Scientific Research Publishing

Health, 2025, 17(8), 921-930
https://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

Challenges and Opportunities in Utilizing Secondary Data for Health Research in Somalia: A Focus on Health Management Information Systems (HMIS)

Abdullahi Abdirasak Mohamed[1,2*], Nsikakabasi Samuel George[3,4], Abdisalam Yusuf Ali[5]

[1]School of Postgraduate Studies, Benadir University, Mogadishu, Somalia
[2]Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, United Kingdom
[3]Institute of Public Health, Faculty of Health Sciences, Jagiellonian University Medical College, Krakow, Poland
[4]School of Medicine and Population Health, The University of Sheffield, Sheffield, United Kingdom
[5]School of Public Health, Mount Kenya University, Nairobi, Kenya
Email: *Binboowe@gmail.com

How to cite this paper: Mohamed, A.A., George, N.S. and Ali, A.Y. (2025) Challenges and Opportunities in Utilizing Secondary Data for Health Research in Somalia: A Focus on Health Management Information Systems (HMIS). *Health*, **17**, 921-930.
https://doi.org/10.4236/health.2025.178060

Received: April 1, 2025
Accepted: August 2, 2025
Published: August 6, 2025

Abstract

Somalia's health system has been significantly weakened by decades of conflict, resulting in some of the world's lowest health benchmarks and leaving women and children especially vulnerable. Despite substantial challenges, the introduction of DHIS2 in 2017 represented a pivotal step toward strengthening health data management, supported by Oslo University and the Global Fund. However, limited coverage, fragmented data reporting across sectors, and insufficient data from private healthcare providers persist. The challenges are further compounded by the Federal Ministry of Health's failure to publish annual health statistics regularly reports or conduct equity analyses, despite DHIS2's capability to disaggregate data by gender and geography. Additionally, the absence of a centralized health journal, repository, or database under the Ministry of Health hampers the systematic storage and access to data and published studies, limiting the availability of reliable resources for research and evidence-based policymaking. Despite these limitations having hindered the secondary use of data, Somalia now has two national frameworks—EPHS (2020) and HSSP III (2022-2026)—that offer a unified strategic approach to enhancing the Health Management Information System (HMIS). Both frameworks prioritize the standardization and integration of data, as well as the effective reuse of routine health information for research, monitoring, evaluation, and policymaking. Transitioning to a learning health system is critical for addressing Somalia's health challenges. By expanding DHIS2 to include

detailed data on individual health cases and private healthcare facilities, enhancing capacity building, and creating a centralized health data repository under the Somali National Institute of Health, Somalia can improve the quality, accessibility, and utilization of health data. This, in turn, would lead to more effective monitoring, resource allocation, and responsive health interventions that align with Learning Health System (LHS) goals and promote health equity. Opportunities in harnessing digital innovations, piloting data integration within urban private hospitals, and establishing decentralized data hubs that enable local health authorities to utilize data more effectively. Enhancing interoperability between DHIS2 and systems for disease surveillance or logistics will be crucial for creating a cohesive health information ecosystem. The paper underscores the importance of investing in health information systems and collaborating internationally to build a robust health infrastructure capable of advancing public health and fostering sustainable improvements in Somalia's healthcare landscape.

Keywords

Health Management Information Systems (HMIS), Secondary Data Utilization, Learning Health Systems

1. Introduction

Somalia's health system has been profoundly weakened by decades of conflict and fragile infrastructure, resulting in some of the world's lowest health benchmarks [1]. These systemic challenges have led to high mortalities, displacements and heightened the vulnerability of women and children [2]. The endorsement of the 2030 agenda for sustainable development (17 SDGs), has triggered an overwhelming demand for data across all levels. This demand is putting immense pressure on the national health management and reporting systems of low- and middle-income countries (LMICs). Despite these countries generating significant volumes of data, much of these data are often low quality, making it difficult to be integrated with existing information systems including health management information systems (HMIS) [3]. Secondary use of health data refers to the utilization of health information for purposes beyond the original intent of its collection [4]. This practice has become an essential component in health research, strategic planning, and evidence-based policymaking. Sources of such data may include routine health facility records, disease surveillance systems, national surveys, and digital health platforms such as Somalia's DHIS2. However, these concerns about data quality have hampered the widespread use of HMIS for research and policy decisions across LMICs [5].

