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Chapter 2: Rewiring public finance for the health sector

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About this publication

This document ('Rewiring public finance for the health sector') is chapter 2 of the 'Public finance in the digital era: Emerging themes' report.

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Abbreviations and acronyms

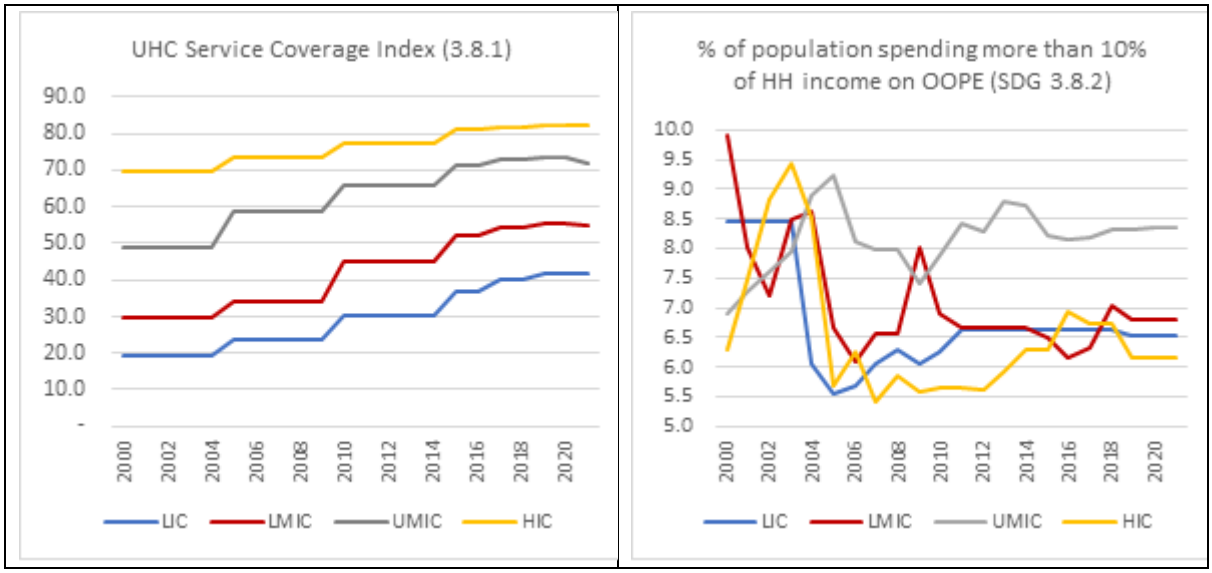
AfHEA	African Health Economics and Policy Association
API	Application programming interface
ASHA	Accredited social health activist
CDR	Common digital registry
CICO	Cash in / cash out
DFF	Direct facility financing
DHI	Digital health intervention
eLMIS	electronic Logistics Management Information System
FFARS	Facility Financial Accounting and Reporting System
GOTHOMIS	Government of Tanzania Health Operations Management Information System
HMIS	Health management information system
IFMIS	Integrated financial management information system
LICs	Lower-income countries
LMICs	Lower-middle income countries
MDE	Minimal digital ecosystem
MIS	Management information system
NHMIS	National health management information system
OOP	Out-of-pocket (expenditure)
PFM	Public financial management
PORALG	President’s Office for Regional and Local Government
SCI	Service coverage index
TB	Tuberculosis
UHC	Universal health coverage
WHO	World Health Organisation

1 Introduction

Many countries have made substantial progress towards Universal Health Coverage (UHC) – defined by the World Health Organisation (WHO) as all people having access to the health services they need, without suffering financial hardship as a result – in the past 25 years. There has been significant progress in expanding coverage of health services, as shown through WHO's UHC service coverage index (SCI), although this has slowed since 2016, with some countries experiencing a decline in coverage (WHO, 2023) (see Fig. 1, below).

There is still considerable ground to cover. WHO's 2023 UHC Global Monitoring Report finds that 4.5 billion people – more than half the world's population – are unable to access essential health services, and that over 1 billion people face financial hardship due to out-of-pocket (OOP) health spending (WHO and World Bank, 2023).

Figure 1 Evolution of UHC Service Coverage (SDG Indicator 3.8.1) and percentage of population spending more than 10% of household income on OOP expenditure (3.8.2) from 2000 to 2021



Source: WHO Global Health Observatory

If countries are to attain UHC, they will need to not only mobilise more funds for health, but also use funds more efficiently. The 'budgetary space for health' is a product of overall public expenditure, the priority accorded to the health sector within budgetary allocations

and – most importantly for the discussion in this chapter – the PFM system (Barroy and Gupta, 2021).

The role of the PFM system goes beyond simply ensuring the provision of resources for the health sector. More informed policymaking and better implementation of budgets requires a set of analytical capabilities, digital tools, and data, which can be created in the digital transformation of PFM systems. Done right, this can ensure that a Ministry of Health, Ministry of Finance or any other stakeholder has an integrated view of both inflow and utilisation of funds in the health sector as a whole, as well as the ability to direct these funds, in a timely manner, to where they are most needed.

In this chapter, we look at how digital tools and digital-era ways of working (Long et al., 2023) can lead to improved visibility, effectiveness and efficiency in health systems. Digital-era PFM can improve the quality and timeliness of data, as well as coordination between multiple stakeholders. Health systems may particularly benefit from these capabilities because of the complexities they contain.

First, providing health services means distributing key inputs (staff, medicines and other health commodities, equipment and maintenance) across a network of primary, secondary and tertiary facilities. The funds for these inputs might come from multiple sources and streams: directly from a national or sub-national finance ministry or department; through budget lines or schemes run by the health ministry; from development assistance or donors; from national or sub-national social health insurance agencies (as payments or reimbursements); and directly from people served (i.e. out-of-pocket health expenditure). Each of these lines of funding can come with their own reporting requirements, rules and constraints.

