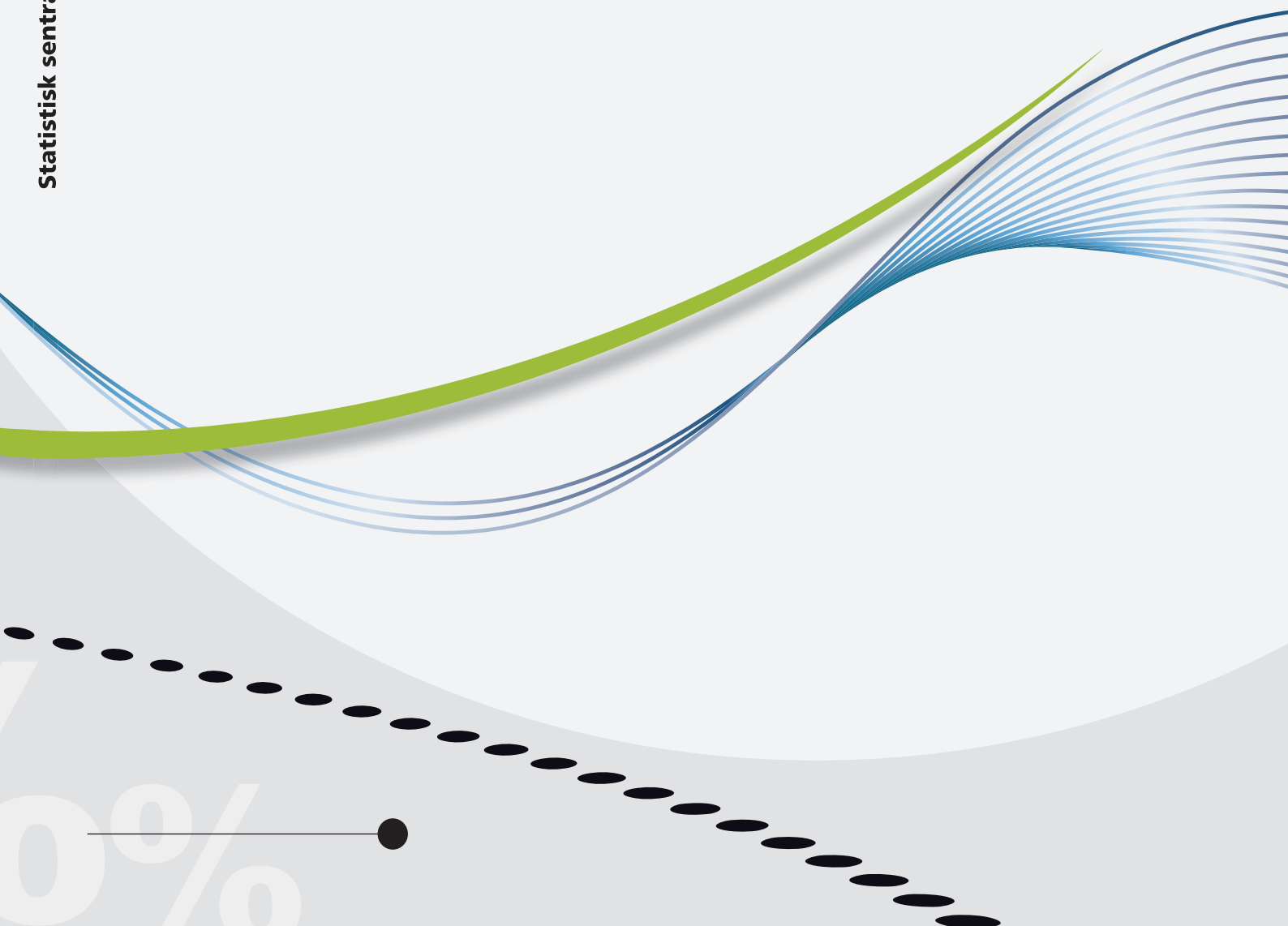


*Geir Hjemås, Remy Bråthen, Stein Terje Vikan
and John Åge Haugen*

**Improving quality on health data,
recommendations and guidelines**

Based on the case of the Health Management
Information System in Malawi and DHIS2



*Geir Hjemås, Remy Bråthen, Stein Terje Vikan and
John Åge Haugen*

Improving health data quality

Recommendations and guidelines

Based on the case of the Health Management Information
System in Malawi and DHIS2

In the series Documents, documentation, method descriptions, model descriptions and standards are published.

