Mapping Hyperlocal Health Data Flows

The Case of Kyela District, Tanzania

A DATA ZETU RESEARCH REPORT

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The Case of Kyela District, Tanzania

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DATA ZETU

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FEEDBACK

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ABOUT DATA ZETU

Data Zetu helps communities to make better, more evidence-based decisions to improve their lives. Through partnerships and collaborations with local communities, Data Zetu works with stakeholders to build skills and develop digital and offline tools that make information accessible to everyone.

FUNDING ACKNOWLEDGEMENT

Cover image: United States Africa Command / Stephen Linch

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Abbreviations and acronyms

BRS4G	Birth Registration System for the 4th Generation
COSTECH	Tanzania Commission for Science and Technology
CRVS	Civil Registration and Vital Statistics
CSO	civil society organisation
DHIR	Tanzania Digital Health Investment Roadmap 2017-2023
DHIS2	District Health Information System (version 2)
DMO	District Medical Officer
e-IDSR	Electronic Integrated Disease Surveillance and Reporting
eLMIS	Electronic Logistic Management systems
EGA	eGovernment Agency
FFARS	Facility Financial Accounting Reporting System
GOT-HOMIS	Government Hospital Management Information System
HDC	Health Data Collaborative
HFGC	Health Facility Governing Committee
HFR	Health Facility Registry
HMIS	Health Management Information System
HRHIS	Human Resources for Health Information System
HSSPIV	Health Sector Strategic Plan 2015-2020
MESI II	M&E Strategy 2015-2020
Ministry of Health	Ministry of Health, Community Development, Gender, Elderly & Children
MSD	Medical Stores Department
NGO	non-governmental organisation
NHIF	National Health Insurance Fund
NHP	National Health Policy 2007
PLANREP	Planning and Reporting System
PO-RALG	President's Office Regional Administration and Local Government
RITA	Registration, Insolvency and Trusteeship Agency
RMNCAH	Reproductive, Maternal, Newborn, Child and adolescent Health
THDC	Tanzania Health Data Collaborative
U5BRI	Under-five Birth Registration Initiative
WDC	Ward Development Council
WEO	Ward Executive Officer

Key findings

1. One in ten health facilities in Kyela District capture data using paper forms only. The remaining facilities also rely on paper-based forms but capture some data digitally.

2. Facilities are required to use at least 11 different reporting tools to capture health data. Most data are aggregated monthly for reporting.

3. The upward flow of health data is well developed. Flows are clearly more paper-based at the district level (from facility to the District Medical Office) and digital from the District Medical Office to the national level.

4. The downward flow of health data was found to be limited to personal initiatives rather than being routine, often for the purpose of improving data quality, and often in the form of health-related information as opposed to raw data to be used for analysis.

5. There are no systems for sharing facility-level health data directly with communities, or vice versa. While formal structures in the form of the Health Facility Governance Committee and ward and village committees are in place to connect communities to their health facilities, the committees do not function effectively in a complex and hierarchical communication system. There was no evidence of a functional mechanism for capturing from local communities extra-facility health data related to events such as births and deaths.

6. While mechanisms for feedback on data from the national and district levels to health facilities are in place to improve data quality, corrections are often not captured at the district level resulting in inaccurate data in the national DHIS2 system.

7. There are no systems that allow for horizontal data flows between health facilities. Health facilities do, however, exchange health information informally indicating a demand for data from neighboring health facilities in the district.

8. Health facilities work closely with NGOs which, in turn, work closely with local communities. However, NGOs are not effectively integrated into the health data ecosystem.

Recommendations

For District Councils

1. Councils should work more closely with village committees (1) in the collection of data and (2) in the exchange and interpretation of data.

2. Councils should consider streamlining the overly cumbersome health planning and governance structures at the local level to improve not only the flow of information but also the flows of data between key actors in the district health system.

3. The district should work with the facilities and other stakeholders to direct resources for the improvement of infrastructure required for data collection and analysis by equipping facilities with computers and providing access to the internet. Such initiatives must be accompanied by efforts to improve computer skills and data literacy. For example, the District could work with existing initiatives such as the consortium of universities led by Makerere University in partnership with MuHAS which addresses national and sub-national identified capacity needs in data analysis, data visualization and data use.

4. The district should explore partnerships and opportunities, both within the public sector, and with external stakeholders, to improve the speed and accuracy of data flows. This could include further development of real-time data collection via mobile phones and other hand-held devices.

For donor funders

1. Donor funders and partners should take stock of existing data initiatives before investing in the health system to ensure that any investment will simplify and streamline the flow of health data rather than add complexity.

2. Donor funders should enforce more actively their requirements that data collected by grantees and partners (both government and non-government organisations) are shared with all stakeholders in the data ecosystem.

3. Donor funders should invest in research to understand better the complex and evolving flows and use of data at both the national and hyperlocal levels. Research should complement and inform existing initiatives aimed at capacity-development and the provision of communication infrastructure in health facilities.

4. Donor funders should extend initial investments in national-level data systems to include those hyperlocal levels where health data originate. Initiatives should also extend to support for data aggregation and use at the district level – the most granular level for the governance and delivery of public health services to local communities.

For national government

1. National government should continue to invest in the implementation of different national plans to strengthen the quality of data collected and used for decision-making. This should include processes to address the current situation where data errors identified at the District level are not captured in the national Health Management Information System. Initiatives should support national efforts to roll out electronic data systems at all health facilities, including but not limited to the M&E Strategy 2015-2020 (MESI II), The Tanzania Digital Health Roadmap 2017-2022 and the M&E plans of disease-specific strategic plans.

2. Allow for broader access to health data by health facilities and other actors working at the local level. This can be done either via timely (real-time) publication of health data at a granular level on open data portals or via regulated access to DHIS2. For example, the two public data portals published online by the Ministry of Health could integrated and scaled down to the district level to increase access to and use of health data by different stakeholders active in the delivery of health services at the district level.

Introduction

Two ministries govern health sector in Tanzania. The first is the Ministry of Health Community Development, Gender, Elderly and Children (MOHCDGEC) mandated to formulate, monitor and evaluate all health policies in the country, and to ensure that all Tanzanians have access to quality and equitable health services. The second is the President's Office-Regional Administration and Local Government (PO-RALG) responsible for the facilitation, management and administration of service delivery at the regional and local levels of government.

In a decentralisation system such as the one in Tanzania, local government councils are responsible for planning and delivering public services. In addition, the district is the primary custodian of the data generated within its geographical jurisdiction.

