

Advanced Population Mapping Webinar

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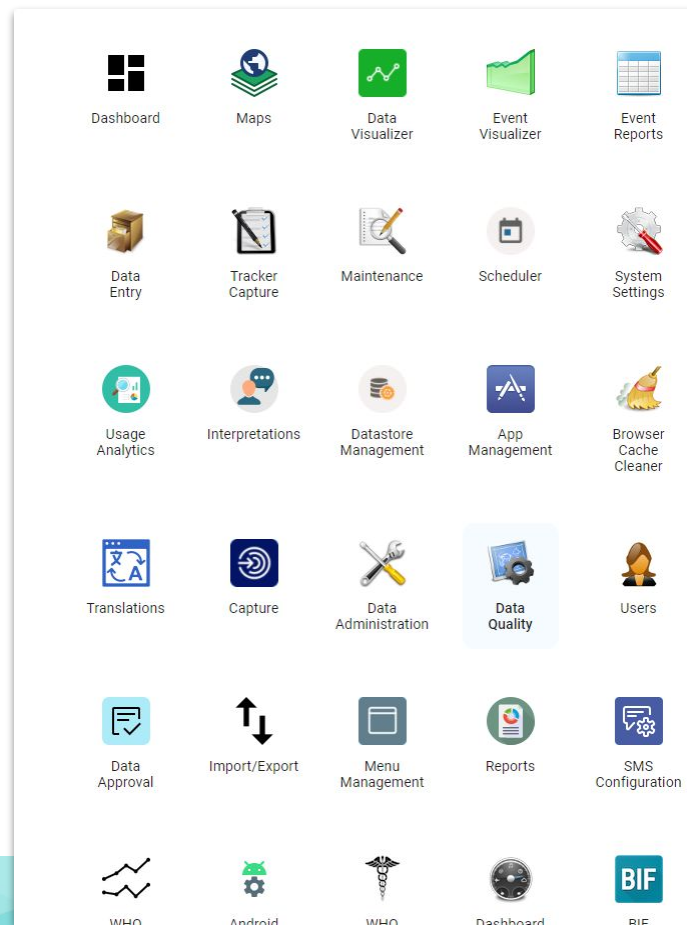
- Intro for DHIS2
- Problem statement
- Use of clinical/service based denominators
- Use of alternative population denominators and catchments areas
- New DHIS2 features to visualize populations
- Crosscut demo of catchment area application - Coite Manuel
- Q&A

Link to session in Community of Practice

<https://community.dhis2.org/t/webinar-on-advanced-population-mapping-in-dhis2-march-23/46231>

DHIS 2 Platform

- Capture, management and analysis of information
- Flexible, generic data platform, wide range of use-cases
- Open source software
- Extensible through Web APIs and app framework
 - Application based ≈ 90 . Available on github



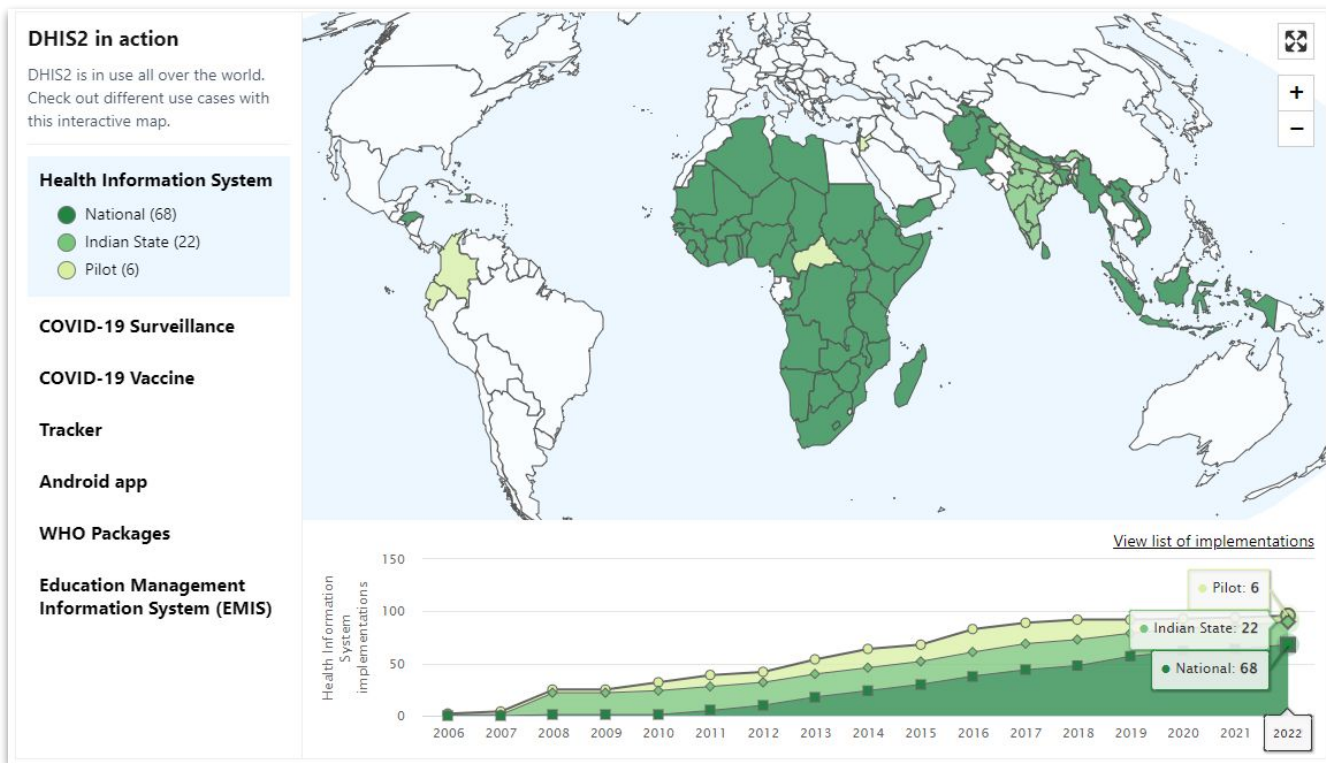
DHIS2 as HMIS

World's largest health management information system (HMIS) platform

4.2 Billion People

Core development at University of Oslo

Thousands of DHIS2 developers and experts around the world.