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Published 18 January 2017

ISBN 978-82-537-9479-2 (electronic)

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Data not yet available	...
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Preface

Data of good quality on health is important for a country's ability to deliver and evaluate its performance of health services. In this report experiences from Malawi is examined as a case for developing a practical strategy for improving data quality in Health Management Information Systems (HMIS). The report focuses on which measures that should be put in place to improve data quality. Suggested improvements are based on lessons learnt in Malawi which also have validity beyond the national experience.

The project is the result of cooperation between the Ministry of Health in Malawi (MoH) and in particular The Central Monitoring and Evaluation Division (CMED), Statistics Norway (SN), World Health Organization (WHO) and the Department of Informatics (DoI) at the University of Oslo. The project activities were carried out in 2015.

Thanks to the Norwegian Agency for Development Cooperation (NORAD) for funding this report.

Statistics Norway, 16 December 2016.

Bjørnar Gundersen

Abstract

A Health Management Information System (HMIS) is an important element for a country's capacity to monitor health, and for evaluating and improving the delivery of health-care services and programs. Many developing countries still struggle with quality problems in their HMIS data. With this as a point of departure, this project has a twofold ambition; first to propose methods for improving data quality of HMIS data in Malawi, second to gain insight on how the DHIS2 system in general can improve HMIS data. Statistics Norway's approach is based on well-known quality methods, involving both statistical methods and evaluating structural and institutional challenges.

HMIS data in Malawi is collected through the District Health Information System (DHIS2). The project achieved to introduce the new DHIS2 quality tool in Malawi, and thus make modern statistical techniques, methods and tools available. In addition, training and local capacity building in the use of these techniques, methods and tools was carried out. In the process it was quickly surmised that, due to lack of quality in the data collected, several other measures needed to be put in place in order to improve the quality of health data in Malawi. Firstly, there is a lack of central control over the process of collecting health data. Multiple agencies are involved, each with its own agenda and field of interest. There is also little or no coordination between the agencies involved. This institutional context has led to a process where vast amounts of data are collected, but these receive little or no quality control. There is need for an implemented strategy for quality control and central data processing. Furthermore, official publication of results has not been regular and no coherent dissemination procedures are in place. Data providers have minimal training in their field of work and there is a high degree of turnover. One last issue is that there isn't any feedback to the local health officials reporting the data. This reduces their incentives to improve their reporting.

To sum up, Malawi today (2015) has access to the technology and the statistical methods that are associated with the production of data and statistics of sufficient quality (DHIS2 and the quality tool). What is found lacking are institutional factors surrounding and supporting the process. A lot has been said about developing countries' ability to leap-frog stages in technological development and the opportunities such advances provide. But modern technology and methods often depend on a proper institutional context in order for society to reap the benefits of the new technology.

For Malawi to reach their goal of good quality health statistics, the institutional context should be subjected to a deeper analysis. First and foremost, central control over production of statistics by the Ministry of Health should be strengthened. Greater coordination of agencies and reduction in the amount of data collected should be one of the main tasks set for the Ministry of Health. The input side in the data/statistics production chain should receive greater focus. Technology can alleviate some problems with paper-based collection, but several problems remain; lack of training, burdensome amount of data collected and lack of feedback. These problems should be resolved in order to increase data quality. Furthermore, an in-depth quality self-assessment should be carried out and an action plan developed to address issues uncovered.

The Ministry of Health, through The Central Monitoring and Evaluation Division (CMED) are motivated to improve DHIS2 data quality. CMED has a central role in this project and have been an active contributing partner, characterised by an approach of openness both by sharing data and working routines

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1. Introduction

A Health Management Information System (HMIS) is generally the most important element for a country's capacity to monitor health, and for evaluating and improving the delivery of health-care services and programs. Even though HMIS is important in developing health care services, many developing countries struggle with data quality problems resulting in incomplete, inaccurate and untimely information which is not useful for health decision-making.

In order to introduce sound statistical methods in editing of health data, a quality tool was developed for the DHIS2-system (Developed by WHO). This tool is, as a part of the project, installed and tested in Malawi. Based on field visits and discussions with key staff at the Ministry of Health, Statistics Norway (SN) has provided advice and built capacity on how to implement the quality tool in the data collection system. Both technical and structural/institutional issues have been looked into. The activities on this project were carried out in 2015, and this report was approved in 2016. The project included 3 missions from Statistics Norway to Malawi with the purpose of reviewing the data collection system for health data and to give workshops on data quality.

In general Statistics Norway's approach is based on best practices and experience from similar work. A statistical approach to data editing and quality improvement needs to be systematic, and if used right, can result in profound improvements in data quality. In addition, these methods can be set up to pinpoint where a data set has the largest potential for improvement, thus providing a way to prioritize limited resources for data improvements. A vital part of improving data is to have a good overview of data flows and evaluate these. Therefore, the Malawian HMIS system is mapped out as a basis for SN's advice on which areas to prioritize. This report provides suggestions for implementation measures for improving HMIS data (DHIS2) in Malawi. The findings in the report are also important information to other DHIS2 countries who wish to improve the quality of HMIS data (but also on other types of data).