The Tanzania Health Data Collaborative[1] acknowledges that Tanzania has made progress in improving its health data and information systems. Improvement include the introduction of District Health Information System (DHIS) software as part of the country's Health Management Information System (HMIS); the development and launch of the Tanzania Digital Health Investment Roadmap; the introduction of an electronic Government Hospital Management Information System (GOT-HOMIS); improved civil registration and vital statistics through the Under-five Birth Registration Initiative (U5BRI) and the Birth Registration System for the 4th Generation (BRS4G); and innovations in community data collection through the electronic population register. However, fragmentation in data collection and a lack of integration between different systems have impaired the quality of data, as well as the sharing of data sharing between different stakeholders. It is not uncommon, for example, for different health programs within the MoH and its agencies (such as NBS, EGA and RITA) to collect separately health data from the same patient and for the data to flow in different, uncoordinated channels to the national level.

> **The district is the primary custodian of the data generated within its geographical jurisdiction.**

Issues related to the quality of health data and a lack of co-ordination is contributing to poor service delivery at the local level as confirmed by the Data Zetu[2] project's work with communities at the sub-national level in Temeke, Mbeya Urban and Kyela Districts. The project has engaged communities to assist them in identifying day-to-day challenges faced by communities and how data can be used to address those challenges. Community-identified challenges included the quality of health services provided by local health facilities, the unavailability of medicines, and the distances between health facilities and communities. The quality and availability of health

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1   The Tanzania Health Data Collaborative is a collaboration of Government of Tanzania, represented by Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) and the President's Office Regional Administration and Local Government (PORALG); health sector stakeholders; and global partners. The collaborative was established on 11 September 2017. See https://www.healthdatacollaborative.org/where-we-work/tanzania/

2   See http://www.datazetu.or.tz

sector data as a contributor to these challenges and has also been documented by other assessments.[3] A Data Zetu research study also noted the inadequacy in data availability at the local level and the predominantly upward flow of data from the hyper local level to the national and supranational levels.[4]

It is against this backdrop that this study prioritized the flow of data at the hyperlocal level as it is the primary site for data-informed decision-making related to the delivery of public health services. By doing so, the study provides a grounded and in-depth understanding of data flows in the health sector in Tanzania and identifies barriers and blockages in the flow of health data at the hyperlocal (district) level.

Objectives and purpose of the study

The main objectives of this study were (1) to take stock of existing datasets, tools and systems currently in use to manage health information in local health facilities; (2) to identify gaps in terms of quality of data collected; and (3) to assess the flow and use of data at the health facility level.

The purpose of the study is to:

- help all stakeholders in the Tanzanian health sector understand the scope and nature of data use challenges as well as the successes at the local level to foster more informed and focused interventions and investments;
- elevate the need for further study of facility-level flows of data;
- provide Data Zetu and its project partners with an empirically-informed overview of data flows at the hyperlocal level;
- identify new lines of inquiry on the flows of data; and
- support further enquiry by making openly available the research methods, instruments and data of this study.

Method

Kyela District was selected as the study site. Its selection was premised on several factors, including the fact that it was one of three localities where the Data Zetu project had engaged communities on the use of data to solve local challenges; it was the most rural of the Data Zetu localities and therefore the most disconnected from regional and national governance structures and facilities; and the Data Zetu project enjoyed the support of the the local government in Kyela District, and this made possible access to the health facilities. Moreover, Kyela District has embraced the

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3   See, for example, the report 'The Journey to better data for better health in Tanzania' (Path) and the 'Big Results Now Star Rating Assessment' (MOHSW) report.

4   Van Schalkwyk F & Sila R (2018) Connecting Flows and Places: Making data useful to hyper-local communities in Tanzania. Data Zetu: Dar es Salaam.

national investment made by the Ministry of Health and the President's Office Regional Administration and Local Authority (PO-RALG) in health data management which aims to achieve data-driven decision-making.

Kyela District consists of 33 wards, 93 villages and is home to an estimated population (according to 2018 estimates) of 249 261.[5]

All 31 *public* health facilities in Kyela District were visited by three members of the research team[6] from 6 to 10 August 2018.[7] A structured questionnaire was designed and administered to the heads of health facilities or to their representatives (see Appendix). Table 1 shows the number of public health facilities covered by the study by type of health facility.

Table 1: Number of public health facilities in Kyela District by type

Type of health facility	Number
Dispensary	29
Health centre	1
Hospital	1
Total	**31**

Data was captured in Open Data Kit (a quick-tap survey application) using hand-held devices (Android mobile phones) and exported to MS Excel for analysis.[8]

The team reviewed several documents in preparation for the field visit in order to familiarize itself with the Tanzanian health system to understand the issues that impact data collection and use for decision-making in the health sector of Tanzania. Reports consulted included the Tanzania Health Data Collaborative report, the Kyela Star Rating Assessment report and the Journey to Better Data for Better Health in Tanzania report. The review team also reviewed different strategies and policies such as Tanzania National eHealth Strategy 2013–2018 and Guidelines and Standards for Integrated Health Facility Electronic Management Systems January 2016.

To gain an understanding of data flows to and use at different levels of the district management, the District Executive Director (DED), the District Medical Officer (DMO) and members of Council Health Management Team (CHMT) were interviewed.

Based on the review of the literature, the study structured its approach with regard to the flows of health data at the local level as follows:

1. Horizontal data flows:
   a. between the 31 active public health facilities in Kyela District;
   b. between health facilities and NGOs; and

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5   http://kyeladc.go.tz/statistics

6   Jacob Mulikuza, Haikaeli Raphael and Rosemary Silaa.

7   According to 2014 data, there are 17 non-public health facilities comprised of private (5) and faith-based (12) facilities (Opendata.go.tz, List of Operating health facilities – 2014, http://opendata.go.tz/dataset/85493939-6743-481b-8361-248d5f684153/resource/f9192849-9b32-4827-90fa-522ec1e84c1e/download/Operatating-Health-Facilities-with-location-2014.csv)

8   The anonymised interview data is available at https://datazetu.or.tz/

      c. between health facilities, NGOs and the community.

  2. Vertical data flows:

      a. from the community to the health facility, and on to the district, regional and national levels

      b. from community to the national level via surveys; and

      c. from community to DMO via other channels.

