

# WHO Data hub

Evidence and Intelligence for Action in Health Department

Pan American Health Organization / World Health Organization

Thiago Hernandes Rocha

**PAHO**



Pan American  
Health  
Organization



World Health  
Organization  
REGIONAL OFFICE FOR THE  
Americas

# WHO Data HUB

As the custodian of global health data, WHO must develop, uphold and ensure high global standards of data collection, processing, synthesis and analysis. This normative role of WHO is essential to ensuring the timeliness, reliability and validity of measurements, ensuring comparability of data and allowing the world to track trends, progress and impact.

## Governance

[WHO data principles](#) >

[WHO data policy](#) >

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## World Health Data Hub

[Country Portal](#) >

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<https://data.who.int/about>

### Age-standardized mortality rate attributed to household and ambient air pollution (per 100 000 population)

Official estimate updated 8 January 2024

[Overview](#) [Metadata](#)

#### Age-standardized mortality rate attributed to household and ambient air pollution (per 100 000 population)

Burden of disease attributable to joint effects of household and ambient air pollution, (SDG 3.9.1)

Total  Female  Male

Country  Year

#### Argentina, Total

2019

Disaggregating dimension	deaths per 100k, 2019
Female	23
Male	38.7
Total	29.7

#### Countries

2019

Country	deaths per 100k, 2019
Finland	7.4
Norway	7.9
Sweden	8.1

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The Data Lake acts as the focal point for all components of the World Health Data Hub creating a foundation to leverage the wealth of data stored in the Data Lake through automation and customization built specifically for WHO's data needs.

Acquisition of data is made simple through the use of a Low Code / No Code solution, allowing data managers to connect to any data source, transform data and store the results in the Data Lake. The drag-drop-configure paradigm is easy to learn enabling data managers to focus more on data transformations. Once complete, transformations can be scheduled to automate the data acquisition / data refresh processes, eliminating repetitive manual tasks.

### Secure by design

The hosting environment is built to conform to WHO's security requirements. Data managers leveraging the platform automatically benefit from this customized implementation, ensuring compliance and security for their data assets.

### Made to scale

The data hosting environment can securely store unlimited volumes of data while offering stellar performance.

### Automation

WHO's data teams can automate tedious and time-consuming tasks like data acquisition, cleansing and formatting using simple and powerful no code tools. Scheduling of pipelines allows the unattended execution of transformations according to a flexible schedule.

### Data landscape

Teams are able to move directly from acquiring and storing unstructured data sets and files, to exploring, understanding and running analysis and visualizations. Advanced tooling allows WHO's data science teams to make sense of their data in new ways.

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### Objective

Applying data science to WHO's data assets is an absolute necessity. Data science, artificial intelligence and/or machine learning patterns can all be applied to real life applications aimed at creating sophisticated data models, inferring new insights from raw data, or deriving predictions across complex datasets. While these core technologies have existed for a number of years, the use of cloud environments has proven to be a perfect adaptation for the complexities of advanced data projects.

### Ease of use and collaboration

The Collaborative Research Environment allows WHO's data scientists to work transparently as a team with shared Jupyter notebooks using built-in support for popular open-source frameworks and libraries. This environment provides maximum productivity leveraging a state-of-the-art environment, easy computing and simplified notebook editing.

### Open environment

The Collaborative Research Environment embraces open standards and accelerates developments through the use of familiar tools and access to thousands of existing scripts and libraries, in R and Python, through familiar software interfaces like Rstudio.

### Scalability and performance

The Collaborative Research Environment can accommodate even the most demanding workloads thanks to the elasticity of a cloud-based solution. It also allows the easy deployment of patterns and models for unattended execution.

### Seamlessly integrated

The Collaborative Research Environment is customized and integrated with other components and solutions within the World Health Data Hub suite – providing an actionable, long-term, end-to-end solution for data initiatives without the need for additional installation, configuration or tuning required of typical data science environments.

