accessible and, in such cases, relevant data are transcribed from reports available in different formats (e.g. PDFs, Word files, Excel spreadsheets). Data can be recorded in country files when they are representative of at least 20% of a target group of facilities. However, data sources recorded in country files are not always used for estimates (see section 4.4).

Reference year

Data sources are assigned a single year in the JMP database, even when data collection and publication span several years. The year assigned to a data source is the last year in which data collection was made or the ending year of the fiscal year during which data were reported. Thus, a survey administered from 1 October 2021 through 2 January 2022 would be assigned to 2022, and an HMIS conducted during the 2021–2022 fiscal year would be assigned to 2022.

Some surveys and administrative data sources involve multiple rounds of data collection, or continuous data reporting within a single year. In such cases, data will be combined into a single set of statistics representing average values for the year, except for specific cases where for example national authorities recommend using the minimum value due to large seasonal variations in WASH service levels.

Geographic scope

The JMP country files include data that are representative of all health care facilities (total) as well as data that are representative of urban health care facilities and rural health care facilities, or representative of specific types of health care facilities, including hospitals and smaller facilities (non-hospitals), or government or non-government facilities. Where possible, data for all seven of these domains are extracted but, in some cases, data are either unavailable or it is not possible to disaggregate them by urban and rural areas, by health care facility level, or by management type. Data that are not representative of any of these domains are generally not extracted into the country files. In cases where recent representative data sources

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4 UN Population Division, World Population Prospects:
https://population.un.org/wpp/
5 https://washdata.org/data/downloads

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are scarce, non-representative data sources may be inserted into the country files but flagged as non-representative and not used to generate estimates.

Weighting

Some data sources rely on random samples drawn from relevant strata. In cases where surveys have randomly selected health care facilities to assess, and have calculated sample weights to account for the sampling distribution, data will be extracted using the available sample weights. In many cases weights are not provided and unweighted tabulations are used. Such details are recorded in notes attached to data sources in the country files.

Health care facility level classification

There is no universal classification system describing the different types of facilities that make up a national health system. There is a general typology of services, including primary, secondary and tertiary care, where secondary and tertiary health care services are usually, though not always, delivered in hospitals following referral from a primary care professional. Where data permit, the JMP groups all health care facilities that are not classified as hospitals into 'non-hospitals' for aggregate analysis, excluding very small facilities (for example, dispensaries, physician's offices, mobile clinics) and specialty clinics.

Management type classification

Governments often directly manage health care facilities, either through central or local government institutions. Non-governmental health care facilities may be managed by for-profit private corporations, not-for profit providers (including faith-based organizations), and individual health care providers such as private doctors. Where possible, data are disaggregated into facilities managed by governments, and facilities managed by others.

Approach to data from different areas within a single health care facility

If data are available from different wards or areas in a facility, data from general consultation or outpatient department (OPD) areas will be given priority for extraction and recording in country files. If data from general consultation areas and OPD are not available, the availability of the service in other available locations can be recorded for the facility as a whole.

4.2 SERVICE LEVEL CLASSIFICATIONS

The JMP uses a standard international classification system to categorize health care facilities having different levels of water, sanitation, hygiene, environmental cleaning and health care waste management services. Data extracted from national data sources are matched to the corresponding standard global classifications to enable comparison between data sources within and between countries. Service levels are classified based on original definitions, questionnaires and guidance provided for each data source, and reference to other data sources already on file. The definitions and terms used in the original data source are recorded next to the matched standard classification in JMP country files.

The following sub-sections outline the criteria used to classify health care facilities as having 'basic', 'limited' or 'no' service based on available data and the assumptions used when national datasets are incomplete. These different service levels are visualized in the form of a 'service ladder', with the three levels usually summing to 100%. In some cases, data may be available for the basic service level, but without sufficient data to distinguish between limited and no service. In such cases the missing elements are shown as 'insufficient data'.

It is recognized that the basic service levels do not consider all elements of the human rights to safe drinking water and sanitation and, where appropriate, some countries may choose to monitor additional elements such as water quality, or hand hygiene compliance. While additional criteria are not yet monitored at the global level due to limited availability of national data, country level examples are collected and highlighted by the JMP and may be considered for systematic global monitoring in the future.

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4.2.1 WATER INDICATORS

The JMP uses a ladder with three rungs (basic service, limited service, and no service) to describe water services in health care facilities (Figure 2).

Water services in health care facilities refers to accessibility of water for multiple purposes, including drinking water, cleaning, cooking, and laundry, while global monitoring of water in households and schools is centred on drinking water only. However, the global 'basic water services' indicator does not cover medical uses of water (e.g. for dialysis).

Water supplies used in health care facilities are classified as either "improved" or "unimproved" based on technology (Table 4). "Improved" water sources are those that have the potential to deliver safe water by nature of their design and construction. The use of "improved" water sources served as the main Millennium Development Goal (MDG) indicator on drinking water in households and forms the foundation of the basic water services indicator for health care facilities. Note that in the context of health care facilities water supplies are needed for multiple purposes; the global indicators consider the main type of water supply infrastructure used for general purposes, including but not limited to drinking. Specialized medical uses of water (e.g. for dialysis) are not considered.

FIGURE 2 JMP service ladders for global monitoring of water services in health care facilities

Service level	Water
Basic service	Water is available from an improved source* on the premises.
Limited service	An improved water source is available within 500 metres of the premises, but not all requirements for a basic service are met.
No service	Water is taken from unprotected dug wells, springs or surface water sources, an improved source that is more than 500 metres from the premises, or there is no water source.

* Improved water sources are those which by nature of their design and construction have the potential to deliver safe water. These include piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, packaged or delivered water and water kiosks.

TABLE 4 Classification of water supply technologies in health care facilities

	Water
Improved facilities	**Piped supplies** • Tap water in the dwelling, yard or plot, including piped to a neighbour • Public taps or standpipes **Non-piped supplies** • Boreholes/tubewells • Protected wells and springs • Rainwater • Packaged water, including bottled water and sachet water • Delivered water, including tanker trucks and small carts/tanks/drums • Water kiosks
Unimproved facilities	**Non-piped supplies** • Unprotected wells and springs
No facility	**Surface water** • Open water sources located above ground, including rivers, lakes, ponds, streams, canals, reservoirs and irrigation channels

Based on this infrastructure classification, the proportion of health facilities with any water source (W_1), as well as the proportion with improved water sources (W_2) can be calculated. In addition to the type of water source (infrastructure classification) used by the health care facility, the service level classification requires information on the **availability** of water **on premises** at the health care facility.

Available

It's possible for a health care facility to have access to an improved water supply, but not to actually have water available from that infrastructure. Water is considered to be "available" if it is available at the health care facility at the time of the data collection/reporting (e.g. health care survey or questionnaire), either directly from the main water supply, or water collected from the main water supply and stored at the health care facility, for example in an overhead storage tank or underground cistern. In cases where health care facilities report water availability on average rather than on the day of the data collection, health care facilities with water available at least 50% of the time (at least 12 hours per day and/or 4 days per week) are classified as having water available. In the absence of data on water availability, the functionality of the water system is used as a proxy where

water facilities classified as 'functional' are assumed to have water available. The proportion of health care facilities with an improved water source from which water is available (W_3) is one of the primary indicators for calculating service levels.

On premises

To meet the basic service level, the point where water is collected should be located either inside the health care facility building(s) or on the grounds (yard or plot). Data on "on premises" can come either from the technology classification, or specific indicators about the location of water points. Piped water supplies (except for public taps or standpipes) are automatically classified as on-premises. The proportion of health care facilities with an improved water source located on premises (W_4) is one of the primary indicators for calculating service levels.

Calculation of water service ladders

The proportion of health care facilities with basic water services is calculated as the proportion of health care facilities with water available on premises from an improved source (Figure 3). Since information about the availability of water from an improved source (W_3) and access to an improved source located on premises (W_4) are primary indicators (see Table 2) and may come from different data sources, estimates for these two primary indicators are calculated using linear regression. The basic service level (W_5) is simply calculated as the minimum of these two estimates (W_3 and W_4).

