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# The potential impact of COVID-19 pandemic on the immunization performance in Indonesia

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**KEYWORDS** Vaccine; coverage; health crisis; mitigation; immunization program

## 1. Introduction

As a country with the highest death toll due to COVID-19 in Southeast Asia [1], the rapidly escalating health crisis has prompted the government of Indonesia to provide against the worst scenario for the impact of this pandemic through pharmacological and non-pharmacological interventions. Health crises and emergencies have been omnipresent and habitually unpredictable in duration and location. With increasing awareness of stakeholders and communities, responses to this pandemic situation should be more systematic and well-organized with adequate timing. Apart from mitigating the pandemic, maintaining immunization program performance is a critical issue to prevent further outbreaks of vaccine-preventable diseases. Routine immunization programs should be reinstated as soon as conditions stabilize, and may be the major indication of a rehabilitating health system in a post-crisis context. To support the rehabilitation process, well-developed communication strategies and approaches are required to inform stakeholders, and the broader society about the potential impacts of COVID-19 pandemic and specific mitigation strategies on the continuity and performance of the immunization program.

## 2. Routine immunization program

In Indonesia, all children receive routine immunization services in public health facilities, free of charge. Immunization services for school children are centrally funded and conducted through the school-based immunization program, where regional health center staffs deliver vaccines in local schools [2]. As a part of this program, measles, diphtheria, and tetanus vaccines are administered to pupils in the first grade of elementary school, while tetanus and diphtheria (Td) vaccine is administered to those in the second and fifth grades of elementary school. Through strong commitment from central and local governments, approximately 15 million children are

targeted to be immunized every year [3]. This annual program is usually started in August in all schools. This successful program has been appreciated by WHO because of its high coverage, acceptance by parents, efficiency, and protective levels [3]. In particular, the wastage rate is reported to be low (<20%) and declining trends of measles, diphtheria, and tetanus incidences are evident [3]. The enrollment rate in this program is also reported to be relatively high (>90%), which is better than, for instance, in Malaysia (85%), the neighboring country [4]. Nevertheless, the COVID-19 pandemic and drop-out could potentially affect the immunization program this year. Due to the current pandemic, the government has decided to close all schools in the country starting 16 March 2020. The duration of school closures will be reviewed periodically, depending on the development of the COVID-19 situation.

Despite the economic growth and the escalated number of investments in the health-care sector, Indonesia remains one of the countries with relevant but declining numbers of under-vaccinated children [5]. In the recent years, national immunization coverage had been steadily increasing, but currently appears to be declining [6]. The latest Indonesian Basic Health Survey reported that the proportion of fully immunized children in the age of 12–23 months old was only 58%, which was lower than the targeted national coverage by the government (93%) [6]. As the most populous island, the proportion of fully immunized children in Java was reported to be 67% (see Figure 1) [6].

The current pandemic will likely further enhance variability between location, local priorities, and economic differences. The concept of an urban-rural divide is a key determinant for immunization success in Indonesia. Although the majority of the population lives in urban areas, 63% of all unvaccinated children live in rural areas, posing specific challenges [7]. In these sub-national variabilities, geographic and logistic challenges as well as local government priorities are critical factors. In the context of decentralization, district governments are

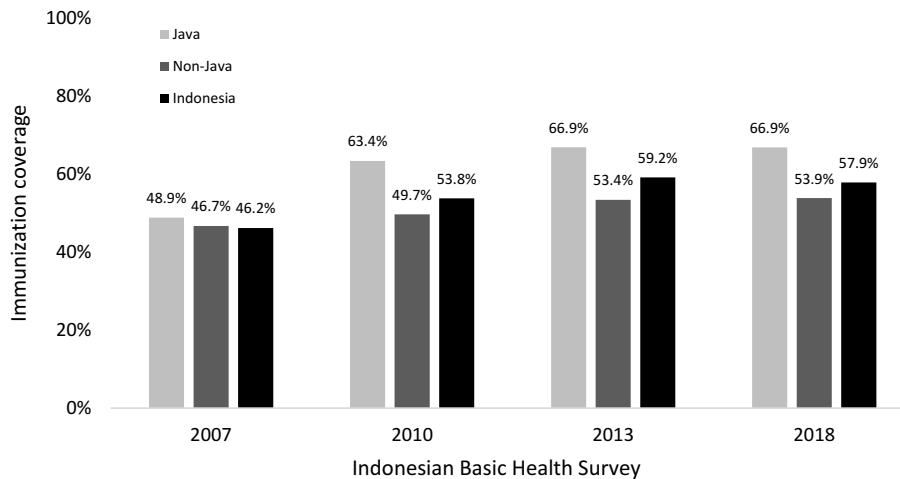


Figure 1. Basic childhood immunization coverage (12–23 months of age).

responsible for service delivery, such as the operational costs of facilities, health worker incentives, cold chain, and other supporting activities. In many districts, potential lack of commitment, comprehensive planning, and budget execution capacity are strongly correlated with low contributions of local governments to support the immunization program's activities. In addition, the wealthy and the well-educated are more likely to complete their vaccinations, even in urban areas where everyone has a near equal chance of having or reinitiating contact with the immunization services. Immunization rates are higher in the wealthiest quintile, compared with the poorest quintile [6]. The COVID-19 pandemic aggravates the challenge to deal with those already existing problems.

