Perspective

Working towards a master patient index and unique identifiers to improve health systems: the example of Myanmar

Lori Thorell1, Joseph Dal Molin2, Justin Fyfe3, San Hone4, Su Myat Lwin5


Correspondence to: Ms Lori Thorell (lorithorell@gmail.com)

Abstract
In the health systems of many countries, there is neither a requirement to collect a minimum set of demographic information during patient registration nor a standard way of identifying patients. This impedes the provision of integrated, good-quality care for individual patients and, at the system level, prevents generation of the high-quality data necessary for effective management and continuous improvement. Assigning each patient a unique identifier (UID) to create a master patient index (MPI) is therefore essential to ensure data interoperability across all the points of patient care within a health system. Although advances in technology are shifting the boundary between civil registration and personal identification, the additional value of an MPI/UID system lies in the technical and operational capacity to ensure that clinical data are safely and securely managed. Moreover, operationalization of MPI/UID data enables the establishment of an evidence-based, constantly improving “learning health system” with feedback loops that allow measurement, evaluation and visualization of performance over time. The Ministry of Health and Sports of Myanmar is actively engaged in a multistakeholder collaborative process working towards a nationwide MPI/UID system. Demonstration pilots are planned for both online and offline modes of operation for HIV/AIDS, mother and child health (including eliminating mother-to-child transmission of HIV and syphilis) and hospital settings, which are expected to open up the potential for expansion to all health interventions and facilities. With the implementation of the MPI/UID system under way in Myanmar, the Ministry of Health and Sports is laying the foundation to put individuals at the centre of care and deliver a lifelong service for all.

Keywords: civil registration system, digital health, master patient index, Myanmar, unique health identifier

Background
An estimated 1.1 billion people, the majority living in Africa and Asia, are unable to prove who they are. A disproportionate number of these people are children and women in poor rural areas, and their inability to prove their identity is a barrier to accessing the rights and services, including health care, to which they are entitled. It is now well established that transforming identification systems to support universal and equitable access to health care represents not only a moral necessity but also an opportunity to improve the quality and efficiency of services. Unique identifiers (UIDs) are fundamental to achieving equity and universal health coverage, from drafting new identity management policies and legal frameworks to investing in cutting-edge information, communications and technology for digital health and interoperability and generating the high-quality data necessary for effective management and continuous improvement.

In many countries, at the clinical level, there is currently no standard way of identifying or managing the identity of the patients interacting with the health system. There is also no requirement to collect a minimum set of demographic information during patient registration. As a result, multiple identifiers may be assigned to an individual by different service providers, making patient-focused care and monitoring difficult, especially among individuals who seek care at multiple health facilities. These issues can be tackled by establishing a master patient index (MPI), a repository containing a registry of all the citizens in a health-care system, through which the demographic and clinical data of every patient can be safely accessed. In an MPI, each citizen has a UID, enabling health records to be linked across multiple settings and facilities and ensuring data interoperability in different institutions across the health-care system.
The learning health system as prerequisite for good-quality health care

The strategic value of a UID to all stakeholders within a health system cannot be overemphasized. It is the foundational and critical component of a patient-focused national digital health architecture (see Fig. 1). It enables the individual to be identified, to align service delivery so that all interactions across the continuum of care can be optimized, thereby contributing to better health outcomes.

The MPI and UID together provide the tools and information needed to make the shift to a patient-centred digital health system, which is in turn essential for establishing a “learning health system”. This is a proven path to achieving and managing continuous evidence-based transformation and innovation in health care. More specifically, transformative models of care, in areas including prevention, telemedicine, home-based care, artificial intelligence, predictive analytics, the use of data science and secondary analysis of clinical data become possible and/or more easily achievable. The ability to uniquely identify and integrate health information enables the adoption of patient-focused digital solutions that ultimately enable health-care workers to focus on delivering the best care possible. An MPI and a UID in essence constitute the “DNA” for building resilient health systems that learn and go on learning.