Second, digital systems are already commonly deployed for tasks such as routine health data and indicator collection and management, financial management for health systems and insurance management and claims processing (Brikci et al., 2023). Some of this software might integrate with or be extended from national-level systems, such as the IFMIS or budgeting and planning software. Mobile wallets and mobile money-based tools have also been adapted for health sector uses. The data from these systems, however, still tends to sit in silos.[1]

This means that policymakers and managers do not have a sufficiently detailed and up-to-date view of the health system at the time they have to make decisions – decisions that could have

[1] A review of digital health interventions in LICs/LMICs found few examples from the ‘data service’ category, that is, digital tools for data exchange and interoperability. The creation and adoption of such systems is a key aspect of WHO’s Global Initiative on Digital Health (Labrique, 2025).

significant implications for the quality of life of people needing healthcare.

Alternatively, they may put in place systems and processes to collect this data; while these may be effective, they represent a systemic inefficiency – multiple stakeholders gathering the same data over and over again, when it could be collected once and shared between them. The burden of this repeated collection and reporting often falls on frontline workers.

We consider how digital-era PFM can make better data (more reliable, more granular and more timely) available for health policy-making, enabling the allocation of resources to where they are most needed, as well as where they might be most effective. We also look at how such reforms can improve budget execution, by addressing some of the challenges that make the flow of funds to facilities, suppliers and frontline health workers slow and difficult. Addressing the challenges to better policymaking and better implementation can improve both allocative and operational efficiency in the health system.

2 Bringing data together for better policies

Delivering health services involves a wide range of stakeholders and digital systems (Labrique, 2025). At any given level, stakeholders can find it difficult to find the data they need to understand what funds they have available, what funds they have already used, and what outputs those expenditures have led to. They will almost certainly need to integrate data from multiple sources, many of which may not be digitised, especially when the source is lower in the administrative hierarchy.

Data on financial allocations and spending, human resources, the allocation of drugs and other essential medical commodities, and on health system outputs (e.g. the number of immunisations provided, or cases of TB treated) may be siloed in separate data systems which are difficult to combine. The data needed to plan and budget effectively – to ensure that resources are allocated across the health system in line with the population's health needs – can be unavailable, incomplete or unreliable. In Kenya, for instance, while reforms have led to more streamlined flow of financial information, there is little integration with non-financial information such as activities, service outputs, or health outcomes. (Fischer et al, 2024).

In turn, the overall allocation of the health sector in the national budget may not reflect the true state of a country's health needs. While data on compliance with processes or aggregate limits may be available, it tends to be much harder to say what outputs are associated with a given expenditure. This makes ongoing policy decisions, such as when and whether to switch allocations from one region or one focus area to another, difficult to model and justify.

Health administrators may have limited or fragmented visibility into the flow of funds to their spending unit. This can have a direct impact on the services they provide, as for instance when they are unable to plan effectively to procure medical equipment, supplies or medicine. Health workers and facility managers may also be burdened with multiple reporting requirements and systems, which might ask for the same data (or for indicators based on the same data), but are not streamlined or integrated.

This can mean a significant amount of time and effort spent on data entry and reporting. Given the propensity for error in manual data entry, especially where users have limited digital fluency or the digital

tool itself is not easy to use, this has implications for data quality and timeliness as well.

Bringing in a digital system will not in itself solve these problems (Dehnavieh et al., 2018). Multiple digital tools are already in use in health systems in many countries, but these tools were often set up to solve the data or management needs of specific stakeholders, typically in a vertical accountability relationship. To answer the range of questions different stakeholders and policy-makers have, they would have to interoperate and exchange data. These capabilities are rarely built in when these tools are implemented (Banks et al., 2023).

At the highest level, for instance, financial management information systems (managed by the finance ministry) and health management information systems (i.e. systems to capture data on health system performance, typically from the facility level, managed by the health ministry) are rarely interoperable. (This is what Fischer et al. (2023) document in Kenya.)

Data from either digital system may be shared with stakeholders from the other ministry, either on a routine basis (e.g. quarterly reports, annual plans or budgets), or when requested by a specific stakeholder (e.g. to answer a question asked in parliament). But this 'integration' often means that a human being is reading data from one system and typing it into the other.

The ways in which countries plan and implement their digital health interventions is crucial for creating more interoperable systems that can deliver real-time data and insights to administrators and policy-makers. As a review of scaling such interventions in LICs/LMICs notes, the capture and utilisation of real-time data to inform stakeholders is a 'frequently neglected opportunity' (Labrique et al., 2018). We discuss below examples from Tanzania, Uganda, Burkina Faso and Ethiopia[2] representing different approaches towards the goal of the right person having the right data at the right time, such that they can take informed decisions based on those inputs.

Tanzania: extending and integrating digital tools for health facilities

In Tanzania, health facilities make their own annual plans and budgets, which are then consolidated through local and regional governments and incorporated into the national budget. This approach, known as direct facility financing (DFF), allows for more

[2] The discussion in this section draws heavily from a panel co-organised by ODI Global, Clinton Health Access Initiative (CHAI) and ThinkWell at the African Health Economics and Policy Association's 2025 Conference (AfHEA 2025) in March 2025. Among others, representatives from Burkina Faso, Ethiopia, and Uganda made presentations, which are referred to below as 'AfHEA 2025 presentation'.

autonomy and responsiveness to (performance-linked) financial incentives. As a form of health systems strengthening, it relies on health facilities having sound financial management of resources received (WHO, 2022).

Health facilities in Tanzania use a combination of four digital systems:

- The PlanRep system, for planning and budgeting.
- The Facility Financial Accounting and Reporting System (FFARS), for accounting and reporting.
- The electronic Logistics Management Information System (eLMIS), for procurement of drugs and medical supplies.
- The Government of Tanzania Health Operations Management Information System (GOTHOMIS), for health data.

Of these, PlanRep and eLMIS are not specific to the health system. PlanRep is used by local governments for planning and budgeting in general, and was extended to health facilities, with some oversight and support functions retained by the local government.

eLMIS is used for procurement management by many government entities. It is interoperable with the Medical Stores Department (MSD) accounting system; facilities are meant to procure supplies from MSD, and if they go to external suppliers (when MSD does not have stocks), it is MSD that makes payments for those purchases. It is also integrated with GOTHOMIS, sharing data on the use of medical supplies and medicine.

GOTHOMIS and FFARS are facility-level digital systems. FFARS was originally a paper-based tool, i.e. a set of standardised templates and instructions for developing standard financial reports. This was subsequently digitised, and the digital tool is now widely used (Mtei, 2020). Due to connectivity issues, some facilities still used paper, with data entered into the digital system subsequently; a mobile phone-based version of the tool has since been developed for low-connectivity areas.

