White Paper: Indonesia's Health Sector Development (2024–2034)

Strengthening Health Security: Navigating Future Improvement

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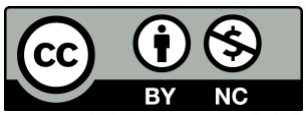

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Abbreviations

AAR : After Action Review
AIDS : Acquired immunodeficiency syndrome
AIHSP : Australia Indonesia Health Security Partnership
AKI : Acute kidney injury
AMR : Antimicrobial resistance
APBN : Anggaran Pendapatan Belanja Negara (State Revenue and Expenditure Budget)
BNPB : Badan Nasional Penanggulangan Bencana
CDC : Centers for Disease Control and Prevention
CEPI : Coalition for Epidemic Preparedness Innovations
CHAI : Clinton Health Access Initiative
COVAX-AMC: COVID-19 Vaccines Global Access-Advance Market Commitment
COVID-19 : Coronavirus disease 2019
EWARS : Early Warning Alert and Response System
GAVI : Global Alliance for Vaccines and Immunization
GDP : Gross Domestic Product
GHS : Global Health Security
GHSA : Global Health Security Agenda
GISN : Global Influenza Surveillance Network
HIV : Human Immunodeficiency Virus
HIS : Health Information System
IAR : Intra Action Review
IHR : International Health Regulations
INB : Intergovernmental Negotiating Body
JEE : Joint External Evaluation
MCMs : Medical Countermeasures
MERS : Middle East Respiratory Syndrome
MTA : Material Transfer Agreement
NAMRU : US Naval Medical Research Unit
NAPHS : National Action Plan for Health Security
PEN : Pemulihan Ekonomi Nasional (National Economic Recovery)
PHEIC : Public Health Emergency of International Concern
PPR : Prevention, Preparedness and Response
SARS : Severe Acute Respiratory Syndrome
SKDR : Sistem Kewaspadaan Dini dan Respon *(see EWARS)*
SMTA : Standard Material Transfer Agreement
SPAR : Self-Assessment Annual Report
TB : Tuberculosis

UNDP : United Nation Development Programme
USAID : U.S. Agency for International Development
WGIHR : Working Group Amendments of International Health Regulation
WHA : World Health Assembly
WHO : World Health Organization

Glossaries

AMR : Antimicrobial resistance occurs when bacteria, viruses, fungi, and parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness, and death.

INB : The World Health Assembly established an intergovernmental negotiating body (INB) to draft and negotiate a convention, agreement, or other international instruments under the Constitution of the World Health Organization to strengthen pandemic prevention, preparedness, and response. The INB's work is based on the principles of inclusiveness, transparency, efficiency, Member State leadership, and consensus.

JEE : Joint External Evaluation is a voluntary, collaborative, multisectoral process to assess a country's capacities to prevent, detect, and rapidly respond to public health risks whether occurring naturally or due to deliberate or accidental events.

MCMs : Medical countermeasures are medicines and medical supplies that can be used to diagnose, prevent, or treat diseases related to chemical, biological, radiological, or nuclear (CBRN) threats. MCMs can include biological products (vaccines, blood products, and antibodies); drugs (antimicrobial or antiviral drugs), and devices (diagnostic tests to identify threat agents and personal protective equipment/PPE).

MTA : Material Transfer Agreement is a contract governing the transfer of materials between two parties. It defines the rights of the provider and the recipient with respect to the materials and any derivatives.

PHEIC : Public Health Emergency of International Concern is an extraordinary event that is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response.

Overview

Health security has become an increasingly critical concern at both global and national levels in recent years. In the past decade, the World Health Organization (WHO) has declared a Public Health Emergency of International Concern (PHEIC) for five separate infectious diseases: Poliomyelitis, Ebola, Zika, COVID-19, and Mpox.[1] Apart from PHEICs, diseases such as HIV-AIDS, TB, and malaria remain significant threats in many countries. Human Immunodeficiency Virus (HIV) was first reported in 1986 in West Africa and soon thereafter spread worldwide, which continues to account for a large share of global mortality.[2] A health threat in one country poses both a national security and development threat globally.

The importance of strengthening health security gained more traction than ever when the COVID-19 pandemic caused widespread disruptions to health systems, economies, and social progress. COVID-19 was first reported in Wuhan, China, and quickly became a global issue. It is estimated to have caused over 20 million deaths worldwide, including more than 160,000 in Indonesia. The most recent PHEIC declaration, for mpox, was reignited in August 2024 due to the emergence and rapid spread of a new virus strain in the Democratic Republic of Congo (DRC) and its neighbouring countries, following the original declaration in 2022 and its resolution in May 2023.[3] The rapid and unprecedented turnaround of communicable diseases underscores the need for a robust health system and multisectoral collaboration.

The International Health Regulations (IHR) 2005 have governed global health security since 2007. COVID-19 became a catalyst for further amendments to the IHR, which were agreed upon in 2023. Another crucial tool for global health governance reform, the Pandemic Agreement, is expected to be further negotiated and finalised in 2024.

While Indonesia is in the process of transforming its health system, discussions around health security, particularly with regard to the One Health approach, remain limited. Moreover, there is a lack of comprehensive studies on health security in Indonesia. This paper aims to outline the state of health security in Indonesia and explore areas for improvement, particularly in preparing for future health threats and pandemics.

Chapter One provides an overview of key health security events from recent decades and defines health security while exploring debates surrounding the term. **Chapter Two** evaluates Indonesia's health security performance using various monitoring tools. **Chapter Three** identifies structural challenges to health security through horizon scanning and expert Delphi consultation. **Chapter Four** presents an ideal scenario, a proposed framework for future improvements, and key recommendations, along with potential catalysts for strengthening health security in Indonesia.

Methodology

This report employs a modified version of the Miles foresight framework, tailored to the study's needs. By integrating key change agents and diverse knowledge sources, this approach fosters strategic vision and anticipation. Foresight emphasises stakeholder networking and participation, effectively informing policy-making, building networks, and enhancing the capacity to address long-term challenges.[4]

The process was conducted in two phases (see Figure 1): 1) **Phase One** (February-November 2023) included pre-foresight, recruitment, horizon scanning, synthesis, and a Delphi exercise, which resulted in the initial draft of the paper; 2) **Phase Two** (March-July 2024) involved internal workshops, an expert panel review, and additional expert consultations to further incorporate updated data and refine the paper. This step was taken to ensure its relevance as a reference for the new administration (2024-2029).

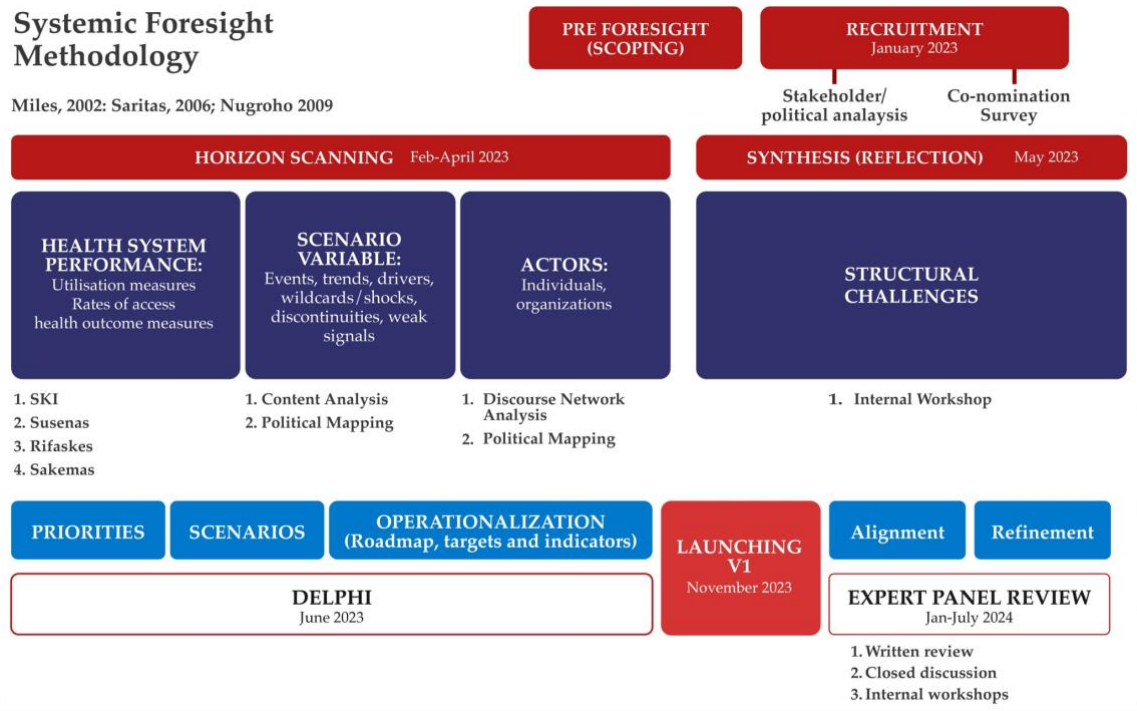


Figure 1. Stages of Foresight Methodology used in the paper[4]

During the horizon scanning process, we analysed and mapped a combination of literature reviews, content and discourse network analysis from Twitter conversations, and online news media feeds to capture events, trends, and drivers related to the issue. We used Google Search and News to automatically track topics related to health security. Specific keywords were identified for each topic, and news articles from January 2017 to May 2023. We filtered the analysis to focus only on opinion pieces and excluded low-quality news sources.

The results were further synthesised to identify structural challenges. Concurrently, during Delphi workshops, we gathered scientific insights and opinions from various stakeholders on strategic health governance issues. In these consultations, stakeholders were asked to identify priorities, build potential scenarios, and define key targets and indicators. The analysis, based on themes from the literature, desk research, and Delphi consultations, was integrated into the framework proposed in this paper.

This research was conducted as a CISDI initiative, with all funding independently sourced by CISDI without support from donors or external parties.

Chapter 1:
A Dynamic Snapshot of Indonesia's Health Security Landscape Future

This book chapter delves into the key events and factors shaping Indonesia's health security landscape, ranging from efforts to combat emerging diseases to the enhancement of healthcare systems. It ultimately aims to provide insight into the nation's ongoing situation, highlighting important improvements needed for the future which have been developed through literature review and experts consultation processes.

1.1. Indonesia's Health Security Landscape

As the world's fourth-most populous country, Indonesia grapples with multiple burdens of diseases and health inequalities. From infectious disease outbreaks to environmental threats and the need to improve healthcare access, Indonesia is navigating a multifaceted landscape of health security.

Indonesia has demonstrated its leadership and active participation in various negotiations and initiatives related to health security at the global and national levels. Notably, Indonesia had triggered a negotiation process for a reformed international framework for influenza preparedness, when the government of Indonesia refused to share its H5N1 Influenza virus samples with the WHO in 2007.[5] The negotiation resulted in Pandemic Influenza Preparedness Framework for the Sharing of Influenza Viruses and Access to Vaccines and Other Benefits. This also led to the expansion of functions and capacity of WHO Global Influenza Surveillance Network (GISN) to become the Global Influenza Surveillance and Response System (GISRS) in 2011.[6]

Figure 2 illustrates the key important events and policies related to the health security landscape in Indonesia for the past decades. It also shows outbreaks still happening sporadically throughout the years, with COVID-19 has become the most disruptive, subsequently reversing health progress and leading to other outbreaks, including polio and measles.

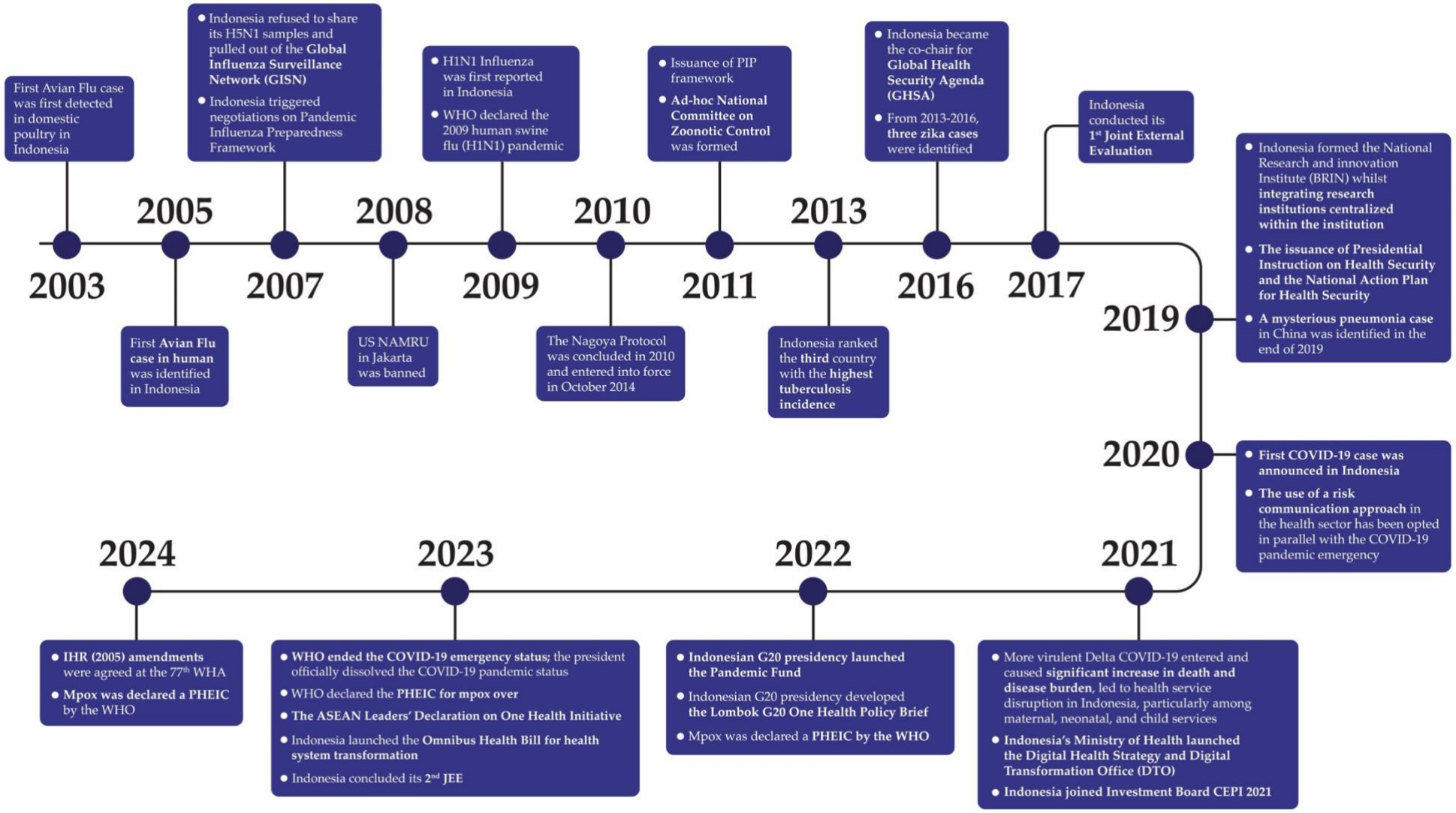


Figure 2. A Kaleidoscope of Important Events and Policies Related to Health Security in Indonesia

2003-2008

A case of Avian Flu (H5N1) was first reported in Indonesian poultry on the island of Java in December 2003. In 2005, Indonesia reported the first human H5N1 case and by the end of 2007, it had the largest number of cases and a case fatality rate of over 80 percent.[7]

In 2007, Indonesia pulled out of the Global Influenza Surveillance Network (GISN), expressing concerns and protests about the unfairness of the global vaccine manufacturing and distribution processes. The Indonesian government was concerned that its samples would be used to develop vaccines in high-income countries and then sold at much higher prices to low and middle-income countries. This drew global attention to existing structural inequality in how vaccines are developed and who benefits from their production. The withdrawal of Indonesia from the network was particularly concerning for some member states and perceived to pose a threat to global health security, given that it had the highest number of confirmed H5N1 human cases and deaths among all countries[5,8] and Indonesian variant of H5N1 appeared to be particularly virulent and hence of a particular risk of global health.[9] Indonesia triggered processes and discourses in not only the Pandemic Influenza Preparedness framework, but also normative developments outside the realm of global health, such as access and benefit-sharing under the Convention of Biodiversity (CBD), intellectual property rights, and the protection of genetic resources. Nelson (2019) states that Indonesia's actions in 2007 radically shifted the global mindset and pushed the boundaries of international law.[10]

In 2008, Indonesia banned the US Naval Medical Research Unit (NAMRU) in Jakarta that had analysed biological samples due to disagreements over the Standard Material Transfer Agreement (SMTA).

