Chapter 14

From Bench to Policy: Strengthening Research Translation for a Better Health System in Indonesia

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A. Introduction

The COVID-19 pandemic has impacted health systems worldwide, including in Indonesia. These pandemic waves continue to fluctuate in Indonesia, increasing the health burden and disrupting the health system, resulting in an inevitable increase in health inequity and sustainability. Improving the quality of health services in every health sector throughout Indonesia is becoming increasingly difficult because this pandemic has exacerbated the disruption even in essential health services. As stated in the second round of the WHO "pulse survey", around 90% of countries reported disruptions to essential health services (WHO, 2021). At the same time, basic health services are the main modal to a robust health system in a country. There are several major causes of instability of the health system, such as

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the shortage of health workers; supply chain problems for medical devices, vaccines, and medicines; obsolete and unequally distributed healthcare facilities; and public distrust of policies made in health services (WHO, 2021; Yunus & Andarini, 2020). Addressing those problems through effective evidence-based policies is vital to restoring and strengthening the health system in Indonesia during and post-pandemic.

Currently, Indonesia mainly focuses on health system solutions and public health activities, which emphasizes six primary responses: preventing local transmission, providing adequate infrastructure and health workforce, delivering effective healthcare services, financing healthcare services, good governing, and measuring other aspects (Mahendradhata et al., 2021). A robust, high-quality research translation is demanded to perform those responses. The first response, preventing local transmission, needs effective communication about the health policy. Credible sources of information are necessary to convey messages and data required to be known by the public. Establishing the COVID-19 task force and delivering live data on COVID through the government's official website has reduced the confusion of data spread in the community (Mahendradhata et al., 2021). The government has also collaborated with the digital industry to increase information coverage to the public and suppress circulating hoaxes (Mahendradhata et al., 2021). However, the communication delivery should be integrated with robust evidence, which the public should readily accept. Evidence-based policies delivered effectively through health research translation can make the public ultimately comply with the government policies implemented to prevent the spread of COVID-19. This effective health research translation is also vital for implementing the other five responses in strengthening the health system during the COVID-19 pandemic. It suggests an urgent need for Indonesia to strengthen its health research translation to improve health outcomes.

Research translation is a complex, interrelated process involving all stakeholders (e.g., government, policymakers, researchers, indus-

tries, and community) that facilitates the transformation of research findings to be implemented to enhance people's lives (Translational Research Institute, 2022). Health depends on four primary sectors as a backbone: basic science, clinical practice and effective care, disease surveillance, and policymaking (Figure 14.1). In this pandemic, Indonesia's health research translation backbone has adapted to deal with COVID-19, revealing weak spots in each sector. While some may have been slightly improved, such as health surveillance (Mahendradhata et al., 2021), many others will remain challenges in the post-pandemic recovery. Therefore, in this chapter, we will discuss 1) the current gaps in the challenges of the research translation backbone in Indonesia; 2) how they impact the reliability of the health system in dealing with the pandemic, and 3) how to strengthen each sector to form a better health system with the ultimate goals to aid post-pandemic recovery and mitigate future public health threats (Figure 14.1).

