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**SHORT RESEARCH COMMUNICATION | COVID-19 AND CHILD VACCINATION**

## **COVID-19 and Child Vaccination: A Systematic Approach to Closing the Immunization Gap**

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### **ABSTRACT**

The COVID-19 pandemic threatens to set back major successes that have been achieved in global vaccine initiatives. We conducted a rapid review and synthesis of the literature on immunization provision and Utilization since the onset of the COVID-19 pandemic. A total of 11 papers comprising peer-reviewed articles and key policies and guidelines, published between January 1 and June 15, 2020, were analyzed. Widespread disruptions of routine immunization and vaccination campaigns were reported leaving millions of children worldwide at risk of measles outbreaks. We present an expanded model of the World Health Organization's Global Routine Immunization Strategic Plan (GRISP) action areas as a tool to help countries quickly adapt to immunization challenges in the presence of COVID-19 and close the emerging immunization coverage gaps.

**Key words:** • Immunization • Child health • Vaccination • COVID-19 • Essential health services • Corona virus

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## **1. Introduction**

While the world battles the Severe Acute Respiratory Syndrome-Coronavirus-2 2019 (COVID-19) pandemic, another crucial global health program is largely suspended, namely, the vaccination programs. Dealing with COVID-19 and not substantially sustaining the vaccine programs could potentially trigger new outbreaks of measles, polio, and other vaccine-preventable diseases. The COVID-19 pandemic

threatens to set back the major progress that has been made in the global vaccine initiatives, putting more than 80 million children worldwide and, especially in poor countries at risk of vaccine-preventable diseases.<sup>1</sup> Immunization is one of the most cost-effective and successful public health interventions to-date. Every \$1 invested in child immunization is projected to yield a return of \$16 resulting from illnesses averted, and up to \$44 if the value of living longer and healthier lives were measured.<sup>2</sup> Due to widespread stay-at-home orders

and physical/social distancing measures implemented to curb the spread of the COVID-19 virus, several unintended outcomes including the freezing or drastic scale-down of immunization activities and other essential health services have occurred in several countries.<sup>3</sup>

We analyzed the immunization landscape in the wake of COVID-19, and proffer evidence-based recommendations to quickly close the emerging gaps in immunization coverage. Our findings will be beneficial to public health decision makers as countries loosen pandemic control restrictions and accelerate efforts to re-establish and strengthen immunization services to prevent outbreaks of communicable diseases.

## 2. Methods

We conducted a rapid review and synthesis of scientific and grey literature on immunization since the onset of the COVID-19 pandemic, published in English between January 1 and June 15, 2020. The search terms included keywords such as “immunization demand,” “availability of vaccination services,” “COVID-19 and child health,” and “impact of COVID-19 on immunization utilization”. We analyzed the retrieved information using two key themes: (1) provision of immunization services and (2) utilization of immunization services. Service provision included the availability/provision of routine immunization services and vaccination campaigns, availability of health workers/vaccinators, and guidelines and supplies for providing vaccination services safely in view of COVID-19. Service utilization encompassed caregiver awareness of continued availability of services, community mobilization, access-related factors such as transportation as a result of travel restrictions, and caregiver concerns for safety and physical distancing.

## 3. Results

A total of 147 results were generated. Of these, 11 relevant publications were retrieved, comprising six peer-reviewed articles, three from low- and middle-income countries (LMICs), two from high-income countries, and one a combination of both LMICs and high-income countries. Additionally, three key World Health Organization (WHO) guidelines and policy documents, and one report by the Measles

and Rubella Initiative met the review criteria and were included in the analysis.

**Service provision:** Following WHO COVID-19 risk mitigation recommendations in March 2020, measles and polio campaigns have been suspended in 27 and 38 countries, respectively, as of mid-May.<sup>1</sup> These comprise high-risk countries with recent or current outbreaks of measles (e.g., the Democratic Republic of Congo), and circulating vaccine-derived poliovirus (cVDPV), typically seen in areas with low coverage of oral polio vaccine.

Further, between March and June 2020, about 67 countries reported moderate-to-severe disruptions or outright suspension of routine immunizations services.<sup>1</sup> In many LMICs experiencing measles outbreaks, the COVID-19-related suspension of vaccination services heightens the risk of spread and puts millions of children at risk of severe illness and, possibly, deaths.<sup>4</sup> Infant vaccinations were also disrupted in India and across several LMICs.<sup>5</sup> Widespread travel restrictions and border closures have negatively impacted the availability of vaccines and other supplies needed to provide safe vaccination services. A survey of frontline health workers from 81 LMICs and high-income countries reported shortages of healthcare providers due to illness, transportation challenges, fear of infection, and insufficient personal protective equipment (PPEs),<sup>3,5,6</sup> and infection prevention and control measures.<sup>6</sup> Similarly, stock-out of vaccines, supplies, and equipment due to transport restrictions and border closures,<sup>1</sup> and redeployment of healthcare resources and providers to COVID-19 response efforts were reported.<sup>7</sup>

**Service utilization:** In many LMICs and high-income countries, frontline health workers reported seeing fewer patients for essential health services, and this was largely due to travel restrictions, caregiver concerns for safety, and fear of infection.<sup>3</sup> In the United States, a study using data from immunization registries found notably fewer orders for non-influenza childhood vaccines between January and April 2020 compared to the same period in 2016-2019.<sup>8</sup> The sharpest declines were in measles-containing vaccine orders. Similarly, lower age-appropriate coverage rates of non-influenza vaccinations were observed across milestone age cohorts assessed in May 2020 compared to the same period in 2016-2019, in Michigan, USA.<sup>9</sup> In