Findings

Collection of data by health facilities in Kyela District

Of 31 public health facilities visited in Kyela District, 6 (19%) indicated that routine health data is captured in paper format only, while 25 (81%) facilities captured data using a combination of paper and electronic data capturing systems.[9] In cases where data is captured on paper only, the paper forms are either submitted to the District Medical Officer's office for transcription into digital format, or the transcription takes place at the health facility, either by facility staff or with the support of data clerks from the office of the District Medical Officer who call on the facility. The district hospital and health centre in Kyela District are the two sites where more regular electronic capturing of routine health data by facility staff takes place, whereas data capturing at dispensaries is more frequently paper-based.

Several factors were noted by respondents that may contribute to a data collection system at some facilities that relies heavily of paper forms. These include:

1. Lack of adequate space for computer equipment (3, 10%).

2. No electricity available at health facility (4, 13%).

3. Lack of electronic data collection tools (2, 6%).

Limited computer and data management skills are clearly also an impediment to the use of electronic system for capturing health data: 8 (26%) facilities rated themselves as having only beginner-level skills, while 20 (65%) rated themselves as having intermediary skills and only 2 (6%) rated themselves as being experts in terms of data management. Interviews with facility staff revealed that most health facility staff had to seek help from other staff on how to use a computer or had to travel to Kyela District Hospital to be assisted.

With exception of the Kyela District Hospital, the health centre and one dispensary, all other public health facilities facilities did not have an official office computer. In other words, where data were being captured digitally, health facility staff were making use of their own personal computers. A dispensary in Bujonde Ward reported that it makes use of a local internet café to transfer data captured on paper forms to digital formats.

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9   The survey questionnaire did not include a question on whether any health facilities only captured routine health data in electronic format. It is therefore not possible to say whether any of the health facilities have a fully digitised routine health data collection system in place, although based on the interviews and observations of the research team, it seems highly unlikely that this would be the case.

Health facilities in Kyela District collect several, different detailed patient-level data including: outpatient data, inpatient data, antenatal data, postnatal data, reproductive health data, vaccination data, HIV/AIDs data, TB data, laboratory data, and radiology data. For each data type, a different 'MTUHA' register is used by the health facility. In addition to routine data collection, the MTUHA Book No. 10 (see Figure 1) is submitted annually to the District Medical Officer's office and provides a comprehensive report on: staff; furniture, infrastructure and equipment; facility population coverage (catchment area); community services delivered in the respective year; death and cause of death at community level; environmental issues; availability of guidelines; financial data; etc.

MTUHA is the Kiswahili acronym for *Mfumo wa Takwimu wa Uendeshaji wa Huduma za Afya*, the Ministry of Health's health management information system (HMIS) that relies on multiple paper registers kept by each health facility and which ultimately feed into the electronic District Health Information System (version 2) (DHIS2) system.

In addition to DHIS2, district health facilities are required to use other electronic systems for collecting health data, including systems such as eLMIS and CTC2. The Electronic Logistic Management Information System (eLMIS) records all health commodities data and transfers the data captured to the Medical Store Department (MSD) for the processing of quarterly orders. The CTC2 database captures HIV program information and includes its own pharmacy module.

The owners or custodians of each data reporting tool also vary and are in many cases shared by different levels of governance within the public health system.

The Government Hospital Management Information System (GOT-HOMIS) has been made available to health facilities and is designed to accommodate the transfer of data captured on paper into the various electronic health data systems.

Table 2 provides an inventory of the different data collection tools mapped in Kyela District. The table shows six different reporting components that comprise the reporting of health data by health facilities in Tanzania. There are several reporting tools – at least 11 if one discounts that each may consist of sub-components – for which data are either captured on paper or digitally. Most reporting tools capture data for all diseases but the table also shows that there are separate reporting requirements for prioritized diseases such as HIV/Aids. Data are consolidated for reporting purposes on a weekly, monthly, quarterly or annual basis depending on the data being reported. Monthly reporting appears to be most common. The owners or custodians of each data reporting tool also vary and are in many cases shared by different levels of governance within the public health system.
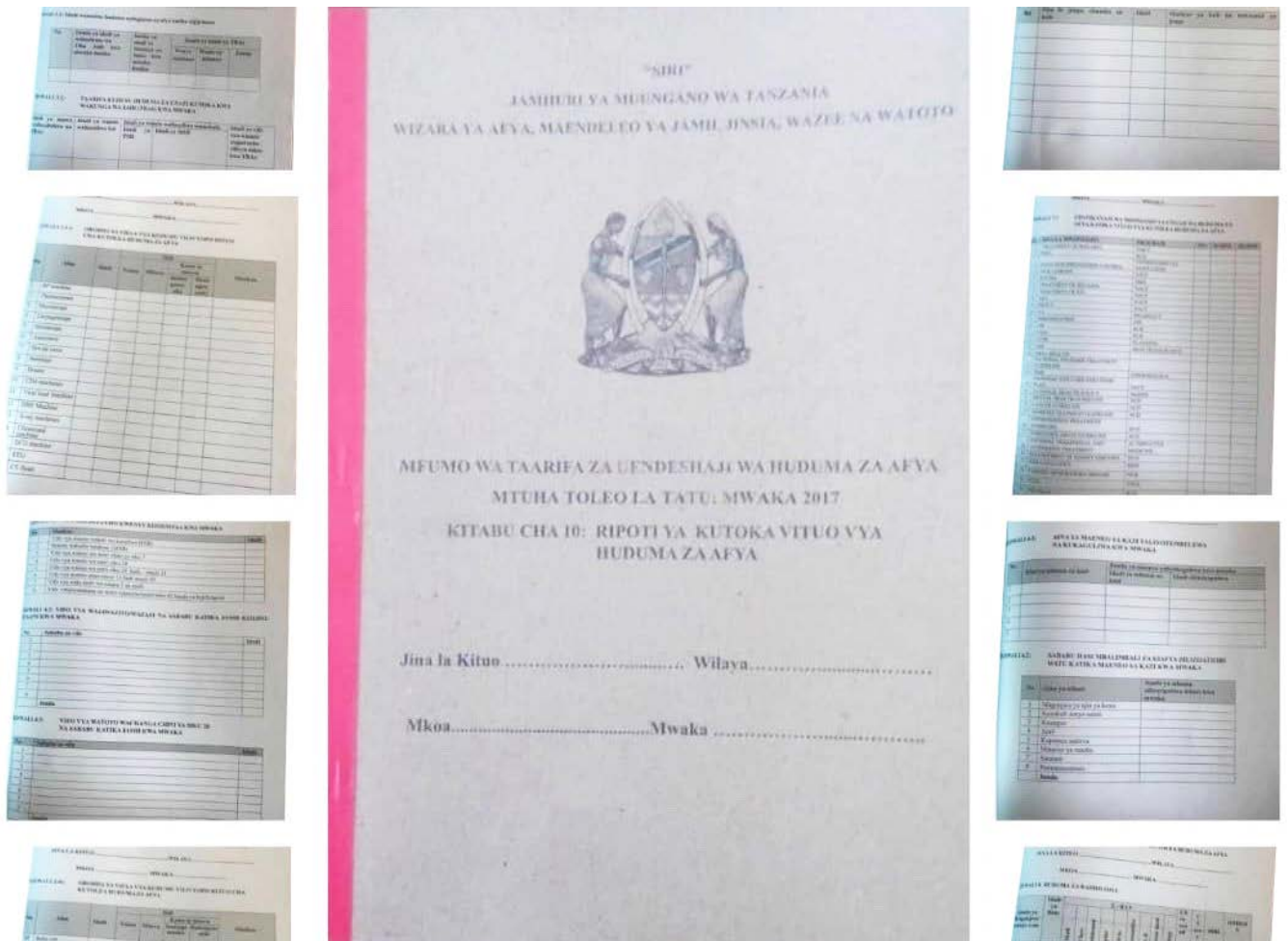
Figure 1: MTUHA book no. 10