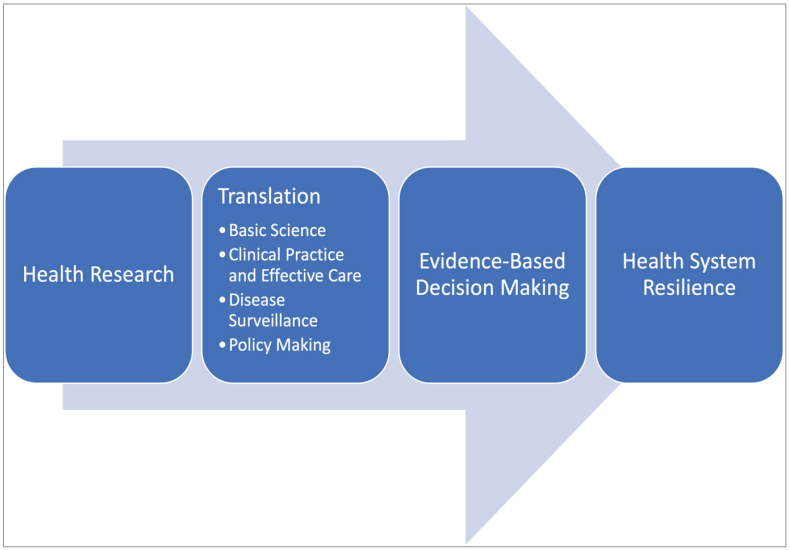

Figure 14.1 Health Research Translation and Health System Resilience

B. Challenges in Indonesia's Research Translation

To date, challenges in health research translation have never been more complicated. The unpredictable nature of the pandemic demands immediate and adaptive responses from our health system, placing an extra burden on each sector in the health research translation process. Reflecting on the current situation, we identified four main difficulties that pose challenges to health research translation in Indonesia. These difficulties include limited resources, research output orientation, poor data management, and communication gaps between stakeholders.

1. Limited Human Resources

Researchers are the main component in producing good quantity and quality research. However, the number of researchers in Indonesia is still lacking. According to the UNESCO Institute of Statistics (2022), there are only 216 full-time researchers per million inhabitants in Indonesia. Although the number of registered researchers in Indonesia is slightly increasing yearly, it is still less than in other ASEAN countries. Researchers, as a functional group, can provide solutions and improve human beings as well as prosperity in the future (Bartram & Dowling, 2013). However, they face challenges in conducting scientific activities and providing evidence-based decision-making. As in other developing countries, researchers in Indonesia are also facing unique challenges.

First, there is a lack of hard skill training and non-technical skills, such as obtaining research funding, citation knowledge, or networking (Kurniawan, 2017), especially for aspiring researchers. Second, collaboration with international institutions is still rare in Indonesia compared to other developing countries (Kurniawan, 2017). This can occur due to the limitation in the number of visiting researchers to Indonesia, as well as challenges in work culture and the language barrier between collaborators (Seidler et al., 2021). Third, there is a lack of a focused research environment. UNESCO Institute of Statistics (2022) reported that more than three-quarters of the total researchers in Indonesia come from the higher education sector. As

lecturers in higher education institutions, they have the Tri Dharma responsibility—to contribute to teaching, research, and community service—which puts a triple burden on their job (Suradijono et al., 2017). Many are expected to spend more time in teaching or administrative duties, reducing valuable time spent on research, thus affecting their research outputs quality and quantity. In some cases, this may induce dissatisfaction and feeling unsupported, leading to researchers' migration into more research-supporting countries. These suggest that re-schematization to create a better research environment is strongly needed to support researchers in their activities.

2. Limited Research Funding and Infrastructures

Budget allocation is a major factor in research funding. In a country, it is reflected by the ratio of gross domestic expenditure on research and development (GERD) to gross domestic product (GDP). According to the most recent data, in 2018, Indonesia, with only 0.2% GERD in GDP, was still far behind developed countries such as Japan at 3.3%, China at 2.1%, Singapore at 2.0%, and Malaysia at 1% (UNESCO Institute of Statistics, 2022). This data indicated that for three years, from 2016 to 2018, Indonesia's GERD to GDP ratio appeared to be stagnant, without notable improvement. Therefore, it is suggested that an increase in research budget allocation is essential to enhance research output.

Limited funding creates challenges among researchers in many ways. Research equipment procurement might be the foremost challenge among researchers. In many research areas in Indonesia, especially in the STEM and medical fields, advanced laboratory equipment is often required to create high-impact, pioneering basic science studies (Suradijono et al., 2017). Without state-of-the-art equipment, Indonesia will perpetually lag in drug development and nanotechnology. Individual-based grants common in Indonesia seem to focus too much on the lecturers' selection rather than project-based, cluster, or multi-discipline grants that may stimulate collaboration and practical interest (Kurniawan, 2017).

Furthermore, researchers in Indonesia also face complicated financial reporting and disbursement of funds that add extra responsibility to them, on top of unrealistic expectations of time and results. Research funds also often emphasize budget absorption targets rather than the impact or soundness of science (Kurniawan, 2017). This indirectly leads to research in Indonesia being skewed towards "low-budget", "low-effort", or simple population or clinical research-which, while also impactful, may not be enough to open new frontiers. Another indirect impact is that researchers are immediately expected to "return" the investment by producing research directly applicable to the public, regardless of the quality of the research.