Health care facilities that have an improved water source on premises but water is not actually available, or an improved water source located within 500 m but not on premises, are classified as having limited service. Estimates for limited services (W_6) are calculated simply by subtracting the proportion of facilities with basic services (W_5) from the proportion having an improved water source (W_2).

The remaining proportion of health care facilities with water from an improved source further than 500 m away, an unimproved source, or no water source at all, are classified as having no water service. In cases where there are data on 'any source' but no data on improved sources from any dataset, 'no service' is estimated based on the proportion of health care facilities with no water source. Estimates for 'no service' (W_7) are calculated as 100% minus the proportion of health care facilities with improved water sources (W_2).

FIGURE 3 Example of calculating water service ladders in health care facilities

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4.2.2 SANITATION INDICATORS

The JMP uses a ladder with three rungs (basic service, limited service, and no service) to describe sanitation services in health care facilities (Figure 4).

Sanitation facilities used in health care facilities are classified as either "improved" or "unimproved" based on technology (Table 5). "Improved" sanitation facilities are those designed to hygienically separate excreta from human contact. The use of "improved" sanitation facilities served as the main Millennium Development Goal (MDG) indicator on sanitation in households and forms the foundation of the basic sanitation services indicator for health care facilities.

Usable

To be usable, sanitation facilities should be (1) available, (2) functional and (3) private. Sanitation facilities may exist but not be available to patients and/or staff if they are located outside the premises or if they are locked and the key is not available at all times. Sanitation facilities may be non-functional; the toilet drain, or drop hole, might be blocked or overflowing, or the toilet structure could be cracked or leaking. Flush/pour-flush toilets are not functional if water is not available. Sanitation facilities can be considered unusable when they don't afford privacy by having closable doors that can be locked from the inside, and no large gaps or holes in walls.

FIGURE 4 JMP service ladders for global monitoring of sanitation services in health care facilities

Service level	Sanitation
Basic service	Improved sanitation facilities* are usable, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for people with limited mobility.
Limited service	At least one improved sanitation facility is available, but not all requirements for a basic service are met.
No service	Toilet facilities are unimproved (e.g. pit latrines without a slab or platform, hanging latrines, bucket latrines) or there are no toilets.

* Improved sanitation facilities are those designed to hygienically separate human excreta from human contact. These include wet sanitation technologies such as flush and pour-flush toilets connecting to sewers, septic tanks or pit latrines, and dry sanitation technologies such as dry pit latrines with slabs, and composting toilets.

TABLE 5 Classification of sanitation technologies in health care facilities

	Sanitation
Improved facilities	**Networked sanitation** • Flush and pour-flush toilets connected to sewers **On-site sanitation** • Flush and pour-flush toilets or latrines connected to septic tanks or pits • Ventilated improved pit (VIP) latrines • Pit latrines with slabs (constructed from materials that are durable and easy to clean) • Composting toilets, including twin pit latrines with slabs and container-based systems
Unimproved facilities	**Non-networked sanitation** • Flush and pour-flush toilets or latrines flushed to open drain or elsewhere* • Pit latrines without slabs, or slabs constructed from materials that are not durable and easy to clean • Open pits • Hanging toilets/latrines • Bucket latrines, including pans, trays or other unsealed containers
No facility	**Open defecation** • Defecation in the bush, field or ditch • Defecation into surface water, including beaches, rivers, streams, drainage channels, seas or oceans

* A survey response of 'flush/pour-flush to elsewhere' suggests that excreta are not being discharged into a sewer, septic tank or pit latrine but into the local environment, and that the facility should therefore be classified as unimproved.

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Dedicated for staff

Staff at health care facilities should have dedicated sanitation facilities to reduce the risk of infections, particularly during outbreaks.

Sex-separated

Women and men should be able to use sanitation facilities in health care facilities without being in the same bathroom with people of the opposite sex at the same time. This is most commonly achieved through having separate sanitation facilities for women and men. However, especially in small facilities, a gender-neutral room with a single private sanitation facility is also considered sex-separated, as it allows women and men to use the facility privately and separately.

With menstrual hygiene facilities

The sanitation facilities available for women and girls should also provide facilities for menstrual hygiene management including a bin with a lid for disposing of used menstrual hygiene products, and water and soap available in a private space for washing.

Accessible for people with limited mobility

Sanitation facilities should be available for people with limited mobility, according to national standards. In the absence of national standards, sanitation facilities should be accessible without stairs or steps, should have a door at least 80 cm wide, and should have handrails or other guides attached to the floor or sidewalls. The door handle and seat should be within reach of people using wheelchairs or crutches/sticks.

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Calculation of sanitation service ladders

The proportion of health care facilities with basic sanitation services (S_8) is calculated as the proportion of health care facilities with improved sanitation facilities (S_2) that are usable (S_3), with at least one sanitation facility dedicated for staff (S_4), at least one sex-separated facility (S_5) with menstrual hygiene facilities (S_6), and at least one facility accessible for people with limited mobility (S_7).

Health care facilities with at least one improved sanitation facility available (S_2), but not meeting all requirements for basic service, are classified as having limited services (S_9). The remaining proportion of health care facilities with unimproved or no sanitation facilities are classified

as having no sanitation service (S_{10}). In cases where there are data on any facility but no data on improved facilities from any dataset, no service is estimated based on the proportion of health care facilities with no facility.

In cases where microdata are unavailable, but the proportion of health care facilities with improved and usable sanitation facilities is known, and data on at least two of the additional primary sanitation indicators (designated for staff, sex-separated, menstrual hygiene, mobility) are available, the primary indicator with the lowest coverage is taken as the limiting factor for basic sanitation services (Figure 5).

The basic sanitation service level is not calculated at the

facility level even when microdata would allow this. Rather, all available primary indicators are calculated at the facility level drawing on all available data sources, and estimates are produced using linear regression. Basic sanitation is taken as the minimum of all available primary indicator estimates (assuming that at least three primary indicators are available, including usability), in order to ensure compatibility with data sources lacking microdata.

To meet the criteria for a basic sanitation service, the health care facility must have at least two sanitation facilities: one dedicated for staff, and one gender-neutral facility for patients that has menstrual hygiene facilities and is accessible for people with limited mobility.

Example of calculating sanitation service ladders in health care facilities

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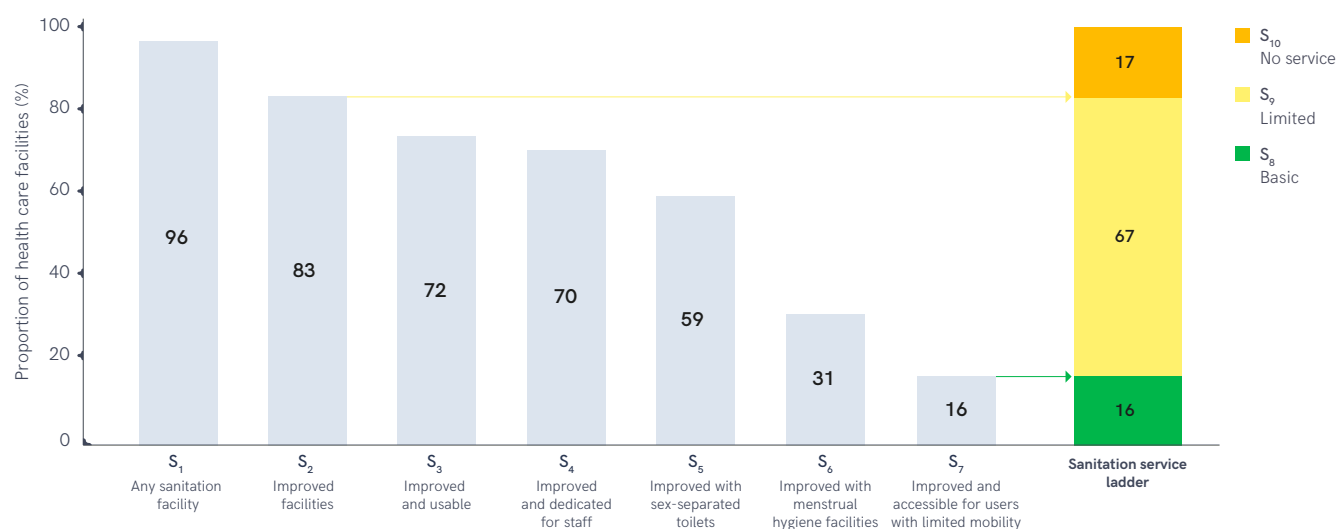
4.2.3 HYGIENE INDICATORS

The JMP uses a ladder with three rungs (basic service, limited service, and no service) to describe hygiene services in health care facilities (Figure 6).