1.1. Document outline

Chapter 1 of this report details the background starting with defining the main goal of this project. After that a short introduction of the context for the project, preferred editing approach and a list of detailing actions to ensure better data quality in the future is provided. In chapter 2 details on the DHIS2 system is presented. In the chapters from 3 to 6 both institutional factors influencing data quality is discussed and an in-depth description of the data collection process is presented. Dissemination and the importance of metadata are detailed in chapter 7 and 8. Final conclusions are presented in chapter 9 and a recommended way forward in chapter 10.

There are two more publications by SN on data quality and DHIS2 published by SN (also see references):

- The Health Management Information system in Malawi: Assessment of data quality and methods for improvements (2017)
- Manual for the DHIS2 quality tool: Understanding the basics of improving data quality (2017)

1.2. Main goals for this project

The goals set at project start in January 2015 were as follows:

1. Implement modern statistical techniques in editing and improving the Malawian HMIS data. This process should involve local capacity building and transfer of knowledge.
2. Implement statistical tools for editing and data quality improvement as a generic tool in the DHIS2 system (app). This means that state of the art editing tools will be available for the whole DHIS2 community.
3. Use statistical methods for analysing the data and provide input on how to improve source data collection and an efficient feedback system. This will lead to better input data, and again better quality.
4. Implement/suggest feedback mechanisms from national and district level to health facilities. Quality improvement on HMIS data is dependent on a well-functioning method for communication between the three different levels: National, district and facility level.
5. Use local competence and build local capacity. Involve Malawian staff in testing and use of DHIS2 system and build necessary capacity at Ministry of Health in the use of statistical methods.
6. Provide feedback for improvements of DHIS2 quality tool and use experiences to prepare suggestions to make a general approach for implementation in other countries.

Achievements in 2015

The implementation of modern statistical techniques, methods and tools was achieved by making available the quality tool in DHIS2 for personnel in Malawi. During missions to Malawi, workshops were held to build local capacity in the techniques, methods and tools now available. Feedback from practical experience with the quality tool was collected and forwarded to WHO personnel responsible for the development of the quality application.

1.3. Malawi

Malawi is predominantly an agricultural country. In 2014 Malawi's population was estimated at 15.8 million, and the population is projected to be around 26 million in 2030, according to the National Statistics Office in Malawi. This rapid growth in population will generate a need for a corresponding increase in health funding.

Malawi has a high prevalence of communicable diseases such as malaria, acute respiratory infection, tuberculosis, diarrhoea and HIV/AIDS. As the majority of these diseases are preventable, emphasis will be on prevention – as a solution in the long run. Other important health areas for Malawi are data related to maternal and infant mortality, and births. These are areas used as background for different indicators for instance used by UNICEF and WHO.

The Ministry of Health is a government agency that, through its various departments, sets the agenda for health in Malawi in collaboration with other stakeholders. It is responsible for developing, reviewing and enforcing health and related policies for the health sector; spearheading sector reforms; regulating the health sector including the private sector; developing and reviewing standards, norms and management protocols for service delivery and ensuring that these are communicated to lower level institutions; planning and mobilizing health resources for the health sector including allocation and management; advising other ministries, departments and agencies on health related issues; providing technical support for supervision; coordinating research; and monitoring and evaluation (National HIS strategic plan, 2011-16, The Ministry of Health). The Central Monitoring and Evaluation Division (CMED) are located under the Ministry of

Health, in the Department of Planning and Policy Development. CMED have the responsible for coordinating routine Health Management Information Systems (HMIS) and different subsystems. Among the responsibilities of CMED are the building of capacity, monitoring, coordination, support and evaluation at the various levels in the health sector.

2. Editing data in DHIS2

DHIS2 is an open source software platform for reporting, analysis and dissemination of data for all health programs, developed by the Health Information Systems Programme (HISP). It is the preferred health management information system in 47 countries and 23 organizations across four continents. DHIS2 helps governments and health organizations in managing their operations more effectively, monitor processes and improve communication. Malawi is among the countries using DHIS2.

A first edition of the tool for quality improvement and data editing in DHIS2 is now developed (developed by WHO). The recommendations in this report for data quality improvements can be used as a general approach for implementation of the DHIS2 quality tool. The data collection tool itself, DHIS2 and the new quality tool, seems to be a highly appropriate tool for collection of administrative data in the health sector.