Table 2: Inventory of Health sector data collection tools in Kyela District

Component	Reporting tools	Format	Disease	Reporting frequency
Health management	MTUHA registers	Paper	All	Monthly
	Patient Monitoring System (PMS)	Paper	HIV/AIDs	Quarterly
	DHIS2	Digital	All	Monthly
	CTC2 database	Digital	HIV	Quarterly
Hospital management	GoT-HOMIS	Digital	All	Monthly
Inventory management	eLMIS (Report & Request)	Digital	All	Quarterly
	CTC Pharmacy Module	Digital	HIV/Aids	Quarterly
	Ledgers & dispensing registers	Paper	All	Monthly & Quarterly
Financial management	FFARS	Digital	N/A	Weekly
		Paper	N/A	Monthly
Health insurance	National Health Insurance Fund	Digital	All	Monthly
Disease surveillance & reporting	eIDSR	Digital	Communicable diseases	Weekly
		Paper		Monthly

Data centralization and quality control at the district level

Collected data are aggregated at the health facilities by completing MTUHA summary forms which are then submitted to the District Medical Officers office for entry into the District Health Information System (version 2) (DHIS2) system. Population and demographic data are also captured in the DHIS2 system from the latest census and census projections done by the National Bureau of Statistics.

Disease-specific coordinators review and validate the data submitted by facilities before submitting the data to the Health Management Information System (HMIS) district focal-person.

The district conducts data quality review meetings at facility level on quarterly basis. For HIV/Aids data the district conducts data collection and verification on a monthly basis. These are the two main forums for improving the quality of health data submitted to the DMO's office by health facilities.

There are also more informal and ad hoc mechanisms to improve data quality. When data received from health facilities is questionable, the HMIS coordinator calls the facility for verification. However, of concern is that data corrections may not be implemented in DHIS2 because making changes to the data at the district level after the submission deadlines creates complications and raises concern at the national level since the uncorrected data is likely to have been disseminated already. This means that more accurate, corrected data held by the DMO may not correlate accurately with the health data held at the national level by the Ministry of Health.

> **Data corrections may not be implemented in DHIS2 because making changes to the data at the district level after the submission deadlines.**

This study did not establish the processes and quality control mechanisms in place for data submitted by health facilities via eLMIS, FFARS, eIDSR and others. This may provide a fruitful line of further enquiry.

Data flows

Health data flows in Kyela District are both horizontal and vertical. Data flows vertically both upward from communities via health facilities to the various layers of governance in the health system, and downward from the national level to communities via health facilities and district-level governance structures. Data also flows horizontally between health facilities, the communities they serve and other stakeholders such as non-governmental organizations (NGOs) active in the delivery of health services at the local level.

Figure 2 shows health data and information flows in Kyela District. Two features of the flow diagram are important to note. The first is that the diagram focuses on flows at the district level only. Flows between the national and district level are described

in the Data Zetu research report 'Connecting Flows and Places: Making data useful to hyper-local communities in Tanzania' (Van Schalkwyk & Silaa 2018). The second important feature to note is the distinction drawn between data and information in the mapping of flows. Data are known or assumed facts about something; they describe numerically, graphically or otherwise the state of an object, person or condition but they do not convey meaning. It is only once data is organized, contextualized and communicated that it is given meaning (Porat 1977), and it is in that process that data are transformed into information. DHIS2 stores data that describes the Tanzanian health system. When the data in DHIS2 is organized, contextualised and communicated, it becomes information because it becomes meaningful. This distinction is important because, as the sections below illustrate, it is data that flows from communities to health centres to the District Medical Officer and into DHIS2, but it is most often information (indicate with grey arrows) that flows back down to and between health facilities and communities.

Horizontal flows

Between health facilities in Kyela District

Health facilities cannot directly access data from other facilities. The only option for them to access health data from other facilities is via the District Medical Officer's office or via one of two open data portals[10] published by the Ministry of Health (see Van Schalkwyk & Silaa 2018).