During the negotiation process from 2007-2011, as WHO member, Indonesia remained formally included in the proceedings as negotiation partner on an equal footing despite its withdrawal from GISN.[5] Apart from a few samples sent to WHO laboratories in the course of 2007 and the release of genetic information, Indonesia remained reluctant to resume full cooperation in the form of virus-sharing.[11]

2009-2012

The 2009 swine flu pandemic, caused by the H1N1/swine flu/influenza virus and declared by the World Health Organization (WHO) from June 2009 to August 2010, was the third recent flu pandemic involving the H1N1 virus (the first being the 1918–1920 Spanish flu pandemic and the second being the 1977 Russian flu).[12,13] The 2009 H1N1 was first detected in the United States in April 2009. In Indonesia, H1N1 influenza (the pandemic strain of 2009) was first reported in April 2009 which then was responsible for 1,005 confirmed cases and five deaths.[14] The Indonesian government halted the importation of pigs and initiated the examination of 9 million pigs in Indonesia.[15]

The negotiation for a more equitable access vaccine gained additional urgency with the 2009 human swine flu (H1N1) pandemic, as it also confirmed Indonesia's and developing countries' concerns about the inequitable nature of the current system. Developed countries stocked nearly all available vaccine doses, while - even after WHO and UN intervention and subsequent vaccine donations - developing countries were left with inadequate means to protect their populations against H1N1.[16]

As of 2010, Indonesia was "the only country that has refused to share virus samples; other developing countries, even those that have supported Indonesia, share their samples without requiring benefits in return" (Fidler 2010: 2). The principle of the fair and equitable sharing of benefits arising from the utilisation of genetic resources has been elaborated and operationalised inter alia in the Nagoya Protocol. The Nagoya Protocol was concluded in 2010 after almost one decade of negotiations and entered into force in October 2014.[5] However, some areas, including definition of genetic resources, and genetic sequences covered in the CBD and Nagoya protocol are still subject to debate.[5]

At the end of the 4-year negotiation process, in 2011 WHO members agreed on a new Pandemic Influenza Preparedness Framework (PIP Framework). The framework includes innovations that partly correspond to Indonesia's demands such as a more equitable distribution of access to vaccines and drugs.[5]

In 2009 and 2010, there were also chikungunya outbreaks in West and Central Indonesia, which resulted in a significant increase in cases from around 3,000 per year to 83,000 and 52,000 cases per year, respectively.[17] However, after 2010, the number of detected cases dropped back down to the previous level of 3,000 per year. The actual incidence rate is likely to be higher since diagnosis is often based solely on clinical presentation.[18,19]

March 2, 2011, the Ministry of Health of Indonesia has announced a new confirmed case of human infection with avian influenza A (H5N1) virus. Initial investigations indicate the case bought poultry meat at a traditional market and took home chickens that were slaughtered after purchase and prepared at the market. In response, an ad-hoc National Committee on Zoonotic Control was established across government agencies, with a tenure lasting until 2016. Until August 10, 2012, the total number of human influenza A(H5N1) cases in Indonesia was 191 with 159 fatalities.[20]

2013-2019

Due to a change in the method of determining the number of TB incidences by the WHO, Indonesia rose from the fourth to the third-highest country in TB incidence in 2013. In the later years, Indonesia's position has alternated between the second and the third highest globally. In the period from 2013 to 2016, three Zika cases were reported by the Eijkman Institute in Jakarta, Bali, and Jambi province.[21] In 2016, Indonesia assumed the Chair of the

steering group for the Global Health Security Agenda (GHSA).[22] The commitment was further translated at the national level with the establishment of a ministerial working group chaired by the Coordinating Minister for Political, Legal, and Security Affairs.[23] Indonesia remains a Permanent Member of the Steering Group.

In 2017, Indonesia conducted a Joint External Evaluation (JEE) on its health system capacity. In 2019, Indonesia reinforced its commitment to health security by issuing a Presidential Instruction on Health Security No. 4/2019. This was followed by the publication of the National Action Plan for Health Security (NAPHS) 2020-2024 in December 2019. Not long after, the first human case of COVID-19 was reported in China.

2020-2023 (COVID-19 pandemic era)

The first case of COVID-19 was identified in Indonesia in 2020. In the early stages of the COVID-19 pandemic, preventive measures were insufficient, and responses were delayed, leading to an exponential increase in cases, with some going undetected.[24] Apart from casualties, COVID-19 further caused health disruption, resulting in high death rates among vulnerable groups due to delayed healthcare and preventable diseases. In 2021, the situation particularly worsened due to the rapid transmission of the Delta variant in Indonesia, exacerbated by delayed vaccine roll-out.[25] In its efforts in vaccine diplomacy, Indonesia joined the Investment Board of CEPI and became the Co-Chair of the COVAX AMC Engagement Group.[26,27]

In February 2022, Indonesia had the highest daily COVID-19 confirmed cases of over 60,000 cases per day, however, a decreased case fatality rate. On July 2022, the WHO declared mpox as PHEIC. The first case of mpox was identified in Indonesia in August 2022. In the same year, there were outbreaks of acute hepatitis among children, estimated to be due to COVID-19 co-infection.[28,29] Outbreaks of acute kidney injury (AKI) among children due to illicit cough syrups. Moreover, given the decreased rate of routine immunisation during 2020-2021, there were outbreaks of measles, diphtheria and whooping cough in several locations in Indonesia.[30–32] During the same year, Indonesia launched the Pandemic Fund and facilitated the G20 Lombok Policy Brief on One Health as part of its G20 Presidency.[33] These initiatives mark a significant step forward in the international community's commitment.

By the end of 2022, Indonesia lifted its social and mobility restrictions.[34] In 2023, while the WHO concluded the COVID-19 emergency status, the President of Indonesia followed by lifting pandemic status to entering an endemic period of COVID-19 within the country.[35] To note, by the time the authors wrote this report, WHO still considers COVID-19 a pandemic.[36]

In 2023, as the Chair of ASEAN, Indonesia also facilitated the ASEAN Leaders' Declaration on One Health Initiative, officially signed off by all 10 Heads of State, which in turn has led

to the ASEAN One Health Joint Plan of Action and the establishment of the ASEAN One Health Network.[37]

PHEIC for mpox was declared over in May 2023 after there had been a sustained decline in global cases.[3] Although there was a period of no Mpox cases identified for a year, eventually, as of November 7, 2023, the Mpox cases in Indonesia had reached 35.[38] Indonesia also concluded its second Joint External Evaluation in October 2023. On regulatory side, the Ministry of Health issued the controversial Omnibus Health Bill to support its grand plan of health system transformation.[39]

2024

The 77th World Health Assembly (WHA), held in May 2024, approved a package of critical amendments to the International Health Regulations (2005) (IHR) and committed to finalising negotiations on a global pandemic agreement by 2025 at the latest.[40] These are key steps toward stronger global commitments and cooperation to protect people from future outbreaks and pandemics.

In 2024, a more transmissible and deadlier strain of mpox, Clade 1b, was reported in the Democratic Republic of the Congo (DRC) and its neighbouring countries (Burundi, Kenya, Rwanda, and Uganda).[41] Due to concerns over the spread of this new clade beyond Africa, the Africa CDC declared mpox a Public Health Emergency of Continental Security (PHEICS) on August 13, followed by the WHO's declaration of a PHEIC on August 14.[42] Historically, a global mpox outbreak originating in Africa spread worldwide in 2022.[3] From January 1, 2024, to June 30, 2024, there were 99,176 laboratory-confirmed cases and 208 deaths across 116 countries/areas/territories.[43]

As of August 18, 2024, data from the Ministry of Health (MoH) confirmed 88 mpox cases in Indonesia, with cases distributed across Jakarta (59), Banten (9), West Java (13), East Java (3), Riau (1), and Yogyakarta (1). Of these, 54 cases were identified as Clade IIB variants. This clade, which has been primarily responsible for the mpox outbreak since 2022, has a lower fatality rate and is primarily transmitted through sexual contact.[44]

1.2. Understanding health security

The link between security and health is not a novel concept, yet there is no universal definition of this terminology. In fact, the definition of health security has been a subject of debate. The United Nations Development Program (UNDP) Report (1994) defined human security as the absence of fear and want, and protection from threats such as hunger, disease, repression, and unexpected disruptions in daily life, which also includes the component of health. This report distinguishes health security into two categories: 1) individual health security, which pertains to ensuring equitable access to medicines, vaccines, and preventive

measures and access to healthcare services; and 2) collective health security, which deals with public health risks that threaten populations, such as pandemics, chemical spills, and nuclear accidents.

The use of the term "security" has sparked debates because of the military connotations, and the US' utilisation of the term "security" in the context of AIDS in the late 1990s and early 2000s. The term "security" is closely linked to the concept of sovereignty.[1] The challenge with sovereignty is states are generally restricted from interfering in the internal affairs of other states, except when there is an agreement to be bound by a different international law.[45] Therefore, the framing of health issues as "security matters" in the context of international relations carries the risk of countries adopting a protectionist or nationalist stance instead of prioritising multilateralism and global solidarity.[11]

On the other hand, the use of the term "security" may have its advantages. As highlighted during the recent Global Health Security Conference (GHSC) 2024 in Sydney, framing health as a matter of national security can draw the attention of political leaders and engage national security institutions, such as the military and police. In Indonesia, this could involve the Coordinating Ministry for Political, Legal, and Security Affairs (Polhukam), giving health issues a higher profile and potentially leading to more resources being allocated.

No state can stand by itself and that collective strategies, institutions, and a sense of collective responsibility are indispensable in addressing global health challenges. In this chapter, Health Security (or interchangeably referred to as Global Health Security) is defined as the proactive and reactive activities and efforts required to ensure strong and resilient public health systems needed to prevent, detect, and respond to acute threats that could endanger people's health across countries and borders.[46,47]

Health security is closely intertwined with the existence of infectious diseases. Looking at the growing trend of urbanisation, population growth, environmental degradation, and the misuse of antimicrobials, it becomes evident that potential upcoming risks, including infectious diseases, to public health, persist. Infectious diseases are considered as national security issues for the following reasons. First, the spread of these diseases could pose a disease threat to the health and well-being of people. Second, a large-scale epidemic or pandemic may cause social disruption and threaten global and local stability, including economic decline by forcing increased government spending on health as a percentage of GDP; reducing productivity due to worker absenteeism and the loss of skilled personnel; trade and transport disruption; reducing investment; and raising insurance costs for health provision.

Global health security is of paramount importance, as it equips the world with the capacity to safeguard the well-being of people and eliminate public health threats, or at the very least,

[1] Sovereignty is a fundamental principle in international law that asserts a state's entitlement to exercise authority and control over its population, resources, and regulations within its borders.

minimise their impact. At the national level, health security remains indispensable, ensuring that a country possesses the capability to prevent, detect, contain, and respond to threats as early as possible. This capacity also enables prompt responses to prevent further transmission and reduce casualties, both within the nation and across borders.

Chapter 2:
Indonesia's Health Security Assessment and Monitoring Tools for Effective Evaluation

A review of IHR (2005) at the 64th World Health Assembly, specific to the H1N1 pandemic of 2009 found that:

> "The world is ill prepared to respond to a severe influenza pandemic or to any similarly global, sustained and threatening public health emergency."

A robust monitoring system is vital to assess the effectiveness, efficiency, and responsiveness of health security measures in Indonesia. It helps identify strengths and weaknesses in the existing framework, enabling more targeted resource allocation and improved preparedness for potential health threats. Analysis and information provided by monitoring provide policymakers with valuable insights for informed decision-making, contributing to the ongoing improvement of public health practices and building a more resilient healthcare system.

To understand national pandemic preparedness, there are various instruments that have been developed. IHR can be used to rank a country's pandemic preparedness with countries asked to self-report their IHR compliance annually using the online International Health Regulations States Parties Self-Assessment Annual Reporting Tool (SPAR). The other monitoring frameworks available related to a country's capacity in health security are the Joint Independent External Evaluation (JEE); the Intra Action Review (IAR) and the After Action Review (AAR); and the Global Health Security Index (GHSI). The SPAR was introduced in 2010 while the other tools followed subsequently. The authors used those monitoring tools to depict the health security situation in Indonesia.

2.1. International Health Regulation States Parties Self-Assessment Annual Reporting Tool

Many countries are not ready to deal with the next pandemic, according to the 2023 International Health Regulation State Party Annual Reporting (IHR SPAR) findings across 182 countries.[48] The SPAR tool is an online self-assessment tool that has to be filled out by all States Parties annually, with the findings compiled in the States Parties Annual Report (SPAR). The tool consists of 35 indicators for the 15 IHR (2005) capacities needed to detect, assess, notify, report, and respond to public health risks and acute events of domestic and international concern.[49] This tool aims to demonstrate and report the country's progress and achievements in developing and maintaining minimum core public health capacities to implement the IHR (2005), as stipulated in Article 54 of the Regulations.

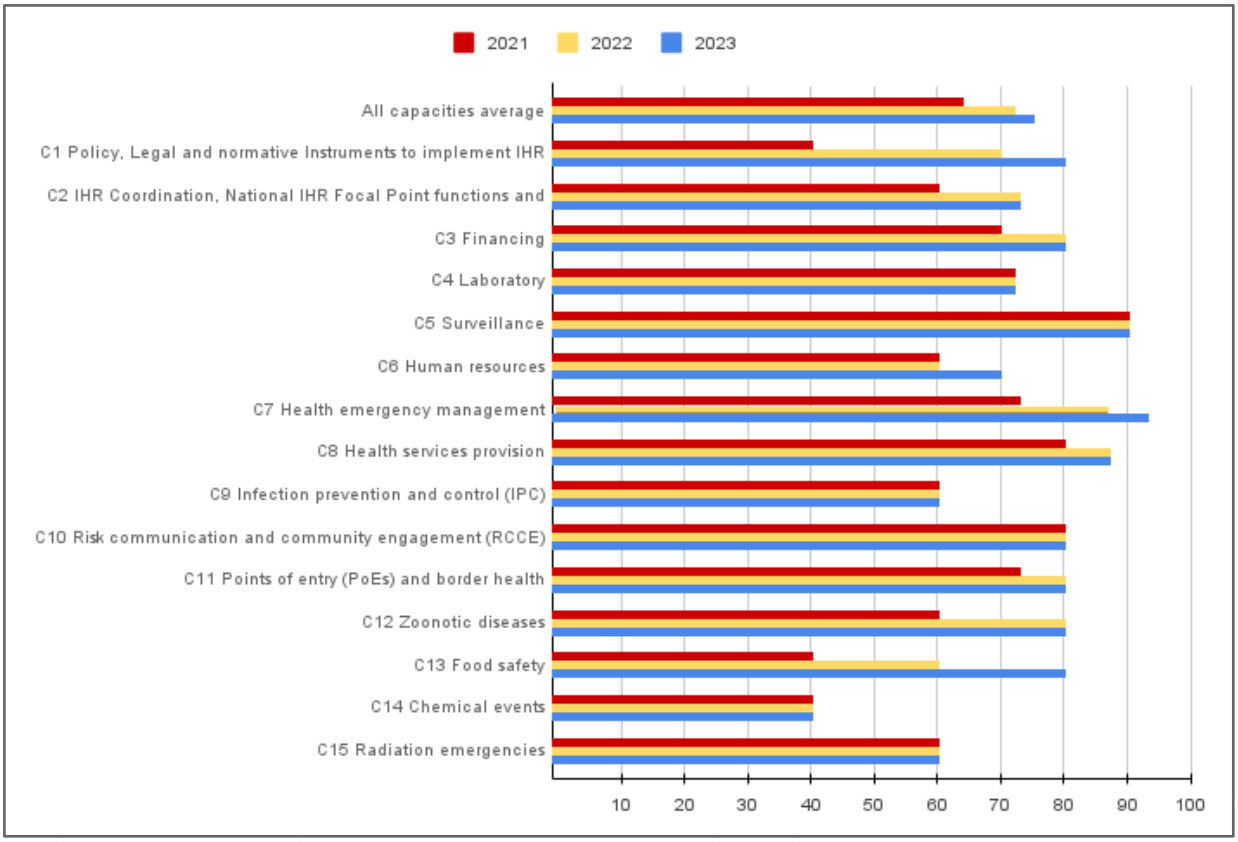


Figure 3. SPAR Result in 2021, 2022, and 2023 (Source: WHO, 2024)[49]

On average, Indonesia's overall score increased from 64 (2021) to 72 (2022) and to 75 (2023). Indonesia's scores in 2022 and 2023 are higher than the regional and global average in the same year. As shown by Figure 3, the highest capacities in 2023 were the health emergency management (C7) with 93 point, surveillance (C5) 90 point, and health services provision (C8) with 87 point. The highest increase from 2021 to 2023 was on Policy, legal, and normative instruments to implement HR (C1) and Food Safety (C3) by 40 points. The lowest component and the only component that still scored 40 over three years was chemical events (C14). The components that remained within the same score were Surveillance (C5), Risk communication and community engagement (C10), Laboratory (C4), and Radiation emergencies (C15).

2.2. *Joint External Evaluation*

Joint External Evaluation (JEE) is a voluntary, collaborative, and multisectoral assessment tool that is conducted by a group of independent experts every 5 years. Its goal is to evaluate a country's capacities in preventing, detecting, and rapidly responding to natural, deliberate, or accidental public health risks. The JEE is a consolidation of the WHO IHR 2005 Monitoring and Evaluation Framework and the Global Health Security Agenda (GHSA) country assessment tool.[50] The JEE has its own scoring system but overlaps with the SPAR framework with some important differences, including data collection approaches and indicators. The JEE assesses 19 technical areas of national health security capacity, which are further broken down into 48

components. The only available report was in 2017, the last evaluation in 2023 has not been published yet.[51]

Indonesia's latest overall JEE evaluation in 2017 resulted in an average score of 3.2 (developed capacity) out of 5. As shown by Figure 4, on a scale of 1 to 5, out of 19 domains, there were five components scored 2 (indicating limited capacity), including chemical events, preparedness, zoonotic diseases, emergency response operations, and antimicrobial resistance. There were four domains that have scored 4 (demonstrated capacity) were immunisation, linking public health and security authorities, medical countermeasures and personnel deployment, and points of entry.[52]

Scores: 1= no capacity; 2= limited capacity; 3= Developed capacity; 4= Demonstrated capacity; 5= Sustainable capacity.