While new sources of funds are emerging, research funding in Indonesia is still provided mainly by the government, which is still low spent, just 0.25% of its GDP on research and development (CCPHI, 2019). This presents another untapped funding source for the construction of laboratories or the purchase of advanced equipment. Funding sources in universities have begun shifting from internal (e.g., DIKTI) and external (e.g., LPDP and Ministry of Research and Technology) governmental funding to collaborative funding (e.g., research center, laboratories, national, and international collaboration) (Kurniawan, 2017). Foundations, scientific associations, non-governmental organizations (NGOs), and particularly foreign organizations are also increasingly playing important roles. In addition, the contribution of private business is becoming more important and gaining more recognition in the broader range of developing countries. Many new funding sources go directly to individuals and research groups rather than institutions (Gaillard, 2008). Indonesia implemented funding collaboration schemes namely RAPID (Riset Andalan Perguruan Tinggi dan Industry). With government funds of 300–500 million per year, industrial partners must contribute cash funds of at least 10%, and higher education institutions are required to contribute a minimum of 15% of the nominal value of the contract (CCPHI, 2019).

Encouraging multi-cooperation and bud re-allocation for certain research missions could contribute to building better funding and infrastructure. Thus, taking advantage of opportunities by cooperating with third parties (government or industry) must be encouraged. Increasing the public and private sector engagement in health research through national and global collaboration could improve the capacity, accessibility, affordability, and quality of research. Besides that, networks owned by lecturers/researchers have the potential to bring in funding for research.

a. Orientation of Research Outputs

A high-quality, evidence-based health research output is vital in formulating and implementing policies and decision-making in various aspects, including the health system. Unfortunately, much research has a low orientation in research outputs due to limited reporting time and funding (Suradijono et al., 2018). For example, grant funds are often disbursed in April and must be reported in December due to the closing period. This limits the time to conduct quality research. The funding is also insufficient to support high-quality research, which consequently causes researchers to sacrifice the quality of the design and research methods they used, thus making it less possible for their research to be accepted by reputable international journals (Suradijono et al., 2018).

A study of the strength of higher education institutions based on three priority areas of national energy, food, medicine, and health in 2015–2019 based on RPJMN showed that only 904 higher education institutions in Indonesia conducted research by producing 14,188 research results (Dimyati et al., 2022). In fact, according to data on several universities in Indonesia in 2019 (Attamimi et al., 2019), there were 4,621 higher education institutions. This means that the number of universities actively conducting research in those three national priority areas (including medicine and health) was only around 20% (Attamimi et al., 2019; Dimyati et al., 2022). This illustrates that the research output quantity in Indonesia is still low, although it may have been increasing compared to previous years.

Indonesia still faces challenges in optimizing research output and is limited to promoting and disseminating results. The quality of research is still low despite some efforts that have been conducted to encourage, increase, and facilitate research within universities (CCPHI, 2019). One of the challenges in the research institutes in Indonesia is the unsustainability of research and development roadmaps year by year. The lack of a research-oriented roadmap to solving the national problems caused the research to be reactive to momentary requests. This makes the quality of research results less agile to mitigate evolving situations (Mathur et al., 2021).

The research by the research organization and higher education providers should be aligned with the national and global agenda. BRIN has established the national research priority through National Research Funding Priority (Pendanaan Prioritas Riset Nasional or PPRN) to address gaps or weaknesses in the research field, formulate advocacy strategies and disseminate research results for policy change, and formulate interventions in the change process. This funding includes nine research focuses, including health (BRIN, 2022). Improving the quality of research relevant to the national and global health agenda can create a proper solution to the current problem (Ibrahim, 2020).

In times of a pandemic, with increasing interest and need for translational research, the gap between the suitability of problems at the population level in the Medium-Term National Development Plan (RPJMN) and health research plans needs to be addressed strategically (Wensing & Grol, 2019). Therefore, the quantity and quality of research need to be increased by developing a research roadmap to respond to global health challenges. Reconstruction of research management is required considering the limited number of researchers and funding (Hidayat & Darmawati, 2019). An appreciation mechanism needs to be created to appreciate researchers who publish international articles to encourage and stimulate others to increase the quantity and quality of research.

