Mapping Access to Essential Sexual and Reproductive Health Services in Malawi

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Extended Abstract

Background

Universal access to essential, good quality sexual and reproductive health (hereinafter abbreviated as SRH) services is a critical goal for promoting health equity, human rights and quality of life and global sustainable development goals. It is also a critical goal for United Nations Population Fund (UNFPA), for promoting the global achievement of the three transformative results[1] in line with Agenda 2030. Knowing the coverage of each element of the essential SRH services for each country at a sub-national level is crucial for future forecasting and addressing gaps to attain universal coverage of essential SRH services.

The 2020 population and housing census and standard SPA data provide a valuable opportunity to obtain the information on health care coverage, coupled with the application of advanced geospatial mapping and analysis methods. The purpose of this research project is to support Malawi on mapping people's geographic access to ARH services. The research objective is in line with Agenda 2063, which is Africa's blueprint and master plan as well as Malawi Growth and Development Strategy III. The 2030 Agenda for Sustainable Development places a huge demand on data that can reveal geographic inequalities in coverage of health, education, and many other services, and also guide planning and delivery of critical sustainable development interventions. This initiative of supporting countries to map access to SRH services will raise the awareness and capacity of National Statistical Offices, NGOs, and practitioners to facilitate the critical development work needed for universal access to health services and advance many aspects of human development.

Data for mapping access

Mapping population access to quality SRH services is possible through the integration of geo-referenced population and health infrastructure data - and such data are increasingly available for many countries. For health service data, Service Provision Assessment (SPA) and Service Availability and Readiness Assessment (SARA) surveys have comprehensive geo-referenced data on SRH services, sometimes as sample data, and in a few countries (Malawi, Mozambique and Haiti), covering each and every health facility - hence offering consistent health sector indicators between countries. In countries without SPA or SARA surveys, there are extensive data resources within the national Health Management Information System.

For population data, with the process of the 2020 round of censuses world widely, many countries have completed the collection of geo-referenced population and housing census data collection using modern technologies and methodologies, and for others without recent census, high resolution population estimates based on satellite imagery conducted by Worldpop are available for most countries. Either of these can provide the population numbers needed for measuring population access to services. In addition, UNFPA is developing a Population Data Platform (PDP) for sharing global data on population numbers and characteristics, as well as geo-located data on infrastructure, health facilities and other information relevant to country programming

[1] UNFPA's Three Transformative Results focuses on new research to estimate the costs associated the global effort led by UNFPA to: (a) end preventable maternal deaths, (b) end the unmet need for family planning, and (c) end gender-based violence and all harmful practices, including child marriage and female genital mutilation. (UNFPA (2020). Costing the Three Transformative Results. Available from: https://www.unfpa.org/featured-publication/costing-three-transformative-results)

and humanitarian needs. The PDP should improve accessibility to such relevant data for all programming countries.

In this case study, data used include: Malawi 2018 Population and Housing Census obtained from Malawi National Statistical Office. The 2013–2014 Malawi SPA implemented by the Malawi Ministry of Health funded by the U.S. Agency for International Development (USAID), under the MEASURE DHS Project were applied to extract health facilities with each essential SRH service. The survey covers information on the availability of health services in different types of facilities and, more importantly, the readiness of these facilities to provide essential SRH services. Road networks were extracted from OpenStreetMap,was used to map the travel distance along the roads.

A GIS-based approach for mapping accessibility

This case study illustrates an innovative approach to combining various data sources, such as census, survey, health facilities, road networks, and land coverage, using geospatial analysis to map the geographic coverage of essential SRH services and identify areas where people lack accessibility.

To analyze people's accessibility, Firstly, we defined what essential SRH service package based on Guttmacher–Lancet Commission's definition[2] (which defined nine SRH service categories), then mapped locations of health facilities that provide each SRH service. Secondly, GIS network analysis and service area analysis were applied to generate SRH service coverage based on travel distance along roads. Finally, service areas were integrated with geospatial population data for estimating the number and proportion of the population within and outside each service area at various administrative and traditional authority (TA) levels. Travel distance was calculated by measuring potential access to services. In the first step of the analysis, the locations of health facilities providing each type of SRH service were mapped. Then, service area analysis was conducted using the ArcGIS Network Analyst extension, combining road data and health service location.

Service areas are illustrated with polygons representing geographies within a catchment areas of 5 km, 10 km, 20 km, and beyond 20 km. We visually verified the accuracy of the data by layering the service area polygons, facilities points, and road networks. In some countries or in some remote areas, road data might not be accurate and well digitized. Therefore, other ArcGIS tools, such as "least cost analysis tool" in ArcGIS or AccessMod software can be used to estimate the travel distances to services when roads data are incomplete. For this case study, we visually verified the accuracy of the road data, and a combination of network analysis and least cost analysis were applied.

