Policy Brief

STRENGTHENING INDONESIAN SURVEILLANCE SYSTEM THROUGH BETTER LINKAGE AND USE OF ROUTINE HEALTH SERVICE DATA FOR LOCAL DECISION-MAKING

AUSTRALIA INDONESIA HEALTH SECURITY PARTNERSHIP

RECONSTRA research for human development

www.aihsp.or.id

Executive Summary

The Secure and Interoperable Surveillance and Health Information System (SISHIS) was a 26-month initiative that modelled a design to enhance Indonesia's health surveillance and information capabilities in the Badung and Buleleng Districts of Bali Province. By creating a secure data warehouse that integrated multiple health data sources routinely collected by public and private health facilities (including primary health centres (*Puskesmas*), clinics, and hospitals), the SISHIS initiative aims to address critical gaps in local early warning system identified during the COVID-19 pandemic. It generates timely, accurate, and accessible data in a visualised format to inform decision-making for potential health outbreaks earlier than would otherwise be possible. The pilots complemented the existing weekly reporting system of *Puskesmas* EWARS (Early Warning, Alert, and Response System-*Sistem Kewaspadaan Dini dan Respons*/SKDR) by reducing the need for manual tally and entry of case information without the burden of creating new applications. The pilot demonstrated the feasibility of transitioning to an integrated health information system that leverages human resource strengths and addresses infrastructure gaps. At the same time, it aligns with the Ministry of Health's Digital Health Transformation Strategy by showcasing interconnectivity at the subnational level.

Background

Supported by national stakeholders and the Bali local government, the SISHIS pilot (2022-2023) demonstrated the feasibility of creating a seamlessly linked health information system that can equip surveillance personnel to conduct prompt epidemiological investigations. By utilising diagnoses based on standardised disease classification codes (i.e., ICD-X[1]), SISHIS enhances the detection and monitoring of 24 priority communicable diseases by conducting analyses within minutes and making data visualisations immediately accessible via mobile phones and dashboards. Unlike the cumulative data in SKDR, SISHIS's individual-level data allows for more robust epidemiological investigations, such as analyses by gender or age group. Throughout the initiative, SISHIS involved continuous advocacy and coordination with both national and local stakeholders, incorporating feedback to improve system implementation and future enhancements. Although the SISHIS pilot officially concluded in May 2023, its significant benefits led to calls for its integration into local surveillance systems and sustainability beyond the pilot phase.

Pilot Locations and Achievements

SISHIS was piloted with district health offices, 24 health facilities in Badung and Buleleng Districts, one provincial-level hospital, and one Ministry of Health's national referral hospital in Bali.

- Badung: a well-resourced district and functioning electronic health service management system[2] across its primary health care providers and hence was ideal to test SISHIS model.
- Buleleng: Chosen for its vast area, limited budget, and the absence of an integrated electronic service management system at *Puskesmas*, this district provided insights into implementing SISHIS in resource-constrained settings.

[1] International Classification of Diseases (ICD) X (or 10) is a globally recognised coding system used to classify and code all diagnoses and symptoms recorded in conjunction with health facilities care. Currently, all hospitals are mandated to use ICD-10 under the national health insurance scheme. Primary health service providers are still in the process of implementing this system.

[2] In Indonesia, Health Information System and Electronic Health Service Management System (EHSMS) are often used interchangeably. An EHSMS is a digital platform that improves healthcare management by integrating functions like patient records, appointment scheduling, billing, inventory management, and clinical data exchange, including electronic medical records. Due to decentralisation, EHSMS are more established in districts with stronger fiscal capacity.