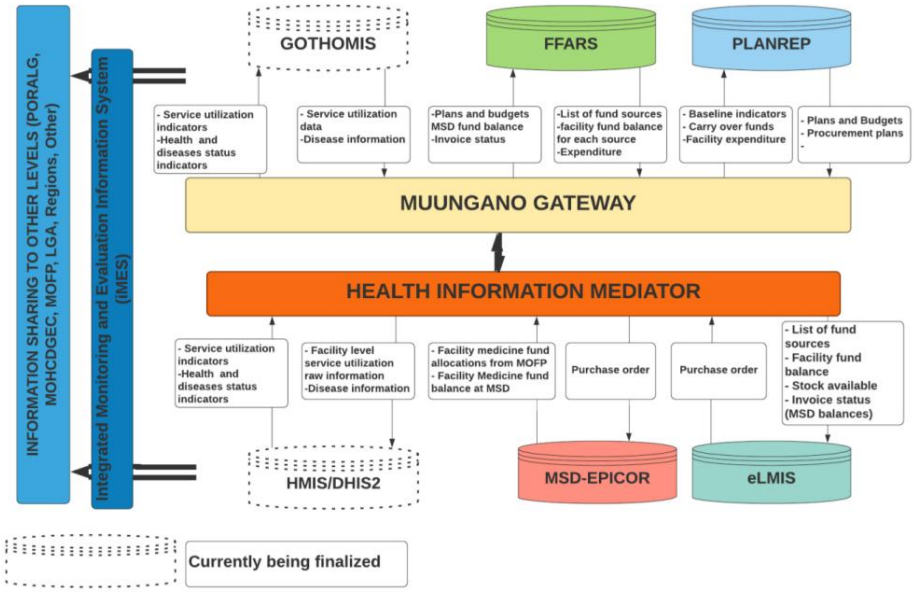
A cost–benefit analysis of the impact of PlanRep reports significant streamlining of bureaucratic activities for financial management, including nearly 90% time savings (from 87 to eight days) on planning and budgeting activities, and a 53% reduction in costs, mainly due to savings on per diem allowances to staff travelling for planning and budgeting exercises (Ruhago et al., 2022).

FFARS is likely to be similarly effort-saving, because it provides visibility into the relevant financial records for administrators at local, sub-national and national government levels. If the mobile-based version is effective, it might lead to similar cost savings on travel and per diems incurred by staff from lower-connectivity areas. The two

systems have been made interoperable, which means that plans and budgets made in PlanRep, once approved, can be exported to FFARS, where they serve as ceilings or parameters against which the use of funds can be reported and assessed.

Integration of data from multiple systems is essential. Tanzania achieves this integration through two layers of intermediation, in the form of the 'Muungano Gateway' (under the President's Office of Regional and Local Governments (PORALG)) and the Health Information Mediator (under the Ministry of Health). The former aggregates data from PlanRep and FFARS, and the latter from eLMIS and GOTHOMIS. They further share this with the national integrated monitoring and evaluation information system (iMES), and through it with government offices at various levels (see Fig. 2, below).

Figure 2 Data integration architecture (public health and finance) in Tanzania



Source: Mtei (2020: Figure 4, p. 20)

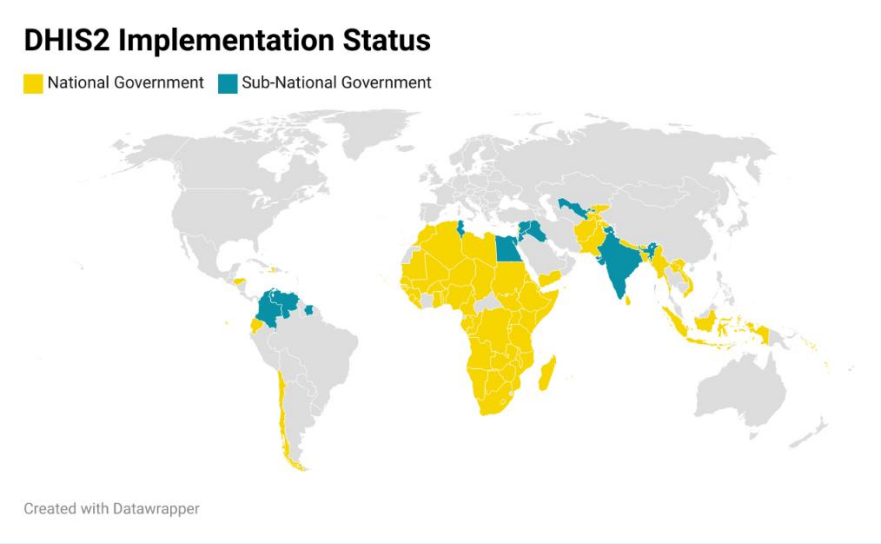
This arrangement illustrates the multiple steps needed to achieve the goal of timely and reliable data for policy-making. It gives policy-makers and administrators the ability to view combined data from multiple sources, and to dig into that data for details relevant to specific questions they may be trying to answer. While this is still not necessarily real-time data, as much of it is entered into digital systems post hoc, it is still more efficient than compiling that data from multiple systems and sources every time a decision-maker wants to rely on it to answer a given question.

Uganda: managing the paper-to-digital transition for DFF, leveraging DHIS2

Health facilities in Uganda use digital systems for reporting on medicine stocks, infrastructure and staffing.[3] A DHIS2-based national health management information system (NHMIS) is in use (see Box 1, below).[4] A notable gap in health system digitisation, however, is facility planning and budgeting.

Box 1 DHIS2 global footprint and key features

DHIS2 is an open-source health management information system (HMIS) to facilitate data collection, management, validation, visualisation and analysis. The platform was developed by the Health Information Systems Programme, housed at the University of Oslo, and is being implemented in more than 70 LMICs.



Map created using the data from: In Action - DHIS2.

DHIS2 is designed to establish a centralised database of health facilities, enabling health centres to report key information based on predefined reporting standards, with data drawn from health system input and service delivery databases. As we currently understand it, where DHIS2 has been implemented, it has not been integrated with IFMIS or other financial management systems. Sharing of financial data recorded on DHIS2 systems should be possible through the use of APIs.