Initial Findings

Among all facilities, the percentages offering indicated SRH services by health facility type, region, and location, based upon the data collected in the Malawi SPA 2013-14.

[2] Ann M. Starrs, Alex C. Ezeh, Gary Barker, Alaka Basu, Jane T. Bertrand, Robert Blum, Awa M. Coll-Seck, Anand Grover, Laura Laski, Monica Roa, Zeba A. Sathar, Lale Say, Gamal I. Serour, Susheela Singh, Karin Stenberg, Marleen Temmerman, Ann Biddlecom, Anna Popinchalk, Cynthia Summers, Lori S. Ashford, Accelerate progress—sexual and reproductive health and rights for all: report of the Guttmacher–Lancet Commission, The Lancet, Volume 391, Issue 10140, 2018, Pages 2642-2692, ISSN 0140-6736, https://doi.org/10.1016/S0140-6736(18)30293-9. (http://www.sciencedirect.com/science/article/pii/S0140673618302939)

Domains	No.	SRH services	Tertiary level	Secondary level	Primary level								Region			Urban/Rural		Total	
			Central Hospital	District Hospital	Rural Hospital	Other Hospital	Health Centre	Maternity Facilities	Dispensary	Clinic	Health Post	Primary (combined)	North	Central	South	Urban	Rural		
Antenatal Care	1	Antenatal care (ANC)	100%	100%	100%	79%	96%	100%	37%	20%	10%	64%	71%	65%	62%	38%	77%	65%	**632**
	2	Test as part of ANC: Syphilis RDT (among HFs offering ANC)	100%	83%	63%	68%	22%	20%	7%	8%	0%	19%	24%	20%	22%	25%	20%	21%	**208**
Delivery	3	Normal delivery services	100%	100%	100%	61%	89%	100%	0%	6%	0%	53%	62%	55%	50%	26%	67%	54%	**528**
	4	Caesarean delivery services	100%	96%	32%	55%	0%	0%	0%	1%	0%	5%	7%	8%	7%	15%	3%	7%	**69**
Postnatal Care	5	Method for Kangaroo Mother Care for low birth weight babies	100%	100%	90%	38%	45%	0%	0%	3%	0%	28%	35%	28%	31%	15%	37%	30%	**297**
	6	Child vaccination services	25%	100%	100%	66%	98%	60%	85%	26%	100%	71%	78%	70%	70%	41%	85%	71%	**698**
	7	Counseling on postnatal care visits (among HFs offering ANC)	100%	88%	93%	72%	94%	100%	35%	17%	10%	61%	69%	61%	60%	34%	75%	62%	**607**
STI	8	STI services	100%	100%	100%	89%	99%	40%	85%	96%	20%	95%	95%	96%	93%	95%	94%	95%	**924**
HIV	9	HIV testing system	100%	100%	100%	89%	98%	100%	67%	60%	39%	81%	84%	83%	80%	75%	85%	82%	**799**
	10	HIV treatment: ART	100%	100%	100%	76%	95%	80%	41%	28%	5%	66%	73%	65%	67%	48%	76%	67%	**656**
	11	PMTCT of HIV infection services	100%	100%	100%	72%	93%	80%	20%	11%	5%	58%	65%	58%	58%	32%	72%	59%	**579**
	12	HIV care and support	100%	96%	95%	79%	89%	60%	43%	36%	5%	66%	74%	65%	65%	53%	73%	67%	**652**
Family Planning	13	Facility offers any modern temporary family planning	75%	100%	61%	62%	90%	60%	85%	77%	77%	82%	85%	84%	80%	78%	85%	82%	**805**
	14	Facility offers at least 3 modern methods of family planning	75%	100%	59%	55%	87%	60%	83%	68%	45%	77%	83%	79%	74%	71%	80%	77%	**753**
	15	Facility offers at least 5 modern methods of family planning	75%	100%	54%	51%	73%	40%	48%	40%	10%	57%	70%	58%	53%	51%	61%	58%	**565**
Maternal Care	16	Including antenatal care, normal delivery and caesarean delivery (indicator 1, 3 & 4)	100%	96%	32%	53%	0%	0%	0%	1%	0%	4%	7%	7%	6%	14%	3%	7%	**67**
Essential SRH Services	17	Including all above indicators	25%	71%	15%	11%	0%	0%	0%	0%	0%	1%	5%	2%	3%	6%	2%	3%	**29**

Table 1. Availability of Identified SRH Services

Findings illustrate that access to certain SRH services is extremely limited (Table 1), as only a few health facilities provide them. Among the 977 health facilities, 924 provide STI services, 799 provide HIV testing, 632 provide antenatal care, 208 provide syphilis rapid diagnostic tests (which should be a component of antenatal care), and only 69 provide cesarean section. Further, only 29 health facilities, or less than 3% or health facilities, provide all the identified indicators. Notably, it is not prudent to have the full essential SRH package in all health facilities, as utilization may not warrant the financial or human resource investment as some SRH services are not expected in all levels of facilities, i.e. caesarean delivery services in a primary level health facility. However, it is critical to evaluate service accessibility to understand where populations are experiencing limited accessibility. Further comparative analysis to understand actual service and expected service availability revealed that room for improvement was evident.