Addressing these challenges requires a transformative approach. Reliable data is essential for effective public health functions, enabling timely and evidence-based decisions in areas such as outbreak investigations and environmental mon-

itoring. However, limited resources often impede meaningful analysis of public health data. The Learning Health System (LHS) offers a solution by leveraging health data for real-time, evidence-based analysis, facilitating improvements in primary care, public health, consumer education, and research [6].

Between 2011 and 2012, Somalia took a significant step towards building a Learning Health System by overhauling its Health Management Information System (HMIS) to streamline data collection from health facilities managed by NGOs. The ministry primarily relied on Microsoft Access for data storage and Excel for data analysis. The system struggled with poor data integration among different databases. Recognizing these issues, the data process was simplified, and DHIS2 was introduced in 2017. Oslo University and the Global Fund supported this milestone [7]. The collaboration with Oslo University and the Global Fund not only provided technical support but also enhanced capacity building within the ministry for sustainable data management practices.

The Somalia Health Sector Strategic Plan (HSSP III 2022-2026) identifies the Health Management Information System (HMIS) as a foundational element for achieving Universal Health Coverage (UHC) and reinforcing national health security. In line with the principles of a Learning Health System, the plan prioritizes the use of integrated, real-time data to inform planning, policy decisions, and performance evaluations across both federal and state levels. This renewed commitment to health information governance represents a significant shift in Somalia's post-conflict recovery, elevating DHIS2—now connected to disease surveillance and logistics systems—from a basic reporting platform to a central driver of health system reform [8].

This paper explores the intersection of secondary data utilization and HMIS to strengthen health research and policymaking in Somalia. By addressing critical challenges and leveraging opportunities for integration, capacity building, and technology adoption, Somalia can build a robust foundation for a Learning Health System—one capable of advancing its health information ecosystem toward sustained improvement and better health outcomes for its population

2. Challenges

In Somalia's public health sector, routine data collection occurs at the facility level through standardized paper-based registries provided by the Federal Ministry of Health, encompassing areas such as inpatient and outpatient care, as well as immunization services. These records are compiled monthly and entered into the DHIS2 system by district Health Management Information System (HMIS) officers, with further aggregation at regional, state, and national levels. However, the coverage is limited, as only 30%-42% of districts have HMIS officers, and DHIS2 usage is restricted to the public sector. Facilities often face challenges such as data duplication in reporting for partner-supported programs, and there are significant limitations in staff capacity, information and communication technology (ICT) resources, and internet access. The system also suffers from fragmentation due to

the coexistence of donor-driven systems and disease-specific programs, which hampers the Health Information System's (HIS) ability to produce data that can inform decision-making [7]. The HSSP III further draws attention to enduring institutional shortcomings, notably the insufficient integration of surveillance and logistics modules within the DHIS2 system. This gap disrupts the regular flow of critical information and weakens the foundation for data-informed decision-making. Although DHIS2 has seen recent upgrades, its full effectiveness remains hindered by unreliable funding and inadequate enforcement of standardized reporting practices [8].

Additionally, the lack of detailed data on individual health cases—such as risk factors, comorbidities, and treatment outcomes—impedes comprehensive analysis, making it difficult for researchers and policymakers to fully grasp the public health challenges in the country [9].

Insecurity is one of the main challenges facing the Somali health system, particularly in some regions of southern and central Somalia. It has been said that having long-term security is a requirement for retaining and attracting skilled health workers, and this makes logical reasoning. Uncertainty on the political front and high turnover rate within the federal Ministry of Health because of that instability, was identified as a main obstacle to long-term advancement [10]. This leaves significant gaps in the country's health data, making it difficult to get an accurate picture of the situation on the ground. In many cases, data collection is delayed or missing altogether. The frequent loss of trained HMIS staff—often due to safety risks combined with weak institutional memory, makes it even harder to maintain continuity and learn from past experiences. These challenges make it difficult to plan effectively, allocate resources fairly, or track progress.