This does not mean that health facilities do not exchange information with one another. Of the 31 public health facilities in Kyela District, 28 (93%) indicated that they are able to and do request information from other facilities whenever the need arises. The three facilities not able to access information from other health facilities are all dispensaries (in Busare, Ngonga and Kajunjum wards). It is not clear why these facilities are disconnected from other facilities in the district.
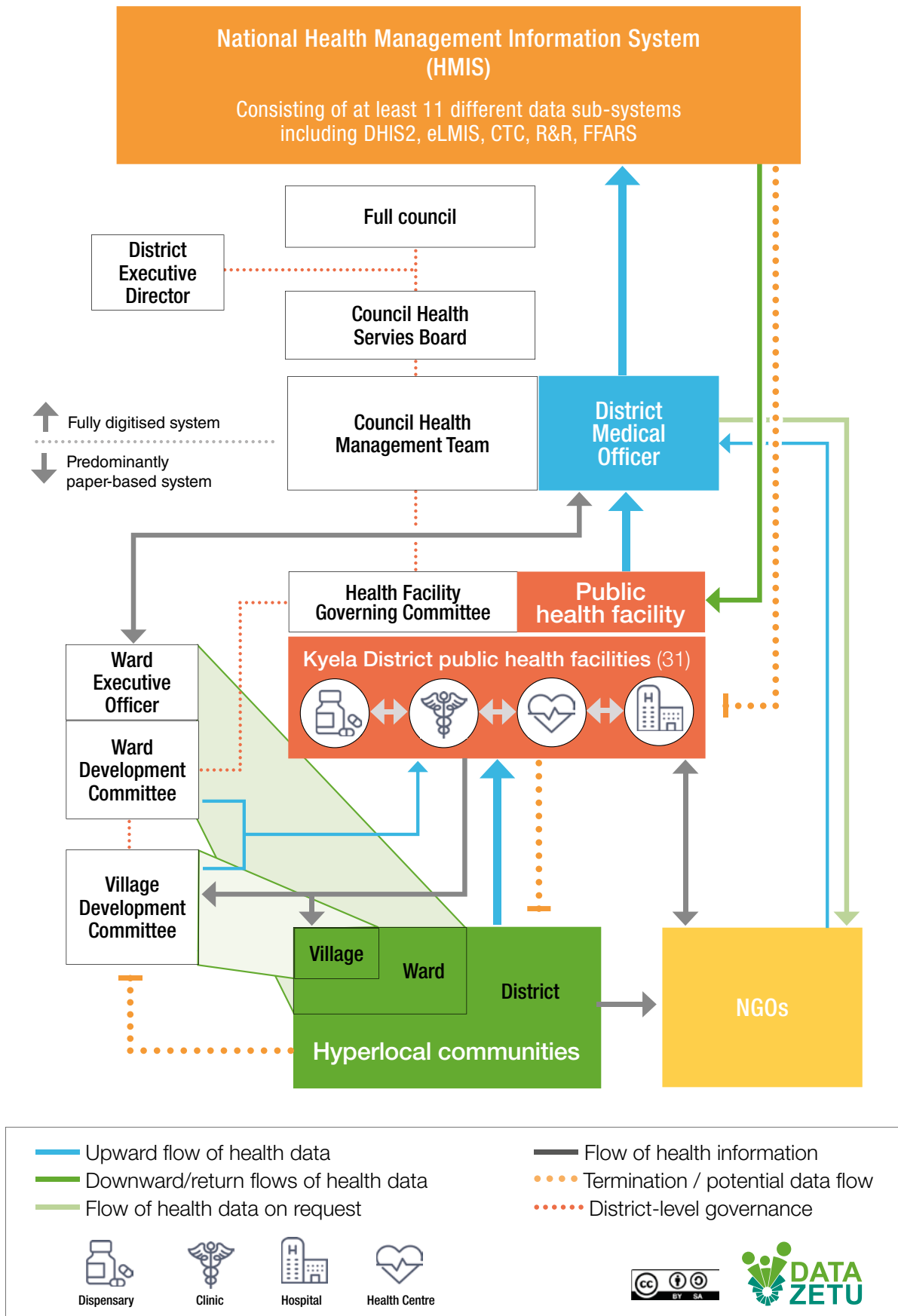
Health facilities cannot directly access data from other facilities.

No formal mechanism is in place to exchange information with the result that requests are often attributable to personal initiatives undertaken by facility staff to address different challenges in the provision of health services to communities.

Of the 31 facilities, 28 (65%) indicated that information is sought from other facilities by making a phone call, while 8 (26%) also used WhatsApp and 3 (10%) also relied on visits to other facilities to exchange information. Most facilities exchange information on the availability of medicines; information regarding a referred patient; and trends related to certain diseases such as malaria.

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10   See https://hmisportal.moh.go.tz/hmisportal/#/ and https://hmisportal.moh.go.tz/dhpportal/#/home

Figure 2: Data flows at health facility level in Kyela District

Between health facilities and NGOs

All visited facilities indicated that they are in communication with NGOs working in the communities within their catchment areas, including PEPFAR collaborators such as St Johns, JPHIEGO, Walter Reed, PSI and IRDO to name some of the NGOs mentioned by respondents.

Some NGOs collect data from health facilities in Kyela District for their respective programs. In particular, NGOs that collaborate in the implementation of HIV programs, often in support of or in partnership with PEPFAR, work closely and jointly with the district during supportive supervision visits, data quality review meetings and overall annual plans of the district to ensure that they align their activities. Furthermore, on a quarterly basis, the Regional Medical Officer coordinates a performance review meeting for specific diseases and these meetings include NGOs and the district coordinators of specific programs.

While NGOs working in the district were not surveyed, there is evidence that data sharing between NGOs working in the health sector is poor (Tunga & Mushi 2016; Van Schalkwyk 2018). Research that focuses on non-government health facilities and organisations at the local level would certainly provide additional insights into the dynamics of health data flows.

Between health facilities and the community

Findings show that all health facilities in Kyela District collect health data directly from the communities they serve and that they use different mechanisms to do so, with the most frequently used mechanisms being via community health workers (CHWs) and NGOs. Most of the CHWs are also recruited by the NGOs, making NGOs a major source of information from the community. The Ward Development Committee (WADC), the Health Facility Governance Committee (HFGC) and village leaders were also mentioned by respondents as sources of health data on the community, but only by very few health facilities. This suggests that health facilities prefer their own and more informal mechanisms for collecting data from the communities they serve over more formal reporting mechanisms and structures.

In the case of flows from health facilities to the community, all but one health facility indicated that health-related information flows from the facility to the community. In the case of information flows from health facilities, formal structures such as the WADC appear to play a far more important role with 22 (71%) facilities indicating that the WADC is used as mechanism to communicate health information to the community. Other mechanisms include village meetings (19, 61%) and outreach campaigns (8, 26%).

Noting the distinction made earlier, it is therefore apparent that while health *information* flows from health facilities to the community, there are no flows of health *data* to communities, either directly or via the governance structures in place (indicated by an orange dotted line in Figure 2).

Vertical flows

The upward flow of health data (indicated by blue arrows in Figure 2) is well developed and assumes a combination of data captured on paper and digital data. Flows are clearly more paper-based at the district level (from facility to the District Medical Office) and digital from the District Medical Office to the national level. Downward flows (indicated by green arrows in Figure 2) were found to be limited to personal initiatives rather than being routine or formalized; often for the purpose of improving data quality; and often in the form of information as opposed to data.