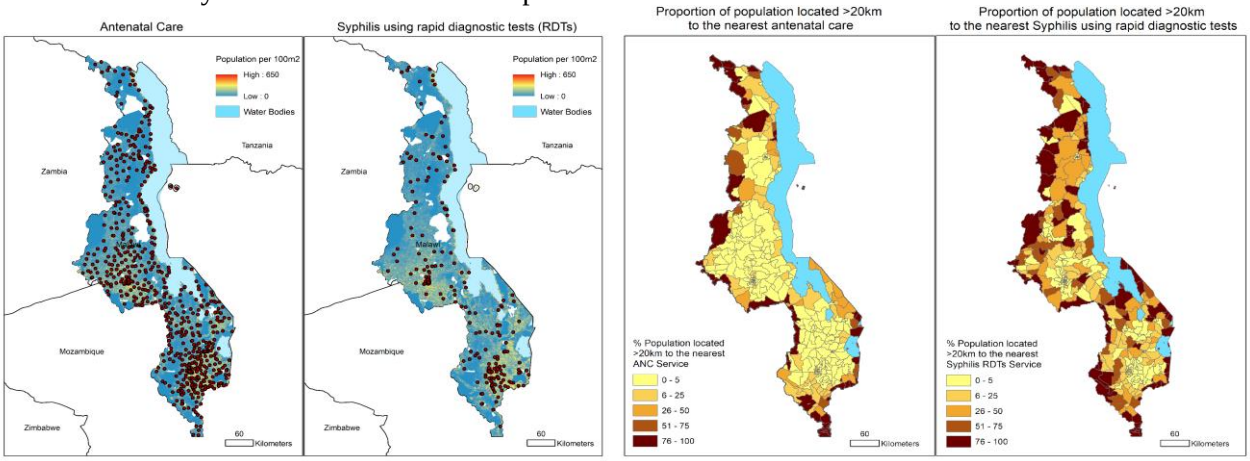

Figure 1. Comparison of people's access to antenatal care and antenatal care with Syphilis tests

After mapping the availability of the identified SRH services, we conducted geospatial analysis using road networks to generate service areas for each type of SRH service. By integrating service areas with population data, people located at out-of-service areas are estimated by TA level. An example of findings (Figure 1) identified the areas where a specific SRH service, syphilis screening (which is expected to be included in the package of antenatal care), is critically limited, by comparing people's access to antenatal care (ANC), and people's access to antenatal care with syphilis diagnostic tests. Among the 977 health facilities in Malawi, 632 health facilities provide ANC service, whereas only 208 health facilities provide syphilis rapid diagnostic tests (RDTs), which should be a component of ANC. When assessing the population with limited access to ANC services versus syphilis RDTs, the estimated number of people outside 20 km service areas are the following: 6% of the population is out of an ANC service area and 26% of the population is out of the service area of syphilis RDT (which is part of ANC), which indicate 1,109,234 people and 54,931 pregnant women reside out of ANC service areas and 4,495,605 of the population and 222,628 pregnant women reside out of syphilis RDT service areas.

This results here only illustrated one of the many SRH service accessibility mapping results obtained from this case study. The estimated potential access to essential SRH services in Malawi as measured by road distance to the nearest health facility revealed that certain types of SRH services have wide coverage, such as family planning and HIV testing and treatment. However, challenges arose during the course of this research. First, geographic variance exists in access to SRH services. Second, some essential SRH services, such as syphilis screening, which should be part of antenatal care, is sorely lacking. Cesarean delivery services are also limited and did not meet the MOH's expectation based on the hospital's type. Further, this research developed a list of essential SRH indicators, and for the first time, provided an approach to integrate population, health facility, road system and other geospatial data to understand people's accessibility to essential SRH services, the location gaps and where interventions are needed.

The research adds value to achieving universal health care by identifying and mapping essential SRH service indicators and their coverage gaps. Using geospatial analysis techniques, the analysis provides an approach of mapping access and illustrates how to use the results to identify gaps in accessibility by comparing actual and expected coverage to determine where (and which) SRH services are lacking, enable deep diving to identify specific types of SRH services with detailed availability and readiness indicators, and integrate all identified indicators to formulate an essential SRH service package. The information generated by this case study will provide a helpful reference for the Ministry of Health to enhance the national health system's provision of SRH services and progressing towards universal health care.