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**xMart is a mature custom-built data harmonization platform, designed by WHO data managers for WHO data managers.**

The xMart system facilitates bulk data loads from Member States into data models optimized for analysis and dissemination via data.who.int. Data in xMart maintains a high standard of data integrity and quality through numerous features such as reference code list validation, custom business rules, preview before commit, and automated issue reporting. Finally, data housed in xMart can be easily shared with the public via a high-performance OData API.

### Data model creation

Health programmes can create a centralized global data model, integrated with reference data and optimized for analysis. xMart produces a physical database table that can then be connected to and from external applications, such as data visualization systems. Every table created in xMart is also accessible as an OData API endpoint.

### Previewing before committing

Before new data is loaded, xMart automatically determines the delta; it shows which records are new, updated, or unchanged, and which specific values have changed in those records. This preview gives data managers a chance to review changes to their database before they commit those changes, making it easy to maintain data quality and integrity.

### Pipelines

xMart pipelines support a rich collection of data extraction and transformation commands to load data into a centralized model from a variety of sources, such as Excel, text files, web connections, other databases and even Zip files. Operations such as parsing json are supported for all source types. In addition, if data is loaded from multiple Excel tabs or from multiple sources, it is possible to cross reference the data before writing it to the mart.

### Data standardization

One of the key features of xMart is the ability to standardize the data. This means that if, for example, data arrives in many languages, it is possible to link all the different versions to the same record. One great advantage of this is that the data can be easily translated from one language to another when it is being displayed.

# WHO GIS Centre for Health



## Geospatial analytics

Supporting geospatial data and analytics to improve compliance and stewardship with WHO Standard Operating Procedures for maps and Web GIS applications.



## Capacity building

By increasing the efficient use of GIS by Member States and partners and strengthening country data, regional data, analytics and health information systems' capacity to meet demands.



## Partnerships and collaboration

By augmenting timely assistance and expertise through a network of UN agencies and trusted geospatial partners.



## Geospatial culture

By promoting a geospatial culture and community of practice; providing training and technical expertise in innovative technology.



## GIS infrastructure

The GIS infrastructure is based on ArcGIS Enterprise (ArcGIS Web Adaptor, Portal for ArcGIS, ArcGIS Server and ArcGIS Data Store). The [Esri Enterprise Agreement](#) with WHO renders licenses available at all three levels of the organization. Additionally, [Esri](#) provides grants to Ministries of Health from low resource countries for ease of collaboration.



# WHO GIS Centre for Health

Timely and reliable decisions save lives



# WHO GIS Centre for Health

## Services offered to countries and partners

### GIS software hub

WHO hosts GIS software (ArcGIS and QGIS) for use by countries, partners and WHO staff. In 2017, WHO signed an [Esri](#) Enterprise Agreement to make the ArcGIS software available to WHO staff and provides access to QGIS to all countries and partners. WHO also facilitates the Esri Health and Human Services grant program to provide free software licenses for 2 years to 75 low-and middle-income countries.

### Geolocated Health Facilities Data initiative

Measuring the availability and the physical access to health services is a prerequisite to understand the performance of health systems and their ability to deliver impact. Up-to-date geospatial databases can maximize the strategic and accurate location of health facilities, their accessibility to the population in need, and the supply chain of essential services and medicines.

### Satellite imagery support

Many of the hardest-to-reach populations live in rural areas lacking detailed maps, thus challenging the health careworker outreach. In this case, satellite imagery becomes a critical tool to rapidly discover remote areas often undetected on the ground. The UN Space Charter provides WHO with unique access to satellite imagery, and WHO supports the processing and delivery of this imagery to countries.

### Geospatial datasets

Population datasets in relation to geographic boundaries and health facilities are essential for geospatial analytics. For example, this data helps us understand who is living where, various population densities, the number of people in various age groups, urban/rural settings, economic stratification, and other social and demographic characteristics. WHO supports countries and partners in collating the baseline population.

### Mobile field data collection tools

Mobile GIS tools collect location data and improve data quality through rules and semantic integrity.

WHO provides tools ( [ODK](#), [Kobo](#) and [ArcGIS Survey123](#)) and technical assistance to countries and partners.

