CHALLENGES AND OPPORTUNITIES FOR IMPLEMENTING THE EWARS SYSTEM IN INDONESIA : LITERATUR RIVIEW

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ABSTRAK

Ancaman pada triple burden berpengaruh terjadinya KLB. Sehingga penggunaan sistem kewaspadaan dini dan respons (SKDR) merupakan sistem survaliens yang digunakan sebagai alat pendeteksi terjadinya ancaman sehingga dapat meminimalkan angka kejadian yang berhubungan dengan KLB. SKDR dapat meningkatkan kemampuan surveilans dan respons terhadap penyakit. Artikel ini memberikan gambaran tentang implementasi EWARS di Indonesia, menyoroti efektivitasnya, tantangan yang dihadapi, dan strategi untuk peningkatan. Penelitian ini menggunakan metode tinjauan pustaka, dimana data dari enam studi yang dilakukan antara tahun 2018 dan 2022 dianalisis untuk mengevaluasi kinerja sistem SKDR. Hasil menunjukkan bahwa tingkat akurasi yang luar biasa, dengan akurasi laporan mencapai 96,32% dan kelengkapan laporan mencapai 99,43%, yang menunjukkan kemampuan sistem untuk mendeteksi dan merespons wabah penyakit dengan cepat. Namun, tantangan masih ada, termasuk kesenjangan dalam pelatihan staf surveilans, keterbatasan infrastruktur, dan pelaporan yang tidak lengkap. Tantangan-tantangan ini menghambat operasi yang lancar dari EWARS, terutama di daerah-daerah dengan sumber daya terbatas dan beban penyakit menular yang tinggi. Strategi untuk mengatasi tantangan ini meliputi perluasan akses internet, peningkatan kapasitas sumber daya manusia melalui pelatihan, dan penguatan kebijakan dan regulasi terkait penggunaan teknologi digital dalam surveilans kesehatan. Selain itu, pemanfaatan teknologi digital, seperti big data dan kecerdasan buatan, menawarkan peluang yang menjanjikan untuk meningkatkan efektivitas surveilans penyakit dan mempercepat deteksi wabah. Kesimpulannya adalah perlunya mengakhiri dengan menekankan pentingnya mengatasi tantangan yang ada dan memanfaatkan peluang untuk memaksimalkan efektivitas EWARS dalam menjaga kesehatan masyarakat dan mencegah wabah penyakit di Indonesia.

Kata kunci : ewars, implementasi, Indonesia, peluang, tantangan

ABSTRACT

Threats in the triple burden affect the occurrence of outbreaks. This article provides an overview of EWARS implementation in Indonesia, highlighting its effectiveness, challenges faced and strategies for improvement. This research uses a literature review method, where data from six studies conducted between 2018 and 2022 were analyzed to evaluate the performance of the SKDR system. Results show that the accuracy rate is outstanding, with report accuracy reaching 96.32% and report completeness reaching 99.43%, demonstrating the system's ability to detect and respond to disease outbreaks quickly. However, challenges remain, including gaps in surveillance staff training, infrastructure limitations, and incomplete reporting. These challenges hinder the smooth operation of EWARS, especially in areas with limited resources and a high infectious disease burden. Strategies to address these challenges include expanding internet access, improving human resource capacity through training, and strengthening policies and regulations related to the use of digital technology in health surveillance. In addition, the utilization of digital technologies, such as big data and artificial intelligence, offers promising opportunities to improve disease surveillance effectiveness and accelerate outbreak detection. In conclusion, it is necessary to conclude by emphasizing the importance of overcoming existing challenges and capitalizing on opportunities to maximize the effectiveness of EWARS in maintaining public health and preventing disease outbreaks in Indonesia.

Keywords : ewars, challenges, implementation, Indonesia, oppurtunities

INTRODUCTION

Advances in transportation technology can affect the mobility of humans, animals and goods to be very high and fast, which will affect the risk of disease transmission globally. Globally, we are currently facing the emergence of extraordinary events (KLB) which can lead to the occurrence or increase of an incidence of morbidity and mortality that exceeds the usual situation in a community group within a certain period of time. This affects the threat of new and re-emerging diseases that can become a global challenge that must be prepared to anticipate prevention and response. Influenced by climate change conditions caused by accelerated global warming with this condition will affect the pattern and type of potential outbreak diseases directly or indirectly (Direktorat Kesehatan, 2023).