Key achievements:

- **Provided experience of having analyses ready within minutes and making data readily accessible via mobile phones to relevant parties.** In the midst of delays and semi-manual entry, it would be ambitious to expect timely early warning and prompt response, including epidemiology investigation. SISHIS demonstrated how data contributors (*Puskesmas,* Clinics, Hospitals) in Badung and Buleleng Districts became data users able to access visualised analytical information within minutes of data being processed. That is unusual, as typically district health offices' and health facilities' role is just to provide a data entry role and they do not have immediate access to digested information useful for decision-making.
- **Fostered local governance ownership for transition to secure and interoperable surveillance health information systems:** Badung district government promptly modified its 2024 budget through the APBD *Perubahan* process in November-December 2023 championed by the District Development Planning Agency (*BAPPEDA*) to support procurement of the information technology (IT) infrastructure, human resources, expenses, and administration needed for better disease surveillance data management and use. Meanwhile Buleleng District Government is now gearing up to procure an electronic *Puskesmas* service management system to participate in the national digital health transformation and enable future adoption of the SISHIS model.

Advancing the Digital Health Transformation Strategy

The Ministry of Health's 2021 digital health transformation initiative emphasises the need for integration of health data across various levels to support preventive and promotive services delivery, including surveillance. Integration and interoperability have been a long-desired ideal for Indonesia's fragmented HIS. SISHIS contributes to that vision by demonstrating that transformation is feasible when data contributors are presented with viable solutions and meaningfully engaged in the transformation process.

Challenges encountered	What SISHIS did
There are discrepancies in the digital health ecosystem preparedness, the overall HIS implementation, and the way health facilities recorded SKDR disease, with variations from one facility to another	AIHSP/Reconstra facilitated MoH DTO and *Pusdatin* in organising the SATU SEHAT introductory workshop in Bali Province – inviting all health facilities' information technology vendors to connect to SATU SEHAT. AIHSP/Reconstra facilitated a field visit for MoH, DTO, and *Pusdatin* to showcase the variability of the digital health ecosystem preparedness.
Some health facilities continue to rely on paper-based registration records while others already use electronic medical records and service management with varied data structure.	AIHSP/Reconstra consulted with the MOH regarding the disconnect and inconsistency, and revisited MOH's model of syndrome-based suspected case definitions. Upon obtaining the preliminary sets of ICD-coded symptoms and syndromic grouping and definitions produced by University of Gajah Mada, Reconstra iteratively refined the syndromic grouping and definitions and used it with data from SISHIS pilot partner hospitals.

Challenges encountered	What SISHIS did
SKDR reporting is not mandatory in all hospitals leading to inconsistent participation and unstable reporting of surveillance data.	SISHIS introduced health facilities to experience the benefit of digital health information systems through data visualisation of their own data; resulting in the health service providers' willingness to move to electronic service management system. In the process, AIHSP/Reconstra provided input on the data structure.
Human resources are a key determinant of data quality, and shortfalls in both availability and capability drive data quality issues: the lack of available human resources, frequent health worker rotation, lack of staff understanding, and lack of training.	AIHSP/Reconstra consulted with the MOH regarding the disconnect and inconsistency, and revisited MOH's model of syndrome-based suspected case definitions. Upon obtaining the preliminary sets of ICD-coded symptoms and syndromic grouping and definitions produced by University of Gajah Mada, Reconstra iteratively refined the syndromic grouping and definitions and used it with data from SISHIS pilot partner hospitals.
Despite the appreciation of the successful donor-funded pilot, both overnments of Badung and Buleleng were not sure they can replicate, adopt, or transition to secure and interoperable surveillance and health information systems across their geographic and catchment areas.	AIHSP/Reconstra facilitated a study visit to Semarang City that has living examples of vast growing and sustained health information and health early warning systems, followed by a series of ideation meetings that catalysed ownership and generated living SISHIS models for reasonable transition according to the local capacity and potentials.

Policy Recommendations

Based on best practices and learning from SISHIS, the following actions are recommended to improve public health surveillance in Indonesia:

Optimise strategic engagement with associations of district governance and health offices for HIS ownership

Digital health transformation requires the right internal management system to improve the efficiency of each activity and reporting that must be performed by agencies that are directly responsible to MOH and agencies that are not directly responsible to MOH but to subnational governments[3]. Therefore, to pursue a nationwide secure and interoperable health information system, including surveillance, it is important to ensure district/municipality health offices and development planning agencies have a critical and

[3] Ministry of Health. 2021. Blueprint of Digital Health Transformation Strategy 2024. Pp 22.4

active voice. Exploring ways to optimise participation and leadership by the District Association(s), such as *ADINKES*[4], *APEKSI*[5], and *APKASI*[6]. Similarly, the national level driven digital health transformation agenda should not proceed in a silo separate from the programs of functioning governance and government associations.