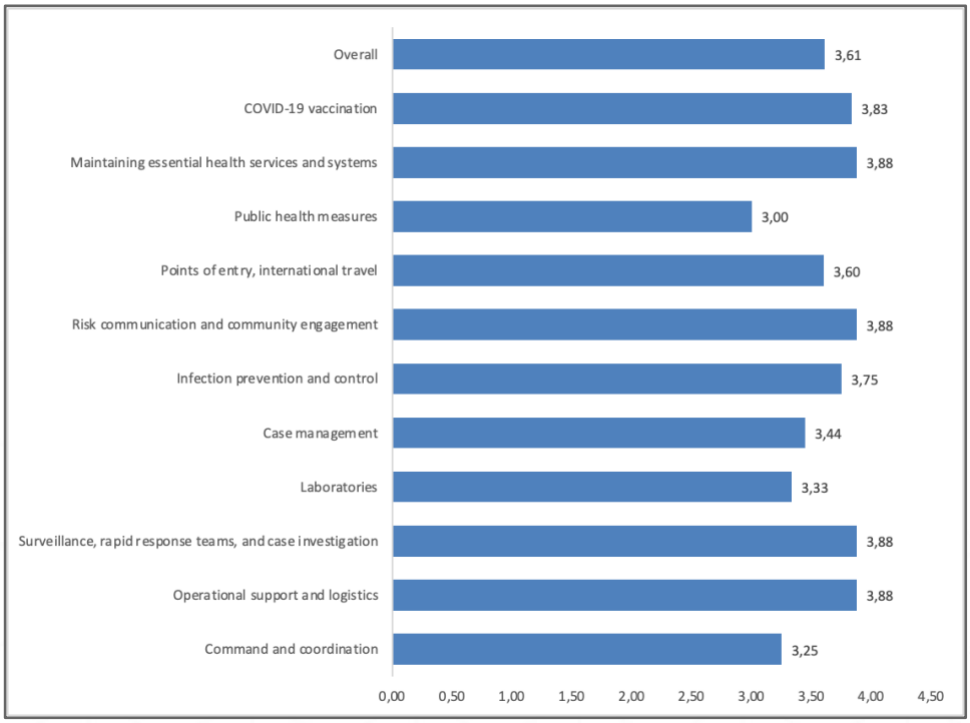
Figure 4. Indonesia's JEE Results of 2017 (Source: WHO, 2023)[53]

While the full Indonesia JEE 2023 report has not yet been made publicly available, one expert informed us that Indonesia's average score increased to 3.6 in 2023 from 3.2 in 2017. However, some indicators were revised in the JEE tool (3rd edition, 2022) before the 2023 assessment, so direct comparisons may not be applicable for all indicators.

2.3. Intra-Action-Review (IAR) and After-Action Review (AAR)

Due to the COVID-19 pandemic, the WHO developed guidance for country-led COVID-19 intra-action reviews that involve multi-stakeholders across sectors. The Intra-Action-Review (IAR) aims to assess public health and emergency response systems, identify best practices,

gaps, and lessons learned, and propose corrective measures. While not an official component of the IHR (2005), it was issued as one of the temporary recommendations to State Parties.[54] The COVID-19 IAR covers 5 pillars aligned with Global Strategic Preparedness, Readiness and Response Plan (SPRP) 2023-2025, which are emergency coordination, collaborative surveillance, community protection, access to countermeasures, and safe scalable care. The government of Indonesia had conducted COVID-19 IAR from 2020 to June 2023, followed by an After-Action Review (AAR) in September 2023 to assess responses to health events, to identify gaps and learning opportunities in Indonesia's COVID-19 response. The monitoring was done two to three times a year and Indonesia had conducted IAR Monitoring 8 times from 2020 to 2023: November 2020, February 2021, April 2021, August 2021, February 2022, June 2022, November 2022, and June 2023. However, the authors were unable to obtain the complete data in 2023.



Score: 1= action has not been implemented; 2= action in the planning/development stage; 3= action implemented but need improvement; 4= action has been implemented; 5= action has been implemented and supporting other countries.

Figure 5. Indonesia's IAR Results of 2022 (Source: MoH, 2022)[55,56]

Indonesia has demonstrated an increased capacity from 2020 to 2022 according to the IAR. In the first year of the COVID-19 pandemic in 2020, Indonesia scored on average 3.01 (indicating action implemented but needs improvement). Seven out of 71 activities were not yet implemented in 2020, including monitoring of operational response plans, activation of health clusters, medical audits for healthcare workers who died due to COVID-19, telemedicine for COVID-19, Health Association Infection (HAI) surveillance, comprehensive surveillance to achieve positivity rate under 5%, and genomic sequencing. In 2022, the score rose to 3.61, with most activities have been conducted and reached score 3 and 4, except for monitoring of

operational response plan that was still in the planning process and comprehensive surveillance for positivity rate below 5% was still not implemented until the end of 2022.[55,56] Figure 5 shows Indonesia did better in the area of operational support and logistics, surveillance, risk communication, essential health services maintenance, and COVID-19 vaccination. The least score it received was for public health measures. As COVID-19 transitions from a pandemic to an endemic state in 2023, a sustainable preparedness program is crucial to handle future public health emergencies.[57]

2.4. Global Health Security Index (GHSI)

Indonesia scored an average of 50.4 (out of 100) in 2021, higher than the global average (38.9) across all components, except for environmental risks. The Global Health Security (GHS) Index (see Figure 6) is an independent evaluation of 195 countries prepared by the John Hopkins Center for Health Security, the Nuclear Threat Initiative (NTI), and the Economist Intelligence Unit (EIU). This monitoring tool assesses countries across six national core capacities with 37 indicators to prepare for epidemics and pandemics, including capacities for prevention, detection, response, health systems, as well as compliance with IHR and risk environment. The first report was published in 2019 and the latest report was published in 2021. The methodology of data gathering draws on multiple secondary sources rather than local or international expert assessment.

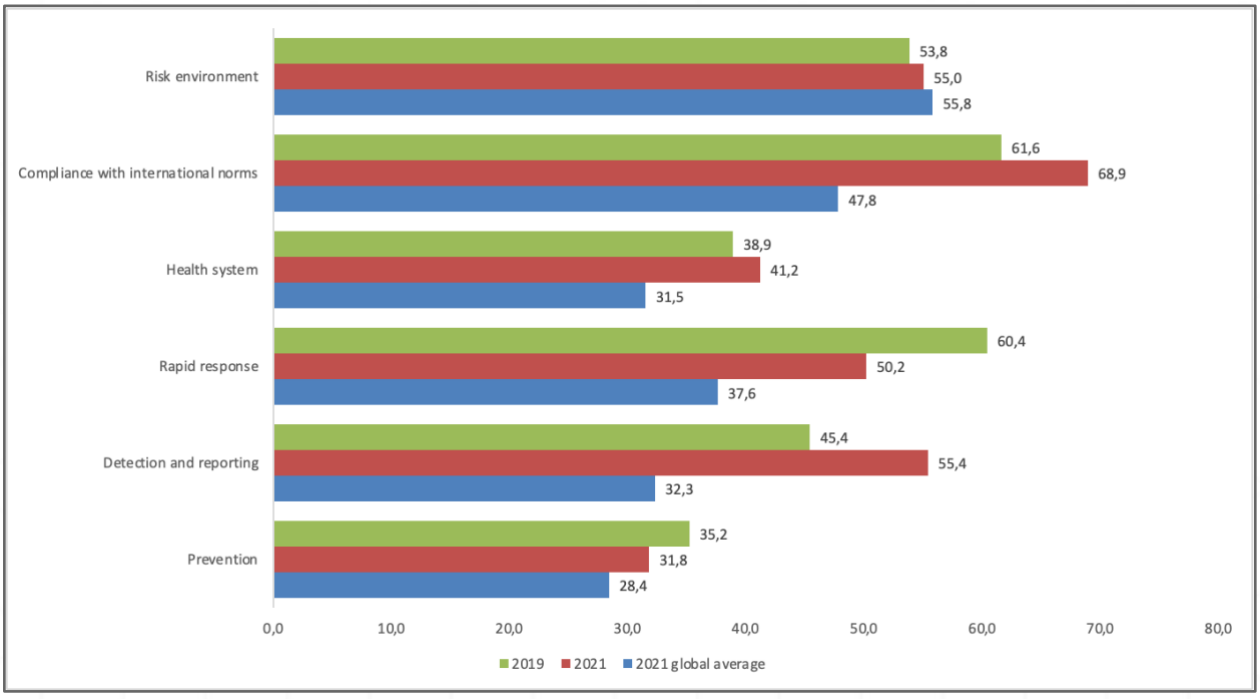


Figure 6. Global Health Security Index of Indonesia in 2021 (Source: Bell & Nuzzo, 2021)[58]

Figure 6 shows that Indonesia's weakest component in 2021 was prevention, while the highest score, 68.9, was in the commitment and norms domain. Overall, all domains appeared to increase from 2019 to 2021, except for rapid response and prevention domain. The highest

increase from 2019 to 2021 was in detection and reporting, while the biggest decrease was in rapid response. Unfortunately, the report did not provide further context about the score.

2.5. Critical Points on The Assessments

The four instruments, whether self-assessed or not, indicate that Indonesia scores moderate capacity or at least above average for most indicators. Among the 4 monitoring tools above, SPAR is the only one filled out by the government and does not involve a multi-stakeholder process. While different tools highlight different weaknesses – SPAR indicates Indonesia's stronger performance in surveillance components, whereas JEE and IAR show surveillance among the lowest. However, JEE and IAR tools show chemical events as one of the weakest components. Despite moderate scores, each component is essential to underpin all capacities, so one weak component may jeopardise the whole health security system.

Current tools and indicators might not be reflective of actual country capacities. A good example is Indonesia's surveillance capacity. The fragmented data and information system, coupled with the limited capacity of laboratory networks and healthcare workers across Indonesia, remain the primary challenges in early detection, containment, and response within the country. Instances such as the COVID-19 pandemic and the outbreak of acute kidney diseases among children in recent years provide evidence of shortcomings in surveillance capacity. A study by Kachali et al (2022) also found that the higher a country's overall ranking in both the IHR and/or GHSI lists, the more COVID-19 deaths per capita in the time periods the study used. The study shows that countries that were assumed to be well prepared for an epidemic outbreak suffered some of the worst health outcomes and impact from COVID-19 in the northern hemisphere spring of 2020, as measured by mortality data. Both IHR and GHSI call for concerted actions across national borders and yet the initial individual country responses to COVID-19 were dissimilar and disparate.[59]

The question remains whether these monitoring tools are sufficient to demonstrate Indonesia's capacity to overcome public health threats. Like SPAR and JEE, GHSI reflects a state-centric conception of health security as threats from beyond state borders, and a policy perspective that prioritises state surveillance and reporting, as well as investment in equipment and systems. Similarly, GHSI includes, but is weak to monitor public health capacity that has been evidently essential for effective COVID-19 pandemic response.[60] A study by Fukuda-Parr (2022) found that all three metrics are not sufficient to represent a country's situation. Despite the differences in data collection approaches, all three metrics focus on physical infrastructure and complex organisation, wherein resource poor countries are most challenged to meet. All three metrics are led by dominant authorities in global health, including rich and powerful countries, experts from prestigious organizations.[61]

According to Kachali et al (2022) country rankings in the IHR and GHSI indices ignores the demographic, cultural and political difference between countries, and it may well be that the differences between the countries that rank in the top 20-40 are negligible, since they are all high income developed countries. The existing preparedness indices may have been constructed based on lessons learned from previous epidemics which have either been suppressed (e.g., SARS), have had a lower mortality (e.g., H1N1 of 2009) or have transmitted with a slower pace (e.g., HIV).

These instruments are largely human health-centric and are primarily owned and led by the WHO. While they do include some One Health dimensions, they have been criticised by other global One Health bodies, such as the FAO, UNEP, and WOAH, for not adequately addressing non-human health aspects. Although global instruments in other sectors are not as well-developed, they do exist, such as WOAH's Performance of Veterinary Services (PVS) Tool. Similarly, key ministries in Indonesia, such as the Ministry of Agriculture and the Ministry of Environment and Forestry, have minimal involvement in processes like the JEE and have little ownership of them.

Furthermore, instruments such as SPAR, JEE, and IAR processes contain significant subjective elements. The assessments and scores are heavily influenced by the governments being evaluated, which can affect the accuracy of the results. As a result, these scores may not be reliable predictors of a country's actual performance in responding to the COVID-19 pandemic. Many of the indicators are not universally or objectively applicable across all countries. Additionally, the presence of subjective elements in these assessments can lead to inflated scores, painting a more positive picture than the reality. Governments often face political pressure to "save face," which may encourage them to highlight achievements that might not be borne out by objective evidence.

The report of the Independent Panel for Pandemic Preparedness and Response (2001) highlighted the need for a fundamental reassessment that better aligns preparedness measurement with operational capacities in real-world stress situations.[62] From the COVID-19 pandemic experience, the SPAR score and other metrics were not reliable indicators of national capacity for pandemic response. The countries that were assessed to be best prepared within this framework—such as the US, UK, and other high-income countries—have been amongst the worst affected.[41] While the COVID-19 pandemic has proven to be different from previous pandemics in many ways, notably in its infection numbers and global spread, the current available metrics are not sufficient.

There is an urgent need for better and more precise instruments to assess pandemic preparedness and response. Future research and tools should include stronger monitoring elements. While frameworks like the IHR and GHSI assess preparedness at the national level, they do not adequately address the importance of sub-national capabilities, citizen practices,

risk communication, and political leadership in shaping outcomes. Preparedness indices could be improved by incorporating aspects of international collaboration, including coordination, resource and information sharing, decision-making speed, public adherence to guidelines, and a country's capacity to scale up services and supplies during a crisis.[59]

Chapter 3:
Building Resilience: Identifying Structural Challenges in Health Security

Numerous factors pose a threat to our health security, ranging from new and emerging infectious diseases to the rise of antimicrobial resistance (AMR). Climate change, environmental degradation, increased global travel, political instability, and fragile health systems exacerbate the opportunities for the rapid global transmission of infectious agents and other public health threats.[64] Despite the progresses made in Indonesia's national health security capacity, the following are ongoing challenges that have persisted over the years identified through literature review and experts consultation.

3.1. Weak National Surveillance System

Global health security relies on a foundation of robust regional and national surveillance systems. For the past decade, Indonesia has faced numerous outbreaks, including Avian flu, Zika, to COVID-19.[65] Not to mention the epidemic and neglected diseases that still exist in Indonesia, such as tuberculosis, filariasis, rabies, leptospirosis, leprosy, dengue, among others.[66] The pandemic has exacerbated the situation, leading to more outbreaks due to the malfunctioning of essential services, including vaccination programs. The re-occurrence of polio cases, after Indonesia had been declared Polio-free in 2014, is particularly concerning.[31] Additionally, the occurrence and peak of acute hepatitis and acute kidney injuries in 2022 underscore the weaknesses in Indonesia's surveillance system.[29,30]

Based on the COVID-19 experience, Indonesia struggled to prevent and respond to the transmission in a timely manner.[24] While scored relatively better in SPAR and IAR (see Chapter 2), the surveillance system, encompassing both communicable and non-communicable diseases, has not been robust enough to facilitate early detection, containment, and effective response. Outbreaks across Indonesia often go undetected or occur without a clear understanding of the initial transmission source and subsequent spread. Even before COVID-19, surveillance has been an issue, including an unresponsive and non-real-time surveillance system, limited capacity for analysing and rapidly responding to surveillance data, weak surveillance at entry points, low routine vaccination coverage, a shortage of qualified surveillance personnel, and the presence of siloed and fragmented information, coordination, and communication mechanisms.[66,67] In fact, Indonesia currently has only approximately 300 field epidemiologists, while it needs a minimum of 579 field epidemiologists and 1,022 assistant field epidemiologists distributed across all provinces.[68]

Indonesia has developed an early warning system, however, it is evident it has been insufficient. As part of Indonesia's commitment to comply with IHR standards, the MoH has developed an electronic Early Warning Alert and Response System (EWARS) program (or *Sistem Kewaspadaan Dini dan Respon* (SKDR) in Indonesian) in 2009 in collaboration with the

WHO. The EWARS application records weekly surveillance data for 23 diseases in Indonesia and uses indicator-based or event-based surveillance systems that rely upon reports from officials to detect diseases, conditions, and events. While online EWARS has been piloted in some Puskesmas, the majority of Indonesia's Puskesmas still rely on weekly, paper-based reporting, which must be transcribed into the national system, posing challenges to data quality, timeliness, and accuracy. The system has only been piloted in a few hospitals and has not been implemented in any private facilities. During the COVID-19 pandemic, it was unable to detect COVID-19 cases as unusual events until a significant number of cases had already been reported.

3.2. Vague Implementation of One Health Approach

The health of humans, animals, and ecosystems is closely interlinked. It has been estimated that 60% of globally reported emerging infectious diseases originate from animals, both in the wild and domesticated. In the past three decades, over 30 new human pathogens have been identified, with 75% of them having their origins in animals. One Health is an integrated, unifying approach that seeks to optimise the health of people, animals, and ecosystems by leveraging the close and interdependent links among these domains to develop new surveillance and disease control methods.[69]

The One Health policy framework has a heavy focus on human health aspects, particularly of infectious diseases surveillance, there is not as much emphasis on intervention to prevent disease outbreaks from happening and more meaningful contribution and collaboration from other sectors within and across ministries/agencies. For example, there is less of a focus on the use of ecological countermeasures that can be employed to prevent land use-induced zoonotic spillover.[70] There is also disagreement about scope and operational definition of one health, among other challenges.[71]

Translating the concept of the One Health approach into tangible regulations, coordinating efforts across sectors, and achieving effective execution have proven to be challenging for policymakers. This concept has been introduced globally since 2010. At the national level, it has gained further recognition through Indonesia's active participation in discussions related to the International Health Regulation (IHR) and its role as the co-chair of the Global Health Security Agenda (GHSA).[72,73] There is a heightened awareness of the interconnectedness between animals, the environment, and human health among key stakeholders.[74] However, operational regulations remain elusive, as a siloed approach remains, both within and across ministries, particularly in the context of program planning and budgeting.[71]

Critical gaps in One Health implementation include fragmented and disconnected health governance of human health, animal health, and the environment, as well as fragmented databases and resources for information sharing. While the MoH, the Coordinating Ministry for Human Development and Cultural (Kemenko-PMK), and Bappenas are demonstrating a

commitment to advancing the One Health approach, implementation remains challenging as the Ministry of Agriculture and the Ministry of Environment have failed to allocate meaningful resources. For example, on average, there is only one puskeswan (veterinary clinic) for every six puskesmas (health clinics) across Indonesia, and most puskeswan have fewer staff compared to the average puskesmas. Similarly, agricultural field workers are far fewer in number compared to community health workers in the human health sector. Environmental health workers responsible for monitoring wildlife health are even scarcer. To implement One Health successfully, major structural changes are required to integrate the human, animal, and environmental health fields.