UNICEF video on how DHIS2 scaled to national level in Bangladesh:
<https://www.youtube.com/watch?v=bUWkvKPcabA>

43 countries use DHIS2 for COVID-19 surveillance

DHIS2 in action

DHIS2 is in use all over the world.
Check out different use cases with
this interactive map.

COVID-19 Surveillance

- Operational (43)
- In development (12)

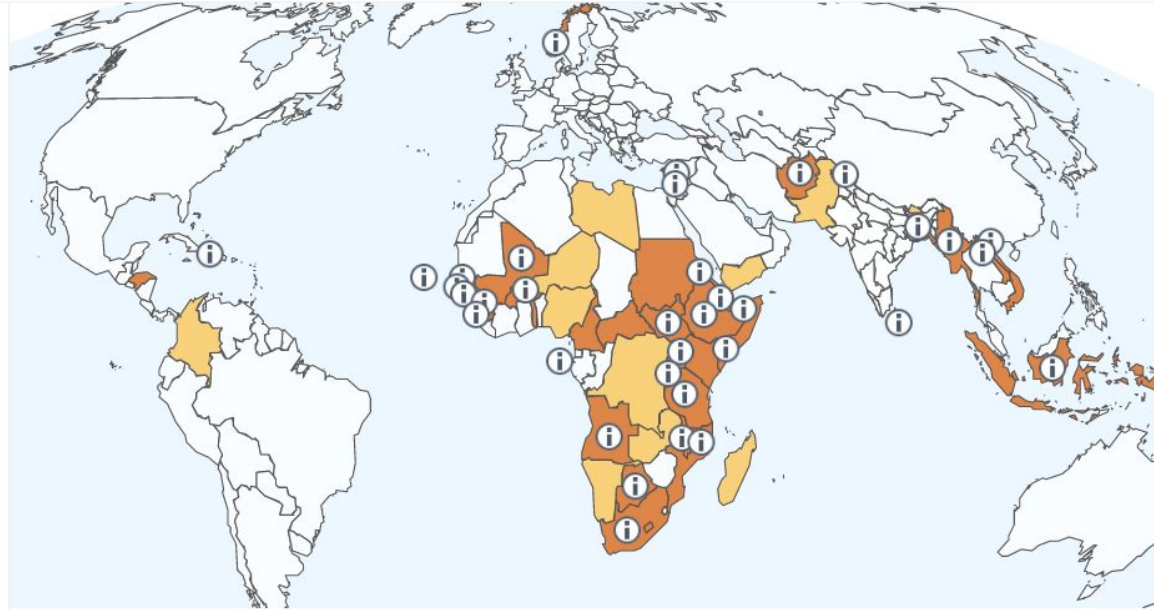
Packages / Tools:

Case-based
surveillance

Contract
registration

Port of Entry
screening

Event &
Aggregate
surveillance



● Operational: 43

Afghanistan	Guinea	Malawi	Somaliland
Angola	Guinea Bissau	Mali	South Africa
Bangladesh	Haiti	Mozambique	South Sudan
Botswana	Honduras	Myanmar	Sri Lanka
Burkina Faso	Indonesia	Norway	Sudan
Cameroon	Jammu and Kashmir	Palestine	Tanzania
Cape Verde		Rwanda	The Gambia

● In development: 12

Bhutan	Zanzibar
Colombia	
Dem. Rep. Congo	
Libya	
Madagascar	
Namibia	
Niger	

41 countries use DHIS2 for COVID vaccine delivery

DHIS2 in action

DHIS2 is in use all over the world. Check out different use cases with this interactive map.

COVID-19 Vaccine

- Operational (41)
- In development (4)

Packages / Tools:

Electronic
Immunization
Registry (Tracker)

Core Analysis &
Datasets
(Aggregate)

AEFI (Tracker)

Logistics

Vaccine
Certificates



● Operational: 41

[Bangladesh](#) ⓘ

Botswana

Cameroon ⓘ

Cape Verde ⓘ

Central African Rep. ⓘ

Chad ⓘ

East Timor ⓘ

Ethiopia ⓘ

Ghana ⓘ

Guinea Bissau ⓘ

Haiti ⓘ

Honduras

Jammu and Kashmir

Madagascar ⓘ

Malawi ⓘ

Mali ⓘ

Mauritius ⓘ

Mizoram

Mozambique ⓘ

Myanmar ⓘ

Rwanda ⓘ

Sao Tome ⓘ

Senegal ⓘ

Sierra Leone ⓘ

Solomon Islands ⓘ

Sri Lanka ⓘ

Sudan ⓘ

The Gambia ⓘ

Togo ⓘ

Uganda ⓘ

Vanuatu ⓘ

Yemen

Zambia ⓘ

Zimbabwe ⓘ

● In development: 4

Ecuador

Equatorial Guinea

Indonesia

Manipur

Covid Surveillance and Vaccine Systems at Scale

People Enrolled:

- **Sri Lanka:** 19,147,151
- **Rwanda:** 10,000,000+
- **Nigeria:** 7,913,042
- **Uganda:** 6,530,933
- **Ghana:** 3,633,623
- **Laos:** 2,456,865
- **Togo:** 1,751,575
- **Tanzania:** 1,107,619

Users

- **Nigeria:** 20,715
- **Tanzania:** 15,478
- **Rwanda:** 8000+
- **Togo:** 5,780
- **Sri Lanka:** 3,400
- **Uganda:** 2,810