### Upward from communities and health facilities to the district level

The flow of health data from health facilities to the District Medical Officer has already been described above. In sum, the upward flow of health data from facilities is still heavily reliant on the completion of paper forms, and is characterized by the aggregation of patient and facility management data on a monthly or quarterly basis for submission to the District Medical Office either as paper forms or as digital files.

Communities are expected to communicate concerns regarding the provision of health services by local facilities via each facility's Health Facility Governing Committee (HFGC) to the District Medical Office (also see Figure 3). The Committee is expected to raise issues and concerns in relation to health from the community, and to discuss these with the respective health facility before reporting back to the community the response and agreed-upon solutions provided by the facility. The Committee is also responsible for collecting information and concerns from health facilities and for sharing these with the community via the Ward Executive Officer's office. The HFGC are also expected to share a copy of the minutes of its quarterly meetings with DMO's office.

During the study, the Health Facility Governing Committees at all health facilities were unavailable as the Committees had completed their three-year term of service and the Kyela District was still in the process of appointing new committees.

From the interviews conducted, it appears that the Health Facility Governing Committees are not yet functioning effectively. For example, minutes of quarterly meetings were either not kept or were not shared with the District Medical Officer. The District Medical Officer's office indicated that the Health Facility Governing Committees have not been proactive in meeting their mandatory roles, confirming concerns raised by previous studies about the value of this governance structure, particularly in relation to its sustainability (Kilewo 2015) and its role as a bridge between the community and district government (Kessy 2008). The District indicated that it has identified the shortcomings of the previous Committee and that these will be addressed in the appointment of the new committee for the period 2018 to 2021.

Figure 3: Flow of information from communities and health facilities to the district council
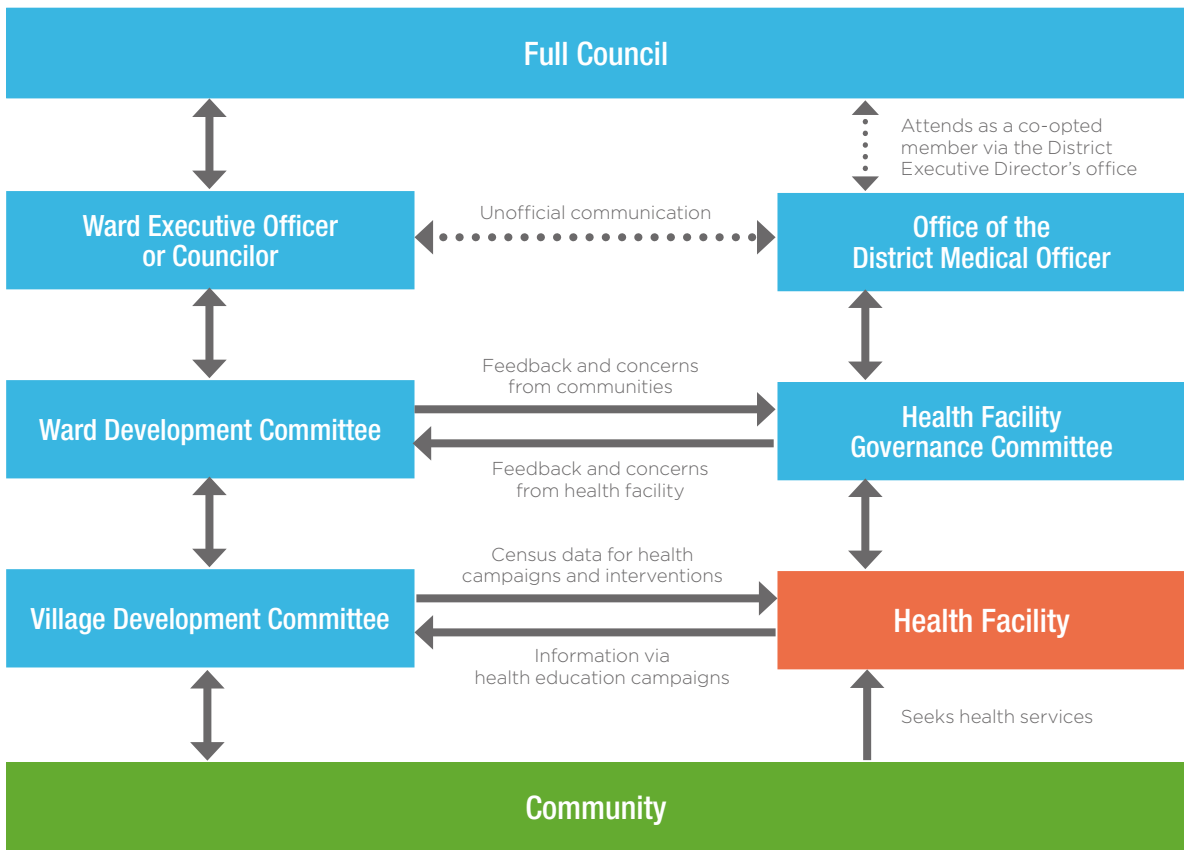
The development of Comprehensive Council Health Plans (CCHP) is a governance mechanism allowing for the inclusion of communities in decision-making related to the delivery of health services in Tanzania. It is in the development of CCHPs that priorities for healthcare at the district-level are set out through an inclusive, bottom-up planning process.

The Council Health Service Board and Council Health Management Team in each district are the responsible organs for receiving and reviewing the annual plans and budget projections from the health facilities. They are also responsible for incorporating these plans into the CCHP before submitting them to the Full Council and the Regional Secretariat for further review and approval. The Full Council is the highest political body in the district and has overall authority for all district health services. After approval by the Full Council, the CCHP is forwarded to the Ministry of Health and the President's Office Regional Administration and Local Government (PO-RALG) for final approval before funds can be disbursed to the Local Government Authority.

The development of a CCHP starts with the Council Health Management Team consulting local communities and other stakeholders in the local health sector, as well as the Health Facility Governance Committees of district health facilities. Community

members are therefore expected to play an important role in developing local health plans, including the drafting of the CCHP based on health data from the community.

Community members are expected to participate in the monitoring and reviewing of progress being made in the implementation of agreed priorities in their villages at quarterly village meetings. To facilitate this process, village councils and ward development committees are required to collect various kinds of data (both primary and secondary) which are to be analyzed and presented for discussion at village and other meetings. Data collection thus is intended to be a regular undertaking in wards and villages.