In urban areas, the private sector is the predominant provider of healthcare services, delivering an estimated 80% of curative care [11]. However, few private hospitals and clinics contribute even minimal data to the DHIS2 system. When data is reported, it typically pertains to immunizations—often supported by partners like Gavi, the Vaccine Alliance—or to notifiable diseases, leaving considerable gaps in information about disease burden, services provided, and patient demographics. This issue is further aggravated by the absence of formal requirements or incentives for the private sector to report data and the use of various incompatible software systems by private healthcare facilities [7].

The Federal Ministry of Health also fails to regularly publish annual health statistics reports or conduct equity analyses, despite DHIS2's capability to disaggregate data by gender and geography [7]. This lack of data accessibility is reflected in the fact that only 2% of scientific publications in indexed journals originate from developing countries, underscoring the urgent need for more robust and comprehensive health data reporting in Somalia [12].

Several studies have highlighted the significant challenges posed by the lack of comprehensive health data in Somalia. For example, one study emphasizes the severe limitations and gaps in data availability, particularly the lack of access to

individual-level health and undernutrition data, which is a major barrier to assessing improvements in mortality and disability rates [13]. Moreover, the deficiency in birth registration is particularly concerning, with only 6% of children under five registered in 2019, further complicating efforts to monitor and improve child health outcomes [14]. Additionally, statistics provided by Africa UN (ECASTATS), which are crucial for tracking progress towards the Sustainable Development Goals (SDGs), including SDG3, are sparse for Somalia and often lack sufficient evidence [15].

The challenges are compounded by the absence of a centralized health journal, repository, or database under the Ministry of Health for systematically storing and accessing data and published studies for research purposes. While a few journals do exist—such as the Somalia Turkiye Medical Journal (STMEDJ) [16], the Somali Journal of Medicine & Health Sciences [17], and the Somali Health Action Journal (SHAJ) [18]—they operate independently and follow their own or international guidelines. This fragmented and inconsistent approach hinders the standardization of key health parameters and limits the availability of reliable secondary data, complicating efforts to build a cohesive health research environment in Somalia.

3. Opportunities

Somalia's health information system faces significant challenges, but there are key opportunities to strengthen it and improve health outcomes nationwide. One of the most promising strategies is expanding the coverage of the DHIS2 system, initially rolled out in 2017, to include private healthcare facilities. Given funding constraints, the Ministry of Health could start with a pilot program in major private hospitals and gradually extend DHIS2 to all private health facilities. The existing pool of trained HMIS officers offers a valuable resource for building capacity among HMIS and healthcare staff in private hospitals and clinics, facilitating smoother system integration across sectors. Ethiopia's Private Health Sector Programme (PHSP) offers a valuable case study, demonstrating how private clinics were effectively integrated into the DHIS2 system through coordinated training, provision of digital infrastructure, and strengthened governance mechanisms. Initially, reporting from private facilities remained inconsistent despite a legal requirement to report to the national HMIS. PHSP tackled this challenge by implementing accountability mechanisms, including memoranda of understanding (MOUs) that tied timely reporting to eligibility for resupplying government-provided medicines [19]. While the Somali government may not currently have the capacity to supply private facilities, adapting this model to Somalia's context could significantly improve private sector reporting. This approach would align with the objectives of HSSP III to engage non-state actors and support the EPHS mandate of delivering equitable and integrated health services.

The DHIS2 platform has the potential to significantly enhance health data collection in Somalia, particularly for tracking individual health cases, risk factors, comorbidities, and treatment outcomes. While this expansion may increase the

workload of HMIS officers, the Ministry of Health can mitigate this by incorporating simple checklist options into both existing register papers and the DHIS2 system. This approach would allow for more detailed data capture without overwhelming staff.

At the same time, building the digital skills of frontline healthcare workers is key to making sure health information systems are used effectively and remain sustainable. This means going beyond one-off training there should be ongoing support through mentorship, hands-on workshops, and clear, easy-to-follow guides available in local languages.

