

Data Release Notes

Name of the dataset	GRID3 COD - Health Facilities v7.0
Name of the file	<i>GRID3_COD_health_facilities_v7_0.gpkg</i>
Date of data release	October 9, 2025
File format	OGC Geopackage
Dataset version	7.0
Abstract	<p>This document outlines the methodology and data sources used during the production of the <i>GRID3 COD - Health Facilities v7.0</i> dataset. The dataset consists of health facility points with name, location, health zone, and health area, among other attributes, for twenty two provinces in the Democratic Republic of the Congo (COD). Limitations and use constraints are provided.</p> <p>The current version supersedes the GRID3 COD - Health Facilities v6.0. The following changes were made:</p> <ul style="list-style-type: none"> • Added data for the provinces of Equateur, Nord-Ubangi, Sud-Kivu
Dataset citation	Center for Integrated Earth System Information (CIESIN), Columbia University, Ministère de la Santé Publique, Hygiène et Prévention, Democratic Republic of the Congo, and GRID3. 2025. GRID3 COD - Health Facilities v7.0. New York: Columbia University. https://doi.org/10.7916/sh27-rp38 . Accessed <DAY MONTH YEAR>.
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Data license	The data and accompanying document are licensed under a Creative Commons Attribution 4.0 International License, CC BY 4.0 (http://creativecommons.org/licenses/by/4.0) and specified in legal code (http://creativecommons.org/licenses/by/4.0/legalcode).
Contacts and data queries	The authors of this dataset appreciate feedback regarding the data, including suggestions, discovery of errors, difficulties in using the data, and format preferences. For dataset-related questions, please send an email to: info@ciesin.columbia.edu

I. Data inputs / methodology

To create this dataset, CIESIN designed a consistent data schema and methodology to harmonize information from twenty two provinces, organized into ten groups. These groups are based on the order in which the original data were collected, though the sequencing may not be consistent across all groups.

- Province group 1: Haut-Katanga, Kasai, Kasai-Oriental, Kinshasa, and Lomami
- Province group 2: Haut-Lomami (updates) and Tanganyika
- Province group 3: Ituri and Kwilu
- Province group 4: Maniema
- Province group 5: Kasai-Central
- Province group 6: Tshopo and Mongala
- Province group 7: Haut-Katanga, Kasai, and Kasai-Oriental; Sankuru
- Province group 8: Kongo-Central
- Province group 9: Lualaba, Mai-Ndombe, Sud-Ubangi, Tshuapa
- Province group 10: Equateur, Nord-Ubangi, Sud-Kivu

Province Group 1: Haut-Katanga, Kasai, Kasai-Oriental, Kinshasa, and Lomami

From January to July 2021 with the support of provincial and national health authorities, local healthcare workers (“head nurses”, “health zone management staff”, and “head doctors of the health zones”) and GRID3 GIS specialists (“mappers” and “provincial coordinators”) engaged in a participatory mapping process in Haut-Katanga, Kasai, Kasai-Oriental, Kinshasa, and Lomami. This mapping process occurred at the level of the health zone (an operational unit made up of approximately 15-20 health areas).

Mappers were deployed to health zones in teams of two for approximately nine days where they trained the health area head nurses on data collection using the Geospatial Tracking System (GTS), an Open Data Kit (ODK)-based application. The head nurses routinely work in their respective areas and have a good understanding of the health facilities, settlements, and points of interest (POIs, such as schools and religious centers) within their health areas.

While the head nurses collected data, the GRID3 mappers worked with the health zone management team to validate and modify data from the field. After all data were collected, cleaned, and integrated into final geospatial layers, the health zone head doctor validated the preliminary data.

From July 2021 through October 2022, the mappers and provincial coordinators worked with CIESIN staff to consolidate the data and address inconsistencies found in the data (e.g. spelling errors, accuracy issues, duplicates, etc). These data were used to produce basemaps at the health area level that were shared back with each health zone and province authorities for a second round of validation.

From November through January 2022, the in-country GIS team worked with CIESIN staff to integrate these corrections into a final geodatabase.

This work was also done with the participation and supervision of the Direction du Système National d'Information Sanitaire (DSNIS). The Agence Nationale d'Ingénierie Clinique, de l'Information et de

l'Informatique de Santé (ANICiiS) also played an important role in the area of data governance. This work was part of the GRID3 Mapping for Health project.

Province Group 2: Haut-Lomami and Tanganyika

Haut-Lomami and Tanganyika health facility data were originally created through an extensive fieldwork exercise spanning July to September 2019; and supplemented with additional data from the National Malaria Elimination Programme in the DRC (PNLP). Some additional fieldwork, specifically focusing on hard-to-reach settlements, was implemented by Acasus and the PEV as part of the polio special strategies in 2024

Phase 1: 2019 Field data collection

With the support of provincial and national health authorities, local healthcare workers and GRID3 GIS specialists engaged in a participatory mapping process in Haut-Lomami and Tanganyika from July to September 2019. This mapping process occurred at the health zone level.