In the contemporary era of globalization, the rapid movement of people and goods has become increasingly prevalent. This phenomenon, while facilitating economic and social interactions, has also heightened the risks associated with infectious disease outbreaks, foodborne illnesses, and other hazardous material contaminations. In Indonesia, these public health challenges persist, resulting in significant morbidity, mortality, and financial burdens, thereby impacting various sectors of the nation (Kemenkes RI, 2014 in Wikansari et al., 2019). To address these pressing concerns, Indonesia has instituted the Early Warning Alert and Response System (EWARS), designed to detect the emergence of 24 different diseases with potential public health ramifications (Direktorat Surveilans dan Karantina Kesehatan, 2021).

The Early Vigilance and Response System (SKDR), a pivotal component of EWARS, operates by identifying indications of extraordinary events (KLB) related to infectious diseases on a weekly basis through a computer-based framework (Wikansari et al., 2019). Upon detecting a surge in disease cases surpassing predefined thresholds within a particular area, the system issues alerts or early warning signals. It is imperative to note that while these alerts signify an elevated risk, they do not necessarily indicate the onset of an outbreak; instead, they serve as precursors necessitating prompt intervention to prevent a full-fledged epidemic (Kemenkes RI in Fitriani et al., 2023). Recent epidemiological data from the World Health Organization (WHO) reveals an outbreak of poliovirus VDPV 2 in Indonesia, with seven reported cases between December 2023 and January 2024. In response, the Ministry of Health (MOH) initiated swift measures, including field investigations, household surveys, data reviews, advocacy efforts, and polio sub-PIN orientations. According World Health Organization, 2024 leveraging the capabilities of SKDR, such outbreaks can be mitigated through timely immunization campaigns. Consequently, Indonesia has prioritized the development and implementation of the EWARS or SKDR system to preemptively identify and address disease outbreaks with potential public health repercussions (Fitriani et al., 2023).

Furthermore, delays in responding to and detecting infectious disease outbreaks can lead to extraordinary events (KLB) that cause an increase in cases and the potential for spread to areas nationally, regionally and globally. This commitment to disease surveillance and response was further strengthened in 2009 with the establishment of Indonesia's national Early Warning and Response System (EWARS). Subsequent enhancements, such as the introduction of the EWARS website in 2015, have streamlined data collection and facilitated faster outbreak detection. Utilizing a short message service (SMS) for data submission by surveillance officers at puskesmas, this automated system ensures rapid dissemination of processed surveillance data to local health authorities. The main objective is to promptly identify specific cases of serious infectious diseases or unusual disease patterns, thus enabling timely interventions to curb potential outbreaks. It is imperative to evaluate the implementation of EWARS in regions with limited resources and a high infectious disease burden (Nurul Haq Arma Putra, 2018).

Initiated by the Ministry of Law and Human Rights, the systematic rollout of SKDR encompasses all levels of healthcare delivery, from grassroots health service units to central

administration. As an integral component of the National Health System (SKN), SKDR endeavors to harmonize various facets of health service delivery to uphold public health standards (Fitriani, et al, 2023). While current EWARS applications primarily receive data from health centers, efforts are underway to integrate data from diverse healthcare providers, including private, government, and clinic-based facilities. Furthermore, there is a concerted effort to enhance the sensitivity of surveillance systems through the utilization of information technology applications, facilitating immediate reporting of potential public health threats. Some surveillance systems employ alerting mechanisms predicated on timeliness thresholds, derived from epidemiologic time series analyses (Agustin et al., 2019).

The early vigilance and response system (SKDR) is a system that can function in detecting the threat of indications of outbreaks of infectious diseases and then reported weekly on a computer-based basis so that it can display alerts or early warning signals related to an increase in disease cases that exceed the threshold value in an area and alerts that come out are systems that do not mean that an outbreak has occurred but are pre-KLB which requires officers to respond quickly so that an outbreak does not occur (Direktorat Kesehatan, 2023). At the level of accuracy and completeness of SKDR reporting, it is still not optimal. that the accuracy and completeness of SKDR reporting is an important thing to improve related to early detection and handling of extraordinary events (KLB). So one of the causes is that there is no guidance on the use of the SKDR application in combining data filling more completely and quickly and ensuring the quality of data filling between regions and puskesmas (Sarmin, 2013). Based on SKDR completeness data on outbreaks in 2013, Indonesia is a country that has SKDR completeness data on outbreak events still less than < 80% then the standard of data completeness is> 80%. There are only 8 provinces that implement the SKDR system with data completeness > 80%, namely Banten, Central Java, West Kalimantan, Riau Islands, Lampung, NTB, and Yogyakarta. Then apart from these provinces, the completeness of data is still < 80%, including the province of South Sulawesi (Direktorat Surveilans dan Karantina Kesehatan, 2021).