3.3. Disintegration between public and private health services

Fragmentation in Indonesia's healthcare system results in limited participation of private health facilities in various public initiatives, including surveillance and reporting. This has become a problem given the considerable number of people accessing private health facilities due to quality and accessibility reasons. For instance, 74% of TB patients initially sought treatment at private healthcare facilities (i.e. pharmacies (52%), private practices (19%), and hospitals (3%)). Despite the substantial contribution of private facilities in providing TB services, the number of TB case notifications from private health facilities remains relatively low, with private hospitals at 8% and private practices/clinics at 1%.[75]

The lack of regulations and incentive and disincentive mechanisms to promote or regulate public-private health care partnerships further contribute to the fragmentation of data, financing, and health services. Another example is during the management of COVID-19, private health facilities conduct surveillance efforts to a lesser extent compared to public health facilities. Out of the 240 private healthcare facilities surveyed, only one followed the national reporting regulation of COVID-19 cases.[76] Furthermore, the private sector needs to see the benefits for them. An example from a pilot project by AIHSP in Bali shows that private clinics are willing to share data if it helps them build better relationships with public sector hospitals, especially when they need to refer complicated clinical cases to larger government referral hospitals.

3.4. Fragmented Health Information System (HIS) and Data

Health data in Indonesia is complex as it is managed in vertical health program-specific systems with minimal horizontal sharing. For example, HIS for TB and HIV/AIDS are managed to separate 'silos' without data sharing, despite the fact that co-infection of TB and HIV/AIDS often occurs, requiring shared information.[77] Health Information System (HIS) is a system that collects data from the health sector and other relevant sectors, analyses data, and ensures the quality, relevance, and timeliness.[78] It aims to provide the required sound and reliable data and information in a timely manner to inform policy and decision-making.

Indonesia has more than 400 health-related applications developed by the central and local governments[79], which each stand alone and require separate data input. This fragmented and non-interoperable health information system places an excessive burden on healthcare workers. As a result, there are delays in reporting, leading to gaps and discrepancies in real-time data, underreporting, decision-making, and early detection.[78] Additionally, the inadequate capacity of health workers at both the service and subnational levels to utilise, analyse, and interpret data remains a persistent issue, exacerbated by poor electricity and connectivity problems in several regions.[78]

There is a lack of data integration across units and government levels. In the case of the Dengue Information System in Indonesia, the data discrepancy between national and regional governments happened due to different data sources from the community level direct to the national information system, and manual reports which are often used by the district health office. As well, the differences in the nomenclature or operational definitions, for example, the definition of 'new cases' and 'old cases' of dengue, the lack of uniformity of data reporting, lack of shared standards, and poor coordination remain challenges to further fragmentation.[78]

On Covid-19, district governments, provincial governments, and central governments have their own information system, leading to data discrepancies between each system. Out of 34 provinces, a study found differences in 25 (73.52%) provinces in terms of positive cases, 31 (91.18%) provinces in cured cases, and 28 (82.35%) provinces in the number of deaths. The reported COVID-19 incidence rate may be biassed or delayed.[80] Differences in terms used to define confirmed cases and COVID-19 deaths also led to underestimated numbers.[81]

Indonesia has been developing an integrated One Health information-sharing platform called the System of Information on Zoonosis and Emerging Infectious Diseases (SIZE). It links the Early Awareness and Response System (SKDR) of the Ministry of Health, the Ministry of Agriculture's iSIKHNAS, and the Ministry of Environment and Forestry's SehatSatli. Supported by USAID and FAO, SIZE was initially piloted for human rabies cases and is now expanding to include other zoonoses such as zoonotic influenza, coronavirus, anthrax, leptospirosis, and tuberculosis.[70] However, further development is still needed.

Currently, surveillance data are primarily facility-based and standardised data is still limited. Facility-based data often fail to capture unusual events or outbreaks in a timely manner. Moreover, given the expanding geographic range of vectors and changes in transmission seasons due to climate change, there is an increasing need to collect more data on the effects of climate change on disease transmission which requires data from different sectors. There is potential for integrating meteorological data with surveillance data for use in early warning and forecasting purposes.

3.5. Weak governance and leadership

Several governance issues heavily impact health security in Indonesia. Despite Indonesia's demonstrated leadership in chairing the GHSA Troika (2016), G20 Presidency (2022), as well as in initiatives like COVAX-AMC, and GAVI, Indonesia still faced challenges in data accountability, outdated regulatory framework, poor coordination among government agencies from the national to subnational levels, and insufficient knowledge management from prior pandemic experiences.[82–84] These issues result in policy overlaps, power struggles between national to subnational governments, and the emergence of indicators related to corruption and conflict of interest.

Unclear leadership and responsibilities across government agencies led to a fragmented and delayed response. The responsibility for leading the COVID-19 response since the beginning was given to the Coordinating Ministry of the Economy (or Kemenko Ekonomi) and the head of the National Disaster Management Agency (or BNPB), instead of the Coordinating Ministry for Human Development and Cultural (or Kemenko PMK) and the Ministry of Health.[85] This might imply several things. First, the ultimate goal of Indonesia's COVID-19 response was to protect the economy, with public health coming second. Second, the Ministry of Health failed to demonstrate strong leadership compared to other ministries and government agencies. This was evident in the many decisions and approaches that appeared to be not evidence-based and deviated from a public health perspective. Moreover, role confusion between the MoH and BNPB arose partly due to the MoH's lack of decisive action at the onset of the pandemic. This led to further confusion at sub-national levels amid conflicting instructions from the central government. There was also a lack of clarity regarding the roles and involvement of the military and intelligence units, who were involved in not only vaccine distribution but also COVID-19 drugs and diagnostic tools development.[86,87] Concerns also arose about corruption during the pandemic due to the absence of accountability mechanisms.[88,89]

The COVID-19 pandemic unravels the weak coordination and communication mechanisms within and across the governments. There remains weak inter-governmental cooperation, information sharing, and coordinated responses, particularly among wildlife, environmental, agriculture, and health agencies. During the early and peak of the COVID-19 pandemic, various ministries and government agencies issued conflicting statements and propagated misleading information disregarding effective risk communication[90] (further detailed in the **Risk Communication** book of this White Paper series). A recent example of this issue is the inadequate response to the rabies outbreak in West Timor, NTT Province. Despite the first cases being detected in April 2023 and clear knowledge of prevention measures, such as public awareness and mass dog vaccination, the response remains insufficient. Rabies has now spread to all six districts of West Timor and into neighbouring Timor Leste. Ambiguity continues over the responsibilities of the Ministry of Agriculture, Ministry of Health, BNPB, and local governments. Back in 2011, an ad-hoc National Committee on Zoonotic Control was formed across government agencies, followed by an ad-hoc working group within the MoH in 2016 to

integrate IHR and address GHSA efforts. However, both groups have since concluded their duties.

In the case of the pandemic and health emergencies, a vulnerable decentralised system caused further complications. While fiscal and political decentralisation are relatively well-defined, significant ambiguity remains around functional decentralisation. The decision-making was mostly centralised and consequently caused further challenges during implementation at the subnational level.[91] Central ministries often attempt to exert control, however the policies were not taken up very well due to a lack of socialisation, communication, various capacities, and commitment of the government, as well as different needs at the implementation level.[92,93]

3.6. Inequitable access to medical countermeasures (MCMs)

The national supply chain proved inadequate in ensuring equal distribution, especially for vulnerable groups.[94] Despite Indonesia's success in achieving primary dose for over 70% of total population, disparities remained. Health security also means having equitable access to medical countermeasures that may prevent, treat, and detect a disease. The COVID-19 pandemic has highlighted inequity in the distribution of Medical Countermeasures (MCMs), both at the global level and across provinces in Indonesia. As of 2023, regions in eastern Indonesia, such as Papua and Maluku, have yet to vaccinate 70% of their populations. Issues beyond supply—such as distribution, prioritisation, data fragmentation, logistical challenges, poor planning, misinformation, and low demand—continue to hinder progress.[95]

Lack of public investment, as well as incentive mechanisms to encourage private sector innovation[96] has contributed to Indonesia's challenges in research, innovation, and manufacturing capacity needed to guarantee an adequate supply of vaccines and necessary medicines.[97] In Indonesia, the government is the primary contributor to research and development (R&D), with the private sector accounting for only around 20 percent of spending.[98] In 2021, Indonesia centralised its R&D efforts under the National Research and Innovation Agency, aiming to boost innovation for economic development. However, the strategies have been criticised for overlooking a critical component — intellectual property (IP). The government has yet to recognise that IP is instrumental for fostering innovation and is a key driver of sustainable economic growth.[99]

Indonesia has the lowest R&D and tertiary education spending among G20 countries, public spending often focussed on social welfare, rather than education or research and innovation. As a result, the country's innovative capabilities lag behind global development. Since 2016, 2912 overseas patents under the Patent Cooperation Treaty have been granted in Indonesia, compared to only 751 domestic patents.[100] Over the last decade, Indonesia's industrial policy has focused on promoting non-tariff measures, such as local content requirements and tax incentives, to drive downstream investment across sectors like mining and manufacturing .[101,102]

However, the success of this approach is questionable, as these policies have yet to significantly boost the global competitiveness of these industries. The manufacturing sector remains reliant on domestic demand, with only a few products making up the bulk of exports.[99]

Significant structural barriers hinder the supply of affordable materials—such as equipment, medicines, vaccines, and reagents—across Indonesia's human and animal health sectors. Imported materials often cost more than double the global market price due to excessive mark-ups by importers and intermediaries. Meanwhile, inadequate investment and poor quality control frequently lead to inferior domestic products. In some cases, domestically produced animal vaccines might fail to induce immunity in vaccinated animals.

3.7. Insufficient financing

Funding for pandemic and outbreak responses in Indonesia is limited and often inaccessible when needed. From 2005 to 2017, Indonesia had an average of Rp 3.1 trillion (US$ 214 million) national reserve fund for disaster relief, which was found to be less than 20% of the realised economic loss.[103] In 2012, local governments on average allocated less than 1% of their annual budget for disaster risk reduction.[62] These allocations proved mostly insufficient to adequately address the challenges posed by disasters including the COVID-19 pandemic. From 2020 to 2022, the COVID-19 National Economic Recovery Program (Pemulihan Ekonomi Nasional / PEN) amounted to Rp 1895.5 trillion[2] (US$ 120.5 billion) from the national budget (Anggaran Pendapatan Belanja Negara / APBN).[104] From the overall PEN budget, less than a quarter (Rp 427 trillion or US$ 27.1 billion) was allocated for health interventions.[25]

In general, Indonesia only allocates around 2.9% of its GDP to the health sector annually, and there has not been an explicitly dedicated funding for pandemic preparedness, prevention, and response (PPR).[105] The Ministry of Health allocated Rp 4.6 trillion (US$ 299.7 million) for infectious and parasitic diseases in its financing scheme, with Rp 1.4 trillion (US$ 91.3 million), or around 30% of the total coming from donors (GlobalFund, WHO, CHAI, USAID, etc).[106] Due to the COVID-19 pandemic, in 2020 the fund raised almost by 11 times to Rp 53.4 trillion (US$ 3.49 billion), with the funding source component consisting of the state budget (Rp 51.6 trillion / US$ 3.37 billion) and donors (Rp 1.8 trillion / US$ 117.7 million).[106] Due to insufficient reserved funds, the government reallocated resources from essential services, such as nutrition supplementation and child immunisation, to cover specific COVID-19 programs during the pandemic, leading to a budget surge of nearly 11 times the previous allocation.[57]

More limited funding allocated in critical sectors like animal and environmental health. Insufficient resources to maintain human capital and conduct monitoring, detection, and response activities in these sectors make it challenging to integrate zoonotic, vector-borne,

[2] This amount is a combination of the 2020 (Rp 695.2 T), 2021 (Rp 744.7 T), and 2022 (Rp 455.62 T) budget

AMR, and food system programs, as well as to support biodiversity conservation and protection.[70]

Limited public funding caused communities to have to spend out-of-pocket for COVID-19 diagnostics, prevention, and treatment costs. Study by Hafidz et al (2023) showed that the average out of pocket expenditure for COVID-19-related monthly expenditure in 2021 was US$ 226, including diagnostic expenditure (36 USD), preventive expenditure (58 USD), medical expenditure (37 USD for COVID-19 treatment; and 57 USD for post-COVID-19 medical expenses) and non-medical expenditure (30 USD) per person out of 1859 Indonesian respondents.[105] Significant proportion experienced catastrophic costs due to COVID-19.[91]

3.8. Limited community participation

Despite being mentioned in the regulations, there is a notable absence of a formalised mechanism for community participation.[107,108] Throughout the pandemic, numerous community-led initiatives emerged as grassroots alternatives for mutual support at the local level, primarily due to the perceived unreliability of the government and the prevailing circumstances.[109] Communities demonstrated their significant roles in activities, such as community-based surveillance, and social assistance provision to their local communities, among other endeavors.[109] In cases where the government did engage with communities, the quality of participation often remained at a superficial level.[110,111]

Disease threats require a whole-of-government and whole-of-society response. Health security relies on addressing the fundamental determinants of health, including economic inequities, environmental degradation and disasters, and other social determinants of health. Consequently, global and national health governance must foster collaboration and engage sectors and stakeholders beyond the health sector. Unfortunately, there were no formal mechanisms for civil society and community meaningful participation despite their valuable contributions during the pandemic. The new concept of governance involving non-state actors is needed.[83]

3.9. Inadequate policies and norms

Policies and norms serve as a foundation for a resilient and effective health security framework. They aim to give clarity, consistency, and adaptability in the face of diverse and evolving health challenges. Robust policies and norms establish guidelines and procedures, direct funding and resources effectively during emergencies, also foster collaboration and information-sharing, among others.

Indonesia has actively participated in discussions and negotiations related to health security, however, the translation and implementation remain weak. As one of the 194 signatory

countries, Indonesia agreed to implement International Health Regulations (2005).[3] Indonesia has also released a National Action Plan for Health Security (NAPHS) 2020-2024 in 2019. Regrettably, it has not been effectively employed as a primary guidance document looking at the COVID-19 pandemic response in 2020 onwards; instead, it remains as more of a working document. The intended translation into action has not been a successful implementation.

Overlapping laws, policies, and guidelines often conflict with one another. Newer policies replace older ones, but the older ones are not officially repealed, leading to further confusion during implementation at sub-national levels.

3.9.1. Available instruments at the national level

At the national level, there are limited instruments on health security in Indonesia. Only a few instruments that specifically mention or address health security and one health (see Annex 1 for the list of regulations). Law No. 4/1984 on Outbreaks, which served as the cornerstone of Indonesia's health security policy, was enacted nearly four decades ago and has not adapted to the evolving national and global contexts. It was followed by Government Regulation No. 40/1991, still focused on infectious disease outbreak control. These outdated legislations fail to align with regional autonomy laws that decentralise health matters, omit specific provisions for cross-sectoral coordination, and lack clearly defined preventive measures for infectious disease outbreaks.[112] Despite being considered for revision since 2013, the bill was revoked and incorporated into Health Law 17 in 2023.

Two years after WHO pandemic declaration and first reported case on human swine flu (H1N1) pandemic in Indonesia,the government issued a Presidential Decree on Zoonotic Control in 2011, establishing a National Committee on Zoonosis Control. Led by the Coordinating Minister of Health and Welfare, this committee had a term of duty until 2017 and included all relevant government agencies. It was responsible for regulating, overseeing, and implementing strategies and programs for the prevention, control, and management of zoonotic diseases.

Additionally, Law No. 6/2018 on Health Quarantine, which lays the foundation for the preventive and responsive measures to disease outbreaks, confronts notable challenges in its implementation. This legislation does not adequately accommodate a tiered and measurable approach to health quarantine and it notably lacks comprehensive provisions stipulating the extent of community engagement and participation in health quarantine initiatives.[113] However, this bill was also revoked and replaced with the new Health Law No.17 issued in 2023.

Despite the availability of various instruments, there is fragmentation in planning, implementation, and aligning these tools for effective One Health collaboration across sectors. In 2019, the government issued the National Action Plan on Health Security 2020-2024,

[3] A legally binding treaty outlining the rights and obligations of countries in preventing, detecting, and responding to public health threats

which remained largely as a working document and was of limited use during the COVID-19 pandemic, focusing heavily on the health sector. In 2022, the Coordinating Minister of Health and Socio-culture issued regulations on guidelines for preventing and controlling zoonotic and emerging infectious diseases, with a strong focus on zoonoses. This involved coordination between the Ministry of Health and the Ministry of Agriculture, with a plan to develop a national and subnational coordinating team and an integrated surveillance system. That same year, the One Health Joint Plan of Action 2022-2026 was launched, a collaboration among the ministries of health, agriculture, environment, home affairs, and development planning, to be finalised by mid-2024. While there are no specific targets for One Health, there are goals related to surveillance systems, such as SIZE, and on infectious diseases like TB, AIDS, and malaria, still largely centred on the health sector.