Mappers deployed to the health zones organized participatory mapping meetings with local healthcare workers, and trained head nurses to collect settlement, health facility, and other points of interest in their respective health areas using an ODK-based smartphone application. Mappers then used this information to delineate health area boundaries. These data were then sent back to CIESIN for additional quality checks.

Phase 2: Data integration

The data collected in the field proved to be highly accurate and nearly complete when compared to the master list of health facilities managed by the DSNIS. To ensure 100% completion, CIESIN integrated a few points provided by data providers such as Acasus, PROSANI, and WHO.

Phase 3: Data updates from 2024 - 2025

In 2024, GRID3 collaborated with the Gates Foundation and partners—including the Expanded Programme on Immunization (EPI), Acasus, PATH, VillageReach, UCLA, and KESP—on a targeted polio vaccination initiative. This effort aimed to systematically reach children in remote and hard-to-access villages who were frequently missed by routine immunization activities. As part of the initiative, GPS data was collected in these underserved areas—many of which had not been previously included in microplans. This effort not only improved immunization targeting but also enabled the completion of the national settlement database by filling in critical geographic gaps. While collecting settlements was the primary objective of the fieldwork conducted by the PEV and Acasus, some missing health facility data was also collected or digitized with the help complete cartography. The PEV Acasus data was integrated by GRID3 in February 2025.

Table 1: Data sources

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Programme de Santé Intégré de l'USAID en la République Démocratique du Congo (PROSANI USAID)	Tabular	2018-2020	PROSANI USAID
Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP)	Spatial points	2019	CIESIN MSPHP
Programme Elargi de Vaccination (PEV) and Acasus	Spatial points	2019-2024	PEV Acasus
Bluesquare (compiled by)	Spatial points	2022	BLSQ
GRID3, Programme Elargi de Vaccination (PEV) and Acasus	Spatial points	2024	GRID3 PEV Acasus

Province Group 3: Ituri and Kwilu

In Kwilu, the data were verified through fieldwork organized in October 2022. Two GRID3 mappers traveled to Kikwit and Bandudu, respectively, to present the cartographic improvements driven by the use of the PNL data and to verify that the boundaries were correctly delineated. The majority of this work was carried out in collaboration with both antenna and provincial level staff.

In Ituri, the data were verified through fieldwork also in October 2022. Four GRID3 mappers traveled to Bunia and Aru, respectively, to validate the health area boundary data in all health zones. GRID3 mappers worked with local health teams, where boundary layers were validated and edited.

All data modifications from both provinces were sent back to CIESIN for final verification before publication. CIESIN ensured that the final layers were free of spelling and topological errors.

Table 2: Data sources

Acronym	Source Name	Kwilu	Ituri
PEV Acasus	Programme Elargi de Vaccination (PEV) and Acasus	X	X
BLSQ	Bluesquare	X	
DSNIS	Division du Système National d'Information Sanitaire (DSNIS)	X	X

Acronym	Source Name	Kwilu	Ituri
CIESIN MSPHP	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP)	X	X
ESPK	Ecole de Santé Publique de Kinshasa (ESPK) / Enquête de Couverture Vaccinale (ECV)		X
OMS DSNIS	Organisation Mondiale de la Santé (OMS) and Direction du Système National d'Information Sanitaire (DSNIS)		X
PNLP IMA	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health	X	
PNLTHA UCLA	Programme National de Lutte contre la Trypanosomiase Humaine Africaine (PNLTHA) / Programme de Recherche et de Formation en Santé, University of California, Los Angeles (UCLA)	X	
OMS ISS	Organisation Mondiale de la Santé (OMS) / Supervision Formative Intégrée (ISS)	X	

Province Group 4: Maniema

The Maniema data were created through an extensive fieldwork data collection conducted by the Kinshasa School of Public Health (Ecole de Santé Publique de Kinshasa, ESPK) and supplemented with additional data from the Elongated Programme for Immunization (EPI/PEV) collected as part of their routine surveillance/ monitoring; as well as fieldwork supported by the Centers for Disease Control (CDC) and CIESIN in 2023.