If a disease or disease alert is detected that exceeds the outbreak safety threshold, the SKDR system will provide a signal to the management of the surveillance program at the district, provincial and central levels. Thus, the emergence of an alert requires the district/city/provincial health office to immediately verify and respond as needed, including laboratory tests to confirm the diagnosis. To see the completeness and accuracy of high report data can indicate the timely submission of weekly SKDR reports. The challenges of SKDR in Indonesia are data completeness, early detection capacity, limited use of digital technology, limited resources, accuracy of data reporting, and capacity building of officers. So that it can affect the quality of the SKDR in Indonesia, this is a challenge for early detection and response to potential outbreak diseases (Marullyta & Rohananingsih, 2022).

Despite these advancements, challenges persist in the implementation of EWARS, particularly in regions like Palembang, where surveillance officers at health centers encounter logistical hurdles, such as reliance on personal communication devices for data transmission. Funding constraints and coordination difficulties further impede the seamless operation of EWARS. Consequently, there is an urgent need to optimize the EWARS system to bolster health surveillance efforts in Indonesia. This literature review aims to elucidate the extent of EWARS implementation in Indonesia's healthcare landscape and offer insights into overcoming implementation challenges, thereby charting a path towards enhanced health surveillance strategies in the future.

METHOD

This research uses a literature review approach. This literature review uses 6 scientific

articles as the main reference material in this research. This literature review search uses Pubmed and Google Scholar with the keywords "Ewars," "Implementation," "Challenges," "Opportunities," and "Indonesia". Articles that have been selected will be immediately analyzed to obtain data information related to the topic that will be discussed by the researcher. The results of the data analysis will be synthesized and will be implemented in the form of tables and narratives to provide an overview of challenges and opportunities for implementing the ewars system in indonesia.

RESULTS

Tabel 1. *Literature Review Results*

Peneliti	Judul	Tahun Studi	Metode	Hasil Penelitian
Hari Firiani, Arief Hargono, M. Atoillah Isdandiari	Perkembangan Pemanfaatan Teknologi Digital Surveilans Sistem Kewaspadaan Dini dan Respon (SKDR)/EWARS di Indonesia	2023	Descriptive	Early development of SKDR not yet can include indicator-based (IBS) and event-based (EBS) reporting. The following year the SKDR experienced an increase in the form of being equipped with indicator-based reporting (I B S) and event-based reporting (EBS).events (EBS) at menu dashboard. The increase in the achievement of indicator targets shows the development of utilization of digital technology from the early vigilance surveillance system and response from all reporting units.
Nurul Haq ArmaPutra	Implementation Of Early Alert System And Puskemas Based Respon In Barru Regency RS	2018	Qualitative dan Descriptive	The results of the study found that there are several challenges that are still faced in the implementation of the SKDR application, which include: a. Surveillance data management staff still have not attended training on SKDR b. Limited facilities and infrastructure in implementing the SKDR program c. Analysis and interpretation of SKDR data is still rarely done and fluctuates in the timeliness and completeness of reports
Mersi K Manurung, dkk	Evaluation of The Indonesian Early Warning Alert and Response System (EWARS) in West Papua, Indonesia	2020	Qualitative	Only 30-35% of participants in each district engaged and trained in EWARS reporting, due to lack of mobile phone networks. Barriers to complete reporting and response to alerts include limited human resources and costs.