The new quality tool in DHIS2 introduces state of the art statistical tools for data review and editing to the DHIS2 system. Important functionality for this tool is for instance selective editing with a top-down approach and a focus on the aggregated level. In other words, this is a method of quality improvement that reviews the figures that have the largest impact on quality first.

SN general advice on implementation of the DHIS2 quality tool is thorough covered in the chapters 2 – 10 in this report. Even though the report focuses on Malawi it highlights areas that SN sees as fundamental in a quality improvement process independent of country and context. In short, a general approach for implementing the DHIS2 quality tool must be secured through a robust data collection, quality improvement and dissemination system. This implies reviewing institutional factors surrounding and supporting the data processing system. Further, an adequate quality of a core section of HMIS data must be secured, owing to the fact that many of the methodological approaches for data improvement rely on comparing diverging figures to an average. If the data quality in general does not have sufficient quality these methods are not efficient. If the assumption of adequate data is not present, then the data collection system as a whole should be addressed, preferable through a self-assessment and/or a mapping to highlight areas of improvement. Based on this an action plan for quality improvement should be developed. In this process the DHIS2 quality tool can provide guidance of where to look and to measure the effect of efforts made to improve quality. To succeed in implementing the DHIS2 quality tool in a country, capacity building in basic understanding of the methods and training in the use of the tool is vital. Training should have emphasis on practical use of the tool. See Manual for the DHIS2 quality tool: Understanding the basics of improving data quality (Details in references)

3. Editing approach

The most efficient editing technique is no editing at all, but instead making sure that the correct data are obtained during the data collection phase. This can be achieved if the questionnaire is designed properly, the manuals are good and the

data requested is easily accessible. This is however difficult to accomplish, so it is necessary to have an editing approach. The most common approaches are micro-editing and macro-editing/selective editing.

Micro-editing is a technique where errors are found through inspection of individual observations. Editing is done at the lowest level. Micro-editing procedures have a number of problems: often there are many checks with narrow tolerances resulting in too many mistakes that need to be resolved manually by analysts. The analysts cannot assess the relative importance of these errors. Each marked item has the same weight and needs the same amount of time for correction. However, many errors have a negligible impact on the final estimates: either they are small or they cancel out.

Macro-editing focuses on the end result and how to achieve the greatest effect with less demand on resources. Selective editing, which is a macro approach, is based on a collection of records to make a selection of those records that contribute the most to errors observed at some aggregate level. During the macro-editing process, the data needs to be displayed in various ways to enable the analyst to zoom in or analyse the data. This is known as a top-down approach. Looking at outliers and deviations at the aggregate level the analyst can either zoom in or apply visualization, e.g. in a scatter plot. The quality tool that is available for the DHIS2 system implements a selective editing with a top-down approach and a focus on the aggregate level.

The following chapters cover different areas of the Malawian HMIS system which SN believes need improvement to increase data quality. To each topic suggestions for further follow up is included. This information, together with the results from a self-assessment, should be used to set up a plan for improved coordination and data quality.

4. Multiple agencies

It has been difficult for SN to identify all agencies involved and their role in the production of health data in Malawi. In addition to different levels within the Ministry of Health it was also unclear to what degree other ministries or agencies were involved. The different donors also play an important role in defining and deciding which variables to focus on. Donors often have to meet demands from their headquarters' interests rather than supporting the Ministry of Health. Without any coordination the health information system has a tendency to develop in a fragmented order. Intense pressure for the rapid availability of data often contributes to the establishment of disease-specific information systems driven by performance-based funding. You then run the risk of developing multiple and parallel information demands which the organization lacks the resources to deliver on. Excessive reporting requirements with inadequate coordination can result in a vast amount of data with uncertain quality that likely will never be analysed or used.

A main challenge in Malawi seems to be that there is no clear division of labour between staff at various levels in the system. This applies in particular to tasks related to quality control and dissemination. Similarly, there is a trend towards pushing analysis functions down towards the districts. In general, there seems to be little focus on the division of labour in the system, although there is a trend towards decentralization. It seems to be unfortunate that the responsibility for the production of statistics is decentralized. It has been difficult to observe any effective system for monitoring or evaluation of the data process and there are few indications that data collected play any major role in decision making.

The legal and regulatory contexts in which health information is generated and used are important as they enable mechanisms to be established to ensure data availability, exchange, quality and sharing. The Ministry of Health should take a more active role and have more control over the data collection. Coordination of the different demands for health data should be coordinated by the Ministry of Health. Dependency on donors and other key partners makes this difficult, and as long as it persists the situation will be challenging.