### Volunteered geographic information

Volunteered geographic information is information collected by users roving the surface of the Earth. Often unnoticed, this contribution consists of content in various geographic locations around the world. Mapathons are crowd-sourced activities to identify built-up structures to support public health responses.

### Map standards and services

Maps must be produced in compliance with legal standards.

WHO provides support to countries and partners with tailored cartographic maps required for fieldwork, analytics, reports and publications in print and digital formats.

### Training and capacity building

Training in GIS and remote sensing software is offered to strengthen country and partner capacity. This enables efficient field data collection using GIS apps, storing, management, analysis, reporting and the use of geospatial data.



# WHO GIS Centre for Health

## Welcome to the GIS Centre Hub!

Connecting maps, apps, data, and people.

We are your comprehensive source for GIS software, crucial datasets spanning administrative, health, and baseline geospatial information, as well as extensive training and staff development programs. Empowering every World Health Organization program, we are the go-to repository for all your needs.

## Map Request

Submit a map request for custom, high-quality maps tailored to your project needs and specifications.

[Request a Map](#)

## Administrative Boundaries

Download WHO-approved administrative boundaries for accurate spatial analysis and mapping in your projects.

[Download Boundaries](#)

## ArcGIS License Request

Easily request licenses for ArcGIS products to support your geospatial work. Our team will process your request promptly.

[Request License](#)

## GIS Training

Enhance your GIS skills with webinars and training materials. Access tutorials on ArcGIS, QGIS, and more.

[Access Training](#)

## Open Office Hour

Join our open office hour every Thursday at 3:30 PM CET to get help from GIS specialists on queries or capacity development questions.

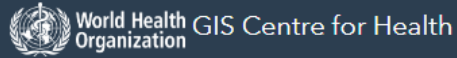
[Join Office Hour](#)

## Publications

Explore our publications, including reports, case studies, and research papers created by the WHO GIS Centre for Health.

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# WHO GIS Centre for Health



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## WHO Global Geodatabase

Search, Visualize and Download

### About this site

This site hosts the WHO administrative boundaries at country level and health boundaries at sub national level which can be visualized, searched, filtered and downloaded through various data formats.

The WHO global geodatabase is a spatial dataset containing administrative, health and other baseline information which could be potentially used by various programs within world health organization. Some of the datasets can be used publicly like to country boundaries whereas the other datasets are primarily designed to be used within WHO. Apart from the global geodatabase there are pre-designed and pre-configured base-maps which can be used as a canvas for interactive web maps or other online applications. The primary purpose of these base-maps is to give relief and topography backdrop along with country boundaries and major cities with appropriate labeling. These base-maps are alternative to Bing, OSM, google earth or others which does not adhere to WHO legal guidelines.

### Detail Boundary files download page.

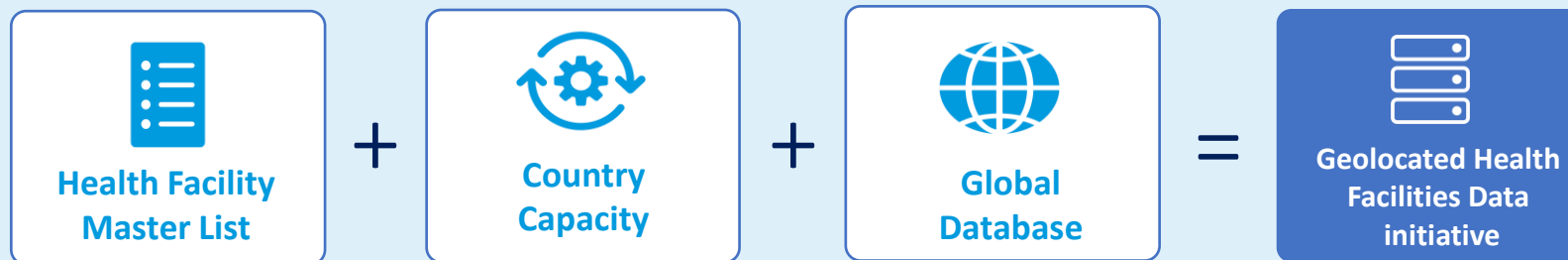
You can search, visualize, and download Detail Boundaries from this page. Various formats of total data or subset of data is available in excel, csv, shapefile, geodatabase, or as API services from this page.