Sites

- **Uganda:** 2,605
- **Rwanda:** 1,800
- **Togo:** 1,004
- **Sri Lanka:** 837

Covid-19 Related Events

- **Sri Lanka:** 25,863,786
- **Uganda:** 7,819,206
- **Laos:** 6,743,808
- **Ghana:** 4,525,188
- **Tanzania:** 2,110,405
- **Togo:** 1,410,691

As of 14 Dec 2021

DHIS 2 Data Models



Aggregate data

Immunization doses given

People trained in FP

Refugees supported



Events

Facility assessments

Clinical visits

Educational events



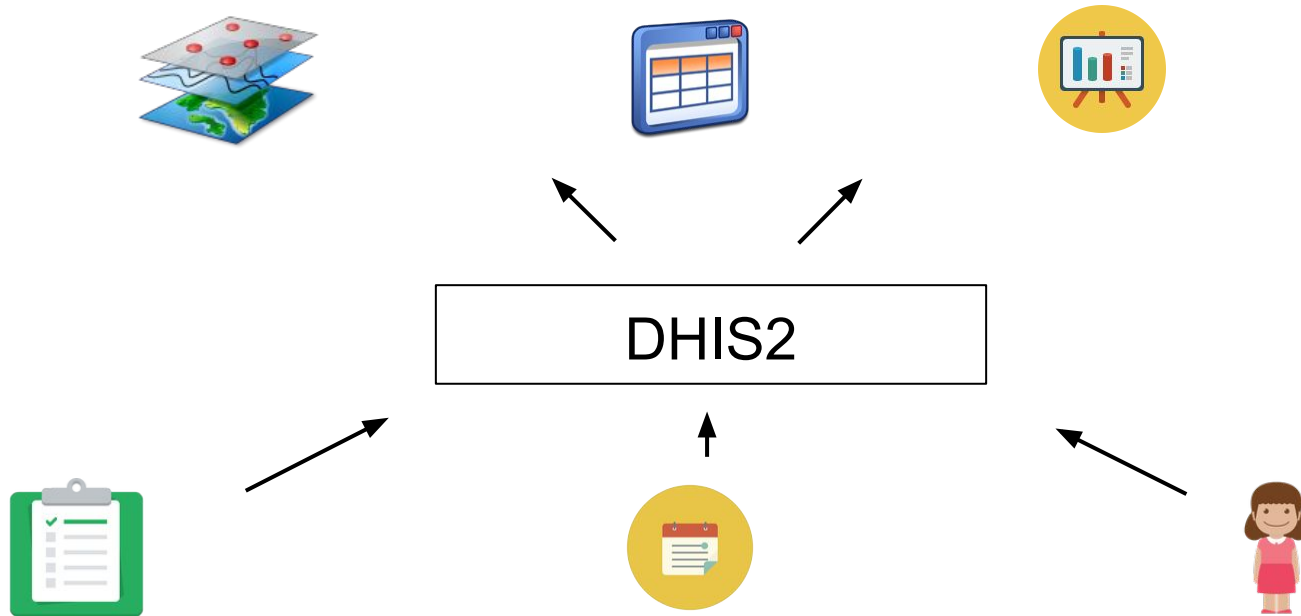
Tracking

Maternal health

Immunization

Equipment, drugs

Integrated Analysis of Data & Events



Aggregate data

Events

Tracking

- HISP groups (Tanzania, Uganda, South Africa, Nigeria, Vietnam...)
- Ministries of Health (80+)
- Donors (8)
- NGOs (150+)
- Organizations / companies
- Research groups (PhDs, masters)
- Consultants
- Software developers

community.dhis2.org



all categories ▾ **Categories** Latest New (3) Unread (360)

Category	Topics
Announcements - Annonces Announcements and news about DHIS2 like beta-testing, new releases, changes to governance or other important information.	3 / month 15 unread
Connect - Connectez-vous Welcome new community members, discuss events and talks, and connect with the people that make DHIS2 possible! ■ Events ■ Marketplace ■ Local - Près de chez vous ■ Le coin des francophones ■ Lusophone	8 / month 1 unread
Implementation - Implémentation Community support for people configuring, implementing and using DHIS2. Share your knowledge or questions around best practice configuration and use with others. Not for software development related topics, but all issues related to configuration and maintenance of DHIS2 implementations. ■ WHO modules	14 / month
Support - Assistance technique Have a question about installing, configuring or using DHIS2, or seeing any unexpected behavior/bugs in DHIS2, this is the place to get support - or help others with their questions.	57 / month 340 unread 2 new
Development - Développement	4 / month

Almost 10 years of knowledge
made available

4000+ members

36 000+ topics

60 000+ posts



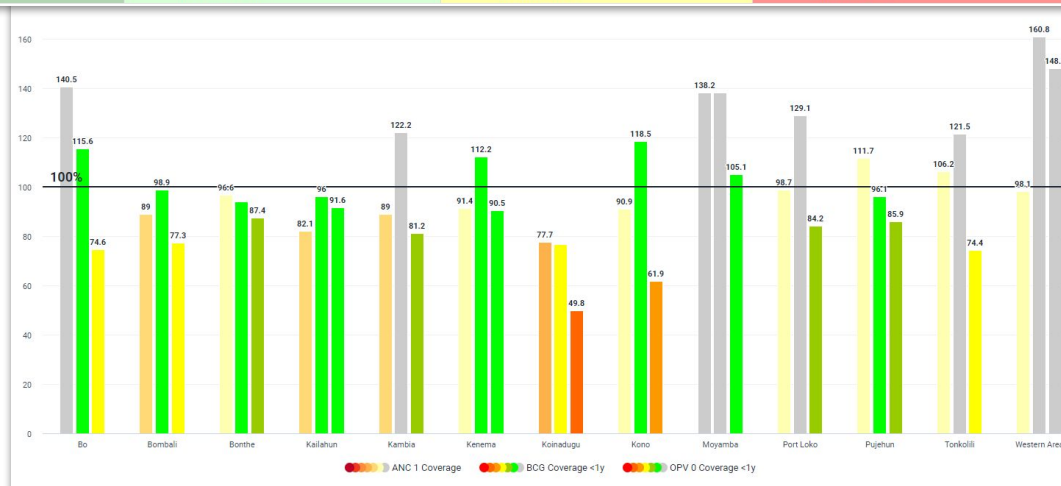
The Problem With Population Figures

The Problem: Census populations are unreliable

Census based population denominators are inaccurate:

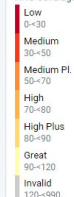
- Old/outdated
- Does not factor in population mobility or changes in population density
- Does not accurately represent vulnerable populations - those living far from clinics
- Does not provide actionable analytics
 - Resolution is too high - not enough detail in population
 - No facility catchments - Impossible to do coverage rates below districts
 - No settlement or structures mapping

Hierarchie	Unité d'organisation	Janvier	Février	Mars	Avril	Mai	Juin	Juillet	Août	Septembre	Octobre	Novembre	Décembre
kn Kinshasa Province - kn Kingasani Zone de Santé	kn 17 Mai Aire de Santé	B 133.7% 13.3%	A 133.2% 2.5%	A 102.8% 6.4%	A 133.2% 7%	A 143.4% 8.7%	A 149.5% 9.5%	A 135.7% 9.7%	B 139.7% 10.1%	B 128.4% 10.4%	A 120.4% 10%	A 112% 9.8%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Atandela Aire de Santé	A 165.7% 2.7%	A 167.2% 3.6%	A 183.8% 8.2%	A 183.8% 8.1%	A 186.5% 5.8%	A 187.8% 4.5%	A 190% 3.3%	A 195.8% 4.3%	A 200.8% 4.5%	A 204.4% 4.4%	A 185.8% 4.4%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Kingasani Aire de Santé	D 58.6% 25%	D 85.8% 31.6%	B 96.8% 20.7%	B 126.5% 11.9%	A 144.3% 9.1%	B 146.4% 10.5%	B 141.8% 10.9%	B 141.5% 10.5%	B 136.8% 10.1%	A 134.4% 9.4%	A 128% 9%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Lisanga Aire de Santé	D 81.4% 39.3%	D 75% 28%	B 97.5% 30.9%	B 116.8% 25.2%	B 127.1% 22%	B 124% 20%	B 108.1% 20.3%	B 110.4% 23.4%	B 112.6% 26.4%	B 134.4% 24.6%	B 106.8% 23.7%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Molende Aire de Santé	A 161.2% 8.4%	A 111.5% 6.4%	A 119.7% 7.9%	A 130.9% 8.4%	A 143.4% 9.7%	B 151.8% 10.8%	B 143.3% 10.9%	B 139.4% 11.2%	B 133.7% 12%	D 129.9% 12.3%	B 118.1% 12.3%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Mulle Aire de Santé	A 117.3% 0.8%	C 76.4% -5.7%	A 93.9% 2.4%	A 113.9% 1.9%	A 122.3% 1.6%	A 125% 2.4%	A 127.3% 2.3%	A 128.1% 2.3%	A 121% 3.3%	A 113.5% 3.4%	A 103.2% 3.4%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn Nsanga Aire de Santé			C 57.3% 5.6%	C 46.8% 5.1%	C 59.9% 6.6%	C 74.2% 5.6%	C 76.2% 5.8%	C 81.2% 7.1%	C 75.2% 8.6%	C 75.5% 8%	C 68.6% 8%	
kn Kinshasa Province - kn Kingasani Zone de Santé	kn St Paul Aire de Santé	A 125% 8.2%	A 127.1% 5.7%	A 131.2% 4.1%	A 135.4% 4.1%	A 138.3% 4.1%	A 117.3% 4.5%	A 100.9% 4.2%	A 105% 4.1%	A 103.7% 4.1%	A 103.1% 4%	A 93.7% 4%	
Catégorie A Couverture ≥ 90% Taux d'abandon ≤ 10%		Catégorie B Couverture ≥ 90% Taux d'abandon > 10%			Catégorie C Couverture < 90% Taux d'abandon < 10%			Catégorie D Couverture < 90% Taux d'abandon ≥ 10%					

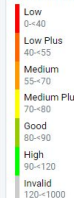


Categories based on Penta 3 coverage and Penta 1-3 drop out rate

ANC Coverage



Immunization Coverage



Advanced Population Estimates

Sources:

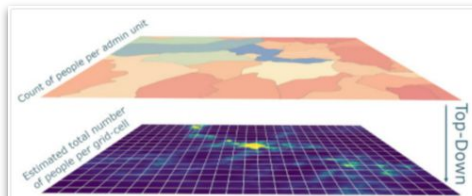
- World Pop.
- Grid3
- Google Earth Engine
- Facebook - Data For Good

Micro-planning webinar:

<https://www.youtube.com/watch?v=EjnxRxG5iHs>



World Pop approaches



Top-down datasets

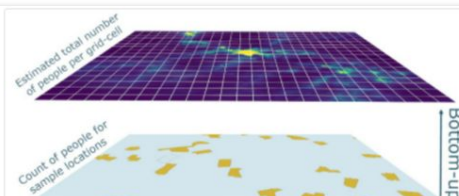
Population and housing censuses are the most important resource to produce accurate population data at the national and sub-national level. These are typically undertaken every decade and simple projections can be used to create subnational estimates in the intervening years. These data are typically only available as counts per administrative unit though, masking small area variations and making them difficult to integrate with other datasets. WorldPop top-down modelling methods take a global database of administrative unit-based census and projection counts for each year 2000-2020 and utilise a set of detailed geospatial datasets to disaggregate them to counts for either (i) each 100x100m or 1x1km grid cell on the planet (top-down unconstrained) or (ii) each 100x100m or 1x1km grid cell classified as settled by humans (top-down constrained).