3. Poor Data Management and Health Research System

Health data and disease surveillance in integrated databases are crucial in monitoring, driving decisions, and directing actions in a pandemic. They are essential for decision-makers and practitioners to formulate and employ timely and relevant policies to prevent, control, and minimize the outbreak (El-Jardali et al., 2020). If reporting and surveillance data in the database are not properly managed, an ongoing activity to support health research will cease. As a result, data reporting and monitoring failures will make it increasingly difficult for policymakers to translate research findings into evidence-based policy.

Indonesia's data reporting, surveillance, and database management are still far from ideal. For example, The Ministry of Health suggests that the national COVID-19 surveillance data result is still unreliable regardless of a standardized reporting form (Kemenkes, 2020b). Furthermore, the presentation of the COVID-19 daily report through the TC-19 All Record Online Application (Kemenkes, 2020a) and the COVID-19 Online Daily Reporting System (S*istem Online Pelaporan Harian COVID 19*/SILAPHAR COVID-19) (Kemenkes, 2020c) also has not yet met the reporting target (Kemenkes, 2020b).

The lack of trained personnel is one major obstacle in obtaining reliable surveillance data. A study in a rural health center implementing a COVID-19 surveillance system showed that the limited number of surveillance personnel with a high workload and the ability of surveillance officers to vary the presentation of data were the biggest challenges in conducting data surveillance (Sidjabat & Arthameivia, 2021). Altogether, these suggest improvements in data reporting systems, both at the central and grassroots levels, are needed to produce reliable data. The existence of adequate personnel and appropriate training for the relevant officers may solve this problem.

In addition, the problem of unintegrated databases is also a significant challenge in health research data management. Currently, researchers primarily obtain data for health research from the department of Research and Development of the Ministry of Health (Kemenkes, 2021). However, this data is limited, as it does not provide

information from other ministries and institutions. The data is from the Ministry of Health, such as half a decade of basic health research data (Kemenkes, 2021). Data from other ministries and agencies is also needed to support health research, for example, data from the social service agency and data from the central statistical agency.

The existence of health data that is faster, more precise, easily accessible, and reliable in an integrated database for researchers will significantly facilitate researchers in encouraging health research. Moreover, it will increase the health system's resilience in the long term. Therefore, providing and enhancing a reliable national reporting, surveillance, and public health database system might be a substantial resource in health research and translation for supporting government decision-making.

4. Communication Gaps

Communication gaps between researchers and stakeholders might impact health research translation (Towfighi et al., 2020). During this pandemic, it is evident that there is a gap between health and medical researchers/practitioners with decision-makers. For example, in the early of the pandemic, the government underestimated the pandemic warning from WHO and researchers (Noor, 2020). When researchers suggested restrictions to prevent the spread of the COVID-19 outbreak, the Indonesian government did not immediately close its international travel, even approving a budget to increase the number of tourists (Noor, 2020). The policy caused controversy and caused the COVID-19 outbreak to occur widely in Indonesia.

The difficulty of using scientific-based hard evidence to establish policies has been around for a long time. It has become increasingly apparent during the pandemic, which requires effective evidence-based policies. Researchers and decision-makers have different work cultures, in which the acquisition of data and research production is not treated as "useful" by decision-makers due to their indirect impact. Waiting for hard evidence before determining the proper implementation is also often perceived as slow or bothersome by policymakers.

The higher standards prescribed by effectiveness studies are often a recipe for inaction. It is often thought that doing something is better than waiting for the evidence and doing nothing. Other factors include negative perceptions of available research evidence, which could not be attributed to the fault of the decision-makers alone. Perceived scientific uncertainty, an undue focus on randomized controlled trials (Ritter, 2009), poor local applicability, and lack of complexity in studies that focus more on the social determinants of health and the multiple components of a health system further distances the use of hard evidence from the policymaking process. The incompatibility of problems at the population level and strategic approaches based on health research results have also deepened this gap (Wensing & Grol, 2019). Furthermore, policymakers are often not supported through training, requirements, or the government expectations to acquire skills to understand and use research evidence (Ritter, 2009). This causes difficulty in implementing research evidence-based policies.