Muhammad Hardhanto, dkk	Quality of National Disease Surveillance Reporting before and during COVID-19: A Mixed-Method Study in Indonesia	2022	Qualitative dan Descriptive	The results show existence of gap in quality et al Disease Surveillance Reporting before and during COVID-19: A Mixed-Method Study in Indonesia surveillance reporting based on EWARS implementation in Indonesia and disease burden on surveillance officers in primary healthcare facilities during the COVID-19 pandemic. Gaps were found in human resources and infrastructure which were exacerbated by by COVID-19 epidemic. The lack of human resource distribution in surveillance impacts the completeness and timeliness of EWARS reporting.
Ni Kadek Sri Dewi Kadari & Made Pasek Kardiwinata	Implementasi Register Berbasis Elektronik Pada SKDR Untuk Mencegah Penyakit Berpotensi KLB Di Kota Denpasar Dan Kabupaten Buleleng Tahun 2019	2020	*Cross Sectional* Descriptive	In the implementation of the SKDR electronic register, there are six components that must be fulfilled by the health center surveillance officer, one of which is reporting by sending 1 sheet weekly to the surveillance officer. District / City using the Whatsapp application. Based on the results, surveillance officers in Denpasar City and Buleleng Regency have mostly used and understood. However, there were officers who admitted that they did not use the SKDR electronic register due to their lack of understanding of the SKDR electronic register.
Astari Marullyta & Rohananingsih	Evaluasi Sistem Kewaspadaan Dini dan Respon Penyakit (SKDR) Provinsi Daerah Istimewa Yogyakarta tahun 2022	2022	Qualitative	Results show that the province DIY reports the SKDR report with completeness and accuracy which is high to reach 96.32% for report accuracy, 99.43% for report completeness. Usage SKDR creates identification of outbreak alerts and unusual event clusters can be done regularly. With the emergence of signals the Provincial Health Office DIY can verify an appropriate response as needed and assist health workers to be able to detect outbreaks of priority disease.

The findings from the literature review, based on six studies conducted in 2022, underscore the effectiveness of the SKDR implementation in Indonesia. The data indicates a remarkable accuracy rate of 96.32% in report accuracy and 99.43% in report completeness, highlighting the system's capability in swiftly detecting and responding to extraordinary events (KLB). Despite this success, challenges persist, including training gaps among surveillance staff,

infrastructural limitations, and variability in report timeliness and completeness. Furthermore, the evaluations reveal obstacles to optimal EWARS implementation, notably the inadequate engagement and training of participants, particularly in remote areas with limited mobile phone network coverage. These hindrances result in incomplete reporting and delayed responses to alerts. Nonetheless, successful implementations in certain regions, such as the exemplary completeness and accuracy of reporting in the DIY province, illustrate the potential of EWARS to bolster disease surveillance and response efforts when adequately supported and executed.

DISCUSSION

Challenges of EWARS System Implementation in Indonesia

In the threat of triple burden in endemic, emerging and re-emerging which is still a challenge for the world of health. So that Indonesia faces it by developing EWARS or known as SKDR is an Early Vigilance and Response System that can monitor the development of trends in an infectious disease that is likely to cause potential outbreaks from time to time. A series of activities carried out in conducting EWARS in the form of data collection processes, data processing, data analysis, data validation, and EWARS data output. In organizing the EWARS system, 3 main points are needed to support the success of the EWARS system, namely completeness of reports above 90%, accuracy of reports above 80%, and the percentage of alerts that can be responded to. According to the Ministry of Health, the EWARS system began to be used in Indonesia in 2009, precisely in Lampung and Bali Provinces through the Sub Directorate of Surveillance and Outbreak Response (Directorate General of P2P) of the Ministry of Health of the Republic of Indonesia (Direktorat Kesehatan, 2023). At the end of 2015, the Ministry of Health of the Republic of Indonesia made a new innovation in the form of creating an EWARS website to facilitate data processing and reporting as an effort to detect diseases early and respond
quickly.

Gaps in the quality of surveillance reporting based on the implementation of EWARS during the Covid-19 pandemic, showed that the lack of human resources and supporting infrastructure impacted the completeness and timeliness of EWARS reporting (Djasri et al., 2023). Since then, the EWARS system has gone through innovation in the form of creating a website to facilitate and streamline reporting, according to Nurul Haq Arma Putra, 2018 related to EWARS who has explained some of the challenges found in implementing the EWARS application, namely in the absence of training on the EWARS operational system that needs to be followed by surveillance data management employees, limited facilities and infrastructure in implementing the EWARS system, and analysis and interpretation of EWARS data has not been carried out routinely and has experienced delays in timeliness and completeness of reports. The limitations experienced in the implementation of the EWARS system reporting can result in a gap in indicator-based reporting and event-based reporting. This is in line with research conducted by Manurung et al., 2020 on the Evaluation of the Indonesian Early Warning Alert and Response System (EWARS) in West Papua, Indonesia, which suggests obstacles in the form of a lack of complete reporting and rapid response due to a cellular telephone network that is difficult to obtain. Limited human resources and costs are also one of the obstacles in using the EWARS system through the website.

