Strengthening emergency preparedness and response systems: experience from Indonesia

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Abstract
Indonesia has made excellent progress on emergency preparedness in compliance with the International Health Regulations, 2005, including a joint external evaluation (JEE) of IHR core capacities in 2017. Development of the National action plan for health security (NAPHS) began soon after the JEE, through multisectoral coordination and collaboration and with the support of a presidential instruction. The logic model approach was used to develop the NAPHS, and provided a robust framework to ensure that activities were linked to indicators at the various capacity levels delineated in the JEE. The NAPHS includes a comprehensive tool within which monitoring and evaluation are completely separated and different indicators applied. Furthermore, development of the NAPHS was done in parallel and in line with that of the National medium-term development plan 2020–2024, which included a focus on health system strengthening based on the primary health-care approach. An innovative approach taken in 2018 was the inclusion of emergency preparedness in the mandatory minimum service standards for provincial and district governments. These standards clearly articulate the importance of local emergency preparedness in Indonesia’s decentralized governance through the development of contingency plans and simulation exercises for natural disasters and potential disease outbreaks. Development of the NAPHS has benefitted from Indonesia’s extensive experience in pandemic influenza preparedness planning and exercises, integrated with a national disaster management system. By signing the Delhi Declaration on Emergency Preparedness in the South-East Asia Region, Indonesia has signalled its commitment to implementing the NAPHS in full, focusing on enhanced emergency preparedness at all administrative levels.

Keywords: Indonesia, International Health Regulations (2005), joint evaluation exercise, national action plan for health security, pandemic preparedness

Background
The world is undergoing rapid changes affecting all aspects of human life and society, such as the increasingly easy and affordable transportation between countries. The resultant large numbers of travellers in short time periods increases the difficulty in detecting disease carriers at international points of entry, such as airports, ports and ground crossings. This, and the rise in emerging infectious diseases (EIDs) has necessitated a paradigm shift in emergency preparedness. The International Health Regulations, 2005 (IHR), signalled the need to move from control at borders to containment at source and from managing emergencies to managing risks.1 The IHR aim to improve countries’ core capacities in detection, verification, reporting and response to public health emergencies of international concern (PHEICs). In line with this, the Asia Pacific strategy for emerging diseases and public health emergencies (APSED III)2 was adopted to guide the efforts of countries, including Indonesia, to strengthen national and regional capacities in relation to emerging diseases and public health emergencies, and also to strengthen regional and international partnerships.

EIDs such as Ebola, Middle East respiratory syndrome and avian influenza have raised concerns for international public health. In 2019, A world at risk: annual report on global preparedness for health emergencies emphasized that the world is at acute risk of devastating regional or global disease epidemics or pandemics that threaten not only to cause loss of life but also to upend economics and create social chaos.3 After the Ebola outbreak in west Africa in 2014, several countries, led by the United States of America, initiated a global forum called the Global Health Security Agenda (GHSA)4 to accelerate IHR implementation by providing political leverage and momentum for high-level and multisectoral commitments, investments and efforts to address health emergencies.
Indonesia chaired the GHSA in 2016 and it hosted the 5th GHSA ministerial meeting in Bali in 2018.

Indonesia’s geographical location and position as an international transport hub make it a hotspot for EIDs and for epidemics to acquire pandemic potential. Preventing and minimizing the impact of such occurrences has therefore become a priority for Indonesia, and this is reflected in the country’s national health strategies and action plans.

Experience of pandemic influenza preparedness for strengthening emergency preparedness

A notable example of Indonesia’s efforts in emergency preparedness is the tremendous effort to improve pandemic preparedness following avian influenza A(H5N1) outbreaks in humans in 2005 through the development of the National strategic plan for avian influenza control and pandemic influenza preparedness 2006–2008. In 2006, an avian influenza committee was established as a multisectoral platform; it was superseded by a committee with the broader remit of controlling priority zoonoses. Since December 2016, the functions of the zoonoses committee have been embedded in the Coordinating Ministry for Human Development and Cultural Affairs. Furthermore, the presidential instruction Capacity building in preventing, detecting and responding to epidemics, global pandemics and chemical, biological nuclear emergency demonstrated a high level of commitment and provided a multisectoral framework to increase resilience in facing public health emergencies that may impact national and global health security.