While the new Health Law has been enacted, it remains limited in addressing existing structural and collaborative challenges. Recognizing the need for healthcare system reform, the Indonesian Government introduced the Omnibus Law on Health (Law No. 17/2023), which aims to revise and update provisions related to health security and infectious disease. Although the law includes more detailed classifications of infectious diseases and promotes coordination between central and local governments, it still notably lacks a One Health approach and comprehensive national governance across sectors to prevent, detect, and respond to health security threats. Most responsibilities remain confined to the health sector alone. Furthermore, the law does not include provisions for social protection during outbreaks and pandemics, nor does it incorporate gender and equity considerations. While it focuses on at-risk populations, there are no specific details on who these key populations are. At the time of this report, the derivative regulation (Government Regulation (PP)) had just been issued, and the Ministry of Health decree (PMK) is in the process of development.

3.9.2. Available instruments at the regional level

In ASEAN, many initiatives are emerging, but they are not integrated into a cohesive regional health architecture supported by a legally binding and robust regulatory framework. The ASEAN Health Sector Cooperation is characterised by sporadic, unstructured, and voluntary initiatives and networks, often initiated by individual member states. For instance, the ASEAN BioDiaspora Virtual Center (ABVC) was established at the initiative of the Philippines during the ASEAN Summit in 2020, while the ASEAN COVID-19 Response Fund was initiated by Indonesia in the same year.[114]

Several new regional instruments were established during COVID-19, including the financing pool 'ASEAN COVID-19 Response Fund', which later expanded into the ASEAN Pandemic Fund; the ASEAN Center for Public Health Emergencies and Emerging Diseases (ACPHEED); and the ASEAN Public Health Emergencies Coordinating System (APHECS). These instruments aim to create a legally binding framework to secure the commitment of all member states to regional public health emergencies. APHECS, in particular, is intended to be

the legally binding instrument, coordinating and facilitating communication among member states regarding public health emergencies. To ensure regional health security, ASEAN requires legitimate cooperation in areas such as regulations, surveillance, data sharing, pathogen and benefit-sharing, vaccine manufacturing, and sovereignty over other medical countermeasures. However, as of the time this report was written, negotiations are still ongoing.

At the 42nd ASEAN Summit, under Indonesia's ASEAN Chairmanship, The ASEAN Leaders' Declaration on One Health Initiative was adopted, recognizing the importance of a multi-sectoral and collaborative One Health approach to addressing the increased risks and vulnerabilities faced by each Member State.[37] In 2024, ASEAN Secretariat also launched ASEAN One Health Network (AOHN) and ASEAN One Health Joint Plan of Action, aiming to coordinate efforts among member states and develop a joint action plan to strengthen national capacity and multisectoral collaboration.

The limited capacity of the ASEAN Health Division, both in human resources and financing, is one of the primary concerns for regional pandemic PPR initiatives. Currently, the ASEAN Health Division coordinates all ASEAN Health Sector Cooperation initiatives, which are rapidly expanding. However, the division has limited foresight capabilities to predict pandemics and public health emergencies in both current and future contexts. Financial support for the division remains restricted to the annual contributions of ASEAN Member States to the ASEAN Secretariat.[115] As more initiatives are pushed at the regional level, the division's role in technical and coordination matters will become increasingly important. Without improvements to its capacity, there are concerns that the division's ability to coordinate, monitor, and evaluate health initiatives at the regional level may not be sustainable or effective.

3.9.3. Available instruments at the global level

At the global level, existing 'hard' laws and global health governance have proven inadequate in addressing health security issues. Legal systems form the fundamental framework for governance, making a robust legal and structural foundation in global health is increasingly important. Despite its traditional role as the primary multinational global health agency, the WHO has seen a decline in its influence.[116–118] Additionally, international laws can sometimes be ambiguous, inapplicable in certain cases, and ultimately, may lack enforceability.[11]

The following section outlines some of the available mechanisms relevant to health security.

3.9.3.1 World Health Assembly Resolutions

WHA resolutions are considered soft laws and are not binding on member states, and may only urge them to act. The World Health Assembly (WHA) is the WHO's supreme decision-making body, convening annually in May to determine the program of work, approve the

budget, and discuss key issues. Most decisions are reached by consensus prior to the WHA and often take the form of resolutions. The WHO Secretariat, the organisation's administrative and technical arm, is responsible for implementing these resolutions. At the 75th WHA in 2022, an agreement was reached to initiate a Working Group on Amendments of the International Health Regulations (WGIHR), starting discussions on IHR amendments. By the 77th WHA in 2024, these amendments were adopted.[40] Additionally, the WHA convened a second special session in December 2021 to establish an Intergovernmental Negotiating Body (INB) tasked with drafting and negotiating a WHO convention, agreement, or other international instrument on pandemic prevention, preparedness, and response.[119]

3.9.3.2 The International Health Regulations (IHR)

The International Health Regulations (IHR) is an international legally binding instrument crucial to health security. It binds 194 signatory countries, aiming to facilitate global communication and cooperation for the early detection and containment of public health emergency of international concern (PHEIC).[120] The IHR has undergone several revisions in 1969 (previously International Sanitary Regulations), in 2005 (after the SARS outbreak)[121], and after long negotiations since 2022, new amendments were adopted on 1 June 2024.[40] Indonesia began implementing IHR (2005) in 2007 and in 2014 conducted a self-assessment using the 2013 WHO instrument. The results indicated that Indonesia's IHR (2005) implementation was optimal and functioning well across all eight capacities (see Chapter 2 for more details).[23]

In 2005, the IHRs were revised by the WHO to address broader public health risks of urgent international importance, considering international trade law and agreements related to disease prevention and control. The IHR (2005) requires countries to improve international surveillance, reporting mechanisms for public health events, and strengthen their national surveillance and response capacities. These provisions became active in June 2007, and were tested during real-world conditions, such as the 2009 H1N1 pandemic, epidemics of Ebola, Middle East respiratory syndrome coronavirus (MERS-CoV), yellow fever and zika virus.[122] The IHR also addresses cross-border threats from public health emergencies such as chemical spills, leaks and environmental dumping, or nuclear melt-downs, and the inclusion of rules on global disease surveillance under the existing Global Outbreak Alert and Response System. Member states are required to align their national policies, laws, practices, and regulatory actions to comply with IHR.[116]

However, the IHR (2005) was perceived to be limited in guiding international response to a pandemic's size and complexity. It was criticised for not enabling countries or empowering the WHO to issue formal alerts, assessments, and recommendations promptly, despite the inevitable scientific and factual uncertainties.[123] Key limitations of the 2005 version included the lack of a compliance mechanism for member states, insufficient in-country and global independent monitoring, inadequate provisions for international collaboration and assistance to address inequity, and limited mechanism to secure and mobilise funding.[123–125]

The IHR (2005) was amended once in 2014 and has now been further updated with new amendments, becoming the IHR (2024).[40] The amendment process, led by WHO Member States through the Working Group on Amendments to the International Health Regulations (WGIHR)[63] began in November 2022 and was finalised at the 77th WHA in 2024.[40] Key amendments include the introduction of a pandemic emergency definition, expanded WHO authority to declare a pandemic, a Coordinating Financial Mechanism to support pandemic prevention, preparedness, and response capacities, the establishment of a States Parties Committee to facilitate implementation, and the creation of national IHR authorities. Despite the successful adoption of these amendments, they received mixed reactions as some long standing issues from the IHR (2005) remain unresolved, including the lack of a compliance mechanism, independent data monitoring, equity provisions, health alerts, and pathogen access and benefit-sharing (PABS).[126]

3.9.3.3 Pandemic Agreement

The pandemic agreement is a potential international treaty currently being negotiated by the 194 WHO member states. Its aim is to better protect people, communities, and countries from future pandemics by strengthening national, regional, and global capacities and resilience. This includes enhancing global cooperation and governance to improve surveillance, alert systems, data-sharing, research and the production and distribution of medical and public health countermeasures at local, regional, and global levels. In the zero draft, it was agreed that the instrument should contain both legally binding and non-legally binding elements.[127] However, no final agreements had been reached at the time this paper was written.

The new agreement will be crucial, as it is expected to ensure a more equitable global response, safeguard national health systems, and enhance cooperation among member states during pandemics.[128] The agreement on pandemic prevention, preparedness, and response is intended to align with and complement the International Health Regulations (IHR), as noted in decision SSA2(5) by the Health Assembly.[129]

Reaching consensus in the negotiations proved challenging, particularly on articles related to pathogen access and benefit-sharing (PABS), intellectual property rights, technology transfer, research and development for pandemic-related products, financing, equity, compliance mechanisms, independent monitoring, concept of common but differentiated responsibilities (CBDR)[130–132]. The Intergovernmental Negotiating Body (INB) was established in December 2021 during a special session of the WHA, but it failed to finalise and adopt the agreement by the 77th WHA in 2024. Critics have pointed out the process's limitations, including the restricted involvement of civil society and its member state-centric approach.[133–135] The WHO's Member States extended the INB's mandate to complete negotiations for a Pandemic Agreement by the 2025 World Health Assembly, or earlier if possible at a special

session in 2024.[40] As the zero draft served as the starting point for negotiations, the substantive provisions and content of the treaty continue to evolve.

Chapter 4:
Health Security Towards A Resilient Health

Indonesia's current health security capacity requires significant improvements to build a more resilient and responsive healthcare system, along with integrated multi sectoral actions. As highlighted in the previous chapter, structural challenges—ranging from weak surveillance systems to inadequate policies—persist in Indonesia's health security framework. While various monitoring tools suggest that Indonesia has a moderate capacity, critics argue these tools fail to fully reflect the reality due to their limitations. Critical gaps remain, emphasising the need for targeted efforts to address these issues and advance towards a resilient health system with effective cross-sector collaboration.

4.1. Proposed framework for health security

The following framework is employed to provide a structured analysis of the core components that may influence national health security. This framework has been developed with due consideration for essential elements of health security, including the fundamental building blocks outlined in the International Health Regulations (IHR). Furthermore, this framework incorporates the significance of political commitment, policy formulation, sustainable financing, institutional collaboration, capacity enhancement, active civil society engagement, and participation for the effective implementation of the One Health approach.[136]

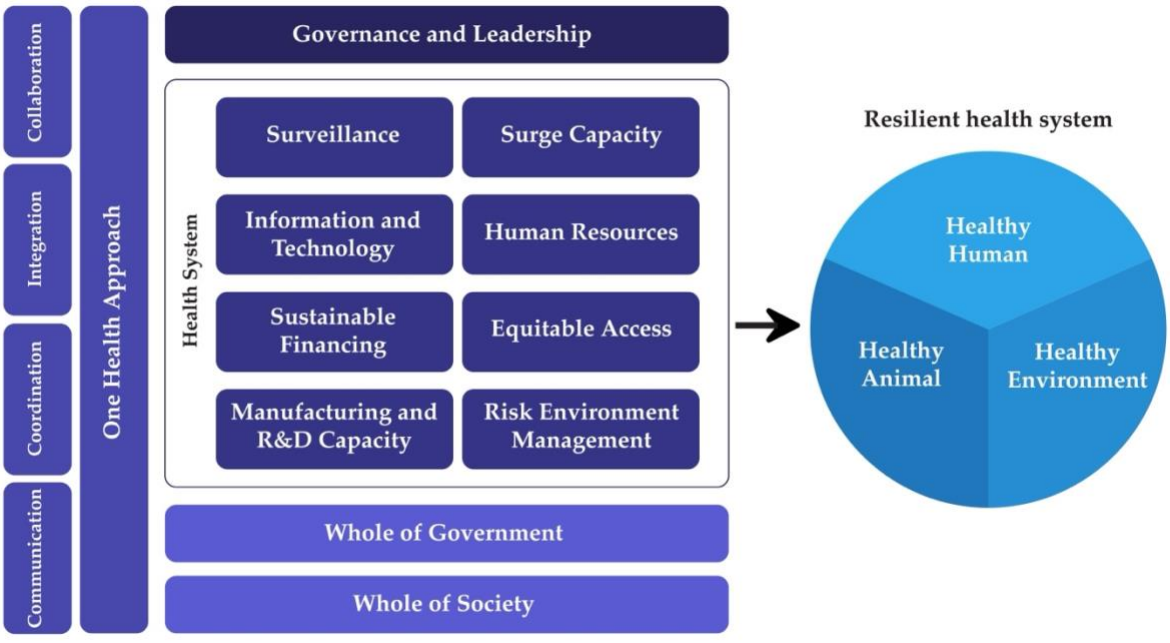


Figure 7. Proposed Health Security Framework

The framework (see Figure 7) emphasises the importance of a 'whole of government' and 'whole of society' approach, encapsulated by the 'One Health' approach. These foundational principles foster communication, coordination, integration, and collaboration among stakeholders, which are pivotal to key pillars in governance and leadership, and health system. These principles underpin health system efforts in preparedness, prevention, detection, and response to public health threats. The effectiveness of the health system is heavily influenced by governance and leadership, including policies and norms. Collectively, these elements aim to create a resilient health system that safeguards and sustains the health of humans, animals, and the environment.

Based on this framework, the author defines a resilient health system as **a robust and responsive health system that ensures not only the health and resilience of communities, but also balances the health of animals and environment through multisectoral collaboration**. Additionally, it must be supported by readily accessible and sustainable financing, equitable access, a well-functioning surveillance mechanism, adequate surge capacity, trained human resources, an integrated and responsive information system, sufficient manufacturing and R&D capacity, and the ability to manage risk factors.

The following subchapter outlines necessary changes and recommendations to ensure a resilient health system.

4.2. Prospective catalysts for change

Several transformative changes may significantly enhance Indonesia's health system and bolster health and community resilience. We acknowledge that a grand plan for national health system transformation is underway. The transformation encompasses a grand strategy involving the overhaul of health information systems, formalisation of community health workers, integration of primary health services, digital health transformation, and the implementation of performance-based payment models, among other initiatives. Should everything progress according to plan, these initiatives will serve as critical leverage points for enhancing health resilience in Indonesia.

Collaborative actions toward a One Health approach across sectors need to be strengthened. While initiatives at regional and national levels are underway, political commitments must be further translated into robust policies and budget allocations that support not only the health sector but also the animal and environmental health sectors.

An effective and responsive early warning system for outbreak surveillance is crucial for promptly detecting and containing diseases, reducing morbidity, and saving lives. Indonesia has established several surveillance systems, such as EWARS and SIZE, but ongoing efforts are needed to ensure their optimal functionality.[137] The system should be strengthened to include a robust detection and real-time reporting mechanism, with mandatory integrated reporting from

both public and private healthcare facilities. Achieving this transition will require both incentivizing factors (pull factors) and enforcement measures (push factors), which could take the form of financial incentives, permits, regulations, and more (see further in **Health System** and Financing Book).

Critical reforms in the data and health information system should focus on improving data protection and governance through integration, interoperability, and accessibility. Seamlessly connecting diverse health data sources—such as electronic health records, public health repositories, and diagnostic centres—will enhance the capacity to monitor, identify, and respond to emerging health risks. Integration will not only streamline the exchange of vital information but also enable real-time analysis and informed decision-making. This empowers healthcare professionals and public health authorities to swiftly detect outbreaks, monitor disease spread, and allocate resources with precision, contributing to a more robust, responsive, and well-prepared healthcare system.[138]

The development and investment in new vaccines and treatments for infectious and neglected tropical diseases have the potential to be pivotal in disease control and elimination. Considering that Indonesia ranks as the second-highest country in terms of Tuberculosis (TB) incidence and has borne the burden for an extended period, the development of more effective TB vaccines could prove to be a game-changer, substantially reducing transmission rates and the overall number of cases. Meanwhile, tropical diseases, such as filariasis, leprosy, frambusia, and schistosomiasis, are still a problem in Indonesia, as evidenced by the number of recorded cases that still exist but are being neglected due to lack of attention, nevertheless, have the potential to become outbreaks again.

To realise its vision of becoming a regional manufacturing hub, Indonesia must shift its industrial policy priorities and create an integrated system that promotes innovation and invention. Mercurio and Tundang (2023) recommend the first priority is to develop a strong upstream industrial base, followed by the development of downstream industries.[99] Therefore, Indonesia must strike the right balance of policy initiatives to encourage innovation and invention, which would also justify stronger IP protection. The government needs to invest in long-term knowledge accumulation through higher education, targeted skill acquisition, modern manufacturing processes, and advanced technical expertise. However, this will be challenging without partnerships with the private sector. The government must create an enabling environment to incentivize research and innovation in medical products, vaccines, and health technologies.

The establishment of an agency dedicated to addressing communicable diseases and public health threats, similar to National Public Health Institutes (NPHIs) in over 30 countries, could be a game-changer for health security in Indonesia. NPHIs are typically independent, science-based organisations that oversee and coordinate essential public health functions, often

as part of or closely affiliated with the Ministry of Health. These functions, which may be shared across institutions in a country, include disease surveillance, emergency preparedness and outbreak response, disease control programs, public health workforce development, occupational and environmental health, and public health research. Currently, these functions are primarily managed by the Directorate of Communicable Diseases under the Ministry of Health. To avoid role confusion and conflict between agencies, the proposed agency should operate under the overall control of the Ministry of Health (further detailed in the **Governance book** of this White Paper series).

Implementing and operationalizing one health at all levels requires major structural changes and strong political commitment and collaboration to integrate the human, animal, and environmental health sectors**.** A more robust coordination mechanism is needed under the President's Office, involving not only the Ministries of Health, Agriculture, and Environment but also the Ministries of Finance and Home Affairs. This includes establishing mechanisms for routine and emergency multi-sectoral communication, collaboration, coordination, and capacity building. Success depends on institutional collaboration, joint planning, and comprehensive surveillance for early detection and prevention of zoonotic diseases.[139] Standardised approaches should be developed to assess the risks of pathogen spillover between animal populations and humans, as well as the emergence of zoonotic diseases, including those originating in food systems.[69] Evidence-based One Health programs must be the cornerstone of planning, implementation, and monitoring, promoting research that enhances risk management, economic understanding, intersectoral coordination, and the translation of global best practices into national action plans. Pooling national financial resources and building capacity among multisectoral actors can accelerate One Health implementation, leading to improved public health outcomes.