Advantages:

- Consistent and complete estimates for each year 2000-2020 for every country, including breakdowns by age and sex
- Maintains the 'official' population estimates or census counts at the administrative unit level of the input data, as well as adjustments available to match UN national estimates

Disadvantages:

- For countries that have not had a census for a long time and/or where significant subnational variations in migration, fertility and mortality exist, the input 'official' population counts and projections based on them can be highly uncertain



Bottom-up datasets

Where little recent population enumeration data exist for a country and timely estimates that account for recent demographic changes are required, the bottom-up approach is likely to provide more accurate estimates. Here, sample data from as many trustworthy and recent survey datasets as possible are used with detailed geospatial datasets to build a statistical model to estimate population numbers and age/sex breakdowns in unsampled locations, together with measurements of uncertainty. This approach can also be used to fill gaps in a census where full enumeration is not possible due to conflict, poor access or financial limitations.

Advantages:

- More accurate outputs than top-down approaches where census data are outdated and/or census projections from these are highly uncertain
- Measurement and mapping of uncertainty highlights where caution in using the data should be exercised and where further data collection could be prioritised

Disadvantages:

- Tailored modelling to the country of interest takes effort and often engagement with governments, which can be slow
- Typically estimates are tied to a single year

Chinsali District, Zambia Population figures

Facility name	MOH pop total	MOH pop 0-11 months	% of pop total	Pop revised 0-11 months	% of pop total
Cheswa HP	6,800	375	5.5	283	4.2
Chilunda HP	4,026	241	6.0	167	4.1
Chinsali Hospital Affiliated HC	31,552	3,630	11.5	1,311	4.2
Chunga Rural HC	12,511	980	7.8	520	4.2
Kalela HP	10,930	454	4.2	454	4.2
Kalisha HP	2,732	188	6.9	113	4.1
Kalwala HP	11,839	1,118	9.4	492	4.2
Lubwa Rural HC	10,487	435	4.1	435	4.1
Mulilansolo Rural HC	22,596	2,170	9.6	939	4.2
Mundu Rural HC	13,507	929	6.9	561	4.2
Munsanya HP	7,811	324	4.1	324	4.1
Nambulumu Police Rural HC	7,666	318	4.1	318	4.1
Nkula HP	4,528	212	4.7	188	4.2
Nkweto HP	3,254	236	7.3	135	4.1
Total	150,239	11,610	7.7	6,240	4.2
Zambia	18,420,651	768,688			4.2

- MOH population figures NOT correct

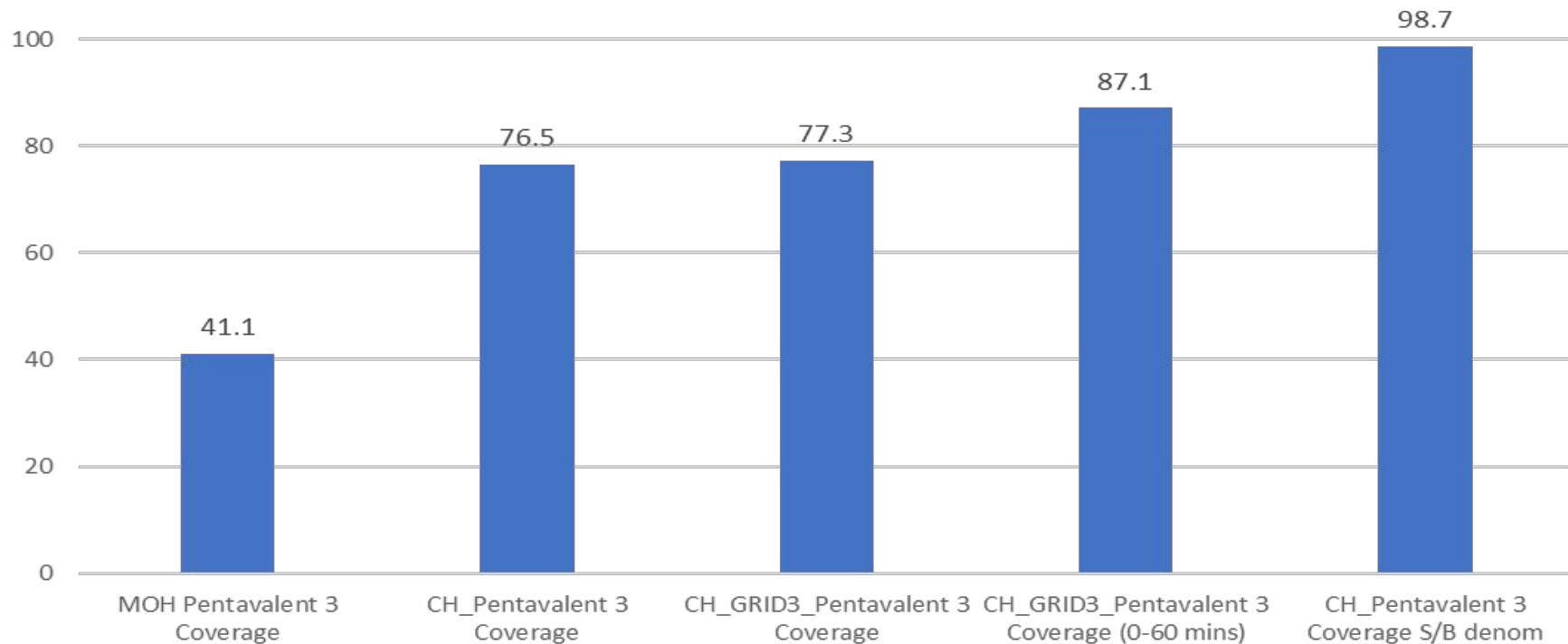
- Percent total population under 11 months changed to approximately 4.15%