Responding to the influenza A(H1N1)pdm09 pandemic in 2009, Indonesia developed and implemented a pandemic response plan involving multisectoral stakeholders. Influenza-like illness and severe acute respiratory infection sentinel surveillance as part of Global Influenza Surveillance and Response System (GISRS) detected H1N1pdm09 in 2009 in Indonesia. Influenza surveillance has a crucial role, especially in monitoring the patterns of the influenza virus circulated in Indonesia and for early detection of the emergence novel influenza viruses.

In 2011, to ensure equality and fairness on pandemic preparedness, Indonesia catalysed the development of the Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits (the PIP framework) to improve pandemic influenza preparedness and response with the objective of a fair, transparent, equitable, efficient, effective system prioritizing low- and middle-income countries according to public health risk and need.

Based on lessons learnt from the experience of the 2009 H1N1 influenza pandemic, WHO developed the guideline Pandemic influenza risk management, which marked a shift towards an all-hazards emergency risk management approach to pandemic preparedness and response. In 2017, Indonesia used this guideline, together with the WHO pandemic preparedness checklist (updated in 2018), in creating the National pandemic risk management guideline and Epicentre pandemic influenza contingency plan. These were developed using a whole-of-society approach, involving multisectoral stakeholders at all levels, resulting in a common agreed coordination framework with clear roles and responsibilities defined for all sectors and agencies.

Testing the pandemic influenza preparedness plan provided important opportunities to strengthen IHR capacities in relation to all hazards. Two full-scale pandemic influenza epicentre simulation exercises for the rural and urban contexts were completed in Bali in 2007 and Makasar city in 2009, respectively. In September 2017, WHO supported a third full-scale field simulation exercise to test national pandemic influenza contingency planning. These exercises were important milestones to show the functional capacities to detect and contain an outbreak of novel influenza at its epicentre by various sectors at all levels. The multisectoral bodies and processes engaged in the exercises included the National Disaster Management Agency, civil–military interoperability, and business contingency planning in essential sectors, for example that carried out by the National Nuclear Energy Agency. This exercise linked pandemic preparedness and response into the national disaster framework to enable access to and mobilization of emergency funds and resources for epicentre pandemic containment. To date, out of 34 provinces, Indonesia has rolled out pandemic influenza contingency plans in 24. In 2019, Indonesia updated the influenza pandemic contingency plan, moving away from the epicentre containment approach towards a focus on pandemic mitigation.

Implementation of the IHR and the Global Health Security Agenda

The Government of Indonesia has complied with IHR implementation since 2007. In 2011, a national commission for the implementation of IHR was established, involving multiple stakeholders including from non-health sectors. In 2014, Indonesia met its IHR core capacity requirements, which it continues to maintain. This is particularly important in the context of the country’s decentralized political and health service delivery structures and wide geographical and ecological diversities.

In 2016, the GHSA and WHO worked together to revise the IHR monitoring and evaluation framework, and the result of this joint effort was the development of the joint external evaluation (JEE) tool to evaluate countries’ capacities to prevent, detect and respond to a PHEIC; the JEE was subsequently revised in 2018. The JEE tool is used to assess core capacities in four categories: prevent, detect, respond and other; 19 technical areas cover the 11 GHSA action packages, together with 48 indicators to score capacities.

Joint external evaluation of Indonesia’s IHR core capacities

To demonstrate Indonesia’s commitment to implementing the IHR, in February 2017 the Government of Indonesia voluntarily asked WHO to organize a JEE conducted by an external team. The objective was to assess Indonesia’s existing capacity to deal with a PHEIC. The evaluation used a standardized, systematic and participatory approach and identified additional needs or gaps and priority actions. To ensure that the JEE process ran smoothly and reflected Indonesia’s overall capacity, a GHSA working group was created within the Ministry of Health. By ministerial decree, coordinators were
appointed for each category of technical area, and focal points were appointed for each technical area. They are responsible for coordinating and collaborating within the Ministry of Health, with other relevant ministries and with stakeholders to conduct a self-evaluation of all activities in each technical area.

A Ministry of Health point of contact was also set up, to communicate with WHO at country, regional and global levels. Communication includes arrangements for sending national experts to participate in other countries’ JEEs and for orientation on the JEE process. These national experts played a fundamental role in preparation for the JEE in Indonesia, in particular by providing information on how self-evaluation and internal coordination were conducted in other countries.