There is an urgent need for a significant scaling up of resources for One Health by the Ministry of Agriculture and the Ministry of Environment and Forestry, alongside efforts to ensure adequate resources for human health. This should be accompanied by a multi-year program aimed at attracting, training, deploying, and incentivizing the necessary human resources in these sectors. Vision and leadership must come from a more strategic level within the government, involving the President's Office, all four coordinating ministries, the Ministry of Finance, and the Planning and Development Agency (Bappenas).

Health security requires reforms in global health and national governance, as well as imperative adjustments to existing norms. The current global and national policies and norms are insufficient in guiding international and country responses to public health threats. Specifically, there is an urgent need for a paradigm shift in national policy formulation to de-sectoral human, animal, and environmental health. Adopting a more integrated, interconnected, and logical programmatic approach and knowledge at every stage of policy development should be a prerequisite to enhance coordination and governance.[74] National

security strategy should be formulated around clear understanding of risks, not threats. And understanding and rating risks must be done dynamically, adapting to real-world events.

The Pandemic Agreement is envisioned as a legally binding instrument providing countries with the necessary tools and regulations to effectively prevent, prepare for, detect, and respond to pandemic threats. It is expected to complement the IHR amendments and specifically address agreements on pathogen-sharing mechanisms, genome sequence information, global supply chain management, equitable access to countermeasures, compliance mechanisms, and the prevention and management of zoonotic risks, among others.[140,141] To ensure a robust Pandemic Agreement, Indonesia must actively advocate for a strong, agile, and rapid global instrument. This agreement should address disruptions both within and beyond the health sector, bind all relevant sectors, engage international actors, activate financial mechanisms, clearly define signatories' obligations (and breaches), and establish mechanisms to evaluate compliance and ensure equity and benefit-sharing. This would require parliamentary ratification and the creation of subsequent national laws.[140]

4.3. Operational recommendations for human health system

At a more operational level, the following recommendations focus on enhancements within the human health system:

4.3.1. Prevention

Health security involves measures to prevent the emergence and spread of health threats, including monitoring and regulating factors that can lead to public health threats. To enhance preventive measures, the following priorities are crucial for building a resilient health system:

- Promote clean and healthy living behaviour and healthy living community movement
- Ensure that every infrastructure development is health-oriented by implementing the concept of health in all policies
- Address the social determinants of health, towards reducing health inequalities and creating a healthier society for everyone.
- Ensure the adequacy of laboratory, manufacturing, and research infrastructure for MCMs at the national level, focusing on both quantity and quality
- Increase screening and implement restrictions at points of entry into country
- Regularly evaluate and improve the accessibility and capacity of health facilities
- Enhance the capacity of institutions to utilise data effectively
- Make health impact assessments mandatory before implementing any program or policy
- Map and manage environmental and endemic risks, including related to AMR and food safety
- Mobilise and ensure the availability and sustainability of domestic resources for the pandemic prevention, preparedness and response (PPR) fund

- Ensure rapid detection of and response to unusual events in humans and animals (including wildlife)
- Strengthen biosafety capacity and capability

4.3.2. Preparedness

Preparedness is a core element of health security, involving planning, organising, and building capacity to respond effectively to health emergencies and other public health threats, including pandemics. To improve preparedness in Indonesia's health system, the following actions are required:

- Utilise, adapt, and update the already established National Action Plan for Health Security
- Stockpile essential medical supplies and countermeasures
- Train and equip healthcare workers with the necessary qualifications, including skills in digitalisation and data analysis (further detailed in the **Human Resources for Health** book of this White Paper series)
- Build and strengthen healthcare infrastructure, disease surveillance systems and research capabilities
- Integrate data and make it accessible for meaningful analysis, including for One Health and climate change related data

4.3.3. Detection and reporting

In the context of health security, timely and accurate detection and reporting of potential threats are crucial for safeguarding public health. Effective detection and reporting are critical for preventing, mitigating, and managing public health emergencies, ranging from infectious disease outbreaks to bioterrorism. To improve these processes, the following measures are required:

- Implement cross-sectoral surveillance mechanisms from the community to the national level.
- Establish community-based surveillance systems with clear coordination mechanisms, remuneration, supervision, and training.
- Strengthen collaborative surveillance systems, as launched by the WHO in May 2023, to boost surveillance capabilities across sectors, reduce fragmentation, and foster interconnectedness among data sources and solutions.
- Develop a biosecurity intelligence unit to analyse potential biotech threats.
- Improve access to diagnostic testing at the point of care within communities.
- Enhance the accessibility and interoperability of a real-time integrated electronic reporting system.
- Actively engage in international negotiations regarding health security.
- Align incentives with high-quality data collection and prompt reporting.

4.3.4. Response

A country's ability to respond effectively to an outbreak is of paramount importance. When an outbreak or pandemic occurs, the country must be capable of containing, treating, and preventing further illnesses and deaths. To achieve this, the following priorities are essential:

- Implement preparedness plans (e.g., NAPHS) to mitigate the impact of pandemics.
- Ensure equitable access, availability, and delivery of vaccines.
- Designate accessible isolation facilities at the community level.
- Implement public and risk communication strategies that address diverse societal needs.
- Maintain essential healthcare services.
- Establish a robust supply chain and distribution system for healthcare resources and personnel.
- Create a unified set of regulations and communication protocols for pandemic and outbreak response.
- Enhance the capacity to handle surges in healthcare facilities.
- Define clear roles and responsibilities for authorities at all levels to enable timely and decisive action.

4.3.5. Monitoring and Evaluation

Monitoring and evaluation systems should be an integral part of a resilient health system, as they provide crucial information on the health system's performance and offer recommendations for more effective resource allocation. These systems should monitor and evaluate key components such as inputs, processes, outputs, outcomes, and the overall impact of the health system. Indicators may include the availability of legislation, standards and guidelines, training, supervision, coordination meetings, strategies, stakeholders, and metrics such as completeness, timeliness, responsiveness, and representativeness.[142] Key actions include:

- Establishing technical guidelines and instruments for monitoring and evaluating specific diseases.
- Building the capacity of the health system and workforce to conduct monitoring and evaluation at national and subnational levels.
- Developing an integrated health information system for routine, event-based, and other forms of monitoring and evaluation

Goals, Targets, and Indicators

To achieve the vision of a resilient and responsive health system, the following **set of goals, targets and indicators** is proposed.

Table 1. Goals, Targets, and Indicators

Goals	Targets	Indicators
Surveillance		
Real-time, interoperable and interconnected electronic reporting and surveillance system	Establish and maintain real-time, interoperable and interconnected electronic reporting and surveillance system	The availability of an integrated electronic reporting and surveillance system, spanning from national to subnational levels, should include specific indicators for each infectious disease epidemiological investigation.
		The establishment of multisectoral surveillance mechanisms supported by regulations, funding, guidelines necessary
Adequate surveillance capacity and quality	Enhance laboratory capacity to detect mutations and variants of priority infectious diseases	The proportion of districts/cities laboratory are equipped with necessary diagnostic capacity, especially those with highest priority infectious disease rates
		The establishment of an accessible, transparent, integrated mechanism for exchanging and distributing laboratory data and information systems from national to subnational level

	Adequate referral and specimen transport system	The availability of system, mechanism, governance for systematic and fair, and safe distribution and sharing samples of specimen
	Establish biosecurity and biosafety unit to identify and analyse potential threats	The proportion of districts/cities who have biosecurity and biosafety teams monitoring outbreak threats, including those originating from animals, humans and the environment
		The proportion of districts/cities who hold at least once per year biosafety and biosecurity training and practices, particularly for new health workers at district and subdistrict level
Human Resources		
Sufficient capacity of human resources	Increase capacity of human resources for surveillance	The proportion of primary healthcare centres that have at least one trained epidemiologist
	Increase capacity of human resources for skills in digitalisation and data analysis	The proportion of human resources for health that are trained for digitalisation and data analysis
	Increase human resources capacity in animal and environmental health	The proportion of trained human resources in puskeswan
		The proportion of trained human resources focusing on environmental health
Community Participation		

Active community participation	Establish community-based surveillance mechanism	The proportion of sub-districts that have established community-based surveillance mechanism
		The proportion of trained local health cadres for community-based surveillance
	Establish formal engagement mechanism for community	The proportion of districts/cities that have established a formal community engagement mechanism
Sustainable Financing		
Sustainable, readily available financing for pandemic prevention, preparedness and response	Establish sustainable and readily available financing for pandemic PPR	The availability of budget allocated for pandemic prevention, preparedness, response and recovery at the national and subnational level
		Proportion of funding directed towards strengthening health system capacity related to pandemic
		Diversity of funding and innovative sources
		Active participation of Indonesian government in Pandemic Fund and other international funding initiatives and partnerships
		The availability of sustainability plans and mechanisms to secure funding and ensure continuity of pandemic PPR efforts

Manufacturing and R&D Capacity		
Indonesia becomes a regional manufacturing hub	Ensure adequacy of vaccines and other relevant medical products and technologies for all ASEAN member states	The availability of agreed policy frameworks for pathogen access, products distribution and contribution among member states
		The quantity of products are produced and distributed as agreed and calculated according to different needs
Robust and resilient infrastructure, along with the capacity for manufacturing and research and development of essential medical countermeasures, is crucial to effectively meet domestic needs and respond to public health demands.	Ensure adequate infrastructure and capacity of manufacturing and research and development of necessary medical countermeasures	The proportion of manufacturers in Indonesia that have the capacity and expertise to produce mRNA-based vaccines and upgrade technologies in line with the technology development
		The availability of policy framework that regulates transfer of research materials, including MTAs that aligns with international standards, agreement and best practices
		The availability and diversity of manufacturing facilities capable of producing pharmaceuticals, vaccines, medical devices, diagnostic tools, and personal protective equipment (PPE).
		The proportion of budget for R&D reach at least 1-2% of GDP

	Develop a strong upstream industrial base to support health innovation and manufacturing	The availability of policies to promote R&D and innovation in the health sector, including incentive mechanisms
		The availability of public-private partnership mechanism that foster innovation in health-related industries
		Strengthen industrial base for pharmaceuticals and medical supplies to reduce dependency on imports
		Integrated broader industrial policy to ensure long-term resilience and economic growth
Equitable Access		
Vulnerable groups have been mapped out	Ensure availability and accessibility data on vulnerable groups	The proportion of district/cities that have data related to specific and integrated vulnerable groups
		The proportion of district/cities that map vulnerable groups and disaggregate data according to demographics and vulnerability factors
		The SATUSEHAT application will integrate data related to vulnerable groups
Equitable access to diagnostic tools	Increase public access to point of care infectious disease diagnostic tools: rapid tests	The proportion of primary health care centres that are well equipped with point of care testing

Equitable vaccination coverage	Ensure equitable primary dose vaccination distributed at the national level	Availability of technical guidelines on vaccinations for vulnerable populations in Indonesia
		Vaccination reaches a minimum of 90% of vulnerable populations
Governance and Leadership		
Health security policies with equity lens	Ensure availability and implementation of guidelines and mechanisms to protect vulnerable groups	Established guidelines of risk communication for various vulnerable groups at community and primary health care level
		Established guidelines of resource allocation and service delivery for vulnerable groups at the national and subnational level during health emergencies
Responsive, robust, and functioning cross-sector and multi-actor coordination mechanism	Ensure the availability and maintenance of a cross-sector and multi-actor coordination mechanism	The establishment of an integrated multi stakeholder governance mechanism across sectors at national and subnational level
		Collaborative national governance that involves, at a minimum, the Ministry of Health, Agriculture, Environment, Home Affairs, Bappenas, and Finance, coordinated under the President's Office
Robust health security governance mechanism	Establish functioning independent agency specific to infectious diseases and other health security threats (CDC Indonesia)	Established an independent agency that acts as a technical and coordinating body for national and subnational stakeholders

	Implement and enforce IHR (2024)	Established mechanisms for coordination and integration of relevant sectors for IHR implementation
		The proportion of national and subnational governments that have aligned their domestic legislation, policies, and administrative arrangements with the IHR (2024)
	Establish functioning multi and across-sectoral management on One Health	The proportion of national and subnational governments that have operationalised One Health concept into regulations, budget and guidelines
	Establish monitoring and evaluation system at the national and subnational levels	The proportion of regulations, guidelines, and budgets allocated for regular monitoring and evaluation at the national and subnational levels to ensure compliance
		The availability of national and subnational dashboard on endemic status data mapping
Information and technology		
Accessible, available, timely, transparent, consistent and regular communication to public	Ensure effective communication and engagement strategies to different demographics, including vulnerable populations	The availability of risk communication guidelines, tailoring to different population needs

	Establish and maintain integrated communication system and channels of various actors across sectors to deliver information	The availability of functioning integrated communication system that involves actors across sectors, including community
	Establish and maintain feedback mechanisms for two-way communication with public	The availability of feedback mechanisms at the national and subnational levels
Integrated, responsive and timely data and information system	Ensure rapid detection, containment, response of potential threats or unusual events related to health	The availability of integrated, fast response, real-time information system from national to subnational level
Surge Capacity		
Health facilities are prepared and responsive for health crises	Increase capacity of health facilities for disease control and prevention within health care facilities	Established guidelines and mechanisms to conduct disease control and prevention, training, increase surge capacity, and additional incentives and recruitment for HRH.
	Improve health care referral systems	The proportion of districts/cities with seamless referral care to adequate tiered health facilities during outbreaks or epidemics, with designated main health facilities for primary referrals.
	Maintain essential health service delivery during health crises	The proportion of districts/cities that have guidelines and mechanisms to sustain essential health service delivery when a crisis happens

		The proportion of health facilities that provide essential health services during health crises
	Increase the capacity of health care facilities for health emergency response	The number of inpatient and critical care beds that can be made available, including surge capacity beds
		The availability of isolation and quarantine facilities in each subdistrict
	Ensure the availability of necessary medical supplies and equipment	The availability of strategic reserves of essential supplies that can be accessed during a surge
		The availability of critical medical supplies and equipment in all districts
	Ensure sufficient capacity and quantity of skilled health workers	Available mechanism for health workers recruitment during crises
		All health workers receive training on the respective health threat and emergency for preparedness and response
		The availability of volunteer or reserve medical and non medical staff who can be mobilised quickly during emergencies
	Implement health crisis operations capacity at the national and subnational	NAPHS is updated and translated into more operative national plans and policies

	level during health emergencies	The proportion of district/city that has operational mechanisms and procedures related to emergencies when a health crisis occurs
Risk Environment Management		
Resilient antibiotic resistance control	Strengthen surveillance of infections caused by pathogenic bacteria	The proportion of districts/cities that have enforced restricting regulations on antibiotic use
		Established integrated surveillance system on antibiotic resistance
Resilient food security	Emergencies due to foodborne illnesses are reduced	The proportion of national and subnational governments that have mechanisms for multisectoral collaboration to ensure rapid response for food safety emergencies and outbreak due to foodborne illnesses
Controlling damage to ecosystems on land, air, and sea	Impact assessment of regulatory products that are enablers of ecosystem damage	The proportion of national and subnational governments that have a standardised waste disposal management mechanism and reporting related to waste disposal
		The availability of national mapping of natural and man-made hazards
		The proportion of primary health care centres have at least one trained sanitarian

Climate change for health and disasters	Resilience towards natural and non-natural disasters related to climate change	The proportion of national and subnational governments that have adaptation and mitigation plans from the national to community level
		The availability of guidelines for basic life support for people living in disaster-prone areas
		The availability of national mapping of climate and disaster risks
Eradication of NTDs	Availability of NTDs monitoring and control strategies	Established monitoring and strategic plan at the national and subnational levels
		The proportion of districts/cities that have specific mechanisms to carry out NTDs related surveillance

Recommendation on future research

Future research is needed to assess the feasibility and cost of implementing these recommendations. Methods should include key informant interviews, cost analyses, and modelling the future impact of diseases on populations, alongside evaluating the Return on Investment (ROI) of preparedness investments.

Study limitations

This study may not cover all communicable diseases due to the authors' limitations in addressing the vast scope of health security and infectious diseases. Additionally, the limited participation of relevant government officials restricts the available information on current efforts and future plans in greater detail.