Rolling out these efforts gradually starting with the regions facing the greatest health challenges and instability can help close the most urgent data gaps first. Priority should be given to collecting reliable data on maternal and child health, tracking infectious diseases, and monitoring non-communicable illnesses, which are often overlooked in crisis-affected area.

Additionally, adopting a hybrid data collection strategy that combines DHIS2 with independent health facility assessments could provide a comprehensive baseline of the healthcare landscape, boosting Somalia's capacity for in-depth analysis and evidence-based policy development. This, in turn, would lead to more effective monitoring, resource allocation, and responsive health interventions that align with LHS goals. Involving local universities and research institutions in these efforts can play a big role in strengthening Somalia's health research culture. It also helps build local expertise in data analysis and public health monitoring skills that are essential for long-term, homegrown solutions. Additionally, creating regional health data hubs can shift more decision-making power to the district or state level. This decentralization allows local authorities to better understand their specific health challenges and respond more quickly and effectively to the needs of their communities.

The National Bureau of Statistics' announcement for conducting Population and Housing Census in Somalia presents another valuable opportunity [20]. The Somali National Institute of Health (NIH) is mandated to conduct and support scientific research addressing critical public health challenges and to provide evidence-based information for informed decision-making [21]. Developing a centralized health repository or database under the NIH could significantly enhance the accessibility and reliability of health data. Such a centralized data repository could become a vital national resource for tracking disease patterns, monitoring health service coverage, and understanding key population health indicators. It would also foster smoother collaboration among various stakeholders such as government bodies, non-governmental organizations, academic institutions, and international partners—by providing a shared foundation of reliable information. This repository could align with LHS principles to foster continuous learning. By establishing standardized guidelines for data collection and publication and ensuring adherence across all health facilities and journals, Somalia can create a more cohesive and consistent health research landscape. Furthermore, establish-

ing data-sharing protocols and ethical oversight mechanisms can help promote the responsible use of health data while safeguarding patient privacy and ensuring data protection.

Investment in health information systems is crucial. At the First NIH Health Research Conference in Garowe, Somalia, it was recommended that the Somali government allocate at least 2% of health expenditures and 5% of health financing to research and capacity building, with a focus on maternal and child health services [13]. To implement this recommendation, the government could establish a specialized Health Research and Innovation Fund, administered in partnership with the National Institute of Health (NIH), to support key initiatives and pilot projects focused on strengthening health information systems. Additionally, offering grants and fellowships to foster collaboration between Somali and international researchers may help drive the creation of locally led, context-sensitive health innovations.

Integrating donor-driven systems with a unified national health information system can reduce fragmentation and improve decision-making. By leveraging international partnerships and technology, such as mobile health applications, Somalia can enhance data collection, supporting the country in achieving its national health targets, health-related Sustainable Development Goals (SDGs), and Universal Health Coverage.

Moreover, Mobile-based community health surveillance tools offer significant potential to expand data coverage in rural and hard-to-reach areas, these tools are particularly valuable in insecure regions where on-site supervision or data delivery is disrupted. Remote data entry supports continuity in reporting and minimizes safety risks for health personnel. Integrating such tools with DHIS2, as promoted in HSSP III, would improve both resilience and responsiveness of the health information system. In addition to addressing security-related disruptions, this also facilitates real-time reporting on disease outbreaks, maternal health, and immunization rates. When scaled effectively, these innovations can help close longstanding data gaps and enhance early warning and response systems. Integrating mobile health technologies with DHIS2 for real-time data exchange would further improve the precision and timeliness of public health reporting. Collaborating with telecommunications providers to zero-rate health application data usage could also boost adoption in areas with limited internet connectivity.

Recent evidence supports this approach, a 2024 scoping review determined key factors such as health worker training, technical support, and system integration as critical to scaling mobile Health tools in low-resource environments [22]. Additionally, a 2025 scoping review emphasized that while mobile health units (MHUs) are flexible tools for delivering services and collecting real-time data in conflict settings, their use is often underreported and lacks standardization. The review identified key challenges such as limited published evidence, inconsistent adherence to WHO guidelines, and sustainability issues. It highlighted the need for stronger coordination, standardized data practices, and logistical planning to

maximize MHU effectiveness [23], particularly in fragile settings like Somalia.