Each technical area focal point held regular and intensive multisector and multistakeholder meetings, with attendees including partners and donors. Partner and donor communities were actively involved, and the process enabled them to align their priorities, projects and further development support with country priorities and capacity gaps identified through standardized and systematic evaluation using the JEE tool.

An internal mock review was done at the midpoint of JEE preparations to help to refine and improve self-evaluation results. It unanimously determined the level of Indonesia’s capacity prior to evaluation by the JEE external team.

The JEE by the external team took place during 20–24 November 2017. The external team consisted of technical experts representing a range of countries and organizations. The JEE reflected active multisector involvement, since all Indonesian stakeholders were present during the evaluation and each technical area was presented not only by the health ministry but also by representatives of the sectors in question; for example, the radiation emergency technical area was led by Nuclear Energy Regulatory Agency and the technical area on zoonotic diseases was led by the Ministry of Agriculture. Based on the findings of Indonesia’s JEE self-assessment exercise, discussion and peer review by the JEE external expert team and its Indonesian counterparts during the evaluation week, the JEE results were agreed by all parties. The results of the JEE showed that Indonesia has reached a fairly good level overall; of the 48 indicators, 34 had developed capacity (scoring 40–70%), 14 had demonstrated capacity (scoring > 70%) and none had zero capacity.

The three overarching recommendations below emerged from the JEE of Indonesia.

1. Develop and implement a fully integrated, multisectoral national action plan for IHR implementation, facilitated by a legal decree at the highest level.
2. Establish a mechanism to coordinate the IHR and global health security work of all relevant ministries, agencies and institutions.
3. Evaluate and improve decision-making structures and delegation of authority and responsibility to act, not only between national and subnational levels, but also at national level.

National action plan for health security

The development of the National action plan for health security 2020–2024 (NAPHS), which was launched in January 2020, began soon after completion of the JEE, maintaining the momentum in accelerating efforts to strengthen emergency preparedness and response systems and plans. It was synchronized with the drafting of the National medium-term development plan 2020–2024. The development of the NAPHS was a fully nationally owned and motivated process with strategic direction from high-level government officials, and active involvement and guidance from experienced national experts. Stakeholders who had been involved in the JEE were invited by the relevant technical area focal points to plan the NAPHS.

During the development of the NAPHS, the following methodology was implemented.

1. The JEE tool was used as the foundation, taking the JEE target for each technical area as the goal, the indicators as the outcomes and the level of capability as the output. This was done on the basis that the JEE tool is comprehensive and that Indonesia’s capacity would continue to be measured by these standards in the future.
2. A logic model approach was used for the 19 technical areas of the JEE; the approach was initially developed for the 11 action packages launched by the GHSA in 2014. In the logic model for the NAPHS, important activities in each of the 19 technical areas are linked to indicators at different capacity levels. The logic model for the preparedness technical area is shown in Fig. 1. This allowed straightforward calculation of the costs of the group of activities that are the main contributors to the achievement of each indicator. The new WHO benchmarks for IHR capacities adopts a very similar approach.
3. There was a focus on selecting priority activities that are in line with JEE outcomes and outputs and harmonising them with existing budgeted national working plans, to ensure that priority activities were implemented.
4. A gap analysis was performed based on the JEE recommendations for each technical area; as a result, new activities were designed to close the gaps and achieve the recommended outcomes. These new activities are open to funding from the government, donors or partners.

NAPHS results show that the priority activities to achieve the outcomes are already aligned with existing national working plans for all 19 technical areas and that around 95% of priority activities have been budgeted for.

Monitoring and evaluation

In addition to the WHO monitoring and evaluation tools, Indonesia has developed a comprehensive tool in which monitoring and evaluation are completely separated and different indicators applied. Monitoring involves tracking of planned activities to ensure that they do not deviate from their original targets. It uses output indicators that may be quantitative or qualitative in nature. Any deviation detected should trigger immediate corrective actions. Evaluation, on the other hand, emphasizes the outcome or impact of the activities as a whole and thus is more detailed and comprehensive. Any unachieved outcome needs to be replanned for the coming years. It is hoped that by assessing the results of monitoring, which is conducted more frequently than evaluation, any shortcomings will be detect more quickly, enabling immediate
Fig. 1. Logic model for the preparedness technical area