Suggestions

- It is necessary to map out all the agencies and strive for regular donor coordination meetings. An international initiative that supports this is the work of the Interagency Working Group on Indicators and Reporting Burden. It was established by global health agency leaders in September 2013 and is chaired by the Director-General of the World Health Organization (WHO). The group has suggested a list of 100 health related variables to be collected¹.

5. Overload of indicators

The HMIS database has a number of forms that all contain a long list of indicators, a lot more than the 100 recommended by WHO, making the total number of indicators to be collected on a monthly basis substantial. There are also parallel reporting systems; some reports go to DHIS2, while others go directly to programs. Lack of trust in the data generated by the HMIS has resulted in donors supporting the creation of parallel data collection systems.

CMED underlines that striking a balance between the core indicators and the programme level indicators is a major issue. If only the core indicators are required health programmes may start creating own information systems to collect the data, they need. It is a major concern for CMED to avoid creating parallel reporting systems with separate databases.

Few of the indicators in DHIS2 currently have sufficient quality. There are also, to our knowledge, few users of these data. There may be some donors who use them but to our knowledge only after internal cleaning of the data.

The overload of indicators is one of the key issues to address if data quality is to be improved. It would be a clear advantage to prioritize a smaller set of key indicators and ensure that these are of sufficient quality. There is work underway to reduce the number of indicators, but we are unsure whether the reduction will be substantial enough to have an effect. Reducing the list of indicators to a manageable size would require acceptance and coordination from the different donors and other key partners. The Interagency Working Group on Indicators and Reporting Burden, show that there is some willingness from central partners to do so. Partners will have to reduce reporting requirements to countries, in order to – hopefully – get data of better quality. A possible challenge in this respect is also reporting requirements needed to show progress on the Sustainable Development Goals (SDG). A key element in strengthening health information systems is to determine what data should be collected, at which levels of the system and by whom.

Suggestions

- Review ongoing attempts to reduce the number of indicators in HMIS to assess if significant reductions are taking place.

¹ <http://www.who.int/healthinfo/indicators/2015/en/>

6. Data collection and processing

Health data collected in Malawi does not only go into the DHIS2 system, some data is also sent directly to various programs. However, the main focus here will be the dataflow connected to the DHIS2 system (see figure 1 on page 12).

6.1. Paper-based data collection

The HMIS in Malawi is largely paper based at health facility and community level and electronic at district and national level. At facility level the health workers are responsible for recording the services that are being provided. Statistical clerks report aggregated data and compile reports to the districts. At district level the paper based data is transferred into DHIS2 and is then available at national level (see figure 1 on next page for illustration). At all three levels there is a risk of errors when writing down or punching the data. In addition, there are several stages on paper which all induce further risk of errors.

Data on individual level is captured in paper-based registries. These registries are only used for creating monthly aggregates for entry into the electronic system. There is thus a substantial information loss that is actually captured on paper but not stored electronically. Guidelines as to how to store the paper registry seems to be lacking. This also makes it difficult to go back and check or recalculate the aggregates.

It is also worth mentioning that there are many duplicates in data elements and organizational units etc. in DHIS2. Efforts by CMED have already been initiated to address this, but it remains an important quality issue.

The ideal solution would be to replace paper-based data collection tools with electronic versions of the same. However, this faces challenges such as instability in internet connectivity and electricity. Inadequate airtime for internet bundles makes it difficult to access DHIS2. Until this issue is resolved, reducing the number of indicators would help the facilities in reducing the number of errors. Fewer indicators would also make a system for storing the paper registry more manageable.

Suggestions

- Review paper-based collection of data in order to reduce the degree of errors at this stage.
- Conduct an assessment of pilots where data is immediately collected electronically to assess suitability for scale-up.