Table 3: Data sources

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Programme Elargi de Vaccination (PEV) / Acasus	Spatial points	2019-2023	PEV Acasus
Ecole de Santé Publique de Kinshasa (ESPK) / Enquête de Couverture Vaccinale (ECV)	Spatial points	2020 - 2022	ESPK

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Fieldwork data collected by the Programme Elargi de Vaccination (PEV) in collaboration with the Centers for Disease Control (CDC) and CIESIN	Spatial points	2023	PEV CDC CIESIN
Health facility data from the DHIS2	Tabular	2023	DSNIS
Fieldwork data collected by the Kinshasa School of Public Health (ESPK) in collaboration with GRID3 and CIESIN.	Spatial points	2024	ESPK GRID3 CIESIN

Phase 1: Data integration

In 2022-2024, CIESIN received health facilities data from the PEV/ Acasus, PEV/ CDC, and ESPK ECV. These datasets were assembled and explored, cleaned, and matched against existing microplans from Maniema, from prior years and DHIS2’s list. The combined data sets created the list of health facilities to collect during fieldwork.

Phase 2: Field data collection and data processing

ESPK with the support of provincial and national health authorities, local healthcare workers and GRID3 GIS specialists engaged in data collection from October 2023 to January 2024. Teams of enumerators were deployed to each health zone, and liaised with local authorities and local health workers to collect health facility’s names and geographic points using an ODK-based application. These data were then sent back to CIESIN for processing, integration, and quality checks.

Province Group 5: Kasai-Central

A comprehensive geospatial survey was conducted by ESPK between March and May 2024 in collaboration with GRID3 and partners. The survey team collected names, geospatial locations, and relevant attribute information of health facilities that conform the network of health service points in the Kasai-Central province.

Table 4: Data sources

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Fieldwork data collected by the Kinshasa School of Public Health (ESPK) in collaboration with GRID3 and CIESIN.	Spatial points	2024	ESPK GRID3 CIESIN

CIESIN proceeded with data processing, integration, and harmonization steps to create a clean health facilities dataset. Data processing steps include standardization of health facility names and types, as well as clustering to detect anomalies in spatial accuracy and/or attribute information. Visual inspection using Maxar’s satellite imagery (2022-2024) was conducted when relevant.

A consistent data schema prioritizing information preservation was also developed to include data fields as per common use cases. A standardized data schema will enable seamless integration across subsequent versions of GRID3 health facility datasets in the DRC. Common generalized values were created for all fields and the original values in each dataset were mapped to these.

Province Group 6: Tshopo and Mongala

A comprehensive geospatial survey was conducted by ESPK between March and May 2024 in collaboration with GRID3 and partners. Similar as in Maniema, the CIESIN team assembled a baseline, and the survey team collected names, geospatial locations, and relevant attribute information of health facilities in collaboration with health authorities in Tshopo and Mongala.

Table 5: Data sources

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Programme Elargi de Vaccination (PEV) / Acasus	Spatial points	2024	PEV ACASUS
Health facility data from the DHIS2	Tabular	2024	DSNIS
Fieldwork data collected by the Kinshasa School of Public Health (ESPK) in collaboration with GRID3 and CIESIN.	Spatial points	2024	ESPK GRID3 CIESIN

Phase 1: Data integration

CIESIN extracted, cleaned, and harmonized health facility locations and names contained in the PEV Acasus dataset and matched it against DHIS2 records in order to identify potential data gaps to be completed during fieldwork. We utilized this preliminary dataset as the baseline.

Phase 2: Field data collection and data processing

A comprehensive geospatial survey was conducted by ESPK between March and May 2024 in collaboration with GRID3 and partners. The survey team collected names, geospatial locations, and relevant attribute information of health facilities that conform to the network of health service points in the Tshopo and Mongala provinces.

CIESIN conducted data processing, integration, and harmonization to create an enhanced health facilities dataset. Data processing steps included standardization of names and types, as well as clustering to detect anomalies in spatial accuracy and/or attribute information. Visual inspection using satellite imagery was conducted as needed.

Phase 3: Data validation and further data processing

Between October and November 2024, a team of GRID3 mappers returned to the field to present preliminary outputs of the data collected in the first half of 2024. Provincial workshops with local health authorities were conducted. Data gaps and corrections in some health zones were completed during this round, as security concerns prevented fieldwork to take place in those areas.

Both GRID3 and CIESIN conducted further data processing, integration, and harmonization of data corrections received from the field. A consistent data schema prioritizing information preservation was followed to include data fields as per common GRID3 protocol.

Province Group 7: Haut-Katanga, Kasai, Kasai-Oriental (updates and Sankuru).

The following data sources were used to update previously released data in Haut-Katanga, Kasai, Kasai-Oriental Provinces, and to add health facility data in Sankuru Province.