**Inputs**

- Human resources
  - Review the national contingency plan
  - Tabletop exercise for national contingency plans according to the district/city hazard risk management results
  - Simulation of national contingency plans becomes an operational plan according to the results of hazard risk management in stages/tiers
  - Preparedness training on biological, nuclear and chemical threats that have the potential to cause a public health emergency
  - Review the national contingency plan for zoonoses and EIDs
  - Tabletop exercises for national contingency plans on zoonoses and EIDs at district/city level
  - EID and pandemic preparedness workshop as part of hospital emergency and disaster preparedness planning

- Funding
  - Contingency plans for districts with direct access to international POEs
  - Tabletop exercises for national contingency plans according to the district/city hazard risk management results

- Methods
  - Training/workshops on use of JRA tool for zoonotic diseases
  - One Health training/workshops for high-risk areas for each sector, followed by joint training
  - Assessment of infrastructure, services and human resources at national and regional hospitals for PHEICs
  - Risk mapping of EIDs

- Partners
  - Review the national contingency plan
  - Tabletop exercise for national contingency plans according to the district/city hazard risk management results

**Outcome: National multi-hazard public health emergency preparedness and response plan is developed and implemented (JEE indicator R.1.1.)**

**Level 3:**
(i) National public health emergency response plans incorporate IHR-related hazards and POEs
(ii) Surge capacity to respond to public health emergencies of national and international concern is available

**Level 4:** Procedures, plans or strategies in place to reallocate or mobilize resources from national and intermediate levels to support action at local response level (including capacity to scale up the level of response)

**Intermediate (4–5 year) outputs**

**Outcome: Priority public health risks and resources are mapped and utilized (JEE indicator R.1.2)**

**Level 2:** A national risk assessment has been conducted to identify potential urgent public health events and resource mapping has been done

**Level 3:** National resources (logistics, experts, finance, etc.) have been mapped for IHR-relevant hazards and priority risks, and a plan for management and distribution of stockpiles is in place

**Short-term (1–3 year) outputs**

- Review the national contingency plan
- Tabletop exercise for national contingency plans according to the district/city hazard risk management results
- Simulation of national contingency plans becomes an operational plan according to the results of hazard risk management in stages/tiers
- Preparedness training on biological, nuclear and chemical threats that have the potential to cause a public health emergency
- Review the national contingency plan for zoonoses and EIDs
- Tabletop exercises for national contingency plans on zoonoses and EIDs at district/city level
- EID and pandemic preparedness workshop as part of hospital emergency and disaster preparedness planning

**EID:** emerging infectious disease; **IHR:** International Health Regulations, 2005; **JEE:** joint external evaluation; **JRA:** joint risk assessment; **PHEIC:** public health emergency of international concern; **POE:** point of entry.

Source: Adapted from National action plan for health security 2020–2024.29
corrective action to be taken and making outcomes more likely to be achieved. The outcome indicators are taken from the JEE tool and are linked with activities in the logic model. Scoring of these indicators is based on achievement of the output targets. For example, if four of the five output targets are achieved, or almost achieved, the score for that particular outcome is 80%.

High-level political commitment and multisectoral mechanisms

The JEE also recommended that a legal decree at the highest level be issued to facilitate the development and implementation of the NAPHS, that a coordination mechanism be established and that delegation be evaluated and improved, not only between national and subnational levels but also at national level. A presidential instruction on enhancement of capability in preventing, detecting and responding to epidemics, global pandemics, and nuclear, biological and chemical emergencies was prepared, in line with the scope of the JEE. Responsibility for these 19 technical areas in the JEE is spread across three coordinating ministries (the Coordinating Ministry for Political, Legal and Security Affairs, the Coordinating Ministry for Maritime Affairs and Natural Resources, and the Coordinating Ministry for Human Development and Cultural Affairs). Regular government coordination is already established among the coordinating ministries; therefore, the presidential instruction was intended to emphasize the Government of Indonesia’s commitment to health security as critical for Indonesia and its intention to ensure that all ministries and agencies, including at subnational level, include health security in their plans.

The issuing of this presidential instruction clearly indicates the importance attributed to health security by the government. Dissemination of and advocacy for this instruction was planned and led by the Presidential Office. Each ministry and agency will develop and align its activities to support health security. Since those at subnational level are not yet involved in JEEs, this presidential instruction enables them to prepare and budget for health security activities, which is essential, as all the pandemics start at subnational level.