Designed for use in low-connectivity and low-capacity contexts, DHIS2 is a 'low code/no code' tool (customisable without programming skills), and can operate without continuous internet connectivity. It incorporates robust data validation features, and can

[3] AfHEA Slides, shared with the authors

[4] Uganda has also adopted a DHIS2-based district education management information system (DEMIS).

be set up to report various indicators, including through reports, dashboards and geospatial maps. As an open-source software, it can be less expensive to implement.

DHIS2's implementation model emphasises local (or at least regional) capacity-building, through a network of 'HISP Nodes' – centres where digital and health sector skills are brought together to support national or sub-national implementation of the software. Each HISP node receives some support from the University of Oslo, and they have emerged as a robust network for peer learning.

Although Uganda adopted DFF in the late 2000s, and despite the use of digital systems in the health sector, facility-level planning and budgeting has remained entirely paper-based, or at best carried out in stand-alone spreadsheets. An ongoing reform aims to address this by introducing a standardised form – Form HMIS001 – for facility planning and budgeting, which can be submitted through the DHIS2-based system.

The form is currently still paper-based; it was developed through multiple rounds of consultations, and piloted with 25 health facilities across four districts in mid-2024. It provides facilities with details on the funds they will receive from various sources, and requires them to submit their proposed workplan for the coming year. Once the workplan is approved, budget and performance updates are to be submitted quarterly.

In parallel, the Ministry of Health is developing a new module for its DHIS2-based system, which will enable electronic submission of the HMIS001 form. The exercise as a whole will remain hybrid: larger facilities (general hospitals and larger health centres) which already have direct access to DHIS2 will fill out the form directly on DHIS2, whereas smaller health centres will still complete the form on paper, and bring it to another facility that has access to DHIS2, or to the district health office, where it will be digitised.

Considerable attention has been given to the process of data capture and validation. The district biostatistician (an official at the district health office) must validate the data before it is made visible to other stakeholders. To facilitate this process, the new DHIS2 module incorporates new data elements, indicators and validation rules.[5] Automatic validation can flag errors such as missing fields or inconsistencies in the data, and facilities will be asked to resolve errors before data is aggregated nationally. There will also be periodic audits and sample checks.

In theory, data could also be pulled from other digital systems, such as those for logistics management and financial reporting. DHIS2 supports such interoperability (through APIs). The specific technical

[5] AfHEA 2025 Presentation, shared with the authors.

measures needed to establish such data exchange will be explored when they are built; however, the pilot of the form has flagged that real-time recording of data (even in existing digital systems) is not widespread. There is thus also an effort to simplify data entry screens to make them easier to use, and to provide supportive supervision to assist facilities and data operators with the transition to the new form.

Uganda is planning to roll out the new DHIS2 form in the 2025/26 financial year. If successful, its experience in 'piggy-backing' financial reporting into a system already used for health reporting at facility level could inform the design and planning of similar efforts to digitise aspects or functions within a health system that are currently being conducted offline, especially given that DHIS2 is so widely used. Also relevant is experience of designing a hybrid system with paper-based elements given limited digital coverage (and limited connectivity) in rural areas, which is still the reality in LICs/LMICs.

Burkina Faso: the 'Minimal Digital Ecosystem'

Multiple digital health initiatives have been active in Burkina Faso, funded by a diverse set of stakeholders; the Ministry of Health and Public Hygiene estimated there were over 100 such tools as of 2020 (Kiendrébéogo et al., 2024). This is clearly sub-optimal, prompting the Health Ministry to survey existing tools and identify ones that can be brought together in a 'Minimal Digital Ecosystem' (MDE): a set of tools to help address key health sector priorities, and that can be scaled up nationally. The eight digital tools selected (see Table 1, below) were piloted in two health districts in 2023–2024, and are now being scaled up to all primary health centres.

Four of these eight tools focus on maternal and early childhood health, including supporting the government's flagship *Gratuité* scheme. Three (Financier, NetSIGL, and E-Quality) are for facility managers and administrators in the health system. The Communautaire tool aims to support frontline health workers. Finally, there is a proposed dashboard that aims to create integrated visibility across the MDE tools, enabling better decision-making.

Table 1 Digital Health Interventions (DHIs) in Burkina Faso's Minimal Digital Ecosystem

DHI	DESCRIPTION/WHAT IT DOES
REC-PCIME	**Electronic Consultation Register – Integrated Management of Childhood Illness:** Enables health workers to create an electronic health registry of child patients, with diagnostic and treatment data, using an android-based tablet. It guides health workers on the protocol for integrated management of childhood illness. Currently, it is implemented across 53 health districts (out of 70), along with the two pilot districts.

REC-maternité	**Electronic Consultation Register – Maternity:** Enables health workers to create an electronic registry of all mothers and newborns using an android-based tablet, which facilitates data-driven health monitoring. It covers antenatal care, delivery, postnatal care, family planning and post-abortion care modules. Currently, it is implemented in 24 out of the 70 health districts, and in one of the two pilot districts.
e-*Gratuité*	*Gratuité* is a maternal and early childhood health scheme. This is an online platform for performance and financial management, including invoices issued by health facilities and payments to health workers. Currently implemented across the country, it is operated by the Health Facility Manager and Health information manager within the district management team.
IECR (*Gratuité*)	This is a digitised care sheet (i.e. an ECR) for individuals covered by the *Gratuité* scheme, enabling healthcare providers to optimise treatment and monitor prescriptions. Still in development.
M-Health Communautaire	This tool for community health workers provides community-level diagnostic and therapeutic guidelines, enabling awareness and health communications campaigns. Currently used in eight health districts, and in one pilot district.
E-Flux Financier	For health facility financial heads/managers: facilitates the real-time monitoring of financial flows in a health facility, creating monthly cash flow reports that incorporate income, expenditure, receivables, payables and other financial data. Currently rolled out in 12 PHCs across four districts, and in three PHCs in one pilot district.
NetSIGL 2.0	This is an online platform for real-time logistics monitoring and management of medicines and pharmaceutical stocks. Built using DHIS2; currently implemented in five districts.
E-Quality	For health facility managers, this is an online platform with all the checklists required for internal and external quality certification and monitoring. Built using DHIS2; currently rolled out across all districts.
(MDE Dashboard)	In addition to the eight tools, an electronic dashboard is also envisaged, enabling facility, district and national leaders to track and visualise key indicators.