In addition, the lack of dedicated integrated health and medical research organization further widens the gap between the researchers and policymakers. The existence of a health research organization such as NIH in the US (NIH, 2021) and MRC in the UK (MRC, 2021) is an integrated organization for health research that can bridge the gap. Although BRIN as an integrated research organization might be a good start, the absence of specific health integrated research organizations in Indonesia is one of the main challenges in encouraging health research translation into evidence-based decision-making. This lack of sustainable collaboration infrastructure also increases barriers between stakeholders in translating clinical research results to address problems at the population level (Towfighi et al., 2020). This absence of a solid relationship between the researcher and policymaker eventually makes the policies confusing to the public as it not supported by solid evidence. If these challenges are not adequately addressed during the period of pandemic recovery, it will be increasingly difficult to recover the health system from disruption.

5. Impact on Evidence-Based Decision Making and Health System Resilience

The aforementioned challenges have heavily impacted evidence-based decision-making in the years leading up to the pandemic, which has led to a less resilient and agile Indonesian health system. This became even more glaringly obvious during the COVID-19 pandemic, where the lack of high-quality data and research outputs, as well as a low number of interventional research and surveillance studies (Macintyre, 2003; Orton et al., 2011), hamper the systematic collection of evidence that form the basis of policy. An example is the lack of data on regional preparedness during the COVID-19 pandemic, perhaps owing to the fragile research infrastructure and the short timeline; however, the Ministry of Health has published data on the distribution of bed capacity and hospitals in Indonesia during the COVID-19 pandemic, which still faced stark inequalities in rural areas (Kemenkes, 2022). While still preliminary, data like these can inform future health decisions, followed by monitoring studies to evaluate effectiveness.

The "gulf" between policymakers and researchers also prevents the use of research findings in informing decision-making processes. Even with the existence of Indonesian research institutes, barriers to access and incompatible timeframes, especially for rapidly evolving situations, further prevent the implementation of true evidence-based policies. To circumvent research problems, decision-making is decided by competing influences, such as political and strategic factors, finances and resources, personal beliefs or common sense, competition, or public pressure (Mitton, 2004). Policymakers often perceive waiting for hard evidence before determining the proper implementation as slow or bothersome. The higher standards prescribed by effectiveness studies are often thought to be a recipe for inaction. It is often thought that doing something is at least better than waiting for the evidence and doing nothing.

However, as Macintyre and Petticrew (2000) argued, "good intentions and plausible theories alone are an insufficient basis for decisions about public programs that affect the lives of others." A wide

range of influences must be considered to develop an effective public health policy. Furthermore, each step of the policy process, which includes problem delineation, option development, and implementation, ideally requires evidence that covers effectiveness, organization, implementation, and feasibility. In this complex decision-making environment, a large volume of research findings is needed, as they are often less definitive or robust in public health applications. Additional sources, such as expert opinion, case studies, social values, or patient preferences, can provide reliable evidence (Mitton, 2004).

In the case of impromptu policies and weak research translation backbones such as these, it is also essential to monitor the long-term impact of policies to determine if the approaches are effective. Evaluation is often hampered, however, by factors such as funds, other policy priorities, or backlash against the random allocation of individuals or communities in receiving assistance programs, which is often deemed unfair or unacceptable (Macintyre, 2003). This is a major problem, as without monitoring studies, there will be no data to create predictive models for future policies.