Population figures GRID3 2021, Chinsali District Zambia

	Population revised 0-11 months	GRID3 Population 0-11 months	GRID3 Population 0-11 months 0-30 mins (Walking time)	GRID3 Population 0-11 months 0-60 mins (Walking time)
Cheswa HP	283	400	240	266
Chilunda HP	167	150	78	133
Chinsali Hospital Affiliated HC	1,311	2,015	1,683	1,941
Chunga Rural HC	520	248	96	200
Kalela HP	454	324	242	299
Kalisha HP	113	115	101	112
Kalwala H	492	440	254	368
Lubwa Rural HC	435	450	321	346
Mulilansolo Rural HC	939	550	429	529
Mundu Rural HC	561	276	214	263
Munsanya HP	324	299	191	273
Mwalule HP		201	156	179
Nambuluma Police Rural HC	318	324	228	283
Nkula HP	188	264	146	177
Nkweto HP	135	115	93	114
Chinsali	6,240	6,171	4,472	5,483

Pentavalent 3rd dose coverage 2021 Chinsali District Zambia

Chinsali Pentavalent 3rd dose Coverage 2021



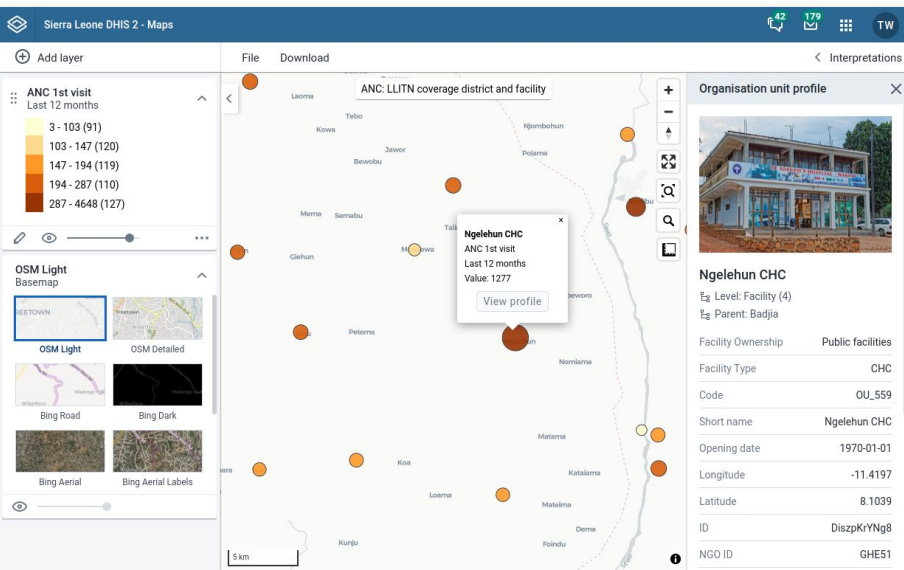
New features to support population mapping

- Facility profiles
- World Pop data via Google Earth Engine
- Structures maps via Google Earth Engine
- Facility Catchments via Crosscut
- Offline Mobile Dashboards

Mapping for population

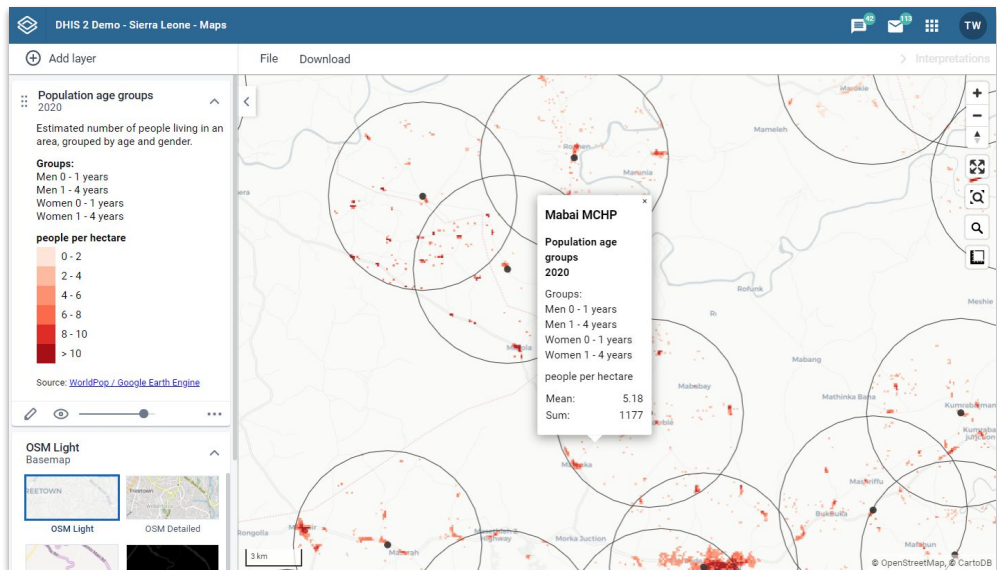
Organization Unit Profile (DHIS2.37)

- Visualize key information for health facilities



Detailed population estimates by age and gender (DHIS2.37)