Drive syndromic surveillance at public and private hospitals to feed into the outbreak early warning and surveillance and, if required, ensure adaptability to support interoperability and seamless integration with SKDR datasets.

It is not uncommon for Indonesians to seek first aid care and initial health service at hospitals. That was especially true in the recent pandemic and outbreaks, which means hospitals often manage a large amount of service data relevant for surveillance. MOH has had multiple pilots with syndromic surveillance for early detection of infectious disease outbreaks from tertiary care level. This would complement the subnational and national surveillance system that currently relies heavily on indicator- and event-based surveillance from public primary healthcare services.

Catalyse and lead nationwide learning and exchange of local innovations that align with and complement the top-down Digital Health Transformation

In the decentralised governance, the MOH should play a more strategic role to catalyse cross learning among locally funded health information systems. First, by curating and creating a systematic inventory of locally sustainable health information systems with existing or promising interoperability with Satu Sehat. The MOH can do this through remote sessions with district health offices (DHO), the DHO association (*ADINKES*), and the national health information system technical working group (HIS TWG), then upload that information on its web resource centre (rc.kemkes.go.id). Second, promote that inventory of HIS innovations and support knowledge and practice exchange between districts health offices.

Address resource disparity for subnational surveillance by mobilising national and bilateral/multilateral funding and assistance to support subnational HIS human capital strengthening and enable inclusive market solutions

Health information system solutions should not only be available for districts with sufficient local resources and leave behind districts with resource constraints. Especially since the MOH is well positioned to drive the national health agenda and bilateral/multilateral assistance priorities and can help eligible development actors secure dedicated funding to support adoption and transition to interconnected and interoperable surveillance and HIS. Investments should mainly cover transfer of knowledge and technical assistance to interim and permanent human resources to orchestrate coordination, technology transformation,

[4] ADINKES: *Asosiasi Dinas Kesehatan Seluruh Indonesia*, Association of Indonesia Local Health Offices formed to meet aspirations and participation of local health offices throughout Indonesia since October 2002. More on https://adinkes.org/en/about-adinkes/

[5] APEKSI: *Asosiasi Pemerintah Kota Seluruh Indonesia*, Association of Municipality Governments across Indonesia. More on https://apeksi.id/

[6] APKASI: *Asosiasi Pemerintah Kabupaten Seluruh Indonesia*, Association of District Governments across Indonesia, a venue for collaboration among District Governments across the country since May 2000. More on https://apkasi.org/

and manage productive engagement with decision-makers and stakeholders. That can be in the form of temporary deployment/assignments for national e-health/HIS human resource centres from MOH (e.g., DTO, Pusdatin, and/or National HIS Technical Working Group) to strengthen local management of complex data systems and generation of actionable information. Such on-site and targeted technical assistance from national HIS experts would also help districts/cities utilise resources efficiently in the rapidly growing market solutions. Then allocation for infrastructure, training, participatory workshops and meetings, and ongoing technical support that follow can be optimised to enhance and maintain system functionality, data quality, and utilisation while ensuring continuous improvements. At the same time, insights from subnational assignments would enrich the iterative digital health transformation agenda.

This policy brief leverages findings and recommendations from the SISHIS pilot and aligns them with the strategic objectives of the Ministry of Health's Blueprint for Digital Health Transformation. The successful implementation of these recommendations will require coordinated efforts and sustained commitment from all stakeholders involved.

This policy brief was prepared by the Australia Indonesia Health Security Partnership (AIHSP) in collaboration with RECONSTRA in 2024.

For more information

Australia Indonesia Health Security Partnership (AIHSP)
International Financial Centre (IFC), Tower 2, Level 18, Jl. Jendral Sudirman Kav. 22-23 Jakarta 12920

Website: **www.aihsp.or.id**
E-mail: **info@aihsp.or.id**