Indonesia, among other South-East Asian and South Asian countries, has a diverse health system where studies still show a lack of demand for research and evidence to inform decision-making. Most LMICs suffer from inequalities in access, affordability, and availability of healthcare services, possibly because of the low value placed on available research, as well as inadequate recognition of the potential of health policy and system research (HPSR) to contribute to policy development (Onwujekwe et al., 2020). In some ways, however, the Indonesian government has improved its utilization of evidence-based decision-making. Several new initiatives were initiated, especially in pursuing the fulfillment of Sustainable Development Goals (SDG) s. For health, SDG 3- which aims for universal and equal health coverage—and to a lesser extent, SDG 10 on reducing inequality—is itself enabled by SDG Target 17.18, which calls for data disaggregation and monitoring. Indonesia has initiated its first comprehensive assessment of health inequality, with 50 indicators across 11 health

topics published in December 2017 (WHO, 2017). These data were further disaggregated by dimensions of inequality, such as education level, sex, or economic status. Further analysis was also performed to determine Indonesia's Public Health Development Index, which has been used for priority-setting, planning, and resource allocation across districts in the country.

On a fundamental level, these findings informed the government on the unequal public health development in the western versus the eastern part of the country, as well as cases of within-province inequality and environmental factors. The findings also revealed that many public health concerns vary greatly between provinces, and thus nationwide health programs would be less useful than ones tailored to their local region. For example, Papua has massive inequality in sanitation and public health access, but adolescent smoking is not a priority concern. Adolescent smoking is prevalent in Western Indonesia and among poor males (Hosseinpoor et al., 2018). These findings would enable policymakers to determine policy priorities, allocate resources more effectively, and understand the important indicators and determinants of health (such as connectivity and sanitation) which must involve other ministries/departments.

C. Strengthening Indonesia's Research Translation

1. Increasing Investment and Access to Funding in Health and Medical Research

Funding limitation has been a major challenge for Indonesia to build a strong HMR. As a fundamental aspect of creating a sustainable health system, a vulnerable HMR may hamper progress in generating a new understanding of diseases, improving diagnosis and treatments, delivering healthcare services, and decision-making in health policy (Jamison et al., 2006). In general, research and innovation in health are supported by three funding resources: governmental, philanthropic, and industries (Robinson, 2021). In the context of Indonesia, solutions to boost HMR may come from increasing investment from governmental resources and enhancing the involvement of and access to philanthropic and industry resources.

The governmental resources for HMR in Indonesia come from the national state budget. It is allocated to different ministries and distributed as grants to government research agencies (e.g., the National Research and Innovation Agencies or BRIN) and universities. The government grants prioritize projects aligned with the national research roadmap of the country and generally fund risk-averse and high-impact projects (Flatto, 2015). Increasing the allocated budget to HMR will allow more research projects to be funded and, thus, will improve research outcomes aligned with Indonesia's national goals in the health sector. However, since HMR in Indonesia is heavily dependent on governmental resources to fund all four research sectors, it becomes challenging to ensure that all HMR sectors receive a proper amount of funding, given the allocated funding is limited. Therefore, it is necessary to diverge the weight from other funding resources to support HMR.

Enhancing philanthropic and industry resources' involvement may help reduce the burden on governmental funding resources. Philanthropic resources or charities provide endowments to mainly non-profitable, high-risk – high-reward research projects and infrastructures (Viergever, 2013). In developed countries, philanthropy is key in driving HMR by supporting initial data collection before applying for government grants, providing seed funding for start-ups before scaling up with industries, and building research facilities in universities and institutes (Murray, 2013). Indonesia has many philanthropic funders, independent or associated with corporations, such as Filantropi Indonesia, Djarum Foundation, Yayasan Dharma Bhakti Astra, Coca-Cola Foundation, and Yayasan Unilever Indonesia (Kemenkes, 2019). However, funding allocated to HMR is still limited and scattered (Kemenkes, 2019). Philanthropic funding supports specific causes in nature. While this gives advantages to improve diversity, equity, and inclusion (DEI) in HMR (Christopherson et al., 2021), the government needs to provide a brief map of areas in the health sector that require improvement and create a system for the philanthropists to disseminate their funds. Therefore, philanthropic

resources can be distributed alongside governmental and industry resources to support areas in HMR.