The operationalization of an MPI supports the establishment of an evidence-based, constantly improving learning health system that can provide feedback loops to measure, evaluate and visualize performance over time. Current health systems and digital health solutions tend to be focused on pre-set indicators because, understandably, administrators seek key performance indicators in order to measure and manage health system performance. These indicators dictate the data that are collected, which in turn heavily influences the data tools or digital health solutions that front-line health-care workers use to report on the care provided. However, services are frequently provided for which there is no indicator, meaning that key aspects of care go unrecorded and unreported. Using an MPI/UID system helps make the shift from an indicator-focused to a patient-focused digital health system that can generate indicator data as a by-product of care delivery. Fig. 2 illustrates how an MPI and a UID play a central role in supporting the establishment of evidence-based feedback loops and shifting from a focus on aggregate indicators to patient-centred digital health systems.

Measuring and accounting for the SDGs

The importance of identifier systems is inscribed in the Sustainable Development Goals (SDGs). SDG target 16.9 is “By 2030, provide legal identity for all, including birth registration”. States are encouraged to provide people with free or low-cost access to widely accepted, robust credentials that facilitate the achievement of SDGs in areas including social protection, health, finance, energy and governance. In the SDG era, therefore, efforts to improve data collection and capacity are inseparable from the broader effort to build strong service delivery systems. Investing in strategies to enhance the quality, coverage and coordination of governments’ data systems must be a priority. It is useful to consider what monitoring and achieving the SDGs could look like in 5 or 10 years, if person-centred digital health investments, including use of an MPI/UID system, were the primary goal.

Relationship with civil registration and vital statistics

There are inherent connections between national identity, health identity and civil registration and vital statistics. Usually, the system for civil registration and collecting vital statistics, primarily via the birth certificate, serves as the basis for individual identification, which in turn allows data to be recorded in population registries. The birth certificate is considered the foundational document for all individual identity systems and fulfills multiple purposes.

Likewise, death certificates allow official recording of a death in the continuous and permanent record, or registry. A continuously updated registry is important for updating electoral rolls, pensions and other social security mechanisms for the distribution of goods and services, including health care. Advances in technology including biometrics and digital identity are shifting the boundary between civil registration and personal identification within national, health and insurance domains. This raises the question, given the complexity of maintaining civil registration and vital statistics systems, why is operationalizing an MPI/UID system still advantageous? There are several reasons, most notably the critical considerations...
and risks associated with privacy, safety, data ownership, human capacity and sharing of data within the varied contexts of a health system. The MPI provides the strategic tools needed for implementing privacy and security. In practical terms, the MPI helps to define and implement the required privacy and security framework for clinical computing and interoperability. This includes policy and practices, technical and operational readiness and maturity to ensure that person-centred data are safely and securely managed.

The strategic value of an MPI is multiplied when its operationalization involves a stepwise, agile process with multistakeholder collaboration. An exemplar of this approach is Myanmar, a country that for the past 5 years has been taking a system-wide approach, including collaboration with multiple stakeholders, towards implementing an MPI/UID system.

Myanmar’s Ministry of Health and Sports’ strategic investment in a master patient index and unique health identifier system

Health care in Myanmar comprises a mix of public and private systems. The Department of Public Health of the Ministry of Health and Sports (MoHS), is the service provider and also takes the regulatory functions of the ministry in protecting the health of the people. A network of hospitals and health centres, which extends down to village level, provides preventive and curative services ranging from primary to tertiary care. To resolve the fragmented nature of the health information systems, the MoHS is working towards a cohesive national information system. It is envisaged that this will increase operational efficiencies and improve decision-making at every level of care, leading to better health outcomes. The efforts of the MoHS to achieve MPI operationalization have involved a multi-stakeholder, collaborative process for moving towards rolling out UIDs at the national scale, while aiming to link together existing systems (i.e., paper and digital) and future software applications, digital identity and biometrics linked to civil registration and vital statistics into an integrated system.

The analysis, design and planning of this integrated system, including the MPI, of the scale and complexity of the MoHS health information system, posed unique and complex challenges. After numerous rounds of separate meetings with stakeholders, the MoHS held its first convergence workshop for eHealth in 2015, the first in the region. Based on Myanmar’s eHealth vision, a detailed road map to maximize digital priority actions and investments to improve health was introduced, and UIDs were deemed essential to facilitate the development of longitudinal medical records and allow users to be tracked across health-care sectors and other social services. Initial plans for a national-scale MPI and UID system soon followed, as part of Myanmar’s overarching Strategic action plan for strengthening health information 2017–2021.