### 3. Impacts of COVID-19 pandemic on the immunization program

Obviously, the COVID-19 pandemic is a disruptive event that causes severe social, economic, and political stress. We analyzed several scenarios for reductions in immunization coverage as compared to the situation before the pandemic. Specifically, we estimated the impact of the pandemic in reducing the basic childhood immunization coverage by immunization coverage reductions in each province by 5%, 10%, and 20% in respective scenarios. Since Java is the epicenter of COVID-19 pandemic with approximately 82% of total confirmed cases and 70% of total deaths in Indonesia [8], we assumed the impact of the pandemic in reducing immunization coverage would be doubled in all provinces of Java. We estimated the basic childhood immunization coverage would be 53%, 50%, and 43% for the respective scenarios of immunization coverage reductions at 5%, 10%, and 20% (see Table 1). Reductions can be assumed to be related to school closures, whereas health-care centers may now present as an alternative option. Yet, vaccine hesitancy may present a next obstacle.

Table 1. The impact of COVID-19 pandemic on basic childhood immunization coverage.

Region	Basic childhood immunization coverage (12–23 months of age)			
	Scenario			
	Baseline (before the COVID-19 pandemic)	5% coverage reduction (Java: 10%)	10% coverage reduction (Java: 20%)	20% coverage reduction (Java: 40%)
Java	66.9%	60.2%	53.5%	40.1%
Non-Java	53.9%	51.0%	48.3%	42.9%
Indonesia	57.9%	53.4%	49.9%	43.0%

The experience of the diphtheria outbreak in Indonesia in 2017 showed that low vaccination coverage was associated with the lack of access to immunization services, the lack of awareness about the benefits of vaccination, and vaccine hesitancy [9]. A recent study on parents' hesitancy toward vaccination in Aceh and West Sumatera, Indonesia highlighted that the majority of respondents would not want their children to get vaccinated [10]. Now on top of that, parents worry to go to health-care centers because of scare for COVID-19 infection. A study by Santoli *et al.* indicated a significant decrease on the coverage of non-influenza childhood vaccines in the USA because parents are concerned about taking their children to the general practitioners during the COVID-19 pandemic [11].

### 4. Expert opinion

To maintain immunization rates in this pandemic situation with school closures, central and local governments are urged to establish mitigation programs to ascertain that immunization services will remain fully accessible through health-care centers. It is well known that decision-making processes regarding vaccination are complex and this process tends to be more complicated and multidimensional in a pandemic situation [9]. Therefore, well-designed campaigns should be applied to minimize perceived barriers and

increase expectations regarding vaccine accessibility, efficacy, and pandemic interventions, such as practice good hygiene and physical distancing, at the same time. In the context of Indonesia, these campaigns should be integrated adequately within the most trusted sectors of society, i.e. religion and healthcare, with critical roles played by trusted individuals in the vaccination delivery programs and religious leaderships [9].

The pandemic is profoundly affecting the countries' economic growth, but the depth and duration of the shock are unusually uncertain. The World Bank estimated that the economy in Indonesia is projected to decline by 2.1–3.5% in 2020, coming from an increase of 5.0% in 2019 [12]. In addition, as a middle-income country, Indonesia is designated to explore internal co-financing of vaccines since financial assistances have been gradually phased out. With economic decline and the country's started transition to fully self-financing its immunization program in 2019, Indonesia needs to find extra sources of new resources to replace about 10–15% externally financed share of the immunization program budget [7]. In addition, as a highly decentralized country, local governments frequently fail to properly execute their resource allocation of the entire health-care budget, whereas the central government has limited ability to influence how resources are allocated at the district level where delivery is done. This also further enhances noted high variability in outputs and outcomes in immunization persists. Such organization of financing sources for the immunization program may threaten its performance also due to the danger of resulting complexity in understanding roles and responsibilities between central and local governments.

Next to maintaining immunization performance, the central government is now struggling to warrant the immunization budget as a result of the pandemic impact. It should be highlighted that the immunization budget in Indonesia is not determined by forecasting needs, but by the level of acceptance of the Ministry of National Development Planning to fit the needs of the healthcare system into the Ministry of Finance's assigned ceiling. Up to now, Indonesia has not yet applied significant efforts to create new potential revenue-generating strategies. An option of taxing on socially harmful goods, such as tobacco and alcohol, has not yet been considered by the government to finance the health-care programs, including immunization. As of yet, Indonesia has rather expressed strong interest in resource tracking and efficiency gains rather than a push for revenue generation. Again, this focus potentially endangers the financial sustainability of the immunization program in Indonesia. Both mitigating the pandemic and maintaining the coverage and success of the immunization program should reflect integrated efforts to control infection spread and reduce the illness attack rate. To be financed over the medium and long term in an uncertain economy, this integrated effort should be considered as an investment in Indonesia's future rather than a cost burden. A realistic approach to expand fiscal space is needed through efficiency gains both in other public sectors and the health-

care sector itself, inclusive immunization, and through new innovative interventions and investments for generating revenues.

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## Declaration of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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## Author contributions

Conceived and designed the study: AAS CB MJP. Analyzed the data: AAS. Wrote the paper: AAS CB MJP.

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