"Hygiene" can cover many different areas, for example, oral hygiene, menstrual hygiene, or food hygiene. For the purposes of global monitoring of WASH in health care facilities, "basic hygiene" services refer to hand hygiene, and in particular to the availability of hand functional hygiene facilities at points of care and near sanitation facilities.

A hand hygiene facility is any device that enables staff and patients to clean their hands effectively, such as a sink with tap, water tank with tap, bucket with tap or other similar device. Alcohol-based hand rub dispensers are also hand hygiene facilities, whether they are fixed or portable.

The **basic** service classification requires information on the availability of **alcohol-based hand rub**, or **soap** and **water** at the time of the data collection/reporting (e.g. survey or questionnaire). Handwashing facilities must be available both at points of care and sanitation facilities.

Availability of alcohol-based hand rub

In medical settings, alcohol-based hand rub (ABHR) is widely used and can lead to higher hand hygiene compliance rates than

Service level	Hygiene
Basic service	Functional hand hygiene facilities* (with water and soap and/or alcohol-based hand rub) are available at points of care, and within five metres of toilets.
Limited service	Functional hand hygiene facilities are available either at points of care or toilets but not both.
No service	No functional hand hygiene facilities are available either at points of care or toilets.

* A hand hygiene facility is any device that enables staff and patients to clean their hands effectively, such as a sink with tap, water tank with tap, bucket with tap or other similar device. Alcohol-based hand rub (ABHR) dispensers are also hand hygiene facilities, whether they are fixed or portable. However, alcohol-based rub is not considered adequate for hand hygiene at sanitation facilities as it does not remove faecal matter from hands.

water and soap. ABHR is the preferred hand hygiene solution at points of care, but it is not considered sufficient in sanitation facilities, because ABHR does not remove organic contamination from hands.

Availability of soap

Soap should be available at the hand hygiene facilities. Bar soap, liquid soap, powder detergent

and soapy water all count as soap for global monitoring purposes. In some cultures, ash, soil, sand or other materials are used as hand hygiene agents, but these are less effective than soap and are therefore insufficient for basic hygiene service. Soap and water may be used for hand hygiene at points of care, or at sanitation facilities. Soap and water should always be

available at or near sanitation facilities to allow proper hand cleansing after using sanitation facilities. If soap and water are not available within five metres of sanitation facilities, the facilities are considered to not have functional hand hygiene facilities at toilets.

Availability of water

Similar to indicator on water availability (W_3), where health care facilities report water availability on average rather than the day of the data collection/reporting, health care facilities with water available at least 50% of the time (at least 12 hours per day or 4 days per week) are classified as having water available for hand hygiene. In the absence of data on water availability, the functionality of the hand hygiene facility is used as a proxy where

functional facilities are assumed to have water available. If there is information on hand hygiene facilities and soap, but not water availability, data on water availability at the facility level is used as a proxy, if available.

The JMP uses data from health care facility censuses (e.g. HMIS) and other health care facility-reported sources in which the head administrator observes the hand hygiene facility and confirms the presence or absence of soap and water. In the few cases where datasets include both observation by an independent enumerator and self-reported availability of soap and water from health care facility staff, self-reported data are used to make estimates to ensure consistency with national HMIS which typically only include self-reported data.

Calculation of hygiene service ladders

The proportion of health care facilities with basic hygiene services (H_6) is calculated as the proportion of health care facilities with hand hygiene facilities that have ABHR and/or soap and water available at points of care (H_4), and hand hygiene facilities with soap and water within five metres of sanitation facilities (H_5) (Figure 7). Health care facilities with functional hand hygiene facilities available either at points of care or sanitation facilities but not both are classified as having limited service. The remaining proportion of health care facilities are classified as having no hygiene service. In cases where there are data on availability of facilities but no data on facilities with water from any dataset, no service is estimated based on the proportion of health care facilities with no hand hygiene facility.

FIGURE **7** Example of calculating hygiene service ladders in health care facilities

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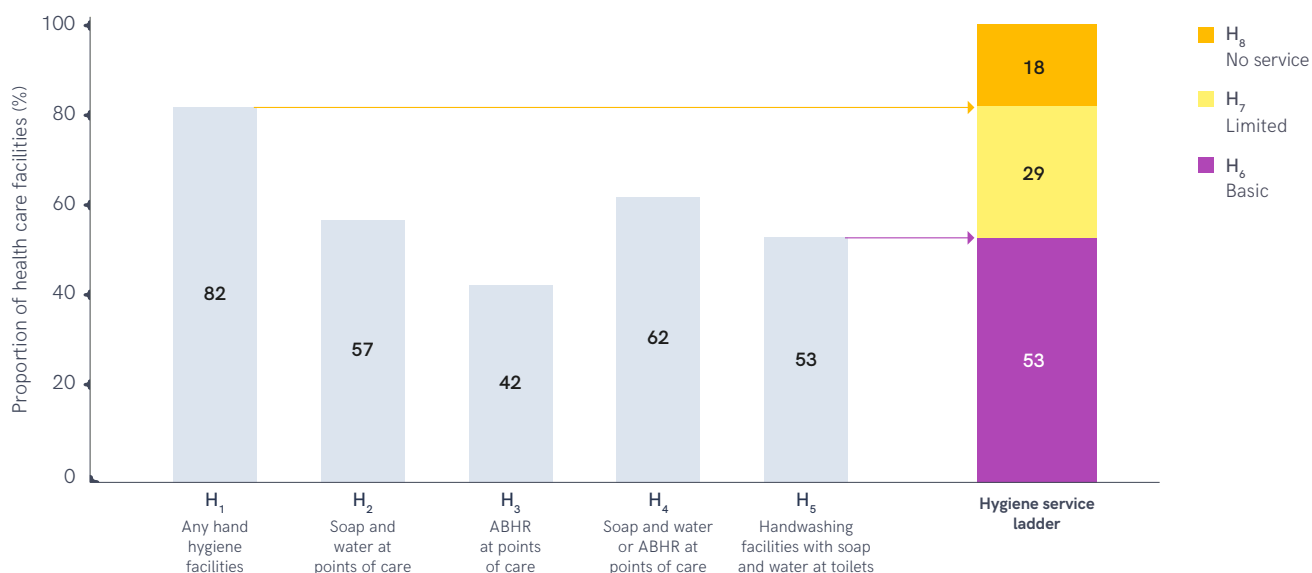
4.2.4 ENVIRONMENTAL CLEANING INDICATORS

The JMP uses a ladder with three rungs (basic service, limited service, and no service) to describe environmental cleaning services in health care facilities (Figure 8).

The basic environmental cleaning services indicator is not based on infrastructure, but on the availability of protocols and the extent to which staff with cleaning responsibilities have received training on cleaning procedures.

Protocols

Protocols should include:
- step-by-step techniques for specific tasks, such as cleaning a floor, cleaning a sink, cleaning a spillage of blood or body fluids; and
- a cleaning roster or schedule specifying responsibility for cleaning tasks and frequency at which they should be performed.

The term for protocols may differ according to local practice; they may be referred to as Standard Operating Procedures (SOPs), guidelines, instructions, etc.

Where possible, protocols should be observed by the enumerator and reported.

Training

"Staff responsible for cleaning" refers to non-health care providers such as cleaners, orderlies or auxiliary staff, as well as health care providers who, in addition to their clinical and patient care duties, perform cleaning tasks as part of their role.