Finally, Somalia has national frameworks such as the EPHS (2020) [24] and HSSP III (2022-2026) that support the creation of a strong, unified Health Management Information System (HMIS). These policies emphasize consistent data reporting across both public and private sectors, prioritizing interoperability and routine data collection at the facility level. Together, they provide a valuable platform for promoting the secondary use of routine health data for research, evaluation, and evidence-based policymaking. By leveraging these frameworks, Somalia has an opportunity to institutionalize data reuse and move toward a more transparent, equitable, and learning-oriented health system.

4. Conclusions

Transitioning to a Learning Health System is critical for addressing Somalia's health challenges. By prioritizing a unified approach to health data systems and leveraging modern technologies, Somalia can create an adaptable and sustainable healthcare infrastructure—directly supporting the HSSP III objective of strengthening the health information ecosystem and digital transformation. This approach will enable continuous learning, evidence-based decision-making, and better health outcomes, in line with EPHS's commitment to improving service quality through data-driven planning and monitoring.

A Learning Health System fosters ongoing feedback loops that link data collection, analysis, and policy action in real time. This approach aligns with the goals of both EPHS and HSSP III to establish real-time monitoring and performance-based improvements in the health system. As health priorities evolve—from infectious diseases to the growing impact of non-communicable diseases. This strategy supports EPHS's aim to deliver integrated, needs-based services at all care levels, while bolstering HSSP III's initiative for responsive, decentralized service delivery.

Investing in capacity building, integrating public and private sectors, and collaborating with international partners reflect HSSP III's goal to involve non-state actors and enhance health system governance. These measures also strengthen EPHS's commitment to equitable service provision and inclusive health workforce development. By encouraging collaboration among ministries, NGOs, and communities, Somalia is progressing toward a more resilient and patient-centered health system.

This transformation will necessitate strong governance structures, standardized data practices, and inclusive stakeholder engagement all of which are fundamental to HSSP III's strategic framework. Promoting a culture where policymakers regularly utilize timely and reliable data supports EPHS's focus on evidence-based service planning and accountability.

With supportive policies, political will, and ongoing investment, Somalia is well-equipped to enhance its national health information system and serve as a regional model for how fragile and post-conflict nations can adopt Learning

Health System principles to achieve universal health coverage and sustainable development goals.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] World Health Organisation (2022) World Health Statistics 2022: Monitoring Health for the SDGs, Sustainable Development Goals. Global Report 2022. https://www.who.int/publications/i/item/9789240051157

[2] Somalia Health Cluster Strategy 2023-2025. https://reliefweb.int/report/somalia/somalia-health-cluster-strategy-2023-2025

[3] Farnham, A., Utzinger, J., Kulinkina, A.V. and Winkler, M.S. (2019) Using District Health Information to Monitor Sustainable Development. *Bulletin of the World Health Organization*, **98**, 69-71. https://doi.org/10.2471/blt.19.239970

[4] World Health Organization Regional Office for Europe (2022) Meeting on Secondary Use of Health Data. WHO. https://www.who.int/europe/news-room/events/item/2022/12/13/default-calendar/meeting-on-secondary-use-of-health-data

[5] Hung, Y.W., Hoxha, K., Irwin, B.R., Law, M.R. and Grépin, K.A. (2020) Using Routine Health Information Data for Research in Low- and Middle-Income Countries: A Systematic Review. *BMC Health Services Research*, **20**, Article No. 790. https://doi.org/10.1186/s12913-020-05660-1

[6] Jennifer, A., Bernstein, J.D., *et al.* (2015) Ensuring Public Health's Future in a National-Scale Learning Health System. *American Journal of Preventive Medicine*, **48**, 480-487. https://www.sciencedirect.com/science/article/abs/pii/S0749379714006710