Of these eight tools, the ones most directly connected to PFM for health are the e-Gratuité, E-flux Financier and NetSIGL tools.

- E-Gratuité enables authorisation and tracking of payments to facilities and frontline workers as part of the Gratuité scheme. When integrated with other tools, it can provide a more comprehensive picture of fund allocation and utilisation.
- E-flux Financier is similar to Tanzania's FFARS system, in that it aims to standardise and digitise accounting and reporting across all health facilities. The goal is to automate the generation of monthly cash flow reports, and make key financial performance indicators visible to stakeholders (at multiple levels of government) in real time.
- NetSIGL is similar to Tanzania's eLMIS, albeit with a narrower focus on pharmaceutical stocks alone. It aims to provide real-time visibility into the supply chain for medicines across all facilities in the country.

The MDE does not extend to supporting facility-level budgeting and planning, that is, there is no tool among the eight that corresponds to PlanRep in Tanzania – possibly because the MDE is being assembled from existing tools, whereas Tanzania created new countrywide systems. There are early signs of impact on ease of administration even so – for instance, the time taken on monthly stock monitoring reports has come down significantly with the use of NetSIGL, from up to five days to a matter of minutes.[6]

The selection of these eight tools and two pilot districts took into account where they are already in use, and what would be needed to scale them up nationally. All eight are designed to be accessible on an android-based tablet; some are also available on a smartphone, with the dashboard also accessible through a browser. They are built on data management platforms (CommCare[7]CH, DHIS2) that are already widely-used in health facilities in Burkina Faso.

As the MDE is being co-created with multiple partners, coordinating to ensure data integration is a more complicated process. For instance, not all the tools were set up with their servers locally hosted in Burkina Faso[8], reflecting in part the fact that the government does not have the necessary data-hosting capabilities yet. Creating these is part of the MDE roadmap, with a goal of replicating existing data and hosting future data on government-owned or -controlled servers.

[6] AfHEA 2025 Presentation, shared with the authors.

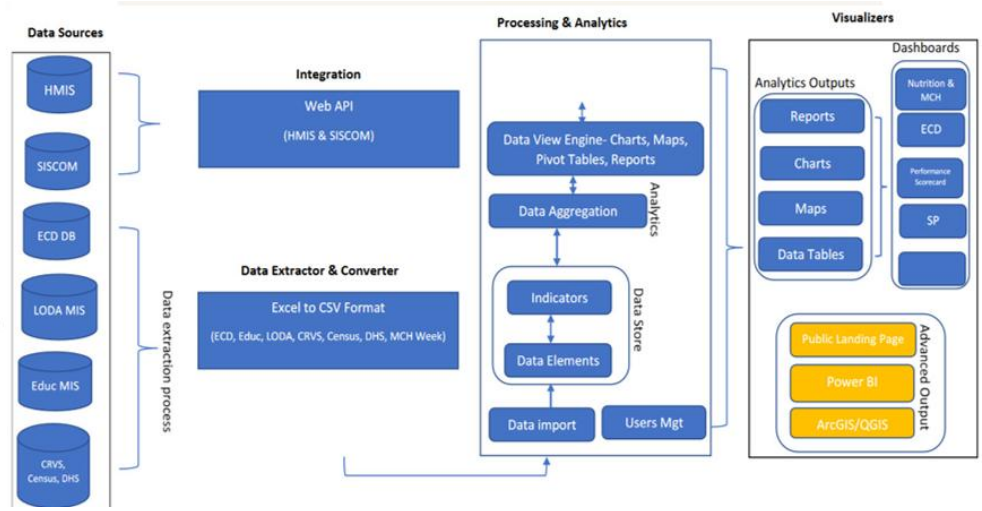
[7] Dimagi CommCare, https://dimagi.com/commcare/

[8] This is not necessarily an issue; however, if cloud hosting bills cannot be paid – whether as a function of financial constraints or because of donors (who were footing those costs) no longer providing funds – there can be interruptions in functioning and/or data access. This became clear when the USAID funding freeze affected, for instance, Kenya's HMIS.

Similarly, the dashboard is being co-created, serving as a learning exercise to understand what data might be integrated, to provide what insights, and what technical arrangements are necessary for interoperability.

While still in the process of design and operationalisation, the ultimate goal is for the MDE dashboard to integrate data from multiple sources – including existing administrative databases – to enable better analytics and inputs for policy-making. An illustrative visualisation of the proposed integration architecture is in Figure 3.

Figure 3 Proposed data integration architecture in Burkina Faso



Source: AfHEA presentation, shared with authors

Ethiopia: creating a standardised data exchange for health resources

In Ethiopia, funding from health comes from multiple sources, and funds and medical supplies flow through multiple channels, creating a complicated mix of sources and recipients.[9] Health facilities use multiple digital tools to report fund receipts and utilisation, and different facilities use different systems depending on their level in the Federal hierarchy.

At the national/Federal level, the allocation and utilisation of 'Channel I' funds (fully on-budget funds, managed by the Federal Ministry of

[9] Ethiopia classifies flows of funds and procured items as Channel I (from the federal Ministry of Finance), Channel II (from the Federal Ministry of Health), and Channel III (from sources outside of the Government of Ethiopia, including technical assistance). Channel I and Channel II funds flow directly to tertiary care facilities, mainly consisting of federal and University hospitals; they flow to secondary and primary health facilities through the Federal system, i.e. through regional and sub-regional (Woreda) administration. The frontline health posts in turn receive funds and supplies through the Woreda-level health centres.

Finance) is recorded in the national IFMIS. Most project-type 'Channel II' funds (managed by the Federal Ministry of Health, often according to donors' rules) are recorded in a national instance of the Peachtree software. Much of the data being recorded at this level is received as spreadsheets, with the data then being manually re-entered into Peachtree or IFMIS.

At the regional level, Channel I funds are recorded in software known as IBEX. Data from IBEX can be converted directly to IFMIS. IBEX has also been extended to the woreda (district) level, and is used for recording Channel I data. Channel II funds are recorded in the Peachtree software, but its use is not standardised across regions. As a result, even though the software is used both at the regional and national level, data transmission is still in the form of spreadsheets (extracted from the regional Peachtree instance, then mailed to the Federal level for entry into their instance of Peachtree or IFMIS as relevant).