[Download Boundaries](#)

# The GHFD Initiative Activities

## The GHFD initiative serves to:

- Help countries develop a single HFML that is digitized, geolocated, regularly updated, and made accessible by the Ministry of Health (MOH).
- Strengthen the technical capacity of MOHs across levels to ensure the availability, quality, accessibility, and use of HFMLs.
- Establish a global database that houses HFML data from country lists that are managed and maintained by the MOH.



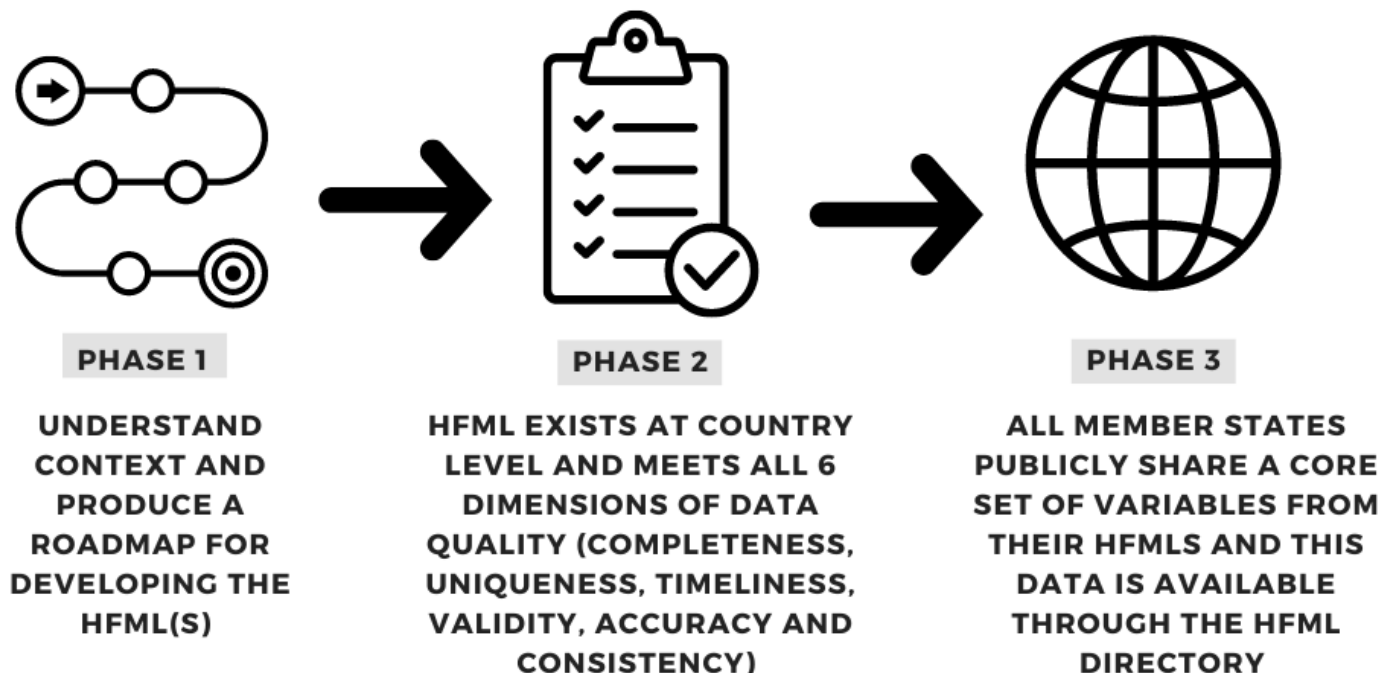
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# GHFD Coordination Structure

Together, let's transform the capacity and effectiveness of Ministries of Health by turning a global gap into a global public good.

For more information, visit <https://www.who.int/data/GIS/GHFD>

## GHFD IMPLEMENTATION PROCESS





**Thank  
you**