[7] WHO (2022) Comprehensive Assessment of Somalia's Health Information System 2022. https://applications.emro.who.int/docs/9789292742188-eng.pdf

[8] Ministry of Health and Human Services (2021) Somalia Health Sector Strategic Plan 2022–2026 (HSSP III). https://moh.gov.so/so/wp-content/uploads/2022/11/Health-Sector-Strategy-Plan-III.pdf

[9] Morrison, J. and Malik, M.R. (2023) Population Health Trends and Disease Profile in Somalia 1990-2019, and Projection to 2030: Will the Country Achieve Sustainable Development Goals 2 and 3? https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-14960-6

[10] Warsame, A., Handuleh, J. and Patel, P. (2016) Prioritization in Somali Health System Strengthening: A Qualitative Study. *International Health*, **8**, 204-210. https://doi.org/10.1093/inthealth/ihv060

[11] Heritage Institute for Policy Studies and City University of Mogadishu (2020) Somalia's Healthcare System: A Baseline Study & Human Capital Development Strategy. https://www.heritageinstitute.org/wp-content/uploads/2020/05/Somalia-Healthcare-System-A-Baseline-Study-and-Human-Capital-Development-Strategy.pdf

[12] Salager-Meyer, F. (2008) Scientific Publishing in Developing Countries: Challenges for the Future. *Journal of English for Academic Purposes*, **7**, 121-132. https://doi.org/10.1016/j.jeap.2008.03.009

[13] Bile, K., Warsame, M. and Ahmed, A.D. (2022) Fragile States Need Essential National Health Research: The Case of Somalia. *The Lancet Global Health*, **10**, e617-e618. https://doi.org/10.1016/s2214-109x(22)00122-x

[14] World Bank Group. Completeness of Birth Registration (%)-Somalia. https://data.worldbank.org/indicator/SP.REG.BRTH.ZS?locations=SO

[15] United Nations Sustainable Development Group. Regional Collaborative Platform: Africa. SDG Progress. https://ecastats.uneca.org/unsdgsafrica/SDGs/SDG-progress

[16] Somalia Turkiye Medical Journal (STMJ). https://www.stmedj.com/index.php/STMJ

[17] Abdue, G.D.H.M.O., Said, A.H. and Isaak, I.A. (2018) Evaluation of the Availability of Safe Water and Sanitation Facilities in IDP Camps in Kahda Distrect in Mogadishu, Somalia. *Somali Journal of Medicine & Health Sciences*, **3**, 36-52.

[18] Somali Health Action Journal (SHAJ). https://journals.ub.umu.se/index.php/shaj

[19] Ali, D., Woldegiorgis, A.G.Y., Tilaye, M., Yilma, Y., Berhane, H.Y., Tewahido, D., *et al.* (2022) Integrating Private Health Facilities in Government-Led Health Systems: A Case Study of the Public-Private Mix Approach in Ethiopia. *BMC Health Services Research*, **22**, Article No. 1477. https://doi.org/10.1186/s12913-022-08769-7

[20] Somali Population and Housing Census. https://nbs.gov.so/somali-population-and-housing-census-launched/

[21] Somali National Institute of Health. https://nih.gov.so/

[22] Tumuhimbise, W., Theuring, S., Kaggwa, F., Atukunda, E.C., Rubaihayo, J., Atwine, D., *et al.* (2024) Enhancing the Implementation and Integration of mHealth Interventions in Resource-Limited Settings: A Scoping Review. *Implementation Science*, **19**, Article No. 72. https://doi.org/10.1186/s13012-024-01400-9

[23] Awad, S., Sheerazi, S. and von Schreeb, J. (2025) Use of Mobile Health Units in Conflict Settings—A Scoping Review. *BMC Health Services Research*, **25**, Article No. 409. https://doi.org/10.1186/s12913-025-12443-z

[24] Federal Ministry of Health & Human Services (2020) Essential Package of Health Services for Somalia. Government of Somalia. https://moh.gov.so/so/wp-content/uploads/2023/05/Essential-Packages-of-Health-Services-2020.pdf