The use of the EWARS application in Indonesia has recorded weekly surveillance data with 23 diseases in Indonesia. However, the current EWARS application can only receive data from puskesmas and has integrated data from private providers, government and clinics. The EWARS system uses an indicator- or event-based surveillance system that can rely on reports from the Ministry of Health to detect diseases, conditions and events. Efforts to increase the sensitivity of the surveillance system on information technology applications can be built in to

facilitate immediate reporting of outbreaks or alerts that can identify possible serious public health threats. However, one of the challenges in the EWARS system in Indonesia is the accuracy and completeness of reporting at the puskesmas level which has incomplete data collection, this will affect the performance of the early notification system for extraordinary events (KLB) according to Marullyta & Rohananingsih, 2022. Obstacles during the initial development of SKDR were also experienced by Fitriani et al., 2023 where initially data reporting was not yet indicator-based and not yet event-based. In this case, developing the EWARS system is considered to increase effectiveness as a tool to prevent further spread of the disease with a complete data reporting system and an accurate, timely and a complete information system in this case can be used to make decisions.

On the challenges of vigilance monitoring using EWARS related to components in output and dissemination on the completeness of data related to the percentage of puskesmas reports received by the Health Office in a timely manner is a provision that can be set in sending reports. Delays from the reporting system that affect the response component with clarification of alert signals that must be followed up in less than 24 hours, in this case the information media component as a means of disseminating information to stakeholders can influence the effectiveness and efficiency of the EWARS system (Nurul Haq Arma Putra, 2018). Then advances in information technology, especially in the use of computerization, greatly support the implementation of health information systems, so that it becomes a challenge if the organization does not understand the use of technology or outbreak protection systems. That the speed and accuracy of the information generated can be immediately accessed by those who can take further action on prevention and eradication precisely and quickly before an outbreak occurs. This can be used as an evaluation tool in measuring the quality of the response carried out by local health officials or rapid response teams.

Strategies To Overcome Challenges and Benefit From EWARS Opportunities

The Early Warning Alert and Response System (WARS) in Indonesia has progressed rapidly in recent years. The utilization of digital technology is the main key in improving the effectiveness of disease surveillance. The Government of Indonesia has demonstrated its commitment to optimizing SKDR through various strategic steps, such as: Developing an online SKDR platform, that this platform allows real-time reporting of disease data from all regions of Indonesia. Secondly Utilizing big data: Big data is analyzed to identify disease trends and potential outbreaks. Application of artificial intelligence (AI): AI helps predict the risk of disease outbreaks. These efforts have shown positive results, such as: Increased coverage of disease data reporting, Shortened disease outbreak detection time, Improved effectiveness of response to disease outbreaks. Challenges and Strategies to Overcome The challenges that SKDR in Indonesia still faces include: Gaps in internet access: Limited internet access in some areas hinders real-time data reporting, Human resource capacity: Lack of trained health workers in operating the SKDR platform and analyzing data, Policies and regulations: Clear policies and regulations are needed regarding the use of digital technology in the SKDR (Agustin et al., 2019).

Strategies that can be applied to overcome these challenges are expanding internet access, where the government needs to work with internet service providers to expand internet coverage to all parts of Indonesia. Improving human resource capacity by conducting training for health workers to improve their ability to operate the SKDR platform and analyze data. Strengthening policies and regulations by formulating clear policies and regulations related to the use of digital technology in the HCS, including aspects of data privacy and information security. Benefits and Opportunities that can be achieved The use of digital technology in SKDR offers various benefits, such as increasing the effectiveness of disease surveillance where digital technology allows faster and more accurate tracking and analysis of disease data.

Accelerating the detection of disease outbreaks where early detection of disease outbreaks allows for faster and more effective interventions. Improving the quality of response to disease outbreaks where accurate and up-to-date data helps make the right decisions in responding to disease outbreaks (Birkhead et al., 2015).