Table 6: Data sources

Source Name/ Description	Data Type/Format	Input Data Year
Field data collected as part of routine Health Center Supervision (HCS) performed by the Elongated Programme of Immunization (EPI/PEV) and Acasus. Includes instances of settlement names and points of interest (POI) data collected in hard-to-reach areas.	Spatial points	2018- 2024
GRID3 COD - Health Facilities v3.0	Spatial points	2024
GRID3 COD - Haut-Katanga - Health Facilities v1.1L	Spatial points	2024
Field data collected between March and May 2024 by GRID3 mappers.	Spatial points	2024
Health Facilities database from DHIS2, downloaded in October 2024.	Tabular	2024 ¹

¹ The download date was used as the input date, although the data compiled in DHIS2 includes references spanning an extended period.

A data gap analysis was conducted in Haut-Katanga, Kasai, and Kasai-Oriental to guide fieldwork plans in these three provinces using existing data from 2021–2022. The Sankuru data collection, completed by GRID3, was incorporated through extensive fieldwork and further supplemented with additional data from the PNLP.

Phase 1: Data Pre-processing

GRID3 supported pre-fieldwork activities to identify health facilities listed in the 2024 DHIS2 database but missing geographic coordinates and/or other relevant information within existing datasets. For this purpose, GRID3 consolidated and processed data records available from the [GRID3 COD - Health Facilities v3.0](#), the GRID3 COD - Haut Katanga - Health Facilities v1.1L, and Health Center Supervision (HCS) data collected monthly between 2018 and 2024 by supervisors from the *Equipe Cadre de la Zone de Santé* (ECZS) and the Expanded Programme on Immunization (EPI/ PEV).

Phase 2: Field Data Collection

GRID3 mappers conducted fieldwork in Haut-Katanga, Kasai, and Kasai-Oriental (March–May 2024) and in Sankuru (July–September 2024) to collect geographic locations, names, and other relevant information about health facilities. In Sankuru, GRID3 used the *Canevas Annuel* application developed by Bluesquare in collaboration with the DSNIS, alongside the GTS tool, to complete data collection. Priority was given to facilities with no prior data, especially those in hard-to-reach or challenging terrain. Special attention was paid to documenting the status of vaccination services provided by health centers (i.e., fixed, outreach, or mobile) and collecting missing information about community-based health sites (SSCs).

Additionally, field data collected by GRID3 and EPI’s local health teams between June and October 2024 were processed and consolidated by GRID3. Comprehensive sanity checks and spatial consistency controls were implemented, with regular consultations with field teams to resolve data conflicts and ambiguities.

Phase 3: Data Integration and Quality Checks

CIESIN conducted rigorous quality checks to ensure consistency in geographic locations and attributes across the spatial data layers for all four provinces. All data were standardized to conform to the predefined GRID3 data schema, facilitating integration with previously released health facility datasets. Maxar/ESRI satellite imagery was used for random visual inspections to address ambiguities and resolve inconsistencies when feasible.

Province Group 8: Kongo-Central

Table 7: Data sources

Source Name/ Description	Data Type/ Format	Input Data Year	Source Acronym
Programme Elargi de Vaccination (PEV) and Acasus	Spatial points	2019-2024	PEV Acasus
Direction du Système National d’Information Sanitaire (DSNIS)	Tabular	2024	DSNIS

Phase 1: Data integration and processing

CIESIN cleaned and pre-processed all data inputs to ensure consistency and remove erroneous entries. Cleaned data points were matched against the list of health facilities as per the DHIS2. Further data processing steps include standardization of health facility names and types, as well as clustering to remove spatial duplicates and to detect anomalies in spatial accuracy and/or attribute information. Visual inspection was conducted using satellite imagery when relevant.

Province Group 9: Lualaba, Mai-Ndombe, Sud-Ubangi, and Tshuapa

Table 8- Data sources

Source Name/ Description	Data Type/ Format	Input Data Year
Data collected by WHO consultants as part of the Integrated Supportive Supervision (ISS) visits on the performance of health workers - <i>Mai-Ndombe Province</i>	Spatial points	2017-2021
Field data collected as part of routine Health Center Supervision (HCS) performed by the Elongated Programme of Immunization (EPI/PEV) and Acasus. Includes instances of settlement names and points of interest (POI) data collected in hard-to-reach areas in <i>Lualaba and Mai-Ndombe Provinces</i>	Spatial points	2019-2024
Fieldwork data collected by the Kinshasa School of Public Health (ESPK) in collaboration with GRID3 and CIESIN - <i>Lualaba, Sud-Ubangi, Tshuapa Provinces (2025) and Mai-Ndombe Province (2020)</i>	Spatial points	2020 - 2025
GRID3 COD - Health Facilities v5.0	Spatial points	2025
Fieldwork data collected by the Programme Elargi de Vaccination (PEV) in collaboration with GRID3 - <i>Mai-Ndombe Province</i>	Spatial points and qualitative feedback	2025
Health Facilities database from DHIS2, downloaded in June 2025	Tabular	various ²

Phase 1: Data Collection and Processing

From October to December 2024 and again from March to June 2025, GRID3 mappers conducted fieldwork across Mai-Ndombe province to collect geographic coordinates, facility names, and other critical information about health facilities. This data collection used the Canevas Annual

² The download date was used as the input date, although we acknowledge that the data compiled in DHIS2 includes references spanning an extended period.

application—developed by Bluesquare in partnership with the SNIS—and the GTS tool. The mapping effort prioritized facilities with incomplete data, especially those in hard-to-reach areas or challenging terrain. Special emphasis was placed on documenting the type of vaccination services offered (fixed, outreach, or mobile) and updating missing details about community-based health sites (SSCs).