Facilities at the woreda level and below, including primary facilities such as health centres and health posts, maintain records on paper and offline spreadsheets, irrespective of the channel of funding. For Channel I funds, these records are consolidated into IBEX at the woreda level. For Channel II funds, these records are shared with the regional level for consolidation and entry into Peachtree.

There is potential for significant time and effort savings if data recording and reporting are streamlined. Moreover, having two systems to manage financial flows creates challenges of oversight and fraud risks if the same expenditures are reported to the two different systems. The Federal Ministry of Health aims to address these challenges by introducing standardised data-sharing across facilities and levels in the administrative hierarchy. This is being done by creating a data exchange layer and a set of data standards, which will create interoperability between current systems, and provide a platform for future systems to plug into.

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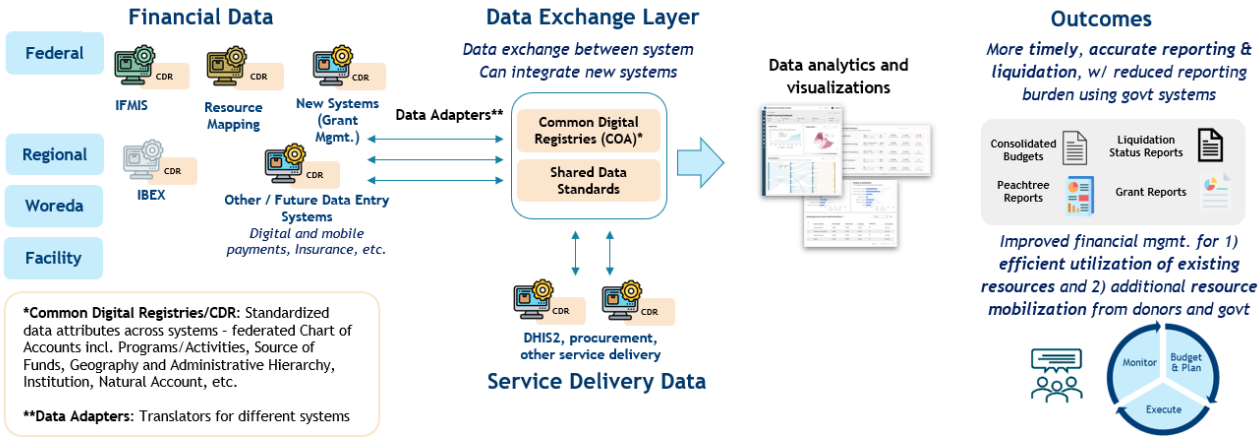
This data exchange layer relies on the creation of common digital registries (CDRs), in which data structures have been standardised (and aligned with an updated chart of accounts) to enable comparability across facilities and levels. Data from these CDRs can then be shared electronically (through system-level adapters when needed), and consolidated, analysed and visualised to support health policy decision-making and management. Resource management in the health sector will thus be one of the first use cases aligned with the digital PFM strategy of the Ministry of Finance.

Figure 4 Proposed data integration architecture in Ethiopia



Source: AfHEA slides, shared with the authors.

As these four examples show, irrespective of how funding for the health system is provided, effective decision-making requires visibility into data about both fund allocation and utilisation. To be reliable, this data has to be granular – that is, compiled from inputs from each facility, which can then be consolidated at various levels of the administrative hierarchy.

It also has to be timely; while planning and budgeting may be an annual exercise (with quarterly updates), data on fund utilisation, procurement and stocks of medical supplies, for instance, should be as close to real-time as possible. Real-time visibility that brings together data both on inputs (staffing, finances, medicines) and outputs (number of patients treated or services provided) is an extremely valuable management tool that can highlight areas or facilities with particularly high or low output.

Only when a policy-maker can look at all of this data together can they assess what outcomes are likely to result from current or proposed expenditures. Modelling the impact of proposed changes will likewise be possible when data are consolidated in this manner. Both digital systems and standards have an important role to play in creating data-driven legibility. These steps can be seen as parallel and complementary to policy-level reforms, such as DFF and performance-linked or results-based financing for health facilities.

3 Flow of funds to the frontline

The data and visibility challenges discussed above can translate into delays in the flow of funds to facilities and frontline workers[10] (Barroy et al., 2019; Welham et al., 2017). As the reforms discussed in the previous section aim to improve the flow of (granular, real-time) data to policy-makers, digital-era PFM systems could also help speed up the flow of funds to facilities and frontline workers.

The same set of systems can be involved in delivering both of these benefits; in Tanzania, for instance, the reason for extending and setting up new digital systems at the facility level was to implement a DFF reform. These systems were necessary for meeting the financial management and reporting requirements involved with funds from donors (collected in a 'health basket fund') being transferred directly to health facilities. That is, improving the flow of both funds and data were part of the same reform.

To improve the speed and certainty of funding flows to the frontline, health facilities need to have a financial management system that can budget and account for these funds. In more sophisticated systems, this may be fully integrated into the national or provincial IFMIS, and a facility will be able to make payments directly from the Treasury Single Account system. Where this is not possible, facilities will need to set up a mechanism for receiving funds (such as a designated bank account), and a way for their financial management system to exchange data with the relevant national or provincial IFMIS.

Assuming such integration is in place, the two remaining areas of work are around streamlining payment processes – that is, how the decision to release committed or allocated funds is made – and extending accounts-payment mapping to individuals (such as frontline workers or vendors/suppliers to health facilities). While not a health sector intervention, the digital system implemented for a workfare scheme in India's Odisha state could provide a model for both.

[10] Between 2008 and 2016, 13 of 29 African countries for which the World Health Organization (WHO) compiled data had average health budget execution rates of less than 85% (Barroy et al. 2019). See also Welham et al (2017) PFM and Health Service Delivery.

Box 2 Digital tools for payments to daily wage workers in Odisha, India

The Chief Minister's Work Readiness Scheme (known by its acronym in Odia, MUKTA) guarantees a certain number of days of paid work on small urban infrastructure projects. Each city was allocated an amount in the annual budget towards these projects, including towards workers' wages.