Training refers to structured training plans or programs led by a trainer or appropriately qualified supervisor.

FIGURE 8 — JMP service ladders for global monitoring of environmental cleaning services in health care facilities

Service level	Environmental cleaning
Basic service	Protocols for cleaning are available, and staff with cleaning responsibilities have all received training.
Limited service	There are cleaning protocols and/or at least some staff have received training on cleaning.
No service	No cleaning protocols are available and no staff have received training on cleaning.

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Calculation of basic environmental cleaning service

The proportion of health care facilities with basic environmental cleaning services is calculated as the proportion of health care facilities that have protocols for cleaning, and where staff with cleaning responsibilities have all received training. If microdata allow combination of these two elements at the facility level, the basic service level can be calculated at that level. Otherwise, the minimum of the two elements can be used at the level of the domain (total, urban, rural, hospital, non-hospital, government or non-government) (Figure 9).

FIGURE 9 Example of calculating environmental cleaning service ladders in health care facilities

Proportion of health care facilities (%)

- C_1 Cleaning measures in place — 81
- C_2 Written policies and protocols for cleaning — 64
- C_3 Non-health care providers with cleaning responsibilities trained on cleaning — 32
- C_4 Health care providers with cleaning responsibilities trained on cleaning — 27

Environmental cleaning service ladder:
- C_7 No service — 19
- C_6 Limited — 54
- C_5 Basic — 27

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4.2.5 HEALTH CARE WASTE MANAGEMENT INDICATORS

The JMP uses a ladder with three rungs (basic service, limited service, and no service) to describe health care waste management services in health care facilities (Figure 10).

The basic health care waste management indicator requires that health care waste be safely segregated in the consultation area (the rooms or areas within the health care facility where care or treatment is delivered).

FIGURE **10** JMP service ladders for global monitoring of health care waste management services in health care facilities

Service level	Health care waste management
Basic service	Waste is safely segregated into at least three bins, and sharps and infectious waste are treated and disposed of safely.
Limited service	There is limited separation and/or treatment and disposal of sharps and infectious waste, but not all requirements for a basic service are met.
No service	There are no separate bins for sharps or infectious waste, and sharps and/or infectious waste are not treated/disposed of.

Waste segregation

At least three clearly labelled or colour-coded bins should be in place to separate (1) sharps waste, (2) infectious waste, and (3) non-infectious general waste. Bins should be no more than three quarters (75%) full, and each bin should not contain waste other than that corresponding to its label. Bins should be appropriate to the type of waste they are to contain; sharps containers should be puncture-proof and others should be leak-proof. Bins for sharps waste and infectious waste should have lids.

For facilities with multiple consultation rooms, it is recommended to select one at random and observe whether sharps waste, infectious waste and non-infectious general waste are segregated into three different bins. If data sources include data on waste segregation in multiple locations, preference is given to the outpatient area.

Some data sources include detailed indicators about segregation of waste, which cover all of the above elements. Others record simply whether sharps containers are present or not. Such limited data sets can be used to produce estimates, but preference is given to more comprehensive data sets. In some cases, less detailed data sources can be used until such a time when more detailed data sources become available. In this case, the less detailed data sources may be 'switched off' in the country file, and not used to produce estimates, if they are not comparable to the more detailed data.

Waste treatment and safe disposal

Following segregation, health care waste should be treated and disposed of safely. A wide range of technologies are used to treat health care waste, and the most appropriate technology will depend on local circumstances, balancing the need to protect public health and the environment.

As shown in Table 6, safe treatment and disposal methods include autoclaving, incineration, burial in a protected ground or pit, and removal offsite after storage in a container or other protected environment. Open burning, burning in a protected pit, open dumping without burial in a protected site, and disposal with non-infectious general waste are not considered to meet the basic service level.

Some countries produce statistics about the amount (volume or mass) of health care waste which is collected and treated. This type of data can be used to calculate the proportion of waste treated, if data are also available on the amount of health care waste which is generated. It is not sufficient to assert that all waste generated is collected on the basis that waste collection is required by law; there should be some empirical evidence to show the extent to which such laws and regulations are actually respected.

Calculation of health care waste management service ladders

The proportion of health care facilities with basic health care waste management services is calculated as the proportion of health care facilities with adequate segregation where waste is generated, and with adequate treatment and disposal of both infectious and sharps waste (Figure 11). If microdata allow combination

TABLE 6 Classification of health care waste treatment and disposal methods in health care facilities

	Treatment and disposal of health care waste
Adequate	**Autoclave**
	Burn in incinerator
	• 2-chamber industrial (800-1000+°C).
	• 1-chamber drum/brick/de Monfort incinerator
	Dump without burning
	• Protected ground or pit
	Remove offsite
	• Stored in covered container
	• Stored in other protected environment
Inadequate	**Open burning**
	• Flat ground, no protection
	• Pit or protected ground
	Dump without burning
	• Flat ground, no protection
	• Covered pit or pit latrine, no protection
	• Open pit, no protection
	Remove offsite
	• Stored unprotected

FIGURE 11 Example of calculating health care waste management service ladders in health care facilities
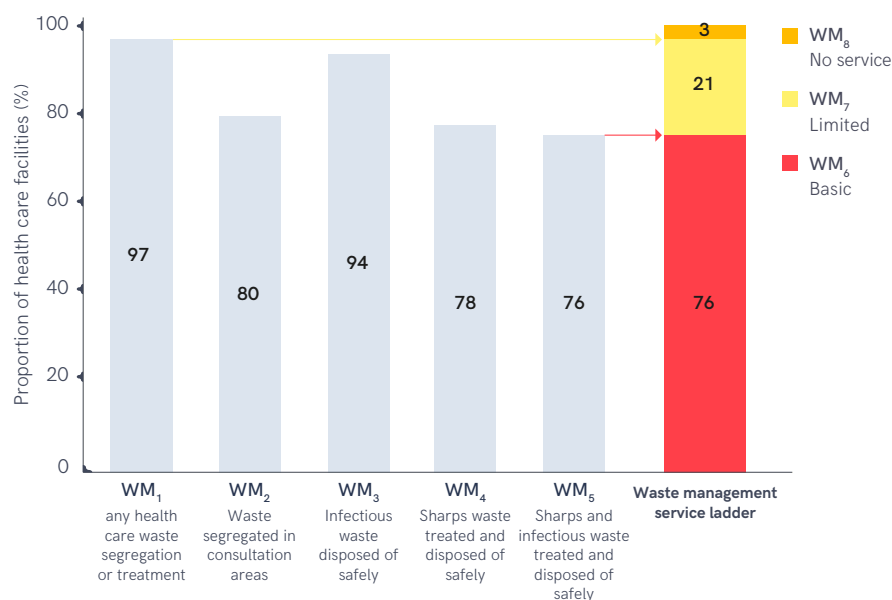
of these three elements at the facility level, the basic service level can be calculated at that level. Otherwise, the minimum of the three elements can be used at the level of the domain (total, urban, rural, hospital, non-hospital, government or non-government).

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4.3 DATA CLEANING AND ADJUSTMENT

Where microdata are available, the JMP calculates the relevant estimates and JMP tabulations are compared against any tabulations reported in, for example, survey reports or administrative reports. In the case of inconsistencies, the questionnaire categories are checked to identify possible errors.

Where response categories are ambiguous or do not map clearly into global or JMP standardized categories, adjustments are made drawing upon data from other datasets for the same country and time period, where available. For example, some surveys record data on health care facilities using ambiguous classifications such as "traditional wells".

Some traditional wells, but not all, meet the criteria for improved sources, so these health care facilities cannot immediately be classified as using an *improved* or *unimproved* water source. If another dataset is available which distinguishes between unambiguous classifications (e.g. the proportion of all wells which are improved), this ratio can be applied to the survey with the ambiguous classification. If there are multiple datasets from which ratios can be generated, the dataset closest in time to the ambiguous data is used.

In some cases, all datasets within a country use ambiguous classifications. In this case, there should be a specific consultation with the country, and in the absence of other information 50% of the ambiguous technologies are considered as *improved*, and 50% *unimproved*.