Similarly, from January to May 2025, ESPK carried out comparable field mapping in the Lualaba, Sud-Ubangi, and Tshuapa provinces, gathering georeferenced data on settlements, health infrastructure, and other key points of interest.

Throughout the fieldwork period, GRID3 consolidated all field data prior to sending it to CIESIN for quality checks and integration. Any necessary corrections were sent back to CIESIN for processing.

CIESIN proceeded with data processing, integration, and harmonization steps to create an enhanced health facilities dataset. Data processing steps included standardization of health facility names and types, as well as clustering to detect anomalies in spatial accuracy and/or attribute information. All data were standardized to align with the GRID3 data schema, enabling seamless integration with previously released settlement name datasets.

Phase 2: Data Integration and Quality Checks

CIESIN performed rigorous quality checks to ensure consistency in geographic locations and attributes across the spatial data layers within the province. Maxar/ ESRI satellite imagery was utilized to visually address ambiguities and resolve inconsistencies as needed.

Province group 10: Equateur, Nord-Ubangi, Sud-Kivu

Table 9 - Data sources

Source Name/ Description	Data Type/ Format	Input Data Year
Organisation Mondiale de la Santé (OMS)	Spatial points	2017-2021
Programme Elargi de Vaccination (PEV) and Acasus	Spatial points	2019-2024
École de Santé Publique de Kinshasa (ESPK) - <i>Sud-Kivu Province</i>	Spatial points	2020
Direction du Système National d'Information Sanitaire (DSNIS)	Spatial points	2022
Programme Elargi de Vaccination (PEV) and Acasus - <i>Equateur and Sud-Kivu Provinces</i>	Spatial points	2025
Health Facilities database from DHIS2, downloaded in June 2025	Tabular	various ³
Organisation Mondiale de la Santé (OMS) and Direction du Système National d'Information Sanitaire (DSNIS) - <i>Sud-Kivu Province</i>	Spatial points	n.d.

³ The download date was used as the input date, although we acknowledge that the data compiled in DHIS2 includes references spanning an extended period.

Phase 1: Data Collection and Processing

Health facility data from PEV Acasus, DSNIS, OMS, and ESPK were shared with CIESIN and combined to generate the health facility layer.

CIESIN proceeded with data processing, integration, and harmonization steps to create an enhanced health facilities dataset. Data processing steps included standardization of health facility names and types, removing duplicates, as well as clustering to detect anomalies in spatial accuracy and/or attribute information. All data were standardized to align with the GRID3 data schema, enabling seamless integration with previously released settlement name datasets.

Phase 2: Data Integration and Quality Checks

CIESIN performed rigorous quality checks to ensure consistency in geographic locations and attributes across the spatial data layers within the province. Maxar/ ESRI satellite imagery was utilized to visually address ambiguities and resolve inconsistencies as needed.

II. Dataset Description

The *GRID3 COD - Health Facilities v7.0* dataset consists of spatial point data with attribute information (see table 10). The data are available for download in OGC Geopackage format contained in a zip file; a metadata file in XML format and a Data Sources table in CSV format are also included.

Table 10: Codebook

Variable Names	Type	Definition
OBJECTID	numeric	Software- generated unique code
pays	text	Country name: République démocratique du Congo
iso3	text	ISO3 code: COD
province	text	DHIS2 province name
prov_uid	text	DHIS2 province code
antenne	text	Antenna name
zonestante	text	DHIS2 health zone name
zs_uid	text	DHIS2 health zone code
airesante	text	Health area name
as_uid	text	DHIS2 health area code
localite	text	Settlement name
essnom1	text	Health facility type and name
esstype	text	Health facility type