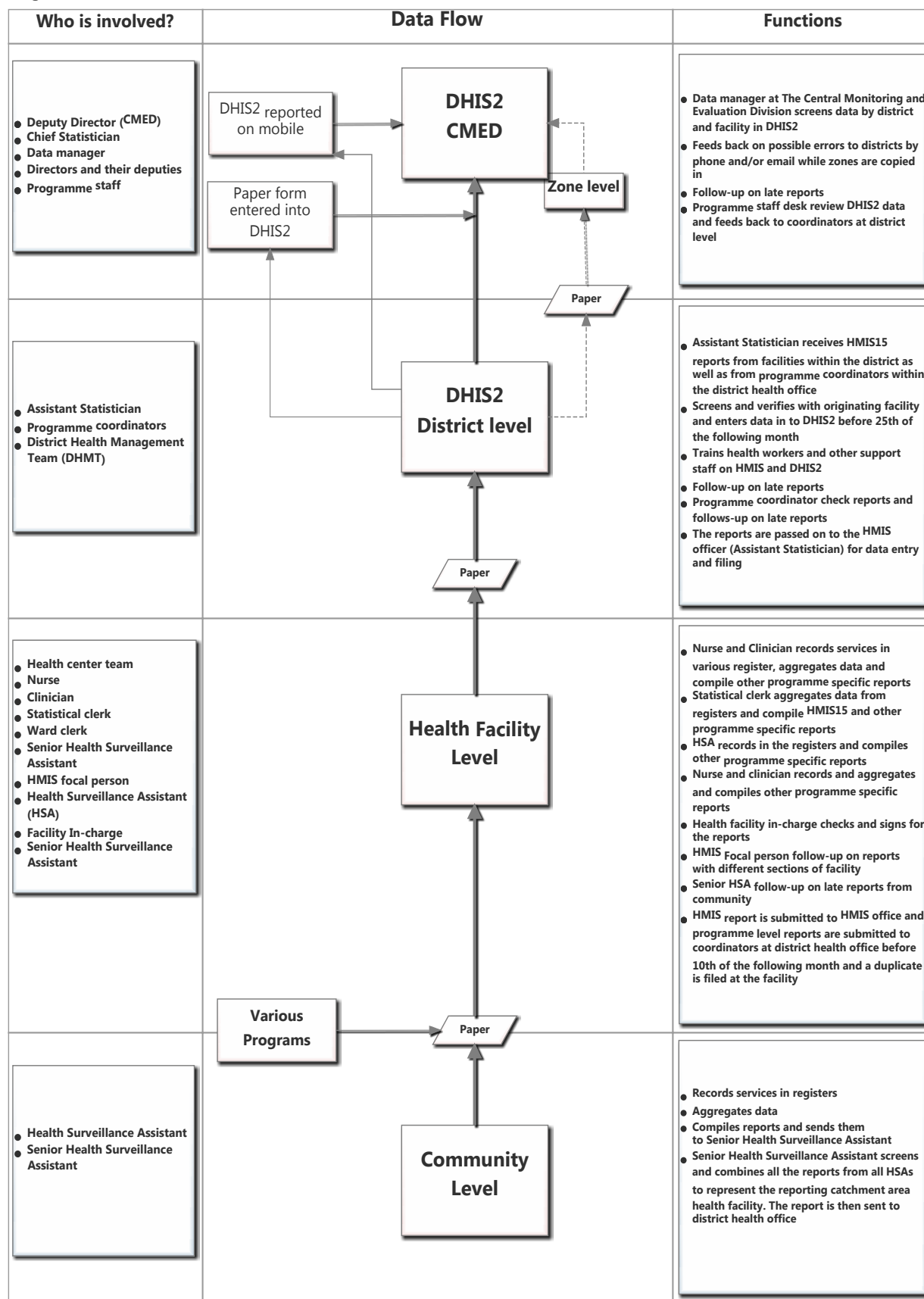
6.2. Control of data before electronic entry

Data collected at facility level goes through several stages on paper before it is being entered electronically (see figure 1 on next page). These stages pose a risk of errors related to capture or entry, understanding the data capture tool, and to calculations or summations. Most control functions are related to the electronic data capture system, DHIS2, after these different stages have been conducted. Five or six stages were identified before electronic data capture. Only aggregates are entered into the electronic system.

Suggestions

- Review paper-based collection of data in order to reduce the degree of errors at this stage.

Figure 1 Overview of Malawian HMIS data flow



6.3. Training of personnel

There seems to be a general lack of training for the staff that collects the data. Some training has been given, but there is no plan for continuous training of new staff or for refresher courses for long-term staff. In addition, there seems to be no

or minimal manuals for most of the forms that are being entered. Combined, this may lead to missing data since the staff does not know how to fill it in correctly and thus leave it blank. And it also increases the chance for different interpretations of questions and what is supposed to be filled in for each variable. This can cause reliability problems in the form of inconsistent reporting.

Prospects for promotion for those responsible for the data entering are low. This in combination with high staff turn-over at district program offices and high work load at facility level due to high vacancy rates has a negative impact on data quality.

A continuous plan for training of both new and old staff should be developed and ideally funded by the Ministry of Health. Training should be included as general running costs of the system. Further, an important part of the training is routine validation of data and audits. Motivating data collectors is generally a challenge despite training on data-collection, registers and questionnaires.

Feedback from the national to more peripheral levels is crucially important, and encourages the creation of a culture of data generation and use. Feedback on each report should be considered to be as essential as submitting a report.