References

1. Wilder-Smith A, Osman S. Public health emergencies of international concern: a historic overview. *J Travel Med*. 2020;27(8):taaa227. doi:10.1093/jtm/taaa227
2. Sharp P, Hahn B. Origins of HIV and the AIDS pandemic. *Cold Spring Harb Perspect Med*. 2011;1(1):a006841. doi:10.1101/cshperspect.a006841
3. WHO. WHO Director-General declares mpox outbreak a public health emergency of international concern. August 14, 2024. Accessed August 15, 2024. https://www.who.int/news/item/14-08-2024-who-director-general-declares-mpox-outbreak-a-public-health-emergency-of-international-concern
4. Miles I. *Scenarios and Foresight: Towards a Constructive Integration*. The University of Manchester; 2002. https://research.manchester.ac.uk/en/publications/scenarios-and-foresight-towards-a-constructive-integration
5. Jakob U. *Norm Conflicts in Global Health: The Case of Indonesia and Pandemic Influenza Preparedness*. Peace Research Institute Frankfurt (PRIF); 2020. https://www.ssoar.info/ssoar/bitstream/handle/document/69029/ssoar-2020-jakob-Norm_Conflicts_in_Global_Health.pdf
6. Zhang W, Wood J. The Global Influenza Surveillance and Response System-65 years of building trust and sharing and a role model for global health security. *Influenza Other Respir Viruses*. 2018;12(5):566. doi:10.1111/irv.12548
7. Sedyaningsih ER, Isfandari S, Soendoro T, Supari SF. Towards mutual trust, transparency and equity in virus sharing mechanism: the avian influenza case of Indonesia. *Ann Acad Med Singap*. 2008;37(6):482-488.
8. The Lancet Infectious Diseases. Share and share alike. *The Lancet Infectious Diseases*. 2008;8(1):1. doi:10.1016/S1473-3099(07)70293-1
9. Elbe S. Haggling over viruses: the downside risks of securitizing infectious disease. *Health Policy and Planning*. 2010;25(6):476-485.
10. Nelson F. What is pathogen sovereignty? … and why does it matter? September 18, 2019. Accessed June 29, 2024. https://www.medicalrepublic.com.au/pathogen-sovereignty-matter/2899
11. Irwin R. Indonesia, H5N1, and global health diplomacy. *Global Health Governance*. 2010;3(2). Accessed October 23, 2023. http://www.ghgj.org/
12. WHO. *Influenza Pandemic Plan: The Role of WHO and Guidanlines for National and Regional Planning*. WHO; 1999:38-41.
13. Michaelis M, Doerr HW, Cinatl Jr J. Novel swine-origin influenza A virus in humans: another pandemic knocking at the door. *Med Microbiol Immunol*. 2009;198(3):175-183. doi:10.1007/s00430-009-0118-5
14. Dharmayanti NI, Ratnawati A, Hewajuli DA. Virus influenza novel H1N1 Babi di Indonesia. *Jurnal Biologi Indonesia*. 2017;7(2). https://e-journal.biologi.lipi.go.id/index.php/jurnal_biologi_indonesia/article/download/3115/2702
15. Kompas. Cegah Flu Babi, Pemerintah Gelar Rapat Koordinasi. April 27, 2009. Accessed February 27, 2024. https://nasional.kompas.com/read/2009/04/27/11120229/cegah.flu.babi.pemerintah.gelar.rapat.koordinasi.
16. Fidler DP. Negotiating Equitable Access to Influenza Vaccines: Global Health Diplomacy and the Controversies Surrounding Avian Influenza H5N1 and Pandemic Influenza H1N1. *PLoS Med*. 2010;7(5):e1000247. doi:10.1371/journal.pmed.1000247
17. Harapan H, Michie A, Mudatsir M, Nusa R, Yohan B, Wagner A. Chikungunya virus infection in Indonesia: a systematic review and evolutionary analysis. *BMC Infect Dis*. 2019;19(1):243. doi:10.1186/s12879-019-3857-y
18. Mulyatno K, Susilowati H, Yamanaka A, Soegijanto S, Konishi E. Primary isolation and phylogenetic studies of Chikungunya virus from Surabaya, Indonesia. *Jpn J Infect Dis*. 2012;65(1):92-94.
19. Sasmono R, Perkasa A, Yohan B, Haryanto S, Yudhaputri F, Hayati R. Chikungunya Detection during Dengue Outbreak in Sumatra, Indonesia: Clinical Manifestations and Virological Profile. 2017;97(5):1393–8. *Am J Trop Med Hyg*. 2017;97(5):1393-1398. doi:10.4269/ajtmh.16-0935
20. WHO. Avian influenza - Disease Outbreak News (DONs). October 8, 2012. Accessed March 3, 2024. https://www.who.int/emergencies/disease-outbreak-news/item/2012_08_10b-en
21. Krisna LAW. Zika Outbreak What You Need to Know. Published online 2016.
22. Kementerian Kesehatan RI. *GHSA Newsletter*. Kementerian Kesehatan RI; 2018. Accessed October 23, 2023. https://sehatnegeriku.kemkes.go.id/wp-content/uploads/2018/11/a3.pdf
23. Kementerian Kesehatan RI. Indonesia Ketua Troika GHSA 2016: Kuatkan Kapasitas Negara Hadapi Ancaman Pandemi Penyakit. Sehat Negeriku. March 28, 2016. Accessed October 23, 2023. https://sehatnegeriku.kemkes.go.id/baca/blog/20160328/1914582/indonesia-ketua-troika-ghsa-2016-kuatkan-kapasitas-negara-hadapi-ancaman-pandemi-penyakit/

24. Ayuningtyas D, Haq HU, Utami RRM, Susilia S. Requestioning the Indonesia Government's Public Policy Response to the COVID-19 Pandemic: Black Box Analysis for the Period of January–July 2020. *Frontiers in Public Health*. 2021;9. Accessed October 16, 2023. https://www.frontiersin.org/articles/10.3389/fpubh.2021.612994
25. CISDI. *CISDI Health Outlook 2023: Saatnya Berubah*. CISDI; 2023. Accessed October 23, 2023. https://cisdi.org/riset-dan-publikasi/publikasi/cisdi-health-outlook-2023-saatnya-berubah
26. Kementerian Luar Negeri RI. Indonesia joined CEPI for development and production of COVID -19 vaccines. Kementerian Luar Negeri Repulik Indonesia. October 23, 2023. Accessed October 23, 2023. https://kemlu.go.id/oslo/en/news/9641/indonesia-joined-cepi-for-development-and-production-of-covid-19-vaccines
27. Sekretariat Kabinet Republik Indonesia. Indonesian Foreign Minister Joins Co-Chairs of COVAX-AMC EG. October 23, 2023. Accessed October 23, 2023. https://setkab.go.id/en/indonesian-foreign-minister-joins-co-chairs-of-covax-amc-eg/
28. Kementerian Kesehatan RI. Kasus Pertama Monkeypox terdeteksi di Indonesia. 2022. Accessed October 23, 2023. https://ayosehat.kemkes.go.id/kasus-pertama-monkeypox-terdeteksi-di-indonesia
29. UNICEF. Acute, severe hepatitis of unknown origin in children. October 23, 2023. Accessed October 23, 2023. https://www.unicef.org/indonesia/acute-severe-hepatitis-unknown-origin-children
30. WHO. Investigation of Acute Kidney Injury in Children in Indonesia: Results and Regulatory Actions. October 23, 2023. Accessed October 23, 2023. https://www.who.int/indonesia/news/detail/01-03-2023-investigation-of-acute-kidney-injury-in-children-in-indonesia--results-and-regulatory-actions
31. WHO Indonesia, UNICEF Indonesia, Kementerian Kesehatan, Global Polio Eradication Initiative. *KLB Virus Polio Jenis cVDPV2 Di Indonesia - Laporan Situasi No. 14 – 1 September 2023*. WHO Indonesia; 2023. https://cdn.who.int/media/docs/default-source/searo/indonesia/14-sitrep-cvdpv-ino.pdf?sfvrsn=e4657d25_1
32. WHO. Measles-Indonesia. Disease Outbreak News : Measles - Indonesia. 2023. Accessed October 23, 2023. https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON462
33. G20 Indonesia. *The Lombok G20 One Health Policy Brief (Chair's Summary: Health Ministers' Meeting of the G20)*. Accessed September 8, 2024. https://g7g20-documents.org/fileadmin/G7G20_documents/2022/G20/Indonesia/Sherpa-Track/Health%20Ministers/2%20Ministers%27%20Annex/The%20Lombok%20G20%20One%20Health%20Policy%20Brief_28102022.pdf
34. Kementerian Sekretariat Negara RI. PPKM Berakhir, Wapres Tegaskan Vaksinasi Terus Dilakukan. 2023. Accessed October 23, 2023. https://www.setneg.go.id/baca/index/ppkm_berakhir_wapres_tegaskan_vaksinasi_terus_dilakukan
35. Sekretariat Kabinet Republik Indonesia. Govt Declares End of COVID-19 Pandemic. October 23, 2023. Accessed October 23, 2023. https://setkab.go.id/en/govt-declares-end-of-covid-19-pandemic/
36. Ducharme J. Experts Can't Agree If We're Still in a Pandemic. March 11, 2024. https://time.com/6898943/is-covid-19-still-pandemic-2024/
37. ASEAN. ASEAN Leaders' Declaration on One Health Initiative. Published online May 10, 2023. https://asean.org/asean-leaders-declaration-on-one-health-initiative/
38. Salsabilla R. Indonesia Catat 35 Kasus Cacar Monyet, Semua Pasien Laki-laki. CNBC Indonesia. 2023. Accessed November 11, 2023. https://www.cnbcindonesia.com/lifestyle/20231107151405-33-487083/indonesia-catat-35-kasus-cacar-monyet-semua-pasien-laki-laki
39. Kementerian Kesehatan RI. Ketok Palu! RUU Kesehatan Sah jadi Undang-Undang. Sehat Negeriku. July 11, 2023. Accessed October 23, 2023. https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20230711/4643487/ketok-palu-ruu-kesehatan-sah-jadi-undang-undang/
40. WHO. World Health Assembly agreement reached on wide-ranging, decisive package of amendments to improve the International Health Regulations. June 1, 2024. Accessed June 10, 2024. https://www.who.int/news/item/01-06-2024-world-health-assembly-agreement-reached-on-wide-ranging--decisive-package-of-amendments-to-improve-the-international-health-regulations--and-sets-date-for-finalizing-negotiations-on-a-proposed-pandemic-agreement
41. United Nation. WHO declares mpox virus a public health emergency of international concern. August 14, 2024. Accessed September 8, 2024. https://news.un.org/en/story/2024/08/1153176
42. Adepoju P. Mpox declared a public health emergency. *The Lancet*. 2024;404(10454):E1-E2. doi:10.1016/S0140-6736(24)01751-3
43. WHO. *Multi-Country Outbreak of Mpox*.; 2024.
44. Kementerian Kesehatan RI. 88 Kasus Konfirmasi Mpox di Indonesia, Seksual Sesama Jenis Jadi Salah Satu Penyebab. August 18, 2024. Accessed August 22, 2024. https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20240818/1546252/88-kasus-konfirmasi-mpox-di-indonesia-seksual-sesama-jenis-jadi-salah-satu-

penyebab/
45. McGrath DC. Principles of sovereignty under international law. Published online 2018. Accessed October 23, 2023. http://envlaw.com.au/wp-content/uploads/handout_sovereignty.pdf
46. United Nation. *A More Secure World : Our Shared Responsibility : Report of the Secretary-General's High-Level Panel on Threats, Challenges and Change*. UN, Dept. of Public Information; 2004. https://www.un.org/peacebuilding/content/more-secure-world-our-shared-responsibility-%E2%80%93-report-high-level-panel-threats-challenges-and
47. Januraga PP, Harjana NPA. Improving Public Access to COVID-19 Pandemic Data in Indonesia for Better Public Health Response. *Front Public Health*. 2020;8:563150. doi:10.3389/fpubh.2020.563150
48. WHO. States Party self-assessment annual reporting tool second edition. October 27, 2023. Accessed October 27, 2023. https://extranet.who.int/e-spar/
49. WHO. Electronic IHR States Parties Self-Assessment Annual Reporting Tool. e-SPAR. https://extranet.who.int/e-spar/
50. Bell E, Tappero J, Ijaz K, et al. Joint External Evaluation-Development and Scale-Up of Global Multisectoral Health Capacity Evaluation Process. *Emerg Infect Dis*. 2017;23(13):S33-9. doi:10.3201/eid2313.170949
51. WHO. Joint External Evaluation (JEE): All Country. May 13, 2024. https://extranet.who.int/sph/jee?region=All&country=327
52. WHO. *Joint External Evaluation of IHR Core Capacities of The Republic Indonesia*. WHO; 2018. Accessed November 11, 2023. https://extranet.who.int/sph/sites/default/files/document-library/document/JEE%20Report%20Indonesia%202017.pdf
53. WHO. Strategic Partnership for Health Security and Emergency Preparedness (SPH) Portal. October 27, 2023. Accessed October 27, 2023. https://extranet.who.int/sph/spar?region=All&country=327
54. WHO. Intra-Action Review (IAR) | Strategic Partnership for Health Security and Emergency Preparedness (SPH) Portal. October 26, 2023. Accessed October 26, 2023. https://extranet.who.int/sph/intra-action-review
55. Kementerian Kesehatan RI. *Laporan Monitoring Tindak Lanjut Intra Action Review (IAR) COVID-19 - November 2022*. Kementerian Kesehatan RI; 2022. https://infeksiemerging.kemkes.go.id/document/download/XgV
56. Kementerian Kesehatan RI. *Laporan Monitoring Tindak Lanjut Intra Action Review (IAR) COVID-19 - Februari 2022*. Kementerian Kesehatan RI; 2022. https://infeksiemerging.kemkes.go.id/document/download/xKz
57. CISDI. *Health Outlook 2022: Habis Gelap, Terbitkah Terang?* Center for Indonesia's Strategic Development Initiatives; 2022. https://cisdi.org/riset-dan-publikasi/publikasi/dokumen/cisdi-health-outlook-2022-habis-gelap-terbitkah-terang
58. Bell JA, Nuzzo JB. Global Health Security Index: Advancing Collective Action and Accountability Amid Global Crisis. 2021. https://www.nti.org/analysis/articles/2021-ghs-index-advancing-collective-action-and-accountability-amid-global-crisis/
59. Kachali H, Haavisto I, Leskelä RL, Väljä A, Nuutinen M. Are preparedness indices reflective of pandemic preparedness? A COVID-19 reality check. *International Journal of Disaster Risk Reduction*. 2022;77:103074. doi:10.1016/j.ijdrr.2022.103074
60. Mahajan, M. Casualties of preparedness: The Global Health Security Index and COVID-19. *International Journal of Law in Context*. 2021;17(2):204-214. doi:10.1017/S1744552321000288
61. Fukuda-Parr S. When indicators fail: SPAR, the invisible measure of pandemic preparedness. *Policy and Society*. 2022;41(4):528-540. doi:10.1093/polsoc/puac024
62. Darwanto H. *Preliminary Examination of Existing Methodologies for Allocating and Tracking National Government Budget for Disaster Risk Reduction (DRR) in Indonesia*. UNISDR; 2012. https://www.unisdr.org/files/32377_32377indonesiadraftdrrinvestmenttra.pdf
63. WHO. Fifth meeting of the Working Group on Amendments to the International Health Regulations (2005). October 27, 2023. Accessed October 27, 2023. https://www.who.int/news-room/events/detail/2023/10/02/default-calendar/fifth-meeting-of-the-working-group-on-amendments-to-the-international-health-regulations-(2005)
64. Lindahl JF, Grace D. The consequences of human actions on risks for infectious diseases: a review. *Infection Ecology & Epidemiology*. 2015;5(1):30048. doi:10.3402/iee.v5.30048
65. de Jong W, Rusli M, Bhoelan S, et al. Endemic and emerging acute virus infections in Indonesia: an overview of the past decade and implications for the future. *Critical Reviews in Microbiology*. 2018;44(4):487-503. doi:10.1080/1040841X.2018.1438986
66. Fauziyah S, Putri SMD, Salma Z, et al. How should Indonesia consider its neglected tropical diseases in the COVID-19 era? Hopes and challenges (Review). *Biomedical Reports*. 2021;14(6):1-10. doi:10.3892/br.2021.1429
67. Asa GA, Fauk NK, Gesesew HA, Foley KM, Lunnay B, Ward PR. Understanding public perceptions in social media responses to posts about acute severe hepatitis of unknown etiology in Indonesia: a qualitative study. *BMC Infectious Diseases*. 2023;23(1):306. doi:10.1186/s12879-023-08195-y