Variable Names	Type	Definition
essnom2	text	Health facility name without type
typeorig	text	Health facility type from the original, raw data
categorie	text	Category of health facility
frigo	text	Refrigeration available
frigoftct	text	Refrigeration functioning at time of field work
vaccfixe	text	Is this site a fixed vaccination site
dhis2	text	DHIS2 health facility code
date	text	Year of data collection or last edit/modification
source_acronym	text	Acronyms of the organizations, institutions or programs who were involved in the creation of the data input.
sourceid	text	Unique identifier referring to each specific data input. The sourceid allows users to link each data record with the corresponding source reference in the Data Sources table (included as a separate file).
lat	numeric	Latitude in decimal degrees
lon	numeric	Longitude in decimal degrees
precision	numeric	Accuracy of GPS coordinates indicating the tolerance in meters ⁴
origine	text	Method for latitude/longitude determination. GPS = smartphone or GPS unit reading; Numérisation = digitized from paper maps or satellite imagery.
grid3id	text	Internal GRID3 ID

III. Known Data Limitations and Disclaimer

The spatial accuracy of the health facilities data are dependent on both the accuracy of the input data as well as on the correctness of the edits made throughout the validation process. Temporal mismatches exist among the point datasets and the satellite imagery used to perform quality checks. This may lead to health facilities not being identified or the inclusion of abandoned health facilities. Likewise, spelling mistakes and/or mismatches may have occurred due to colloquial variations on how data points are referred to in the field.

Significant gaps remain in the spatial coverage of health facilities in Kongo-Central, with geolocation data available for less than 40% of facilities listed in the DHIS2 database.

This operational dataset has not been fully validated by government officials or ministries.

⁴ Some facilities have very low GPS accuracy (horizontal position error > 1 km), so their coordinates should be treated as rough approximations.

CIESIN, Columbia University, and its co-authors follow procedures designed to generate data of reasonable quality. If, despite these procedures, users encounter apparent errors or misstatements in the data, they should contact CIESIN, info@ciesin.columbia.edu.

CIESIN, Columbia University, its co-authors, and their sponsors do not guarantee the accuracy, reliability, or completeness of any data provided. We provide these data without warranty of any kind whatsoever, either expressed or implied, and shall not be liable for incidental, consequential, or special damages arising out of the use of any data provided.

IV. Acknowledgments

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Caritas.

Centers for Disease Control and Prevention (CDC).

Direction d'Etudes et Planification (DEP).

Direction des Soins de Santé Primaires (DSSP).

Division du Système National d'Informations Sanitaires (DSNIS).

Division Provinciale de la Santé (DPS) de Equateur, Haut-Katanga, Haut-Lomami, Ituri, Kasai, Kasai-Central, Kasai-Oriental, Kinshasa, Kongo-Central, Kwilu, Lomami, Lualaba, Mai-Ndombe, Maniema, Mongala, Nord-Ubangi, Sankuru, Sud-Kivu, Sud-Ubangi, Tanganyika, Tshopo, et Tshuapa.

Ecole de Santé Publique de Kinshasa (ESPK).

Gates Foundation.

Gavi, the Vaccine Alliance.

Geospatial Evaluation and Observation Lab (geoLab), College of William & Mary.

Global Affairs Canada (GAC).

Global Good.

IMA World Health,

Initiative Régionale de Documentation et d'Accompagnement Communautaire au Développement (IDRAC Sarl).

International Federation of Red Cross and Red Crescent Societies (IFRC).

International Medical Corps (IMC).

Médecins Sans Frontières (MSF).

Ministère de l'Environnement et Développement Durable (MEDD).

Ministère de la Santé Publique, Hygiène et Prévention (MSPHP).

Novel-T.

Open Street Map (OSM).

PATH.

Programme Elargi de Vaccination (PEV).

Programme National de Lutte contre le Paludisme (PNLP).
Référentiel Géographique Commun (RGC).
Soins de Santé Primaires en Milieu Rural (SANRU).
The International Organization for Migration (IOM).
United Nations Children Fund (UNICEF).
United Nations Development Programme (UNDP).
United Nations Office for Project Services (UNOPS). Denmark and CO
United Nations Office for the Coordination of Humanitarian Affairs (OCHA).
United Nations Organization Stabilization Mission in the Democratic Republic of the
Congo (MONUSCO).
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V. Appendix 1 - Data Sources Table

Source Acronym	Sourceid	Citation
BLSQ	BLSQ_001	Bluesquare (compiled by) Health facilities. 2022. Bluesquare - IASO. Accessed in 2022.
CIESIN MSPHP	CIESIN_MSPHP_001	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Haut-Katanga. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed on July 2021.
CIESIN MSPHP	CIESIN_MSPHP_003	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Kasai-Oriental. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed on July 2021.
CIESIN MSPHP	CIESIN_MSPHP_004	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Kasai. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed on July 2021.
CIESIN MSPHP	CIESIN_MSPHP_005	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Kinshasa. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed on July 2021.
CIESIN MSPHP	CIESIN_MSPHP_006	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Lomami. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed on July 2021.
CIESIN MSPHP	CIESIN_MSPHP_007	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Kwilu. 2021. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed in 2022.
CIESIN MSPHP	CIESIN_MSPHP_008	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlement names and health facilities - Ituri. 2022. GRID3 - Cartographie pour la Santé/ Mapping for Health (M4H). Accessed in 2022.