Suggestions

- A comprehensive training plan that is adapted to the skills required for staff at each level should be developed.
- Processes for feedback on data entry should be developed and quality indicators prepared for management to monitor the feedback.

6.4. Manuals

There seems to be little information and/or manuals on how to collect and transfer data. There is thus need for development of manuals that both defines each variable and guidelines on how the variable is to be collected. This should ideally be done after the number of indicators have been reduced.

Suggestions

- Simple and instructive manuals should be made with the aim of explaining how and why data are collected (an instructive and motivating manual). Training of personnel should be based on this manual.

6.5. Data collection; completeness

Completeness of facility-based data is generally a challenge. In the case of Malawi data are incomplete in numerous ways. Many facilities do not send reports at all. Other facilities fail to send reports regularly. The facilities who regularly send reports nevertheless fail to report data on all elements every month. The variation between completeness among variables in HMIS15 is substantial. This leads to a major problem with missing data, which undermine the data quality and contribute to a lack of trust in the data.

A reduction in the number of requested indicators will probably increase the completeness rate; a reduced reporting burden will leave more time to focus on those data that still needs to be reported. There must also be something in it for the data collectors; some kind of incentive to collect the data. Such an incentive may be that facilities receive feedback and statistics where they can easily compare themselves with others on both regularity and completeness. It is important that the data collectors have a sense of ownership towards the data.

Suggestions

- Review ongoing attempts to reduce the number of indicators in HMIS to assess if significant reductions are taking place.
- Prepare monthly quality reports on completeness, not only at facility level, but down to data record level.

6.6. Editing approach in Malawi

Firstly, there are currently few, if any, check points where data are checked for further processing. There is no explicit strategy for editing. The editing staff is left to their own devices and the prevailing norm is micro-editing. In addition to an editing strategy largely guided by personal preference, there is no system in place for securing the transfer of knowledge, neither between statistical areas nor to successors. To our knowledge, which units that were prioritized in the editing process depended largely upon the personal experience and preferences of the individual doing the editing.

First and foremost, a new approach should move away from the time consuming micro-oriented approach to a more efficient approach. It should be based on established methodology to safeguard quality. Selective editing involves a focus on errors that can have an impact on the overall results, i.e. at the aggregate level. Given that efforts are being put in place to increase completeness, we recommend developing a control system which can flag suspicious values and prioritize units for further investigation. Selective editing with consistent prioritization of critical error are efficient use of resources. A prerequisite for this approach is that the data need to be of acceptable quality. Without this condition editing will not improve the data as intended.

Suggestions

- An overall editing approach, with accompanying documentation procedures, should be established. All staff involved in editing should be trained in this approach and be expected to adhere to it.

7. Dissemination

Dissemination signifies the final process of the statistics production. Distribution of statistical information to policy makers, donors and other partners, mass media, investors, international bodies, and the citizens is the reason for gathering data in the first place. An important objective of a dissemination strategy is to set the conditions for spreading the statistical information and give credibility to the statistics. Information that is not credible has less value. If users cannot test the accuracy of statistical information, i.e. they must trust the institution that issued the information.

7.1. Dissemination routines

The Ministry of Health has, as of now, no regular official release of the health data, and lack dissemination procedures. A few years back CMED used to produce the HMIS bulletin semi-annually and annually. The bulletin was disseminated to all districts, development partners and training and research. (The publishing of the HMIS bulletin seems to be back on track again)

It is the Ministry of Health themselves that manages and releases the data for use, and there is no intermediate body that performs quality control of the data and prepares them for release. It was observed a general lack of routines for quality control on HMIS data and also few or no routines for dissemination of data or results.

Data is generally entered into the system by staff at district level and they are immediately available for users. In this sense the data could be considered “real time”. However, there is no staff or body that is responsible for checking the quality of the data and preparing them for release. The Ministry of Health has thus little control of how the data is being used by various users including donors. Not only is this a clear quality issue, there is also a clear danger that different users will tweak the data in different ways paving the way for conflicting presentations of the same data.

The Ministry also lacks clear procedures for release of data. There are no announcements of when the data is ready, and there are no uniform dissemination procedures in place.

Dissemination procedures should be put in place to ensure that data is available to all users at the same time, and no tweaking of data by various users should be allowed after release. It is recommended to develop a system for dissemination. Health data is important and official statistics on the subject should be common goods for society and thus available to everyone.

The statistics should be readily available and easy to understand for everyone, at least the main results. Data alone do not reveal the full situation – meaning is only acquired when data are analysed and interpreted. Data also need to be synthesized, analysed and interpreted within the overall context of the health system and delivery of health interventions. In this way data is transformed into information, evidence and knowledge for action. It is often difficult to manoeuvre through the numbers without any story, supported by graphs, charts and maps.