Discussions with stakeholders in Kyela District indicated, however, that the way the process works in practice is far from the way it is intended to work (Aiko 2018). There are several explanations for this, including the low rate of participation of community members in the village meetings; low levels of capacity, both in term of equipment and the ability of village and ward executive officers to collect, manage and analyse data to produce actionable information; and the fact that the plans and priorities identified by communities are rarely endorsed at higher levels of government (Aiko 2018). Therefore, there is a breakdown in the upward flow of additional, non-facility health data from communities to health facilities and the District Medical Officer via village and ward committees (as illustrated by the dotted red line in Figure 2). This also suggests that more efforts to engage communities, including making this data more accessible to people with low levels of capacity, could help to realise this ideal practice.

Downward from the district to health facilities

Interviews with the District Medical Officer's office and with health facilities revealed that each facility has access to DHIS2 data and that data are used for different purposes. For example, interviews with medical officers in charge at health facilities confirmed that they generate reports from DHIS2 to compute trends in disease outbreaks or to produce information for community education purposes. For example, Kajungumele dispensary launched a malaria fumigation initiative which was informed by a noted increase in malaria cases. The facility also experienced cholera outbreaks and from an analysis of the data realized that the community was not building or using toilets resulting in the pollution and contamination of water sources. Based on this information, the facility launched an education campaign in its catchment area. An HIV program highlighted that access to health data helped them to support several community-based interventions in relation to lost cases and understanding the supply needs of HIV patients.

Despite the positive finding that individual facilities access and use DHIS2 data, health facilities cannot access health data on the district health system as whole.

Between the district and NGOs

It has already been pointed out that NGOs contribute to the health data system by working closely with health facilities to collect data as well as in reporting. However,

there are no official mechanisms for the flow of data from the district or from health facilities to NGOs. The only available official route to access district-level health data is to make a formal request in writing to the District Medical Officer (indicated by a pale green line in Figure 2).[11]

Conclusion

This study has shown that all health facilities are required to use several data collection and compilation tools made available by the national Ministry of Health. At the facility level, data capturing is still predominantly paper-based, and reporting appears to be institutionalized and executed by healthcare workers who are proficient in the use of the various reporting systems. However, while data for reporting may be institutionalized, the use of health data by facilities is not widely institutionalized.

There are ongoing efforts to improve electronic reporting. All health facilities surveyed and interviewed are either aware of or use government-designed software tools to input data. However, inadequate infrastructure such as Internet connectivity, space, electricity and a lack of computer and data skills are hindering the uptake of reporting using electronic systems at some health facilities in the district. As a result, the role of data entry into electronic systems is left to the DMOs office.

This partial implementation affects data flow and availability, both of which are critical for informed decision-making. It also affects the quality of data available in the health management information system: because errors are not identified in real time, it is often too late and too onerous to make corrections when errors are identified. As a result, data errors noted at the district level are often not corrected in the national system and this introduces data inconsistencies which leads to users doubting the quality and being leery of depending on the data for decision-making.

The study shows that there is a clear upward flow of data from health facility to the district level. Intra-facility information sharing was observed but health facilities are not able to access data directly from other health facilities in the district. There are also no official mechanisms for the downward flow of data from the district to the facilities or to communities and NGOs.

It is hoped that the findings from this study are of use to different stakeholders both within and outside Kyela District, particularly in terms of having shown where in the local health data system there are opportunities to unblock flows and improve data use for decision-making that is in the best interested of the district. The findings should provide useful evidence to inform ongoing efforts to develop a prototype subnational data roadmap that sets out specific areas for action.

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11   NGOs could make use of the data portals published by the Ministry of Health to access health data. It is not clear, however, whether the portals make available the kinds of data sought by NGOs, and the warning that 'This data is not for publication – it is used for administrative purpose only. To get data for publication, contact [the] Permanent Secretary, Ministry of Health' does not encourage reuse.

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Appendix:
Health facilities visited in Kyela District by ward and type

Name of facility	Type/ level of service	Ward
Bujonde	Dispensary	Bujonde
Busale	Dispensary	Busale
Ikama	Dispensary	Ikama
Ikolo	Dispensary	Ikolo
Ikombe	Dispensary	Matema
Ilopa	Dispensary	Ikama
Ipande	Dispensary	Ipande
Ipinda	Health Centre	Ipinda
Itope	Dispensary	Itope
Kajunjumele	Dispensary	Kajunjumele
Kandete	Dispensary	Ipande
Kapamisya	Dispensary	Mwaya
Katumba Songwe	Dispensary	Katumba Songwe
Kilasilo	Dispensary	Ikimba
Kisale	Dispensary	Ipinda
Kyela District Hospital	Hospital	Bondeni
Lema	Dispensary	Busale
Lugombo	Dispensary	Mwaya
Lukwego	Dispensary	Lusungo
Lutusyo / Muungano	Dispensary	Ikolo
Makwale	Dispensary	Makwale
Mwalisi	Dispensary	Ngana
Ndobo	Dispensary	Ndobo
Ndwanga	Dispensary	Katumba Songwe
Ngana	Dispensary	Ngana
Ngonga	Dispensary	Ngonga
Ngekye	Dispensary	Mababu
Njisi	Dispensary	Njisi
Njugilo	Dispensary	Ipande
Sinyanga	Dispensary	Nkokwa
Tenende	Dispensary	Mwaya