Source Acronym	Sourceid	Citation
CIESIN MSPHP	CIESIN_MSPHP_009	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: health facilities - Haut-Lomami and Tanganyika. 2019. GRID3 - Mapping Portfolio Accessed on August 9, 2019
CIESIN MSPHP	CIESIN_MSPHP_010	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlements - Haut-Lomami. 2019. GRID3 - Mapping Portfolio Accessed in 2019.
CIESIN MSPHP	CIESIN_MSPHP_011	Center for International Earth Science Information Network (CIESIN) and Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Fieldwork data: settlements - Tanganyika. 2019. GRID3 - Mapping Portfolio Accessed in 2019.
DSNIS	DSNIS_001	Direction du Système National d'Information Sanitaire (DSNIS). Health facilities. n.d. Bluesquare - IASO. Accessed on March 16, 2022.
DSNIS	DSNIS_002	Direction du Système National d'Information Sanitaire (DSNIS). District Health Information System 2 (DHIS2) - Health facilities. 2024. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on November 11, 2024.
DSNIS	DSNIS_003	Direction du Système National d'Information Sanitaire (DSNIS). Health Areas 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on September 22, 2022.
ESPK	ESPK_001	École de Santé Publique de Kinshasa (ESPK). Enquête de la Couverture Vaccinale (ECV) Chez les Enfants de 6-23 mois - Liste des établissements de santé (2020). 2020 Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed in 2022.
ESPK	ESPK_002	Ecole de Santé Publique de Kinshasa (ESPK). Enquête de la Couverture Nationale de Vaccination (2021-2022). 2021-2022 Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed in 2023.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_001	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Kasai-Central. 2024. GRID3 - Phase 2 Accessed on July 2024.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_002	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN).

Source Acronym	Sourceid	Citation
		Fieldwork data: settlement names, health facilities, and points of interest - Maniema. 2024. GRID3 - Phase 2 Accessed on January 2024.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_003	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Mongala. 2024. GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on June 2022.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_004	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Tshopo. 2024. GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on June 2022.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_005	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Sud-Ubangi. 2025. GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on April 2025.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_006	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Tshuapa 2025. GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on April 2025.
ESPK GRID3 CIESIN	ESPK_GRID3_CIESIN_007	École de Santé Publique de Kinshasa (ESPK), GRID3, and Center for Integrated Earth Science Information (CIESIN). Fieldwork data: settlement names, health facilities, and points of interest - Lualaba. 2025 GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on May 2025.
ESPK UCLA	ESPK_UCLA_001	École de Santé Publique de Kinshasa (ESPK) and University of California, Los Angeles. Villages - Kwilu. 2017. Accessed in 2018.
ESPK UCLA	ESPK_UCLA_002	École de Santé Publique de Kinshasa (ESPK) and University of California, Los Angeles. Boundaries - Vaccination Health Areas - Haut-Lomami and Tanganyika 2018. Accessed on October 2018.
GRID3 PEV Acasus	GRID3_PEV_Acasus_001	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: health facilities - Haut-Katanga. 2024. GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on August 28, 2024.
GRID3 PEV	GRID3_PEV_Acasus_002	GRID3, Programme Elargi de Vaccination (PEV) and Acasus.

Source Acronym	Sourceid	Citation
Acasus		Fieldwork data: health facilities - Kasai-Oriental. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on July 11, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_003	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: health facilities - Kasai. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on July 30, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_004	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: health facilities - Sankuru. 2024. GRID3 - Phase 2. Accessed on October 3, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_005	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: health facilities - Mongala. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on November 25, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_006	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Haut-Katanga. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on August 28, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_007	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Kasai-Oriental. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on July 30, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_008	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Kasai. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on July 11, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_009	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Sankuru. 2024. GRID3 - Phase 2. Accessed on October 3, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_010	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Mongala. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on November 25, 2024.
GRID3 PEV Acasus	GRID3_PEV_Acasus_011	GRID3, Programme Elargi de Vaccination (PEV) and Acasus. Fieldwork data: settlement names - Haut-Lomami. 2024. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on August 21, 2024.
GRID3 PEV	GRID3_PEV_012	GRID3, Programme Elargi de Vaccination (PEV). Fieldwork data: settlement names - Mai-Ndombe. 2025. GRID3 - Fonds Accélérateur d'Equité (FAE) en RDC. Accessed on June 18, 2025.