With the development of the MPI/UID system well under way, in November 2018, the MoHS organized a second national convergence workshop to advance development of the eHealth blueprint, hosted by Dr Myint Htwe, the Union Minister of Health and Sports. This was led by a high-level team from the MoHS, comprising Ms Aye Aye Sein, Deputy Director-General of Planning and Finance, Dr Thet Thet Mu, Deputy Director-General of Health Information Systems, and Dr Thandar Lwin, Deputy Director-General of Disease Control. Participants represented a wide range of health-care areas – including HIV/AIDS, tuberculosis, malaria, mother and child health, and immunization – and settings, including laboratory, outpatient and inpatient services. Notably, the Central Statistics Office, civil society organizations and development partners supporting the MoHS in the development of sustainable
point-of-care services also participated. The MoHS eHealth convergence workshop spawned a number of activities that served to enhance the health information system, eHealth governance and actions towards implementing the eHealth blueprint. They built upon ongoing commitment to and expansion of the MPI/UID system. The main sources of financial support for the MPI/UID work in Myanmar have been the United Nations Office for Project Services, Save the Children and the Joint United Nations Programme on HIV/AIDS. The United Nations Children’s Fund and the World Health Organization have provided technical support.

For Myanmar, operationalizing the MPI is expected to contribute to developing the country’s digital health system in the policy, technical and operations areas listed next.

- **Privacy and security policy and compliance**: adapting and implementing the minimum privacy and security policies and standards necessary will support demonstration pilots for workflows and pave the ground for establishing comprehensive national policies and standards.

- **Standards and interoperability**: open, international standards exist that allow users to copy, distribute and use technology, free of charge or at low cost, that is necessary for establishing and managing unique identity. By identifying and implementing these standards, Myanmar can share and merge patient health data cost-effectively.

- **Applications and tools**: pilots and subsequent national deployment will be supported by the adaptation, development and implementation of tools and software components.

MPI/UID demonstration pilots are being planned for both online and offline modes of operation for HIV/AIDS, mother and child health (including elimination of mother-to-child transmission of HIV and syphilis) and hospital settings, which are expected to open up the potential for expansion to all health interventions and facilities. The “system perspective” also provides important underpinning for newer solutions in the digital health arena to be introduced. It is yet another opportunity where the effort to implement an MPI/UID system at scale will spawn system-wide efforts toward larger nationwide health impacts.

These demonstration pilots are providing a “learning by doing” opportunity to operationalize the MPI in a health-care setting, to guide the development of policy, workflow, procedures for longer-term scale-up and sustainability. For example, the MPI demonstration pilot under consideration for mother and child health, starting with the childhood immunization programme, is expected to make good use of the many tablets recently purchased for health-care workers, designed to leverage the MPI with digital identity/biometric solutions, which enable authentication of a person’s identity, together with electronic primary health-care records.

With the implementation of the MPI/UID system under way in Myanmar, the MoHS is laying the foundation to advance development of the country’s eHealth blueprint. An MPI/UID system puts individuals at the centre of care, moving the health system away from episodic interventions to delivery of a lifelong service for all. An MPI/UID system therefore plays a critical part in strengthening health outcomes, health-system reporting, measuring the SDGs and maximizing sound health investments, as countries progress towards universal health coverage.

Acknowledgements: The authors thank Dr Thandar Lwin, Deputy Director-General of Disease Control, Dr Thet Thet Mu, Deputy Director-General of Health Information Systems and Ms Aye Aye Sein, Deputy Director-General of Planning and Finance, Ministry of Health and Sports, Myanmar, for their support of the MPI initiative.

Source of support: None.

Conflict of interest: None declared. Joseph Dal Molin and Justin Fyfe acted as consultants to the Myanmar United Nations Office for Project Services on the MPI implementation.

Authorship: LT, JDM and JF wrote the paper, with inputs provided by SH and SML.


References