68. FETP Indonesia. Indonesia Masih Kekurangan Tenaga Ahli Epidemiologi Lapangan. October 21, 2018. https://fetpindonesia.or.id/page/content/25/indonesia-masih-kekurangan-tenaga-ahli-epidemiologi-lapangan
69. WHO. One Health. 2023. Accessed October 23, 2023. https://www.who.int/news-room/fact-sheets/detail/one-health
70. Chandrasekera R, Aryal S. *Reframing the One Health Approach: Observations from One Health Programs in Southeast Asia*. Vital Strategies; 2024. https://www.vitalstrategies.org/resources/onehealthapproach/
71. Suwandono A, Campbell A, Stevenson A, et al. Implementing and Financing One Health. Published online 2022. https://www.t20indonesia.org/wp-content/uploads/2022/10/TF6_Implementing-and-Financing-One-Health.pdf
72. Kementerian Kesehatan RI. *Indonesia National Action Plan For Health Security (NAPHS) 2020 - 2024*. Kementerian Kesehatan RI; 2020. https://extranet.who.int/sph/sites/default/files/document-library/document/INDONESIA%20NAPHS.PDF
73. Global Health Security Index. *Global Health Security Index 2021*. Johns Hopkins Centre for Health Security, NTI, Economist Impact; 2021. https://www.ghsindex.org/wp-content/uploads/2021/12/Indonesia.pdf
74. Hitziger M, Esposito R, Canali M, Aragrande M, Häsler B, Rüegg SR. Knowledge integration in One Health policy formulation, implementation and evaluation. *Bull World Health Organ*. 2018;96(3):211-218. doi:10.2471/BLT.17.202705
75. Kementerian Kesehatan RI. *Laporan Program Penanggulangan Tuberkulosis Tahun 2022*. Kementerian Kesehatan RI; 2023. https://tbindonesia.or.id/wp-content/uploads/2023/09/Laporan-Tahunan-Program-TBC-2022.pdf
76. Hardhantyo M, Djasri H, Nursetyo AA, et al. Quality of National Disease Surveillance Reporting before and during COVID-19: A Mixed-Method Study in Indonesia. *International Journal of Environmental Research and Public Health*. 2022;19(5):2728. doi:10.3390/ijerph19052728
77. Global Health Security Index. *Indonesia Global Health Security Index 2021*. Johns Hopkins Centre for Health Security, NTI, Economist Impact; 2021. https://www.ghsindex.org/wp-content/uploads/2021/12/Indonesia.pdf
78. Faridah L, Rinawan FR, Fauziah N, Mayasari W, Dwiartama A, Watanabe K. Evaluation of Health Information System (HIS) in The Surveillance of Dengue in Indonesia: Lessons from Case in Bandung, West Java. *International Journal of Environmental Research and Public Health*. 2020;17(5):1795. doi:10.3390/ijerph17051795
79. Kementerian Kesehatan RI. *Blueprint for Digital Health Transformation Strategy 2024*. Kementerian Kesehatan RI; 2021. https://repository.kemkes.go.id/book/710
80. Barsasella D, Iman AT, Fadly F, et al. Information Flow and Data Gaps in COVID-19 Recording and Reporting at National and Provincial Levels in Indonesia. *Healthcare*. 2022;10(2):204. doi:10.3390/healthcare10020204
81. CNN Indonesia. LaporCovid-19: Gap Data Kematian Pusat-Daerah Capai 20 Ribu. October 27, 2023. Accessed October 27, 2023. https://www.cnnindonesia.com/nasional/20210722171840-20-670974/laporcovid-19-gap-data-kematian-pusat-daerah-capai-20-ribu
82. Brinkerhoff, D. Health Governance: Concepts, Experience, and Programming Options. Published online 2008. https://www.hfgproject.org/wp-content/uploads/2015/02/Health-Governance-Concepts-Experience-and-Programming-Options.pdf
83. Hufty, M. The Governance Analytical Framework. Published online 2009. https://www.graduateinstitute.ch/library/publications-institute/governance-analytical-framework.
84. The Commission on Global Governance. *Global Governance: Our Global Neighbourhood*. The Global Development Research Center; 1995. https://www.gdrc.org/u-gov/global-neighbourhood/
85. Peraturan Presiden. Perpres No. 82 Tahun 2020 tentang Komite Penanganan Corona Virus Disease 2019 (COVID-19) dan Pemulihan Ekonomi Nasional. 2020. Accessed November 11, 2023. http://peraturan.bpk.go.id/Details/141403/perpres-no-82-tahun-2020
86. CNN Indonesia. BIN akan Patuhi BPOM Soal Pengembangan Obat Corona. 2020. Accessed November 11, 2023. https://www.cnnindonesia.com/nasional/20200819185438-20-537483/bin-akan-patuhi-bpom-soal-pengembangan-obat-corona
87. Direktorat Pengembangan Usaha UGM. Badan Intelijen Negara Berminat Mengembangkan GeNose UGM: Alat Skrining Covid-19 Berbasis VOC Biomarker. 2020. Accessed November 11, 2023. https://ditpui.ugm.ac.id/badan-intelijen-negara-berminat-mengembangkan-genose-ugm-alat-skrining-covid-19-berbasis-voc-biomarker/
88. CNN Indonesia. Korupsi APD Covid-19 di Kemenkes Diduga Rugikan Negara Ratusan Miliar. 2023. Accessed November 11, 2023. https://www.cnnindonesia.com/nasional/20231110132038-12-1022493/korupsi-apd-covid-19-di-kemenkes-diduga-rugikan-negara-ratusan-miliar
89. Sinaga N. Korupsi Vaksin Covid-19 di Sumut, Para Terdakwa Kumpulkan Rp 313,4 Juta. kompas.id. September 9, 2021. Accessed November 11, 2023. https://www.kompas.id/baca/nusantara/2021/09/09/korupsi-vaksin-covid-19-di-sumut-para-terdakwa-kumpulkan-rp-3134-juta
90. Kompas. LP3ES Catat Ada 37 Pernyataan Blunder Pemerintah soal Covid-19 Halaman all. KOMPAS.com. April

6, 2020. Accessed November 11, 2023. https://nasional.kompas.com/read/2020/04/06/17522121/lp3es-catat-ada-37-pernyataan-blunder-pemerintah-soal-covid-19
91. Heywood P, Choi Y. Health system performance at the district level in Indonesia after decentralization. *BMC International Health and Human Rights*. 2010;10(1):3. doi:10.1186/1472-698X-10-3
92. Lele G. Concurrency as crisis decision-making governance: Lessons from Indonesia's response to the COVID-19 pandemic. *Regional & Federal Studies*. 2023;33(3):307-332. doi:10.1080/13597566.2021.1960513
93. Meckelburg R, Bal C. As COVID-19 escalates in Indonesia, responses are fractured and fractious. *MAR*. 2020;4. doi:10.37839/MAR2652-550X4.5
94. Aisyah DN, Mayadewi CA, Budiharsana M, et al. Building on health security capacities in Indonesia: Lessons learned from the COVID-19 pandemic responses and challenges. *Zoonoses and Public Health*. 2022;69(6):757-767. doi:10.1111/zph.12976
95. Herlinda O, Sumulyo SAK, Larasanti A, Jundullah SM, Pradana AN. *Kajian Kebijakan Studi Inklusivitas Program Vaksinasi COVID-19 Pada Masyarakat Adat dan Kelompok Rentan*. CISDI; 2023. Accessed October 19, 2023. https://cisdi.org/riset-dan-publikasi/publikasi/kajian-kebijakan-studi-inklusivitas-program-vaksinasi-covid-19-pada-masyarakat-adat-dan-kelompok-rentan
96. World Bank. *Regional Vaccine Manufacturing and Development: Indonesia Country Case Study*. World Bank; 2023. doi:10.1596/40374
97. Magdalena CC, Hafizon MI, Sumulyo SAK, Jundullah SM. *From Market Failures to Market Shaping: Working Towards Equitable and Sustainable Access to Medical Technologies*.; 2023. https://policycommons.net/artifacts/4511644/from-market-failures-to-market-shaping/5321335/
98. Robertson L. Indonesia needs to get serious about R&D. February 18, 2019. Accessed September 8, 2024. https://www.thejakartapost.com/life/2019/02/18/indonesia-needs-to-get-serious-about-rd.html
99. Mercurio B, Tundang R. Jump-starting Indonesia's transition to an innovative economy. February 24, 2023. Accessed September 8, 2024. https://eastasiaforum.org/2023/02/24/jump-starting-indonesias-transition-to-an-innovative-economy/
100. Lokadata. Jumlah paten terdaftar menurut jenis paten. 2016. Accessed September 8, 2024. https://lokadata.beritagar.id/chart/preview/jumlah-paten-terdaftar-menurut-jenis-paten-1489119384
101. Kuncoro A. Trends in the Manufacturing Sector under the Jokowi Presidency. *Journal of Southeast Asian Economies*. 2018;35(3):402-424.
102. Fernando O, Ing LY. *Indonesia's Local Content Requirements: An Assessment on Consistency with Free Trade Agreement Commitments*. Economic Research Institute for ASEAN and East Asia; 2022. https://www.eria.org/publications/indonesias-local-content-requirements-an-assessment-on-consistency-with-free-trade-agreement-commitments/
103. Kementerian Keuangan RI. *Strategi Pembiayaan Dan Asuransi Risiko Bencana*. Badan Kebijakan Fiskal Kementerian Keuangan Republik Indonesia; 2018. https://fiskal.kemenkeu.go.id/files/parb/file/PARB2018_Revisi.pdf
104. Kementerian Koordinator Bidang Perekonomian RI, KPC PEN. *Buku Vaksinasi COVID-19 Di Indonesia*.; 2022. https://ekon.go.id/publikasi/detail/4880/buku-vaksinasi-covid-19-di-indonesia
105. Hafidz F, Adiwibowo IR, Kusila GR, et al. Out-of-pocket expenditure and catastrophic costs due to COVID-19 in Indonesia: A rapid online survey. *Front Public Health*. 2023;11:1072250. doi:10.3389/fpubh.2023.1072250
106. Badan Kebijakan Pembangunan Kesehatan. *National Health Accounts Indonesia Tahun 2020*. Kementerian Kesehatan RI; 2020. https://repository.badankebijakan.kemkes.go.id/id/eprint/4357/1/National%20Health%20Accounts%20Indonesia%20Tahun%202020.pdf
107. DPR RI. Undang-undang Republik Indonesia Nomor 25 Tahun 2004 tentang Sistem Perencanaan Pembangunan Nasional. Published online 2004. https://www.dpr.go.id/dokjdih/document/uu/26.pdf
108. Kementerian Kesehatan. *Peraturan Menteri Kesehatan Republik Indonesia Nomor 48 Tahun 2017 Tentang Pedoman Perencanaan Dan Penganggaran Bidang Kesehatan*.; 2017.
109. IFRC. Case Study: Community-based surveillance in Indonesia. Published online 2021. Accessed November 11, 2023. https://www.ifrc.org/document/case-study-community-based-surveillance-indonesia
110. Adamy A, Rani HA. An evaluation of community satisfaction with the government's COVID-19 pandemic response in Aceh, Indonesia. *International Journal of Disaster Risk Reduction*. 2022;69:102723. doi:10.1016/j.ijdrr.2021.102723
111. Haitami M, Rengganis A. The Dilemma of Good Governance Implementation in Indonesia during the Pandemic of Corona Virus Disease (COVID-19). *JASSP*. 2021;1(1):55-67. doi:10.23960/jassp.v1i1.25
112. Kementerian Hukum dan HAM RI. *Naskah Akademik RUU Tentang Perubahan Atas Undang-Undang Nomor 4 Tahun 1984 Tentang Wabah Penyakit Menular*. Kementerian Hukum dan HAM RI; 2013. Accessed November 11,

2023. https://www.bphn.go.id/data/documents/naskah_akademik_ruu_perubahan_atas_uu_no._4_tahun_1984_tentang_wabah_penyakit_menular.pdf
113. BNPB. Pandemi, Momentum Revisi UU Kekarantinaan Kesehatan. BNPB. November 10, 2023. Accessed November 10, 2023. https://bnpb.go.id/berita/pandemi-momentum-revisi-uu-kekarantinaan-kesehatan
114. Djalante R, Nurhidayah L, Minh HV, et al. COVID-19 and ASEAN responses: Comparative policy analysis. *Progress in Disaster Science*. 2020;8:100129. doi:10.1016/j.pdisas.2020.100129
115. World Bank. *ASEAN Regional Vaccine Manufacturing and Development*. World Bank; 2023. https://documents1.worldbank.org/curated/en/099061623000077536/pdf/P17809200be5e702109e24081db4b2ea1c9.pdf?_gl=1*1v9fp5y*_gcl_au*MTk0Nzc3MjA3MS4xNzI1ODY4NTY5
116. Novotny, Thomas E. Global Governance and Public Health Security in the 21st Century. *California Western International Law Journal*. 2007;38(1). https://scholarlycommons.law.cwsl.edu/cgi/viewcontent.cgi?article=1112&context=cwilj&httpsredir=1&referer=
117. Kickbusch I. SARS: Wake-Up Call for a Strong Global Health Policy. Yale Global Online. October 23, 2023. Accessed October 23, 2023. https://archive-yaleglobal.yale.edu/content/sars-wake-call-strong-global-health-policy
118. Burci, Gian Luca. The Legal Response to Pandemics: The Strengths and Weaknesses of the International Health Regulations. *Journal of International Humanitarian Legal Studies*. 2020;n(2):204-217. doi:10.1163/18781527-01102003
119. The Global Health Centre Geneva Graduate Institute. Timeline of efforts to strengthen global pandemic preparedness and response in light of the covid-19 crisis. Governing Pandemics. October 27, 2023. Accessed October 27, 2023. https://www.governingpandemics.org/timeline
120. Meier BM. Implementation of the International Health Regulations: Evolving Reforms to Address Historical Limitations. 2022;(4240916). doi:10.2139/ssrn.4240916
121. Broberg M. A Critical Appraisal of the World Health Organization's International Health Regulations (2005) in Times of Pandemic: It Is Time for Revision. *European Journal of Risk Regulation*. 2020;11(2):202-209. doi:10.1017/err.2020.26
122. WHO SEARO. Strengthening IHR and health emergency capacities through implementation of national action plans. Published online September 2, 2019. https://iris.who.int/bitstream/handle/10665/327908/Agenda8.3-sea-rc72-8Rev.1-eng.pdf?sequence=1
123. WHO. Governments hold fourth round of discussions on proposed amendments to International Health Regulations (2005). October 27, 2023. Accessed October 27, 2023. https://www.who.int/news/item/31-07-2023-governments-hold-fourth-round-of-discussions-on-proposed-amendments-to-international-health-regulations-(2005)
124. Gostin L, Habibi R, Meier BM. Has Global Health Law Risen to Meet the COVID-19 Challenge? Revisiting the International Health Regulations to Prepare for Future Threats. *The Journal of Law, Medicine & Ethics*. 2020;48(2). doi:10.1177/1073110520935354
125. Sohn M, Ro D, Koh DK, Lee S, Kim SY. The problems of International Health Regulations (IHR) in the process of responding to COVID-19 and improvement measures to improve its effectiveness. *J Glob Health Sci*. 2022;3(2):e18. doi:10.35500/jghs.2021.3.e18
126. Searchinger. The New Amendments to the International Health Regulations. Think Global Health. June 4, 2024. Accessed September 8, 2024. https://www.thinkglobalhealth.org/article/new-amendments-international-health-regulations
127. WHO. *Zero Draft of the WHO CA+ for the Consideration of the Intergovernmental Negotiating Body at Its Fourth Meeting*.; 2023. https://apps.who.int/gb/inb/pdf_files/inb4/A_INB4_3-en.pdf
128. WHO. WHO Director-General's opening remarks at the media briefing – 21 February 2024. February 21, 2024. Accessed June 29, 2024. https://www.who.int/director-general/speeches/detail/remarks-at-the-media-briefing-21-february-2024
129. WHO. Pandemic prevention, preparedness and response accord. June 20, 2024. Accessed June 29, 2024. https://www.who.int/news-room/questions-and-answers/item/pandemic-prevention--preparedness-and-response-accord
130. The Lancet. The Pandemic Treaty: shameful and unjust. 2024;403(10429):P781. doi:10.1016/S0140-6736(24)00410-0
131. Michaud J, Kates J, Rouw A. The 'Pandemic Agreement': What it is, What it isn't, and What it Could Mean for the U.S. April 1, 2024. Accessed June 29, 2024. https://www.kff.org/global-health-policy/issue-brief/the-pandemic-agreement-what-it-is-what-it-isnt-and-what-it-could-mean-for-the-u-s/
132. Nature. A global pandemic treaty is in sight: don't scupper it. May 21, 2024. Accessed June 29, 2024. https://www.nature.com/articles/d41586-024-01464-z

133. Pandemic Action Network. Pandemic Action Network's Pandemic Agreement Civil Society Meeting Intervention. February 27, 2024. Accessed June 29, 2024. https://www.pandemicactionnetwork.org/policies-and-actions/pandemic-action-networks-pandemic-agreement-civil-society-meeting-intervention/
134. Brian S. New Pandemic Agreement: Pharma Wins, Developing World Loses. April 24, 2024. Accessed June 29, 2024. https://www.aidshealth.org/2024/04/new-pandemic-agreement-pharma-wins-developing-world-loses/
135. Phelan A, Gostin L. The world needs the new pandemic treaty. May 27, 2024. Accessed June 29, 2024. https://www.statnews.com/2024/05/27/pandemic-agreement-world-health-assembly/
136. Bhatia R. Implementation framework for One Health approach. *Indian J Med Res*. 2019;149(3):329-331. doi:10.4103/ijmr.IJMR_1517_18
137. Manurung MK, Reo SE, Pardosi JF, Muscatello DJ. Evaluation of the Indonesian Early Warning Alert and Response System (EWARS) in West Papua, Indonesia. *WHO South East Asia J Public Health*. 2020;9(2):111-117. doi:10.4103/2224-3151.294304
138. Braa J, Sahay S, Lewis J, Senyoni W. Health Information Systems in Indonesia: Understanding and Addressing Complexity. In: Choudrie J, Islam MS, Wahid F, Bass JM, Priyatma JE, eds. *Information and Communication Technologies for Development*. IFIP Advances in Information and Communication Technology. Springer International Publishing; 2017:59-70. doi:10.1007/978-3-319-59111-7_6
139. Kelly TR, Karesh WB, Johnson CK, et al. One Health proof of concept: Bringing a transdisciplinary approach to surveillance for zoonotic viruses at the human-wild animal interface. *Prev Vet Med*. 2017;137:112-118. doi:10.1016/j.prevetmed.2016.11.023
140. Nikogosian H, Kickbusch I. The case for an international pandemic treaty. October 27, 2023. Accessed October 27, 2023. https://www.bmj.com/content/372/bmj.n527.full
141. Vinuales, Jorge, Moon, Suerie, Moli, Ginevra Le, Burci GL. A global pandemic treaty should aim for deep prevention. 2021;397(10287):P1791-1792. doi:10.1016/S0140-6736(21)00948-X
142. WHO. *Communicable Disease Surveillance and Response Systems : Guide to Monitoring and Evaluating*. WHO; 2006. https://iris.who.int/handle/10665/6

Annexes

Annex 1. List of Regulations

No	List of Regulations
1.	Law No. 4/1984 on Outbreak
2.	Government Regulation No. 40/1991 on Infectious Diseases Outbreak Control
3.	Presidential Regulation No. 30/2011 on Zoonosis Control
4.	Decree of the Minister of Health No. 273/2016 on Global Health Security Working Group of the MoH
5.	Law No. 6/2018 on Health Quarantine
6.	Presidential Instruction No. 4/2019 on Enhancing Capacity in preventing, detecting, and responding outbreaks, global pandemics, Nuclear, Biological, Chemical Emergencies
7.	National Action Plan on Health Security (NAPHS) 2020-2024
8.	Regulation of the Coordinating Minister for Human Development and Cultural No. 7/2022 on Guidelines for Zoonotic and New Emerging Infectious Diseases Prevention and Control
9.	Law No. 17/2023 on Health
10.	One Health Joint Plan of Action (OH-JPA) 2022-2026