Some datasets only include information on health care facilities with specific types of facilities that correspond with national standards (e.g. piped water). Data on *piped water* can be used to calculate *improved and on premises* by assuming that 50% of the complement (non-piped water) are improved and located on premises. However, this statistic is only used for estimating *improved and on premises* when *piped* is at least 90%. In case data on waste treatment are available and show that at least 80% of health care facilities use an appropriate form of waste treatment, but data are lacking for the other health care facilities, it is assumed that 50% of these other facilities are also applying an appropriate form of waste treatment.

Some facility type data are based on a multiple response question where the total proportion of health care facilities using each facility type sums to more than 100%. Where microdata are available, the number of facilities per health care facility is reduced to one based on a hierarchy starting with the 'most improved' (e.g. piped water, flush toilet) to the 'least improved' (e.g. surface water, bush/field), so that health care facilities with any improved facilities are classified as such,

even if the health care facility also has unimproved facilities. If microdata are unavailable, the data are inserted in the country files but they are not used unless additional information is available to facilitate data cleaning and adjustment.

Where possible, facilities that did not complete the survey question are excluded from analysis, unless there is information that suggest these data indicate something else, such as *no facility* or *other*, or data from other sources suggest they should be included in the analysis. These assumptions are checked for consistency and reviewed as new datasets become available.

If any of these adjustments are made in the JMP country files, they are highlighted in the notes for that dataset under the domain tabs in the country files.

4.4 DATA ACCEPTANCE

In some cases, data that have been extracted and shown in the JMP country files are considered unsuitable for use in JMP estimates and excluded from further analysis. Datasets can be excluded for a number of reasons.

- National authorities may communicate that the data are not considered reliable or appropriate for use (see Country consultation, section 6).
- The national classification of the data may be based on few generic categories which are not aligned with JMP standard categories.
- Data may not be representative of a target group of health care facilities (total, urban, rural, hospital, non-hospital, government or non-government). Data may be excluded from use if the sampling design is not representative of at least 80% of the entire target group of facilities. If data on the distribution of health care facilities are not available, the distribution of population may be used as a proxy. For example, a subnational survey collecting data from districts accounting for 60% of the health care facilities in a country could be excluded from use.
- The sample size may be too small. Data should be available from at least 50 health care facilities in a target group in order to be used. In small countries which may not have even 50 health care facilities,

data should be available from at least 30% of the total number of the target group of health care facilities operating in the country.
- Sums of categories which should be mutually exclusive and comprehensively exhaustive may be far from 100%.
- A variable such as type of water supply that includes a response for "other" may present a very large proportion.
- Data may be markedly different from multiple other data points from a similar timeframe. Data sources with microdata available are given higher priority than tabulations provided by authors, printed reports, or websites, since the calculations can more precisely match the global definitions and methods.

- Data better aligned with the SDG indicator definitions may have become available and are markedly different.

For any of these reasons, a data extract may be excluded from calculation of any of the indicators reported by the JMP. In some cases, a data source can be used for one or more but not all indicators because of variable data availability and quality. For example, a health care facility survey might yield reliable data on "improved sanitation" but unreliable data on the usability of those facilities, because of ambiguous question wording or inadequate training of survey teams. When data shown in a country file are not used for estimates, the reason is recorded in the notes for that dataset under the domain tabs in the country files.

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Producing country estimates

5.1 TOTAL, RURAL AND URBAN, AND HEALTH CARE FACILITY LEVEL ESTIMATES

All data that have been reviewed and included in the analysis for a country and domain are used to produce JMP estimates. Separate estimates are made for total, urban, rural, hospital, non-hospital, government and non-government health care facilities where data are available.

In all countries there are likely to be many more primary health care centres and other small facilities (non-hospitals) than hospitals. If data are only available for non-hospital health care facilities, these data are used for total estimates since these smaller health care facilities constitute the majority of health care facilities and serve a large proportion of the population. If data are only available for rural (or urban) health care facilities, these data are used for total estimates where the population living in rural (or urban) areas comprise more than 80% of the total population. In some countries there are likely to be many more government facilities

than non-government facilities. In such cases, if data are available only for government facilities, total estimates can be generated.

5.2 ESTIMATION OF PRIMARY INDICATORS

The JMP estimates 25 primary indicators (or sub-indicators of service level indicators) directly from data inputs, all of which refer to the proportion of health care facilities with access to water, sanitation, hygiene, health care waste management and environmental cleaning facilities or services (Table 2). Separate estimates are made for each

indicator. In many cases data are only available for some of these indicators. For example, some countries may have an estimate for the proportion of health care facilities with improved sanitation facilities (S_2), but no data on the other sub-elements needed to calculate the proportion of health care facilities with a basic service (S_3 through S_7). In other cases, data are reported for the proportion of health care facilities with basic sanitation (S_8), but separate data are not provided (and microdata are unavailable) for the sub-elements of basic sanitation (S_2 through S_7).

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For each primary indicator with data available, estimates are calculated using a standard set of "JMP estimation" rules for interpolation, extrapolation, and extension of estimates.

Interpolation rules (within the years covered by data inputs)

1. If data points are at least four years apart, estimates are interpolated using ordinary least squares linear regression.[6]
2. If data points are less than four years apart, estimates are interpolated using a simple average.

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6 This follows a similar method to that used for household data, which uses a span of five years. A shorter time span is used for health care facility data based on the common usage of annual HMIS data (or annual data from the same source).

Extrapolation rules (outside the years covered by data inputs)

1. If there are at least two data points, estimates are extrapolated using ordinary least squares linear regression (or simple average, if data points are less than four years apart) forwards two years from the latest data point, and backwards two years from the earliest data point.
2. If extrapolation results in estimates above 99% or below 1%, the estimates are reported as ">99%" and "<1%", respectively.
3. If there is only one data point, no extrapolation is made.

Extension rules (beyond the years covered by data inputs and extrapolation)

1. Estimates are extended forwards four years from the latest estimate, and backwards four years from the earliest estimate.
2. Estimates are extended forwards or backwards indefinitely, if the estimate is 99.5% or greater, or 0.5% or less.

Estimates are made for all years possible within the period from 2000 to one year prior to the year of reporting.[7] The following examples illustrate the application of JMP estimation rules for the 2022 progress update which included estimates for all years between 2000 and 2021.

Examples

1. Figures 12 through 16 provide illustrative examples of applying the rules for interpolation, extrapolation, and extension of estimates.

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7 In the 2018 baseline report estimates were made for all years possible within the period from 2000 to two years prior to the year of reporting (i.e. 2000 to 2016). Starting with the 2020 update, estimates were produced for all years possible from 2000 to one year prior to the year of reporting. Accordingly, the 2024 report included estimates from 2000 to 2023.

BOX **1**   Evaluation of alternatives to linear regression

In 2014 the JMP convened an Expert Group Meeting to review the methods used for interpolation, extrapolation and extension. Alternatives to linear regression were considered including logistic regression, piecewise spline, and loess. While the datasets in the JMP database show evidence of some nonlinear trends for some parameters over time, the nonlinear models assessed require large numbers of datapoints to allow interpolation of estimates that are superior to simple linear regression. For many countries, there are not enough datapoints to justify the use of nonlinear methods. Nonlinear techniques are also limited in their ability to extrapolate even a few years, which is often necessary for the JMP's estimation method. Accordingly, the JMP has continued to use linear regression, with the set of rules regarding interpolation, extrapolation and extension described above (WHO and UNICEF, 2014).

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PRODUCING COUNTRY ESTIMATES | 25

FIGURE **12**

Three data points are available, spanning at least four years, and last data point is recent.