For an eligible individual to receive their wages, two conditions have to be met: the organisation managing the project has to certify the number of days worked (recorded in the 'muster roll'), and the city government has to certify that work on the project is proceeding or has been completed as planned (recorded in the 'measurement book'). The scheme faced issues with late payments due to delays in compiling and approving these two documents.

A pilot implementation of two digital tools – MUKTAsoft and a Just-in-time (JIT) payments adapter – reduced these delays by as much as 90%, bringing payment times down from months to just over a week.

- MUKTAsoft digitised and streamlined the project management process, from creating projects and estimates to recording attendance and creating and submitting a weekly muster roll, as well as the recording of project progress by city engineers in the measurement book.
- When these two documents are digitised and verifiable, the JIT payments adapter can integrate with IFMIS to automate the release of funds directly from the state treasury to workers' accounts (which in India have been mapped to national ID).

Payments to vendors or suppliers to health systems could follow this model. The conditions to be met for release of payment would typically feature in a contract between the supplier and the health facility. Once the designated official certifies that the relevant milestone or condition is met, treasury systems can release the payment directly to the supplier's bank account. (In the MUKTA scheme, project managers received payments for expenses incurred on materials for the project.) Digital systems can also monitor overall timelines and payments, and flag delays for further inspection.

The Gates Foundation, which funded the development of MUKTAsoft and the JIT adapter, is exploring with other state governments in India whether these tools can be adapted for payment of wages and incentives to frontline health workers (who are typically not on regular staff payrolls, and for whom performance-linked incentives can be a significant share of total payments). Rajasthan has implemented a similar system for payment of Accredited Social Health Activists (ASHAs), reducing delays in payment of wages (CIPS, 2022).

Such fund transfers work best where authorisation in the IFMIS can trigger payments directly to designated bank accounts, typically through integration between the treasury and the banking system. In Rwanda, for instance, the integration between IFMIS and the National Bank of Rwanda enabled a rapid digitisation of invoicing and payments, which was implemented rapidly in response to the COVID pandemic (Mukwende and Serebro, 2020).

Where the same level of financial inclusion and integration does not yet exist, mobile money platforms offer an alternative for making payments to frontline workers. Nigeria aimed to migrate payments for vaccination workers in its polio campaign from cash to electronic transfers (Yehualashet, 2016). A pilot of mobile money payments was conducted, with mixed results, mainly due to coverage and digital skills gaps.

A related consideration is that, even if an electronic transfer is possible, without either market acceptance of mobile money or suitable cash in/cash out (CICO) infrastructure, individuals may still prefer payments in cash (Narayan, 2023). Over time, as both connectivity and familiarity with mobile money improve, this may be a promising avenue for faster and more direct payments. Bangladesh saw a surge in government-to-person digital payments, largely through mobile-based accounts, during the COVID pandemic (Ali and May, 2021).

Insurance payments can be seen as a similar case, where multiple stakeholders and processes must certify eligibility as well as work done before payments are disbursed, either to a health facility or to the insured individual. This would require a mechanism for checking eligibility; biometric-linked insurance cards could be one way to do this, though the possibility of exclusion errors suggests proceeding with caution. It would also require integration with the digital systems that record care provided, e.g. an electronic patient record.

4 An emerging research agenda

Efforts to leverage digital tools for better PFM for the health sector are ongoing at multiple levels, including extending national systems, creating new digital systems and joining up existing systems at the sub-national or facility level. The potential of more reliable (granular, real-time) and joined-up data to enable better policy-making and management, driving both allocative and operational efficiency, is clear. Whether this potential is realised in a given case depends to a great extent on how the intervention is designed and implemented.

To better understand the suitability and potential impact of such efforts, further research – especially by studying the experiences of countries implementing such reforms – could look at how countries have moved from manual to more digitalised financial management, monitoring and reporting in the health system. How have they been able to introduce interoperability or integration between the various digital tools and systems they use? What factors drove demand for this? How has interoperability between financial MIS and health MIS been created, and which other health sector systems (e.g. procurement or supply management) can add value through such interoperability?

What are health facilities doing?

One avenue to approach these questions is to ask, at the facility level, what digital systems are in use, and to understand the process and experience of designing, implementing and using those systems. Have any of these systems adopted an agile rollout model, and what lessons can be learned from that experience?

In what ways do these systems support operational and allocative efficiency? How do they eventually integrate or share data with systems at higher levels of the hierarchy, including HMIS and FMIS? The intersection of digital PFM with the long-standing facility financing reform agenda can be part of this exploration, both in terms of ease or speed of execution and implications for accountability (Piatti-Fünfkirchen, Hadley and Mathivet, 2021).

Taking into account connectivity and capacity challenges, what approaches can countries take to facility-level digitalisation? When is

it more effective to create new facility-level digital tools, adapt existing tools or systems, or extend systems operating at a higher level in the national hierarchy? What might some of the prerequisites be for successful extension and integration with national systems?

Approach to data standardisation

Effective data-sharing, leading to better utilisation of data for policy-making, relies not only on technology but also on standardisation of data structures. What approaches have been taken to standardise data structures, whether in terms of health data or financial data in health systems? What types of data governance frameworks have countries (or sub-national entities) put in place to enable creation and sharing of standardised data?

Are there lessons to be drawn from other digital systems in the health space – for instance, are there examples of good practice in creating standardised electronic health records or reporting health indicators? Are there particular measures that can promote interoperability of financial and health data in these systems?

What digital tools are already in use at the frontline?

When it comes to funding flows to the frontline, the questions can be slightly broader than those for PFM systems alone. For instance, one could look at digital banking, financial inclusion and mobile money more broadly, to understand what combinations of integration and payments infrastructure have enabled faster, more reliable and more accountable transfers of funds to facilities, frontline workers or individuals.

Questions such as these should be explored with particular attention to what is happening at the frontier, such as among health posts or extension workers in the health system. For instance, are there innovations for low-connectivity contexts that can enable improved budgeting for and reporting on facility-level payments (Hamani et al., 2023)?

Ultimately, the data that policy-makers need is likely to exist across multiple systems, in a mix of data formats, and in a combination of digital, digitised and paper-based records. Even where eventual digitisation is possible, issues of standardisation as well as latency (i.e. time lag between the event and the data becoming visible) will likely persist. This will be true not just for data as an input for policy-making, but also data being used for day-to-day or line management of facilities and the health workforce. Documenting and understanding where and how countries are able to move from this fragmented reality to a more comprehensive and reliable view of the health system will help inform the future of such reforms.