Innovative approach to strengthening emergency preparedness at subnational levels

In Indonesia, risk indexing and mapping for natural disasters are carried out by the National Disaster Management Agency. Since governance in Indonesia is decentralized, a command post at the district level has the primary responsibility for mobilizing emergency response, including containment at source for high-threat infectious hazards. The resources at the province and central government levels can be mobilized to support the command post operation. In an escalating emergency scenario, where the district has no capacity to tackle the emergency response, the province issues an emergency statement and takes over the emergency operation lead. In the worst-case scenario, a national emergency response statement can be issued by the President to activate a national emergency command post.

An innovative approach taken in 2018 was the inclusion of emergency preparedness in the minimum service standards developed by the Ministry of Home Affairs. Achieving and maintaining these minimum service standards are mandatory for each district and municipality. The standards include risk assessment, contingency planning and exercises for disease outbreaks, including outbreaks of zoonoses. The standards also facilitate risk profiling and mapping of important outbreak-prone diseases, strengthening of the early warning alert and response system and building the capacity of rapid response teams. The minimum service standards are important for the development and testing of scenario-based contingency planning for disaster risk mitigation and management of natural hazards at district and provincial levels. In addition, they enable all health-care centres and hospitals to assess preparedness and operational readiness for identified risks in their catchment areas. Five key ministries responsible for the success of minimum service standards work synergistically to improve emergency preparedness at subnational level – the Ministry of Health, the Ministry of Home Affairs, the Ministry of Environment and Forestry, the Ministry of Public Works and Public Housing and the Ministry of Education and Culture. Local governments should allocate sufficient resources to achieving the minimum service standards. The village fund programme could be used to strengthen community emergency preparedness.

Conclusion and the way forward

The JEE and lessons learnt from implementation of the Pandemic influenza preparedness framework both benefited the development of the NAPHS in Indonesia. This was further enhanced by multisectoral coordination mechanisms and the active engagement of all relevant stakeholders and the highest level of political commitment and authoritative backing through various presidential decrees.

Building an emergency preparedness culture in all sectors and at levels is essential. Robust preparedness planning for pandemic influenza and other EIDs using the all-hazard and whole-of-society approaches facilitates advocacy for investment preparedness activities while strengthening resilience at national, subnational and community levels.

The Indonesian experience in applying a logic model approach to develop the activities of the NAPHS is unique. The approach clearly shows how the activities of each 19 technical areas logically link with corresponding indicators to achieve capacities required. NAPHS development was a fully nationally owned process with WHO strategic guidance. A first step towards full implementation will be to ensure that the presidential instruction is operationalized in all relevant policies and activities of all relevant ministries and institutions at national and subnational levels.

Full implementation of the NAPHS will also depend on health system strengthening. Development of the NAPHS was synchronized with the drafting of the National medium-term development plan 2020–2024. This parallel working reflects that health security is enhanced through a strengthened health system based on the primary health-care approach, because of the need for timely delivery of key capacity functions at the front-line level, such as primary prevention, health promotion and early detection. This is especially relevant in Indonesia, with decentralized organizational structures and geographical challenges. Key components of the primary health-care approach are equity, cross-sector collaboration, community empowerment and use of appropriate technology.
Recognizing the need to strengthen the IHR capacities in decentralized settings, the country has taken important steps towards ensuring health emergency risk mitigation and management through enhanced preparedness planning and efforts at subnational levels, by implementing minimum service standards at province and district levels.

With the signing of the Delhi Declaration on Emergency Preparedness in the South-East Asia Region on 3 September 2019, Indonesia has committed to developing stronger partnerships among countries of the WHO South-East Asia Region, to scale up capacities in disaster risk management and emergency preparedness involving all relevant stakeholders for a safer and more secure region. As a member of the GHSA steering committee, Indonesia has also committed to a global leadership role on global health security.

Acknowledgements: The authors would like to acknowledge Dr Wiendra Waworuntu, Dr Pretty Multihartina, Dr Siti Nadia Tarmiz and Mr Acep Somantri from the Ministry of Health, Indonesia, for their continued support and guidance in the development of the NAPHS. We also especially acknowledge Mr Teguh Supriyadi from the Cabinet Secretariat of the Government of Indonesia, Dr Nalih Kelsum from the Coordinating Ministry for Human Development and Cultural Affairs, Dr Fuadi Darwis from the National Disaster Management Agency, Mr Nugroho Mujianto from the Ministry for Law, Politics and Defence, and Dr Elizabeth Jane Soepardi.

Source of support: None.

Conflict of interest: None declared.

Authorship: All authors contributed equally to this paper.


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