Source Acronym	Sourceid	Citation
GRID3 PEV	GRID3_PEV_013	GRID3, Programme Elargi de Vaccination (PEV). Fieldwork data: health facilities - Mai-Ndombe. 2025 GRID3 - Fonds Accélérateur d'Équité (FAE) en RDC. Accessed on June 16, 2025.
IOM	IOM_001	International Organization of Migration (IOM). Displacement Tracking Matrix: Settlements n.d. IOM - Global Data Institute Accessed on July 2020.
MONUC GNS	MONUC_GNS_001	Mission de l'Organisation des Nations Unies en République démocratique du Congo (MONUC GNS) Settlements n.d. Accessed on November 14, 2024.
OMS DSNIS	OMS_DSNIS_001	Organisation Mondiale de la Santé (OMS) and Direction du Système National d'Information Sanitaire (DSNIS). Health facilities. n.d. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed in 2020.
OMS DSNIS	OMS_DSNIS_002	Organisation Mondiale de la Santé (OMS) and Direction du Système National d'Information Sanitaire (DSNIS). Health facilities. n.d. Bluesquare - IASO. Accessed on March 16, 2022.
OMS GPEI	OMS_GPEI_001	World Health Organization (WHO) and Global Polio Eradication Initiative (GPEI) Settlements 2018. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed in 2022.
OMS ISS	OMS_ISS_001	Organisation Mondiale de la Santé (OMS). Health Center Supervision data. 2017-2021. OMS - Integrated Supportive Supervision (ISS). Accessed on March 19, 2021.
PATH GRID3	PATH_GRID3_001	PATH. Health facilities - Haut-Katanga. n.d. Accessed on August 28, 2024.
PEV Acasus	PEV_Acasus_001	Programme Elargi de Vaccination (PEV) and Acasus. Health Center Supervision data. 2019-2024. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on December 2024.
PEV Acasus	PEV_Acasus_002	Programme Elargi de Vaccination (PEV) and Acasus. High risk communities - Haut-Katanga and Tanganyika. 2023-2024 Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on May 2, 2024.
PEV Acasus	PEV_Acasus_003	Programme Elargi de Vaccination (PEV) and Acasus. Health Center Supervision data. 2025. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Last accessed on August 2025.
PEV CDC CIESIN	PEV_CDC_CIESIN_001	Programme Elargi de Vaccination (PEV), United States Centers for Disease Control and Prevention (CDC), and Center for

Source Acronym	Sourceid	Citation
		Integrated Earth System Information (CIESIN). Fieldwork data: health facilities - Maniema. 2022. GRID3 - Mapping Portfolio Accessed on October 10, 2022.
PNLP IMA	PNLP_IMA_001	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Haut-Lomami. 2021. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on January 2022.
PNLP IMA	PNLP_IMA_002	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Ituri. 2021. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on June 2021.
PNLP IMA	PNLP_IMA_003	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Kwilu. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on July 2022.
PNLP IMA	PNLP_IMA_004	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Maniema. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on May 2022.
PNLP IMA	PNLP_IMA_005	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Tanganyika. 2020. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on March 7, 2024
PNLP IMA	PNLP_IMA_006	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Sud-Ubangi. 2024. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on December 2024.
PNLP IMA	PNLP_IMA_007	Programme National de Lutte Contre le Paludisme (PNLP) and IMA World Health. Pre-Registration Distribution Survey - Nord-Ubangi. 2019. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on October 2021.
PNLP SANRU	PNLP_SANRU_001	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Lomami. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on June 2023.
PNLP SANRU	PNLP_SANRU_002	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Sankuru. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on May 2023.
PNLP	PNLP_SANRU_003	Programme National de Lutte Contre le Paludisme (PNLP) and

Source Acronym	Sourceid	Citation
SANRU		SANRU. Pre-Registration Distribution Survey - Kongo-Central. 2024. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on March 2025.
PNLP SANRU	PNLP_SANRU_004	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Haut-Lomami. 2024. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on March 2024.
PNLP SANRU	PNLP_SANRU_005	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Tshuapa. 2023. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on June 2023.
PNLP SANRU	PNLP_SANRU_006	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Mai-Ndombe. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed October 31, 2024
PNLP SANRU	PNLP_SANRU_007	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Equateur. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed June, 2022
PNLP SANRU	PNLP_SANRU_008	Programme National de Lutte Contre le Paludisme (PNLP) and SANRU. Pre-Registration Distribution Survey - Sud-Kivu. 2022. Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed February, 2022.
PNLP Chemonics	PNLP_Chemonics_001	Programme National de Lutte Contre le Paludisme (PNLP) and Chemonics. Pre-Registration Distribution Survey - Lualaba. 2024 Ministère de la Santé Publique, Hygiène et Prévention (MSPHP). Accessed on October 29, 2024.