Industries play a major role in funding research. Unfortunately, Indonesia's private and public funding ratio is still low (1:7), which is vice versa for the OECD countries (Kemenkeu, 2019). To address this problem, the Ministry of Education and Culture launched the Kedaireka platform to facilitate and enhance the universities-industries partnership, allowing researchers and Indonesian companies to fully explore and match their expertise and collaborate to solve real societal problems (Kemdikbud, 2021). The approach Kedaireka brought as a match-maker platform not only unveils the abundance of funding opportunities from industries at various scales but also highlights one major caveat—there is no integrated platform where researchers can access funding information from all three funding resources, and no specific program that focuses on HMR. Creating or using a platform (e.g., Research Professionals) that collects and provides information about national and international funding opportunities from different resources will ease access to the available funding. Therefore, HMR in Indonesia will not depend only on nationally available funding but also can benefit from international grants available, which ultimately will enhance investment and help strengthen HMR in Indonesia.

2. Building a Sustainable and Equitable Health Research System

Indonesia must establish a designated medical research agency and independent HMR institutes to build a sustainable and equitable health research system. As defined by Pang et al. (2003), a health research system is *"the people, institutions, and activities whose primary purpose in relation to research is to generate high-quality knowledge that can be used to promote, restore, and/or maintain the health status of populations; it should include the mechanisms adopted to encourage the utilization of research"* (Pang et al., 2003). Establishing a good research system requires an ecosystem where researchers, practitioners, funding bodies, and communities can gather and collaborate to generate new knowledge and translate discoveries into better health outcomes.

Indonesia's research agencies that cover the health sector were previously situated under the Ministry of Health and LIPI but now have just recently moved under BRIN (BRIN, 2021). While BRIN is an exemplary embodiment of establishing a research system, it is still necessary for Indonesia to have a designated agency that solely focuses on HMR. Reflecting on established medical research agencies in developed countries, such as the US National Institutes of Health (NIH) (NIH, 2021). Medical Research Council (MRC) in the UK (MRC, 2021) and National Health and Medical Research Council (NHMRC) in Australia (NHMRC, 2021), these institutes act as a benchmark and a core pillar in leading, organizing, and conducting focused research to tackle diseases and emergency public health issues in their countries. They also play a key role in bridging the communication between health and medical researchers and policymakers, providing an integrated platform for research translation and evidence transfer. Thus, having a designated medical research agency will aid Indonesia in developing strategic research planning, conducting research with a faster pace of knowledge sharing and collaborations, and delivering responses to tackle critical public health threats.

Independent medical research institutes also contribute to building a health research system supporting the nation's medical research agency. However, only six actively published, non-university research institutes in Indonesia were identified to work related to health research, including the only one specifically working in HMR under the Ministry of Health in 2019 (CSIC, 2019). Besides the lack of institutes focusing on research activities, Indonesia also needs audit institutions to monitor the influence of corporations on public health policy, research, and practice, such as the Corporate Europe Observatory in Europe and the US Right to Know in the USA. Having independent research and audit institutes across the country will allow Indonesia to 1) decentralize and perform research tailored to HMR focus, specific to the needs of the regional area alongside the national research roadmap; 2) build infrastructures; 3) create more job opportunities in the regional area; 4) provide specialized training for

research personnel; and 5) monitor research translation process and policy implementation. Altogether, this would not only strengthen the health research system but also increase economic growth and equality across nations. The existence of adequate personnel and appropriate training for the relevant officers may solve this problem.

3. Incorporating Technology into Medical Research and Health Practice

The global transition to industry 4.0 has brought technologies to medical research and health practice forefront. There are several ways Indonesia can implement technology to improve its health system by strengthening each component of the research backbone. First, by incorporating STEM into basic and clinical research to accelerate discoveries, achieving a greater translational impact in a shorter time frame using technologies. This can be achieved by building a multidisciplinary research team to solve a medical or health-related problem. Second, speeding up health data digitalization to create databases for big data analysis. This will allow the use of machine learning and artificial intelligence to assist with medical diagnosis, disease surveillance, and the forecast of future public health threats (Zeng et al., 2021). Furthermore, the availability of data collection platforms that include equity parameters, such as WHO's Health Equity Assessment Tool (HEAT), will also allow a more comprehensive data collection and can be a useful tool to democratize public health research (Januraga & Harjana, 2020). Altogether, this would provide easy access to assist policymakers in generating evidence-based health policy promptly while ensuring the decision meets the equity standard, particularly in an emergency such as a pandemic. Third, enhancing the Internet of Things to improve equality in healthcare service delivery in regional areas and reduce carbon footprints generated from the health sector. Internet use has enabled telehealth and virtual collaborations in the past two years. These technologies can greatly overcome distance and travel limitations, as these two are major obstacles in healthcare service delivery (Huot et al., 2019; Syed et al., 2013) and are also main contributors to carbon footprints in the health sector (Adshead et

al., 2021). Altogether, strategically implementing these technologies would significantly accelerate HMR; facilitate the transition into a green, smart, and connected Healthcare 4.0; and subsequently strengthen Indonesia's health system.