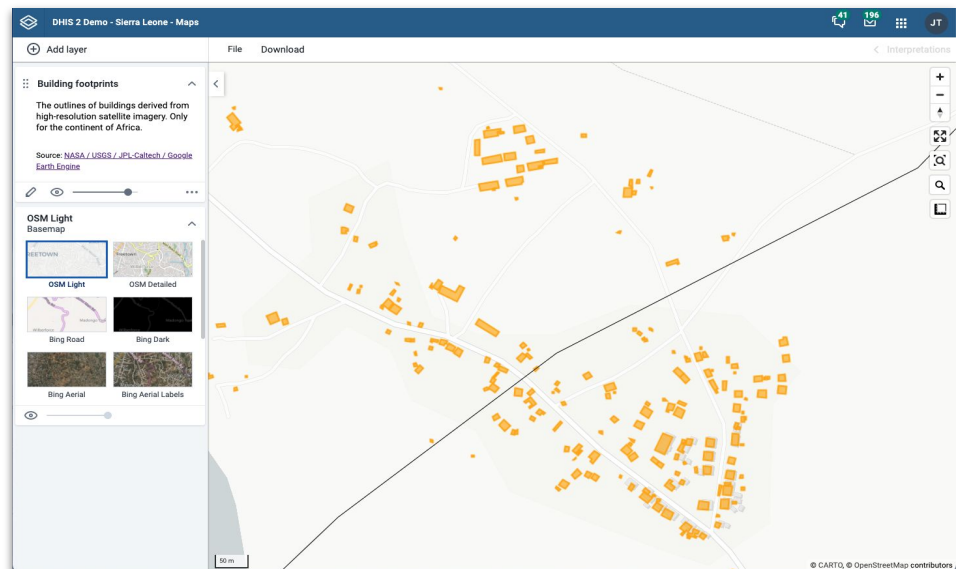
- Grid3, WorldPop



Structures Maps (DHIS2.38)

Via google earth engine

The dataset contains 516M building detections, across an area of 19.4M km² (64% of the African continent).

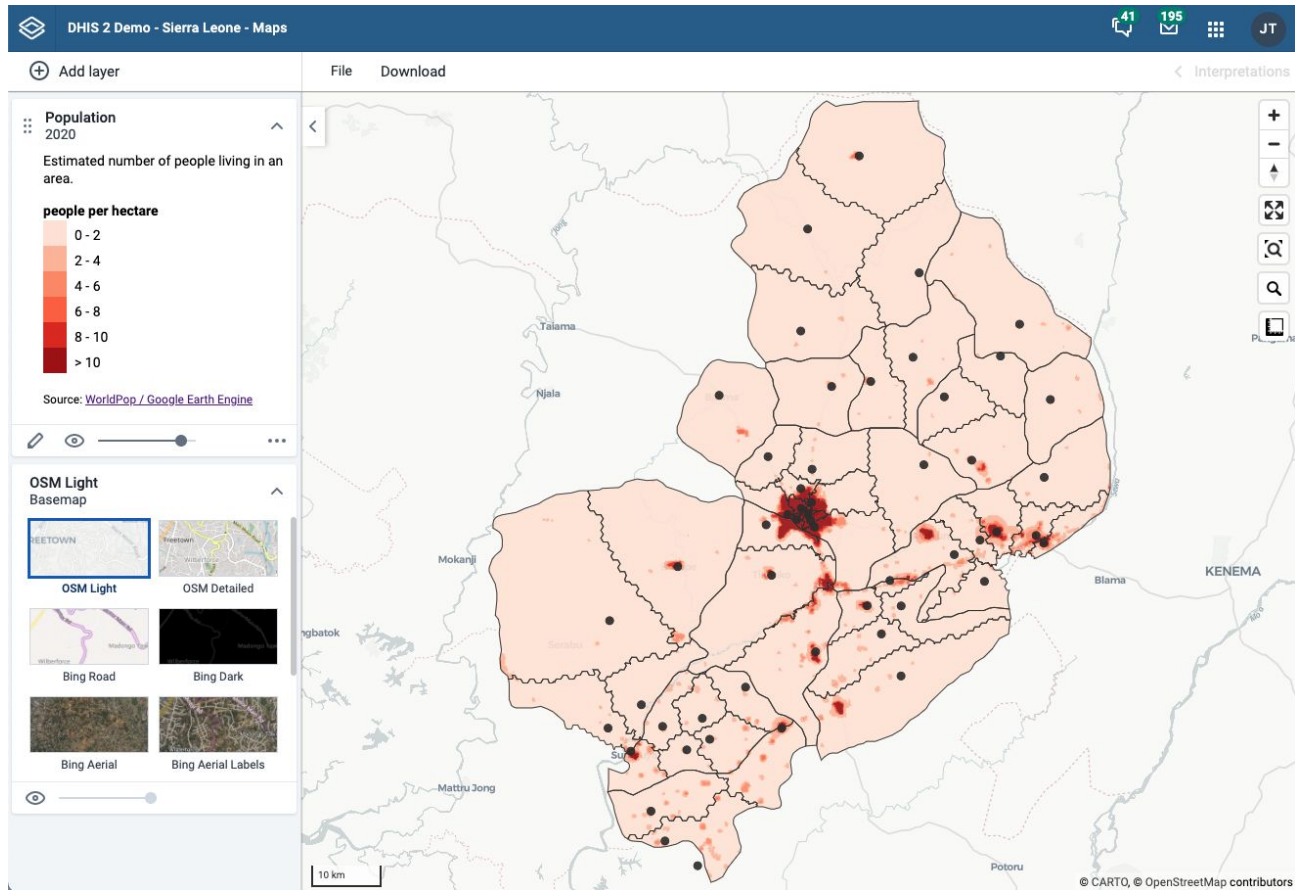


Facility catchment layer (DHIS2.38)

Facility catchment layer

- From Grid3 and Crosscut
- Crosscut application to generate and draw facility catchments.
(Factors in road conditions, driving time, walking time, terrain, river crossings, and land cover)
- Population by catchment