The Ministry of Health demands a lot of data from the health facilities, and should then be obliged to use the data, at least in an annual publication or in another form visible to the health facilities (like the HMIS bulletin). Otherwise it is difficult to defend all the resources spent on obtaining all these data.

A main objective for The Ministry of Health should be to inform the public by giving them high quality and timely statistical information.

The Ministry of Health in Malawi can benefit of assistance regarding the dissemination processes. Project concerning health data quality in Malawi should prioritize getting a dissemination strategy in place.

Suggestions

- A Dissemination Strategy should be developed, with clear guidelines for how data is released for use.

8. Metadata

Metadata are data that define or describe other data. Metadata are essential for interpreting data and making meaningful comparisons over time. In order to understand the data, the sources and methods for producing data should be explained. Statistical metadata is structured or systematic information that is used for the production, dissemination, understanding, finding and (re-)use of statistics. Data labels, definitions, descriptions of methodology, legends, source information, footnotes, are all examples of metadata.

Metadata must be produced and used at all stages of the statistical production process. This is a challenge for every producer of statistics, but nevertheless

important. It was not observed a system in use for metadata for health data in Malawi.

In order for The Ministry of Health to achieve quality data on health it is recommended to have a metadata strategy, and as of today it is difficult to spot any reliable strategy or system regarding metadata. Without metadata the statistics can lose credibility and purpose. It is recommended that The Ministry of Health in Malawi prioritises to develop a metadata system, and if necessary seek assistance from experienced partners.

Suggestions

- A system for metadata management should be developed.

9. Conclusion

Implementing modern statistical methods and technology are important factors in achieving good quality in statistics. But, as this report has detailed, it also depends on other factors. As important as modern statistical methods and technology is the role of institutional factors.

The use of statistical methods for editing in parts depends on having data of adequate quality in data collected. To collect data of sufficient quality it is vital that an institutional framework supporting the process is in place.

The collection of health data in Malawi is fragmented. Weak central control and multiple agencies with little or no coordination between them have resulted in a system that collects vast amount of data of uncertain quality.

A quality self-assessment could play a key role in enabling The Ministry of Health assessing the overall system and the measures that are needed to achieve a sound foundation for producing quality statistics. With such an assessment in hand The Ministry of Health would have a much better base for constructive engagement with donors and other agencies.

There are several issues that will be beneficiary to addressed in the quality self-assessment. The mandate for carrying out the data collection is not entirely clear, nor is it clear who has the decision power on the content of the data collection. The amount of data that is collected is not followed by adequate resources to ensure acceptable levels of quality in the data collected. There should be a greater focus on quality rather than quantity. Data collection and processing should be based on a sound methodology. The excessive burden on respondents that comes with collecting vast amount of data should be reduced. The cost for introducing new variables should also be documented and easily accessible. A system for evaluating cost and benefits when introducing new variables should be put in place. The end result, in form of dissemination, must be reliable and timely.

10. The way forward

As this report has shown, changes and improvements to the system of health data collection in Malawi would benefit the data quality. In the following, there are specified key action points that can be particularly helpful in achieving improved data quality:

1. A Quality Self-Assessment of HMIS should be carried out to provide a holistic assessment of quality challenges in HMIS and a way forward.
2. Conduct regular M&E Technical work group meetings, with participation from all relevant development partners.
3. Conduct a mapping exercise to provide an overview of all actors involved in generating data in the health sector. The mapping should also include projects that are not necessarily country-wide.
4. Review the WHO 100 health related variables and assess whether these could form the core of HMIS.
5. Review ongoing attempts to reduce the number of indicators in HMIS to assess if significant reductions are taking place.
6. Review paper-based collection of data in order to reduce the degree of errors at this stage.
7. Conduct an assessment of pilots where data is immediately collected electronically to assess suitability for scale-up.
8. A comprehensive training plan that is adapted to the skills required for staff at each level should be developed.
9. Processes for feedback on data entry should be developed and quality indicators prepared for management to monitor the feedback.
10. Prepare monthly quality reports on completeness, not only at facility level, but down to data record level.
11. An overall editing approach, with accompanying documentation procedures, should be established. All staff involved in editing should be trained in this approach and be expected to adhere to it.
12. A Dissemination Strategy should be developed, with clear guidelines for how data is released for use.
13. A system for metadata management should be developed.

References

Statistics Norway. Documents 2017/3. *The Health Management Information system in Malawi: Assessment of data quality and methods for improvements*

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ISBN 978-82-537-9479-2 (electronic)



Statistisk sentralbyrå
Statistics Norway