4. Engaging Communities to Empower Society

An active community is vital to strengthen the health system as we approach Society 5.0, a people-centric society where most services, including health, will be personalized or tailored to individual needs (Deguchi et al., 2020). To ensure a smooth transition into Society 5.0, first, the government needs to foster a culture of evidence-based policy making and implementation that provides all layers in the community are included in the decision-making process. Adopting WHO's Innov8 approach can facilitate this process by reorienting health programs and policy workflows towards equity using collected data (Koller et al., 2018). Through this approach, the design and theory of health programs are re-examined; consensus is developed on populations that are not included in the plans; and proposals are redesigned to include intersectoral action and social participation while integrating monitoring and evaluation. Second, the government should promote awareness and improve health literacy in the community so that people become educated on their fundamental rights and responsibilities for their health and others. Third, the government must improve clarity and consistency in delivering health-related information. For instance, using infographics and lay language and disseminating information through a 'one-gate' approach. Fourth, the government in collaboration with other stakeholders should create more opportunities for the communities to actively participate in medical research, public health activities, and decision-making—to grow the sense of belonging in the community and create a safe environment for people to participate in it communicate their needs and ideas actively. At foremost, by creating a system to achieve health equality and sustainability, our health and medical research will move to a community-based support system to protect vulnerable societies. Given that the people in the community are health-aware and actively participate in communicating their

needs, these would form the basis for conducting a community-based approach in healthcare.

D. Conclusion

The global health system has been overwhelmed by the COVID-19 pandemic. It challenges every country, including Indonesia, to improve their science translation into equitable, sustainable, and effective policies. The goal of research translation that involves many relevant stakeholders is to provide more relevant and practical outputs that directly improve population and human health, which will be extremely valuable during the pandemic recovery period. However, the research translation in Indonesia still faces several challenges. The fundamental problems in Indonesia's research translation into effective policy include a lack of resources in health research, improper research output orientation, poor management of health research data, and communication gaps.

As a result of these issues, Indonesia's healthcare system remains susceptible, while the number of COVID-19 cases fluctuates. In addition, Indonesian decision-makers indicate a lack of demand for research and research evidence to support decision-making. The ultimate goal of implementing evidence-based practice is to build a more robust and agile health system ready to integrate new ways and respond to future health threats.

E. Recommendations

From the challenges and impacts of the lack of research translation during the current pandemic, we propose to the government to 1) increase investment and access to health and medical research funds; 2) create a sustainable and equitable system of health research; 3) integrate technology with medical research and health care; and 4) bring communities together to strengthen society. With these approaches, Indonesia can strengthen its research translation backbone and enhance the resilience of its healthcare system. As a result, it will

boost economic recovery and national health during the pandemic and increase readiness to tackle future global health issues.

Finally, the ultimate goal of adapting evidence-based practice is to create a more resilient and agile health system, ready to implement new approaches and adapt to emergencies. From the government down to the community level, objective and informed health policies and decisions would bypass many inhibiting factors that do not give maximum health benefits to the public (Boustani et al., 2019). This is especially important in Indonesia, where limited resources and various cultural and geographical challenges must cope with myriad public health problems. An increase in high-quality research output, especially those tailored to local communities and populations, would create a "push" towards utilizing better evidence. While currently available health research is limited and has various drawbacks to its utilization, newer policies seem to be moving in the right direction. Widespread and effective implementation of evidence-based practices must also be implemented in community settings. Finally, all aspects of the Indonesian health system, from policymakers to providers, must have an open and ready attitude towards health research and evidence and readily utilize them in clinical decision-making.

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