SKDR also opens up opportunities to develop a more responsive health system by utilizing digital technology, allowing the health system to adapt quickly to changes in the health situation. Improve the efficiency and effectiveness of the use of resources that digital technology can help optimize the use of limited resources in the health system. Research Marullyta & Rohananingsih, 2022 on the website-based Early Vigilance and Outbreak Response System currently being carried out in Indonesia including in DIY Province helps health workers in the Province to respond to events in a timely manner so as to prevent outbreaks. The system is easy to use and can provide information on weekly alerts and disease mapping based on reporting units. Seeing the high completeness and accuracy of reports, it can indicate that most health centers do not have a problem sending weekly SKDR reports which can be done via WhatsApp (Kadari & Kardiwinata, 2020). Internet connection is available in almost all health centers, district health offices and in all provincial health offices. SKDR provides rapid detection of alerts with geographic and automated data analysis at district, provincial and central levels. Encouraging innovation in health by utilizing digital technology opens up opportunities for the development of innovative solutions in health. The utilization of digital technology in the SKDR in Indonesia has shown significant progress. By overcoming challenges and capitalizing on opportunities, SKDR can be a powerful tool to improve public health and prevent disease outbreaks.

Evaluation of the EWARS system can also be carried out with the stages of activities in the form of situation analysis, review of surveillance programs, and preparation of a draft model of the surveillance system (Athena & Anwar, 2014). The function of conducting a situation analysis and surveillance program review is to get an overview of how the EWARS system has been running so far using rapid assessment. Meanwhile, the preparation of the draft system model is carried out through the identification of the required data, the source and frequency of data collection, as well as data processing and analysis. In a study conducted by Anggraini et al., 2016 an evaluation of the performance of surveillance officers in using the EWARS system was carried out in the form of written feedback evaluations regarding attendance accuracy and completeness of reports every 6 months. The results obtained in the form of reports as much as 48.8% were carried out when asking for a signature, both when there was a case or not, but the delivery of feedback results was only done verbally, not in writing.

Effectiveness of The EWARS System in Detecting and Responding To Disease Outbreaks in Indonesia

Technological developments can affect the accuracy of data in the EWARS system. So that there is a policy in the form of using the EWARS website so that reporting is done directly to the center via sending via SMS (Wikansari et al., 2019). The use of the EWARS website also facilitates data processing and reporting as an effort to detect disease early and respond quickly.

The characteristics of EWARS officers affect the data recorded in EWARS. These characteristics consist of age, gender, education, length of service, and concurrent duties. Officers aged 26-45 years old produce more reports that are in accordance with the target. Many female officers produce reports that are not on target. In addition to education, abilities and skills also support case reporting. On the characteristics of length of service, officers with a long tenure produced more accurate reporting. In the characteristics of duplicate tasks, officers who have duties other than surveillance are expected to be able to manage time and energy so that the tasks they carry can be completed properly.

In research Marullyta & Rohananingsih, 2022 it is known that they have done the accuracy and completeness of reporting. The accuracy and completeness of reporting that DIY Province has done has met the minimum requirements. The use of SKDR allows the identification of outbreak warnings and clusters of unusual events to be carried out regularly. With the emergence of these signals, the DIY Provincial Health Office can carry out verification and appropriate responses as needed and help health workers to detect priority disease outbreaks.

CONCLUSION

In conclusion, the implementation of the Early Warning Alert and Response System (EWARS), known as SKDR in Indonesia, represents a significant step forward in bolstering disease surveillance and response capabilities. Despite challenges such as training gaps, infrastructural limitations, and incomplete reporting, the SKDR system has demonstrated remarkable success in swiftly detecting and responding to disease outbreaks. Efforts to optimize the system through strategic measures, including the development of an online platform, utilization of big data and artificial intelligence, and expansion of internet access, offer promising opportunities to further enhance disease surveillance effectiveness. By capitalizing on these opportunities and addressing existing challenges, SKDR can serve as a powerful tool to improve public health outcomes and prevent disease outbreaks in Indonesia. Additionally, research indicates that characteristics of EWARS officers and the use of the system, particularly in regions like DIY Province, significantly influence the accuracy and completeness of reporting, underscoring the importance of human resource capacity and effective system utilization in maximizing EWARS effectiveness. Overall, the progress made in EWARS implementation signifies a critical milestone in Indonesia's efforts to safeguard public health and mitigate the impact of infectious disease threats.

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