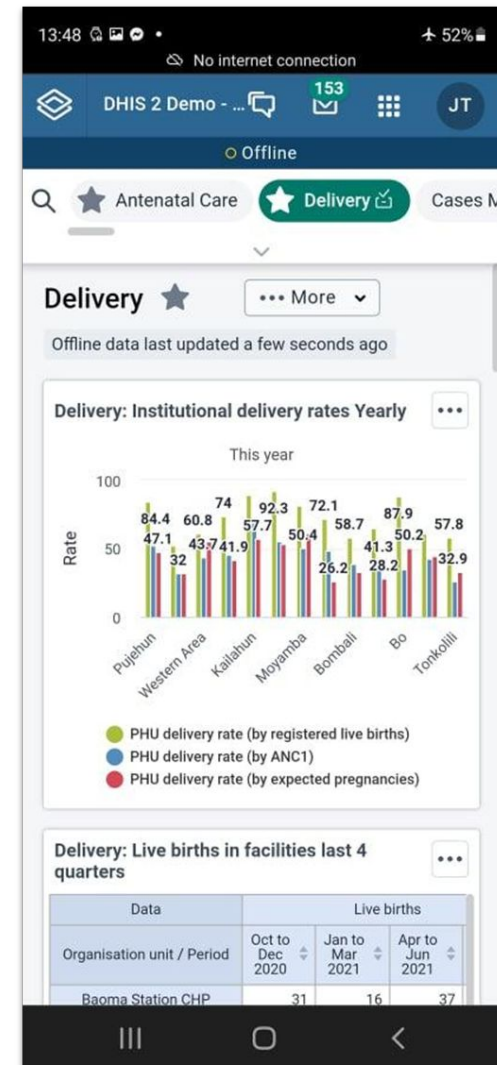
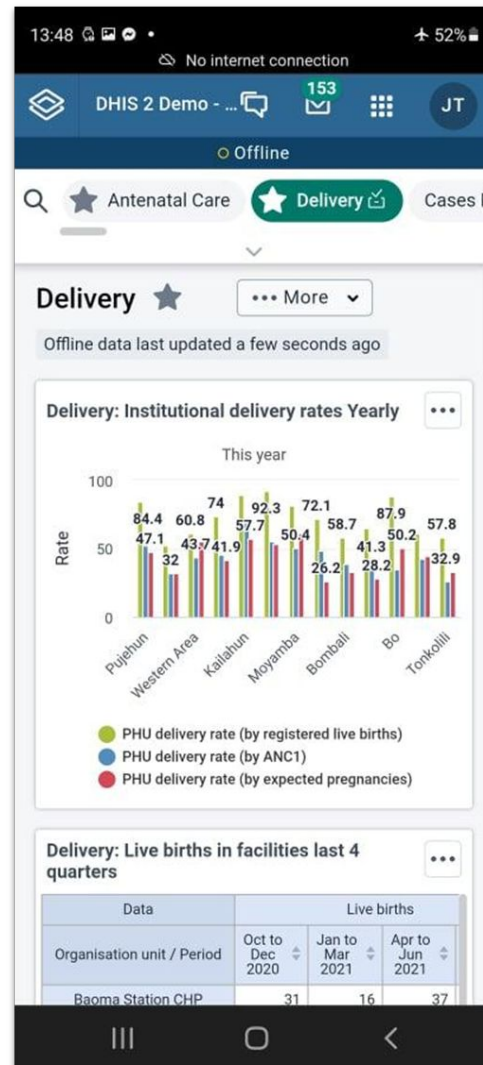
Do you know of any countries that want facility catchments?



Offline Mobile Dashboards (DHIS2.36)

- iOS and Android via mobile web browser
- Optimized for mobile screens
- Dashboard can be saved to be viewed while offline

DHIS2 dashboards in your pocket
anywhere and any time.



Google Earth Engine Data Importer

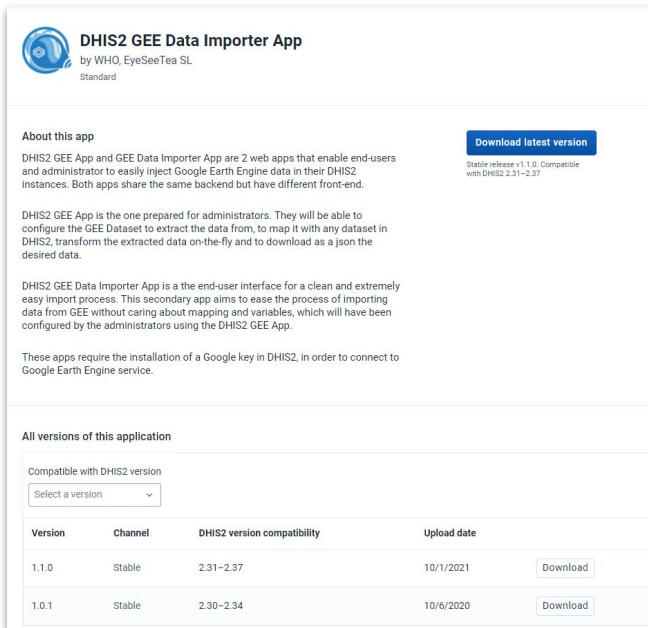
Coming to core in DHIS2.39

Will allow all google earth engine data to be imported to be able to be used able to be visualized in other analytics and used in indicators.

From DHIS2.31 - DHIS2.37 the GEE Data Importer App can be used. →

Available on the DHIS2 app hub:

<https://apps.dhis2.org/app/f0cd4b99-db98-460d-9d5a-8e526fdf8b50>



The screenshot shows the app page for 'DHIS2 GEE Data Importer App' by WHO, EyeSeeTea SL. It includes a 'Download latest version' button and a table of all versions of the application.

About this app

DHIS2 GEE App and GEE Data Importer App are 2 web apps that enable end-users and administrator to easily inject Google Earth Engine data in their DHIS2 instances. Both apps share the same backend but have different front-end.

DHIS2 GEE App is the one prepared for administrators. They will be able to configure the GEE Dataset to extract the data from, to map it with any dataset in DHIS2, transform the extracted data on-the-fly and to download as a json the desired data.

DHIS2 GEE Data Importer App is a the end-user interface for a clean and extremely easy import process. This secondary app aims to ease the process of importing data from GEE without caring about mapping and variables, which will have been configured by the administrators using the DHIS2 GEE App.

These apps require the installation of a Google key in DHIS2, in order to connect to Google Earth Engine service.

All versions of this application

Compatible with DHIS2 version

Select a version

Version	Channel	DHIS2 version compatibility	Upload date	Download
1.1.0	Stable	2.31-2.37	10/1/2021	Download
1.0.1	Stable	2.30-2.34	10/6/2020	Download