Appendix:
Map of health facilities in Kyela District by type
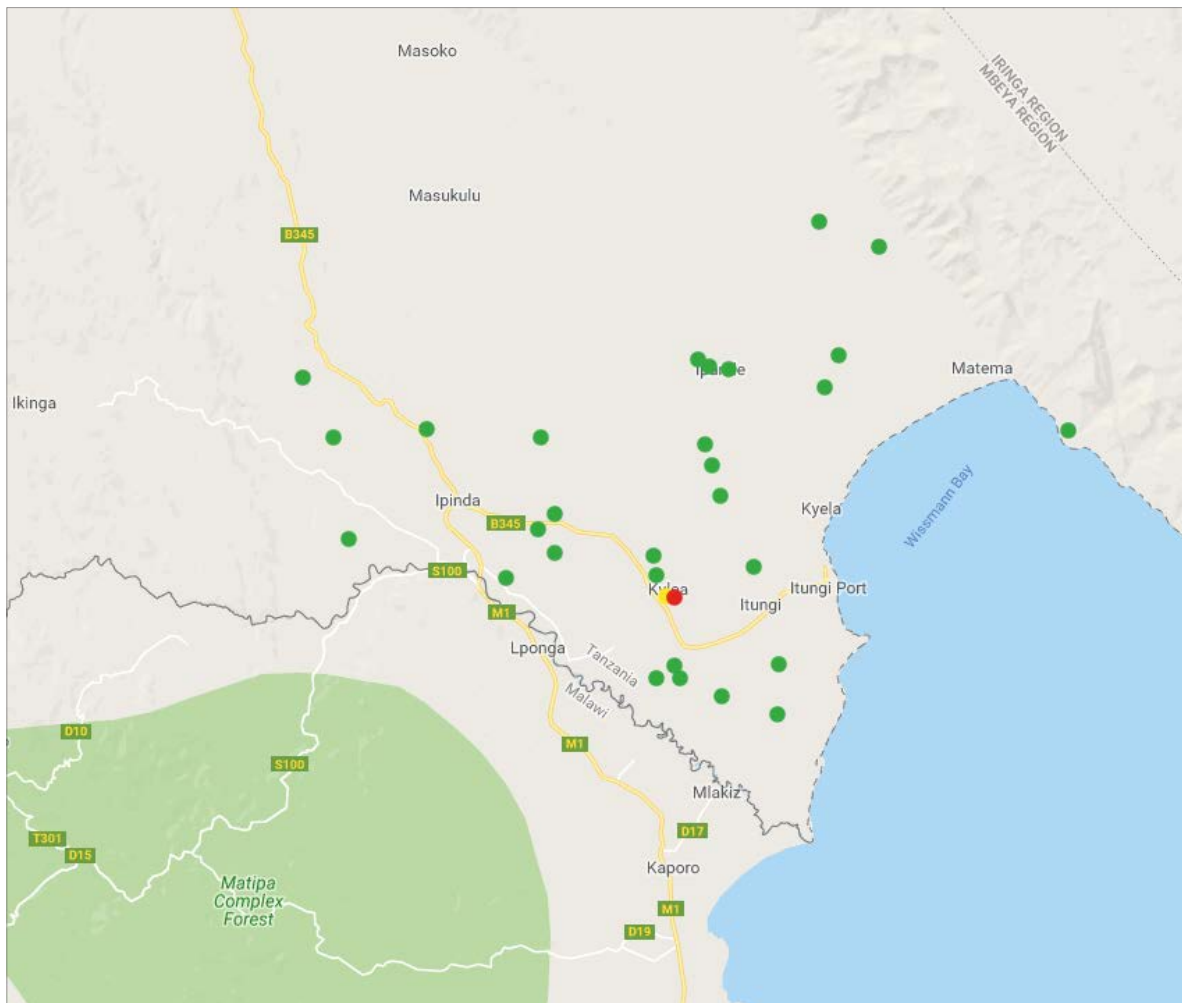
Legend

● Hospital   ● Health Centre   ● Dispensary

Data sources:
1.   The United Republic of Tanzania - Government Basic Statistics Portal http://statistics.go.tz/data-set/35376869-7270-486d-a2ef-dd579a07742d/resource/14d5d241-292a-4115-8f3c-b42ece5ff34e/download/Distribution-of-HF-by-Council-for-the-year-2014.csv
2.   https://kipindupindu.com
3.   https://www.tripmondo.com/tanzania/mbeya-region/kyela/
4.   Co-ordinates collected by research team
5.   Own calculations and adjustments

The dataset for this map is available at www.bit.ly/dzresearchdata

Appendix: Survey questions

Questions for the District Medical Officer (DMO)

1. Do NGOs have access to data?
2. If YES, what are the procedures for NGOs to access data
3. Does the community have access to health data?
4. If YES, what are the procedure for Community to access data
5. Does the DMO conduct data quality checks for entry to DHIS? (Yes/No)
6. What are the other data captured by the DMO in DHIS2? (List)
7. What additional data does the DMO collect?
8. Does the DMO keep any data records that are only relevant to the health needs of the district? (Yes/No)

Questions for the District Executive Director (DED)

1. How does the DED's office access health data?
2. Does the Director have access to dhis2? (Yes/No)
3. Is the Director aware of the two public data portals published by the Ministry of Health? (Yes/No)
4. Have you ever used the MoH's publicly accessible health data portals? (Yes/No)
5. If YES, then for what purpose?
6. Have you ever used other, non-MoH data sources, e.g. WHO, UNICEF, others? (Yes/No)
7. If YES, which ones and for what purpose?
8. What types of health data would you like to have but are not currently available?
9. Does the office make requests to the District Medical Office for data? (Yes/No)
10. If YES, what is the mechanism for making such requests to the DMO?

Questions for health facilities

1. What kinds of services are offered by your facility?
2. Does your health facility have a table with enough space to place a computer together with other things like dispensing register?
3. What type of mobile service provider is available in your area?
4. Does your facility have electricity?
5. What software tools are currently used at facility?
6. Does the health facility staff responsible for data entry?
7. How would you self assess your computer knowledge?
8. Are you able to manage data?
9. If YES, what level of data management are you at? (Beginner, intermediary or Expert)
10. Is the facility well stocked with data collection and aggregation tools?
11. Where is data captured by your facility? (Paper/Digital)
12. What data is captured on paper and what is captured digitally?

13. How frequently is data consolidated for reporting to the DMO?
14. Are you able to access data from other health facilities in the district?
15.   If YES, which facilities?
16.   If YES, what data?
17. Do you ever request data or information from other health facilities? For example, on availability of beds or medicines?
18. If YES, how is the information requested?
19. Describe the type and frequency of data on HIV/AIDs and Reproductive Health collected at the health facility.
20. Describe the type and frequency of data on cholera collected at the health facility.
21. Do you receive feedback from DMO on health data submitted to that office?
22.   If YES, how is the feedback provided?
23. Do you receive feedback from the MoH on health data submitted to that office?
24.   If YES, how is the feedback provided?
25. Are you aware of the two public data portals published by the Ministry of Health?
26. Have you ever used the MoH's publicly accessible health data portals?
27. If YES, then for what purpose?
28. Have you ever used other, non-MoH data sources, e.g. WHO, UNICEF, others?
29.   If YES, which ones and for what purpose?
30. Does the health facility collect health data from the community?
31.   If YES, then what is the mechanism?
32. Does information flow from Facility to community?
33.   If YES, then what is the mechanism?
34. What purpose is the information for?

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