References

Ali, S., and May, M., (2023). Bangladesh's COVID-19 response is taking digital finance to new levels. CGAP. https://www.cgap.org/blog/bangladeshs-covid-19-response-is-taking-digital-finance-to-new-levels.

Barroy, H. and Gupta, S. (2021). Fifteen years later: moving forward Heller's heritage on fiscal space for health. *Health Policy and Planning.* Volume 36, Issue 8, Pages 1239–1245

Barroy, K., Boudreaux, G., Cammack, C., and Bain, N. (2019). "Leveraging Public Financial Management for Better Health in Africa: Key Bottlenecks and Opportunities for Reform." World Health Organization.

Brikci, N., Pioch, C., Struckmann, V., et al. (2023) Digital technologies for health financing in low-income and middle-income countries: a scoping review protocol. BMJ Open 2024;14:e080132.

Chi,Y., Glassman, A., Ghosh, S., Regan, L., et al. (2021) How will COVID-19 Impact Our Progress Towards Universal Health Coverage? Center For Global Development Blog. https://www.cgdev.org/blog/how-will-covid-19-impact-our-progress-towards-universal-health-coverage

Dehnavieh, R., Haghdoost, A., Khosravi, A., Hoseinabadi, F., Rahimi, H., Poursheikhali, A., Khajehpour, N., Khajeh, Z., Mirshekari, N., Hasani, M., Radmerikhi, S., Haghighi, H., Mehrolhassani, M. H., Kazemi, E., & Aghamohamadi, S. (2018). The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries. Health Information Management Journal, 48(2), 62–75.

DHIS2. (2025, January 29). In action - DHIS2. https://dhis2.org/in-action/

Glassman, A., Giedion, U., Smith, P., et al. (2017) What's In, What's Out? Designing Benefits for Universal Health Coverage. Center For Global Development. https://www.cgdev.org/sites/default/files/whats-in-whats-out-designing-benefits-final.pdf .

Hamani, A., Jama, I., Amoakon, M., Roland, Y., Wanjeri, L., Oppon-Kusi, A., Karimi, D., Kiconco, P., Akpotu, O., and Saka, M. (2023). "Mobile Money and the Importance of Timely, Complete Payments to Frontline Health Campaign Workers in the Fight to Eradicate Polio: Pilot Experience from a World Health Organization Digital Payment Platform in Africa." BMC Health Services Research 23 (1): 16.

Kiendrébéogo, J. A., Tapsoba, C., Sory, O., Kaboré, I., Kafando, Y., Tiendrébéogo, S., Zombré, D., Kaboré, R., Konsebo, N., Relwendé, N., Ouattara, J. S. D., Foutry, G., Hyde, S., Green, D., Chaitkin, M., Ouédraogo, A. L., & Yaméogo, S. P. (2024b). Is it better to bring digital health tools together? Where Burkina Faso is going with a minimal digital ecosystem (MDE). Oxford Open Digital Health, 2.

Labrique, A. (2025). From infrastructure to impact: why foundations matter in digital health. Bulletin of the World Health Organization, 103(02), 83-83A.

Labrique, A.B., Wadhwani, C., Williams, K.A. et al (2018). Best practices in scaling digital health in low and middle income countries. Global Health 14, 103.

Long, Cathal, Marco Cangiano, Emily Middleton, and James Stewart. 2023. "Digital Public Financial Management: An Emerging Paradigm." ODI Working Paper.

Mukwende, P., Serebro, D., (2020) Ensuring treasury continuity during COVID-19 lockdowns. CABRI. https://www.cabri-sbo.org/en/blog/ensuring-treasury-continuity-during-covid-19-lockdowns-the-role-of-rwandas-integrated-financial-management-information-system.

Mtei, Gemini (2020). Direct facility financing: Tanzania health sector experience.
Narayan, A., (2023). An Agent Success Framework – Part I: Why must agent networks offer access to reliable CICO services? Dvara Research. https://dvararesearch.com/an-agent-success-framework-part-i-why-agent-networks-offer-access-to-reliable-cash-in-cash-out-cico-services/.
Piatti-Fünfkirchen, M., Hadley, S., and Mathivet, B. (2021). “Alignment of Performance-Based Financing in Health with the Government Budget: A Principle-Based Approach.” World Bank. https://documents1.worldbank.org/curated/en/935821632462316181/pdf/Alignment-of-Performance-Based-Financing-in-Health-with-the-Government-Budget-A-Principle-Based-Approach.pdf.
Ravishankar, N., Banks, C., Co, P. A., and Mbuthia, B., (2023). “Use of Digital Public Infrastructure to Improve Health Resource Tracking.” Thinkwell. https://thinkwell.global/wp-content/uploads/2023/12/dPFM-for-HRT.pdf
Ruhago, GM., Kapologwe, NA., Ngalesoni, FN., Kengia, JT., Kibusi, SM., Kalolo, A., Kitali, EJ., Mtatifikolo, JD., Masuha, SR., Kikula, A., Mtei, G (2022) Cost-Efficiency Analysis of the Improved Web-Based Planning, Budgeting, and Reporting System (PlanRep) in Tanzania. Front. Health Serv. 1:787894. Available at: doi: 10.3389/frhs.2021.787894.
Waghmare, A. (2025). Access to banking. Data for India. https://www.dataforindia.com/access-to-banking/
Welham, B., Hart, T., Mustapha, S. and Hadley, S. (2017) Public financial management and health services delivery. London: ODI. https://odi.org/en/publications/public-financial-management-and-health-services-delivery/.
World Health Organization: WHO. (2019). Universal health coverage. https://www.who.int/health-topics/universal-health-coverage
World Health Organisation & World Bank (2023). Tracking universal health coverage: 2023 global monitoring report [Report]. https://iris.who.int/bitstream/handle/10665/374059/9789240080379-eng.pdf.
World Health Organization. (2022). Direct facility financing: concept and role for UHC. https://iris.who.int/bitstream/handle/10665/351945/9789240043374-eng.pdf?sequence=1.