Interpolation is made from 2015 to 2021 with linear regression. Extrapolation is made backwards for two years, from 2015 to 2013, and this estimate is extended backwards for four years, until 2009. Extrapolation is made forwards from 2021 to 2023, and this value could be extended forwards until 2027, but is truncated at the reporting year for the report (2023 in case of the JMP 2024 report).
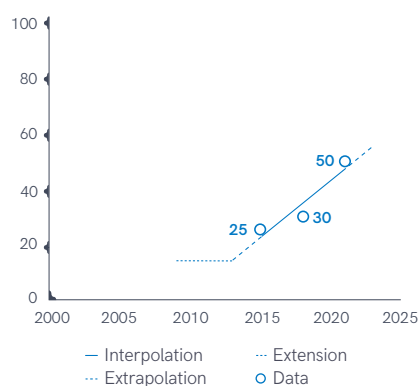
FIGURE **13**

Three data points are available, spanning at least four years, and last data point is more than six years old.

Interpolation is made from 2007 to 2013 with linear regression. Extrapolation is made backwards from 2007 to 2005. Extrapolation is also made forwards from 2013 to 2015. The 2005 estimate is extended backwards to 2001, and no estimate is made for 2000. The 2015 estimate is extended for four years to 2019, and no estimate is made for 2020 and beyond.
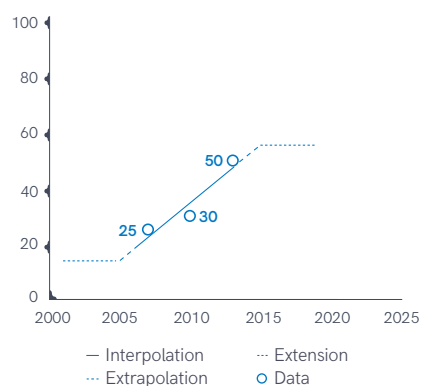
FIGURE **14**

Three data points are available, spanning at least four years, and estimates are greater than 99.5%.

Interpolation is made from 2007 to 2013 with linear regression. Extrapolation is made backwards from 2007 to 2005, and forwards from 2013 to 2015. The 2005 estimate of 58.2% is extended backwards four years to 2001, while the 2015 estimate of 99.7 % is extended indefinitely since it is above 99.5%.
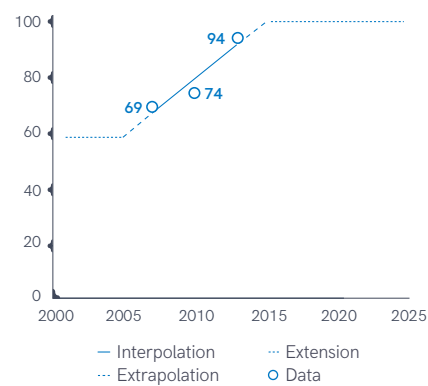
FIGURE **15**

Three data points are available, spanning less than four years.

Interpolation is made from 2013 to 2016 by averaging. Extrapolation of this averaged value is made backwards from 2013 to 2011, and forward from 2016 to 2018. The 2011 estimate is extended backwards to 2007, and the 2018 estimate is extended forward to 2022. No estimate is made for 2023 or later.
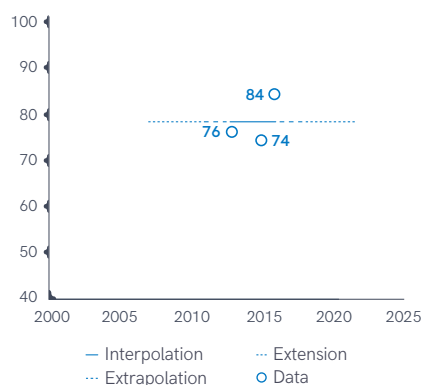
FIGURE **16**

Only one data point is available.

No interpolation or extrapolation is made. The 2017 estimate is extended backwards to 2013, and forward to 2021. No estimates are made for earlier or later years.

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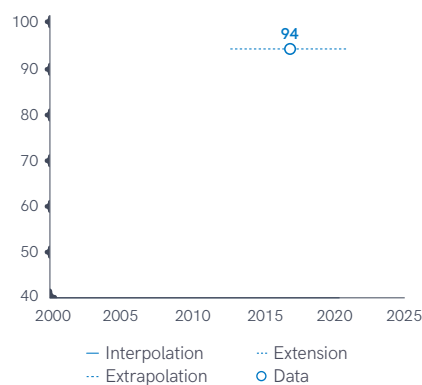
5.2.1 ADJUSTMENTS

Improved water or sanitation facilities is a subset of 'any facilities', so data on any facility (W_1 and S_1) should never be greater than improved water (W_2) or improved sanitation (S_2), respectively. Similarly, basic service is a subset of improved facilities, so data on improved facilities (W_2 and S_2) should never be greater than basic water service (W_5) or basic sanitation service (S_8), respectively. Because separate regressions are made for each of these indicators, and may draw on different sets of data, it is possible for these unrealistic situations to be estimated, in which case the JMP applies standard corrections. If the estimate for improved facilities exceeds the estimate for any facility, W_2 is set as equal to W_1, unless there are more datapoints for W_2, in which case W_1 is set as equal to W_2. If the estimate for basic service exceeds improved facilities, W_5 is set as equal to W_2. The same logic is used for sanitation. For hygiene, if the estimate for functional hand hygiene facilities with soap and water at points of care (H_2) is higher than the estimate for any hand hygiene facility (H_1), H_2 is set as equal to H_1, unless more datapoints are available for H_2, in which case H_1 is set as equal to H_2. If the estimate for basic hygiene service (H_6) exceeds the estimate for H_4 or H_5, H_6 is set as equal to the lower of H_4 or H_5.

JMP estimation rules may result in estimates that predate the establishment of a new country, area, or territory. Estimates are removed in such cases:

- No estimates are made for South Sudan before 2011
- No estimates are made for Montenegro before 2006
- No estimates are made for Timor-Leste before 2002.

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PRODUCING COUNTRY ESTIMATES |27

Country consultation

Every two years the JMP updates its global databases to incorporate the latest available national data for the global indicators. The JMP is committed to consulting national authorities on the estimates generated from national data sources through a country consultation process facilitated by WHO and UNICEF country offices. While the two agencies work together, WHO leads the consultation efforts for WASH in health care facilities and UNICEF leads the consultation for WASH in schools, which is typically conducted at the same time. The country consultation aims to engage relevant national stakeholders to review the draft estimates and provide technical feedback to the JMP team.

The purpose of the consultation is not to compare JMP and national estimates of WASH coverage but rather to review the completeness or correctness of the datasets in the JMP country file and to verify the interpretation of national data in the JMP estimates.

The JMP produces detailed guidance to facilitate country consultation on the estimates contained in JMP country files. A key resource is the "Data Summary" tab of the country file which lists the national sources of data which have been collected to date (see Annex 1). The consultation focuses on three main questions.[8]

a. Is the country file missing any relevant national sources of data on water, sanitation, hygiene, waste management and environmental cleaning in health care facilities that would allow for a better estimate?
b. Are the data sources listed considered reliable and suitable for use as official national statistics?
c. Is the JMP interpretation and classification of the data extracted from national sources accurate and appropriate?

For the purpose of global monitoring and comparison of countries, the JMP seeks to apply the same rules to all countries and for this reason some common requests from countries cannot be accommodated, including:

- to use national indicators instead of SDG global indicators for WASH in health care facilities;
- to assume that 100% of health care facilities have basic WASH services, if there are regulations or standards requiring basic (or higher) levels of service, without supporting data to verify compliance rates;
- to make provisional estimates based on partial datasets or small studies which did not meet the minimum threshold for data coverage required under the JMP rules described above; or
- to simply use the most recent data point, rather than producing modelled estimates based on all available data points within the reference period.

WHO and UNICEF endeavour to consult with all countries and respond to feedback received, and to give explanations in cases where JMP definitions or methods differ from those used or recommended by national stakeholders.

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8 The latest full country consultation guidance note can be found in multiple languages at https://washdata.org/how-we-work/jmp-country-consultation

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Producing regional and global estimates

Regional and global estimates for basic water, sanitation, hygiene, health care waste management and environmental cleaning services are published only when the population of countries, areas and territories (CATs) with data exceeds 30% of the regional or global population.[9]

To produce global estimates, as well as regional estimates for regions defined by geographical proximity, an imputation process is applied for countries lacking data for one or more of the WASH in health care facilities indicators (Table 2). Imputed total (national) estimates are not published and only used for calculating aggregated estimates.

Imputations are made by calculating population-weighted averages for different regional groups. If data are available from CAT in a given M49 subregion[10], all CATs in that subregion with missing data are assigned imputed values using the subregional population-weighted mean. If there are no CATs with data within a subregion, imputed estimates are generated using the M49 regional average. If no CATs in the M49 region have data, the global average is used for imputation (Table 7).

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9 A cutoff of 50% is used for basic WASH services in households. A lower threshold is temporarily set for health care facilities due to data scarcity for these new global indicators.

10 See https://unstats.un.org/unsd/methodology/m49/overview/ for lists of M49 regions and sub-regions

TABLE 7 Regional and subregional groupings used for the 2024 data update

Region	Number of countries, areas and territories	2023 population (millions)
Asia region	**50**	**4723**
Central Asia	5	77
Eastern Asia	7	1663
South-eastern Asia	11	681
Southern Asia	9	2008
Western Asia	18	294
Europe region	**49**	**742**
Eastern Europe	10	290
Northern Europe	14	107
Southern Europe	16	150
Western Europe	9	196
Latin America and the Caribbean region	**50**	**660**
Caribbean	28	44
Central America	8	179
South America	14	437
Northern Africa region	**7**	**260**
Northern Africa	7	260
Northern America region	**5**	**377**
Northern America	5	377
Oceania region	**23**	**45**
Australia and New Zealand	2	31
Melanesia	5	12
Micronesia	7	1
Polynesia	9	1
Sub-Saharan Africa region	**51**	**1167**
Eastern Africa	20	473
Middle Africa	9	196
Southern Africa	5	69
Western Africa	17	429
World	**235**	**7975**

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PRODUCING REGIONAL AND GLOBAL ESTIMATES | 29

Regional aggregates for regions that are not defined by geographic proximity (e.g. World Bank income groups) are calculated through simple population-weighted averages among all CATs with data, without any imputation.

Regional estimates are prepared for a number of different regional groupings. The 2024 update report included estimates for the global region, the SDG regions, and three thematic groupings: least developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing States (SIDSs). Estimates for the following regional groupings are currently available on the JMP website (www.washdata.org): World, SDG regions, LDCs, LLDCs, SIDSs, M49 regions, M49 sub-regions, WHO, UNICEF programme, UNICEF reporting, and World Bank income groups. In addition, JMP produces more detailed regional snapshots (in Excel) with various figures and analysis specific to listed regions and more.[11]

11 Regional snapshots can be accessed here: https://washdata.org/how-we-work/country-and-regional-engagement. Regional estimates for other regions can be provided by the JMP upon request (contact: info@washdata.org)

There are multiple steps in the process of calculating total (national), regional and global estimates for WASH in health care facilities, as described in this document. There could be a large degree of uncertainty in resulting estimates due to the uncertainty that is associated with each step of this process, including:

- **Individual data sources** may have sampling error due to sample size, non-sampling error due to missing populations such as the exclusion of private health care facilities from some EMIS, and ambiguous terms that are not easily comparable to other data sources.

- **National estimates** can have modelling errors around regression (see Box 1).

- **Regional estimates** may have errors due to low data coverage within the region.

- **Global estimates** may have errors due to imputation of estimates for countries with missing data.

Because of these multiple sources of uncertainty, the JMP doesn't produce confidence or uncertainty limits around its estimates.

Uncertainty is decreasing with each progress update as countries are harmonizing data collection activities, reducing ambiguity and filling data gaps. These improvements are reflected with new regression lines each time data is added. Each new progress update therefore supersedes the last.

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REFERENCES |31

JMP country files for WASH in health care facilities

JMP country files are created in Excel for water, sanitation, hygiene, waste management and environmental cleaning in health care facilities based on the scope and ambition of the SDG targets. The country files detail the data sources that are available in the JMP database, as well as the resulting JMP estimates. Country files are available for each country with data on the JMP website (https://washdata.org/data/downloads).

The following outlines each tab/sheet of the country files for WASH in health care facilities:
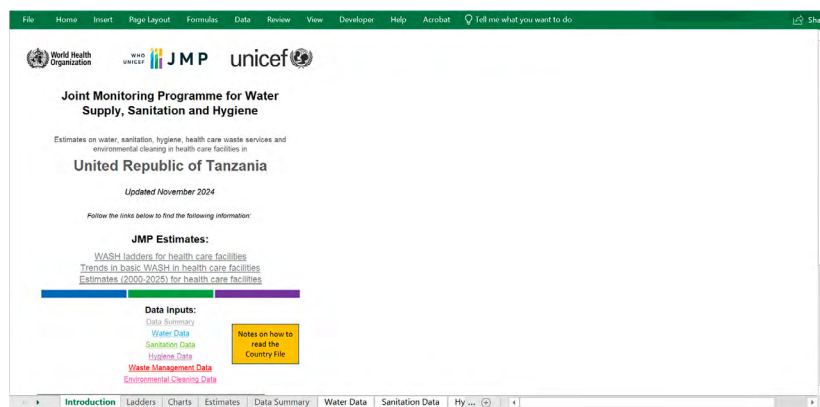
Introduction: The Excel spreadsheet has a series of tabs but for ease of reference the front page includes links to the key tabs.
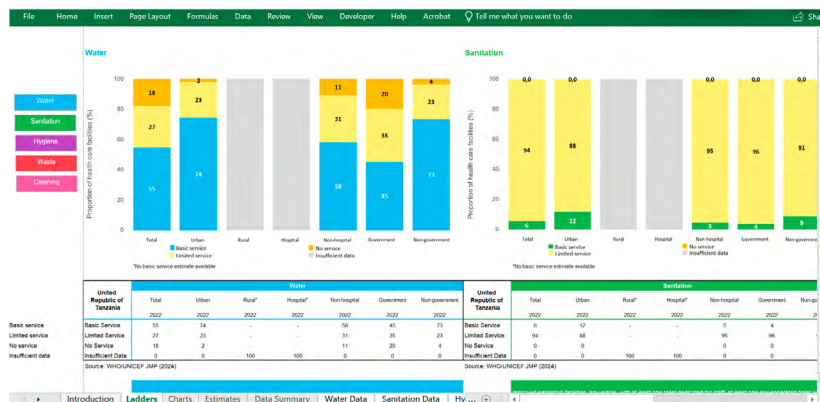
Ladders: This tab displays water, sanitation, hygiene, waste and cleaning 'ladders' used by the JMP for global monitoring purposes. The ladders show the latest total, urban, rural, hospital, non-hospital, government and non-government health care facility estimates. Summary estimates are tabulated below as they will appear in the statistical tables at the back of JMP progress reports on health care facilities.

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Charts: This tab includes charts showing estimated coverage trends for water, sanitation, hygiene, waste and cleaning services since the year 2000. These charts illustrate the JMP method of using a linear regression of available data points to generate estimates for a given reference year and highlight differences between estimates of 'improved,' which has been a common indicator used in the past, and estimates of 'basic' services.

Estimates: This tab provides estimated values for water, sanitation, hygiene, waste and cleaning services for all years possible from 2000 through the latest reference year. Estimates are provided for total, urban, rural, hospital, non-hospital, government and non-government health care facilities.

Data Summary: This tab provides a comprehensive list of all national data sources included in the country file in chronological order. It shows which sources are used for the calculation of different indicators, and the type of data source (HMIS, survey, census or other). Values in the database that are not used to produce estimates are indicated with square brackets. For more detailed information see the 'Water data', 'Sanitation data', 'Hygiene data', 'Waste Management Data' and 'Environmental Cleaning Data' tabs.

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IN HEALTH CARE FACILITIES

Water, Sanitation, Hygiene, Waste Management and Environmental Cleaning Data tabs: These tabs include details on each data source for water, sanitation, hygiene, waste and cleaning (respectively) in health care facilities, including original definitions and assumptions made. These tabs include notes detailing how the data have been extracted, recorded and used in the country file.

Guidance: This tab provides a summary and outline of the country file while presenting useful and short guidelines on how to navigate in and use the document.

In addition to above listed tabs, there are hidden tabs ("Chart Data" and "Regressions") in the country file feeding the visible tabs which are more user friendly. "Chart Data" hidden tab is a copy of the "Data Summary" tab with unused (bracketed) data removed from estimations. "Regressions" hidden tab is the source of data in "Estimates" tab (See Annex 2 for the variable names and definitions in "Regressions" tab, row 13). The formulas in visible tabs can be used to trace the data source of those tabs and hence the name of the hidden tab. Hidden tabs could be used by data analysts as they are in raw data format and cleaner for data analysis purposes.

A statistical analysis software package (Stata) imports data from the "Population" sheet and the "Chart Data" sheet for all the countries/areas/territories where data are available and runs the estimation model. The resulting estimates are exported back to each country file in a hidden "Regression" sheet, which in turn feeds the "Estimates" tab where estimates from 2000 to the reference year are produced for the full set of indicators. The "Estimates" tab, together with the hidden "Chart data" tab, is used to create all the charts and the ladders at country level.

Figure A1.1 summarizes the relationships between the different tabs in the country file.

FIGURE **A1.1** Data flows in the JMP country file for WASH in health care facilities

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DATA FLOWS IN THE JMP COUNTRY FILE
FOR WASH IN HEALTH CARE FACILITIES | 35
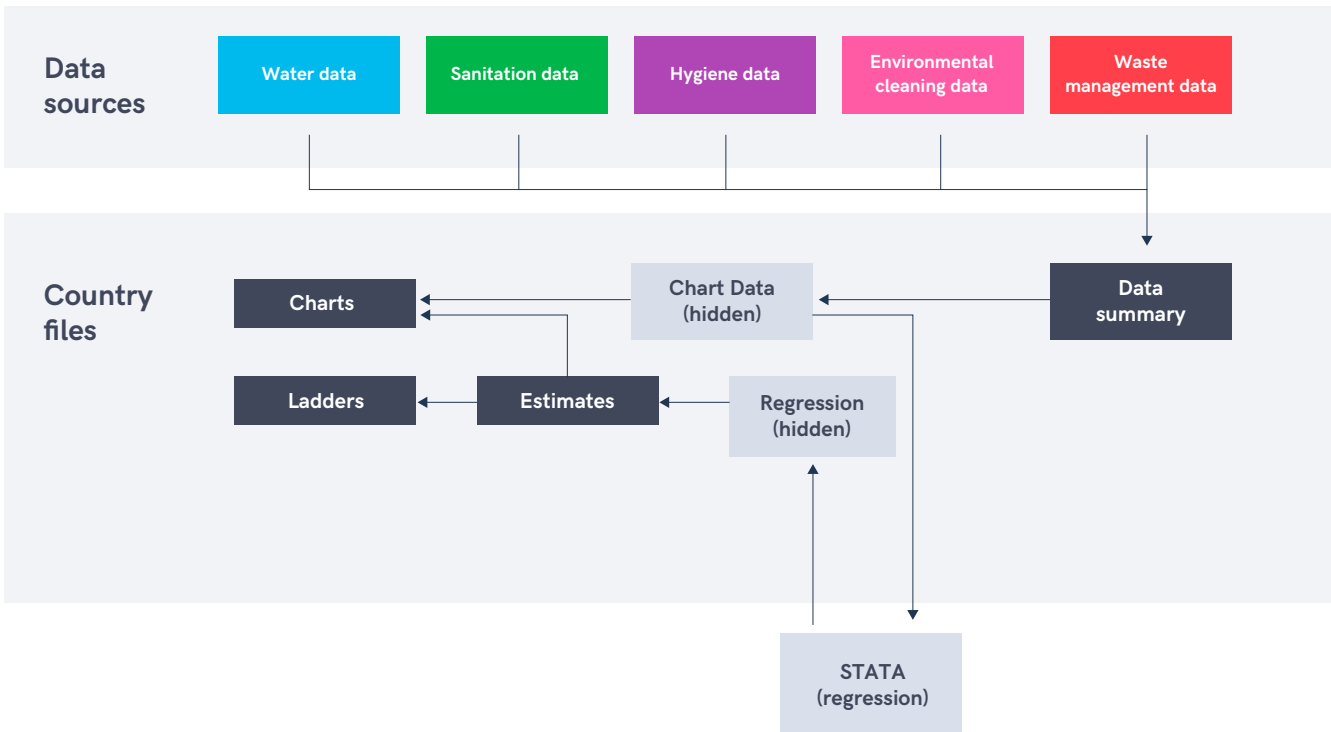
Variable IDs, names and definitions

TABLE A2.1 Variable IDs, names and definitions used in JMP country files

	Variable ID	Variable name in country file*	The proportion of health care facilities with…
Water	W_1	wat_fac	any water source
	W_2	wat_imp	an improved water source
	W_3	wat_imav	an improved water source from which water is available
	W_4	wat_imop	an improved water source located on premises
	W_5	wat_bas	an improved water source located on premises, from which water is available (basic water service)
	W_6	wat_lim	limited water service
	W_7	wat_ns	no water service
Sanitation	S_1	san_fac	any sanitation facility
	S_2	san_imp	improved sanitation facilities
	S_3	san_ius	improved sanitation facilities which are usable
	S_4	san_idw	improved sanitation facilities which are dedicated for staff
	S_5	san_imh	improved sanitation facilities with sex-separated toilets
	S_6	san_ids	improved sanitation facilities with menstrual hygiene facilities
	S_7	san_imo	improved sanitation facilities accessible for users with limited mobility
	S_8	san_bas	improved and usable sanitation facilities, with at least one toilet dedicated for staff, at least one sex-separated toilet with menstrual hygiene facilities, and at least one toilet accessible for users with limited mobility (basic sanitation service)
	S_9	san_lim	limited sanitation service
	S_{10}	san_ns	no sanitation service

* Variables representing the estimates resulting from regression have long stubs: "wat", "san", "hyg", "clean", and "wman". Variables representing data inputs from individual data sources have short stubs: "w", "s", "h", "cl", and "wm".

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	Variable ID	Variable name in country file*	The proportion of health care facilities with…
Hygiene	H_1	hyg_fac	any hand hygiene facility
	H_2	hyg_bsw	functional hand hygiene facilities with soap and water at points of care
	H_3	hyg_alc	functional hand hygiene facilities with alcohol-based handrub at points of care
	H_4	hyg_bwa	functional hand hygiene facilities with alcohol-based handrub and/or soap and water at points of care
	H_5	hyg_toi	functional hand hygiene facilities with soap and water within five metres of toilets
	H_6	hyg_bas	functional hand hygiene facilities available at one or more points of care and within 5 metres of toilets (basic hygiene service)
	H_7	hyg_lim	limited hygiene service
	H_8	hyg_ns	no hygiene service
Environmental cleaning	C_1	clean_mea	cleaning measures in place
	C_2	clean_wpp	written policies and protocols for cleaning
	C_3	clean_tnh	non-health care providers with cleaning responsibilities trained on cleaning
	C_4	clean_th	health care providers with cleaning responsibilities trained on cleaning
	C_5	clean_bas	protocols for cleaning, and staff with cleaning responsibilities have all received training on cleaning procedures (basic environmental cleaning services)
	C_6	clean_lim	limited environmental cleaning service
	C_7	clean_ns	no environmental cleaning service
Health care waste management	WM_1	wman_fac	any health care waste segregation or treatment
	WM_2	wman_seg	health care waste segregated in consultation areas
	WM_3	wman_inf	infectious waste treated and disposed of safely
	WM_4	wman_sha	sharps waste treated and disposed of safely
	WM_5	wman_trd	sharps and infectious waste treated and disposed of safely
	WM_6	wman_bas	health care waste safely segregated in consultation areas and sharps and infectious waste treated and disposed of safely (basic health care waste management services)
	WM_7	wman_lim	limited health care waste management service
	WM_8	wman_ns	no health care waste management service

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