India, an alarming 69% reduction in measles-mumps-rubella vaccination coverage was reported from data from the National Health Mission.<sup>7</sup>

#### 4. Discussion and Global Health Implications

The indirect toll of COVID-19 on childhood immunization and survival is dire. The pandemic

and the mitigation measures adopted to control it have negatively affected the provision and utilization of child immunization services in LMICs and high-income countries, and threaten to undo the gains made in the control of vaccine-preventable diseases for the past two decades. This impact is particularly severe for vulnerable populations with low immunization coverage, where vaccination was

**Table 1: Adapted GRISP framework for rapidly closing the immunization gap in the COVID-19 pandemic era**

GRISP Action Areas <sup>a</sup>	COVID-19 Pandemic-Related Action Areas <sup>b</sup>
<p>Maximize Reach</p> <ul style="list-style-type: none"> <li>• Detect and reach the unreached</li> <li>• Design services to reach all equitably</li> <li>• Build capacity of vaccinators and managers</li> <li>• Ensure vaccine quality and availability</li> <li>• Create synergy with special vaccination efforts</li> <li>• Integrate immunization services</li> </ul>	<ul style="list-style-type: none"> <li>• Make data-informed decisions on the best approaches to quickly and safely boost vaccination status in communities with poor coverage</li> <li>• Train, remotely as much as possible, service providers and vaccinators in advance of restarting campaigns and routine immunization services</li> <li>• Ensure availability of adequate infection prevention and control measures at all fixed sites, including functional handwashing stations, PPEs, sanitizers, designated waiting areas, and patient flow patterns to minimize contact with health workers and vaccinators</li> <li>• Provide influenza vaccination for health workers and vulnerable population groups</li> <li>• Prioritize epidemic-prone vaccines (measles, polio, diphtheria-pertussis) if necessary and extend intervals between doses in a multiple-dose vaccine series</li> </ul>
<p>Manage the Program</p> <ul style="list-style-type: none"> <li>• Secure political commitment and partnerships</li> <li>• Plan, budget and mobilize resources</li> <li>• Ensure excellence in national leadership</li> <li>• Set program policy and guidance</li> </ul>	<ul style="list-style-type: none"> <li>• Update national and local microplans to identify and develop appropriate plans for addressing resource gaps</li> <li>• Plan for a phased transition towards full-scale campaigns and supplemental immunization activities (SIAs) as deemed safe.</li> <li>• Communicate and distribute context-specific, written guidelines, and job aids to support health workers in delivering immunization services safely</li> <li>• Implement and monitor adherence to infection prevention and control measures, new patient flow patterns, and screening and referral for COVID symptoms</li> <li>• Adopt innovative supportive supervision strategies</li> </ul>
<p>Mobilize People</p> <ul style="list-style-type: none"> <li>• Engage communities and create demand</li> <li>• Mobilize and communicate for vaccination</li> <li>• Address vaccine hesitancy and false perceptions</li> </ul>	<ul style="list-style-type: none"> <li>• Sensitize communities, using popular and culturally-acceptable media strategies, on the availability of essential services and routine immunization with location and schedules</li> <li>• Communicate COVID-19 risk mitigation strategies adopted for service delivery (e.g., physical distancing, IPC, new patient flow patterns) with communities to gain confidence</li> <li>• Engage stakeholders and community partners in collaborative efforts to address polio vaccine-preventable disease outbreaks and COVID-19</li> </ul>
<p>Monitor Progress</p> <ul style="list-style-type: none"> <li>• Monitor program performance and disease occurrence</li> <li>• Evaluate the program through surveys and reviews</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen surveillance and reporting systems for polio, measles and other VPDs</li> <li>• Utilize VPD outbreak data to plan appropriate response strategies</li> <li>• Continuously monitor COVID-19 infections in local areas to identify, isolate, refer and trace contacts of those infected with the virus</li> <li>• Assess coverage data regularly for catch-up vaccination planning</li> <li>• Monitor regularly vaccine stock, cold chain, and related immunization supplies</li> </ul>

<sup>a</sup>Existing GRISP recommendations; <sup>b</sup>Additional recommended action areas from WHO and Polio Eradication Initiative guidelines.

suspended temporarily. As a result of the suspension of these services, the most vulnerable children are deprived of lifesaving vaccines and essential interventions. They are, therefore, at increased risk of outbreaks of vaccine-preventable diseases, which could be potentially life-threatening.

As economies reopen and movement restrictions are relaxed, countries must have a clear plan in place for rapidly closing the immunization gap resulting from the impact of the pandemic.<sup>10</sup> The WHO and the Global Polio Eradication Initiative have issued guidelines for restarting vaccination campaigns and routine immunization services during the COVID-19 pandemic.<sup>10-12</sup> The Global Routine Immunization Strategic Plan (GRISP)<sup>13</sup> can provide a pragmatic and evidence-based framework for operationalizing these guidelines and getting countries and immunization programs ready to intensify immunization efforts. GRISP organizes strategies and practices to strengthen routine immunization systems into four primary areas of action, thereby enabling a systematic approach to improve immunization coverage. The GRISP framework, though familiar and already in use, was originally developed to strengthen routine immunization services. However, due to the unique challenges of the ongoing pandemic and decreasing immunization coverage, there is a need to incorporate additional action areas (such as vaccination campaigns and supplemental immunization activities) to rapidly increase coverage and ensure the safe provision of vital vaccination services. To address these limitations, we expanded the GRISP framework to include action areas for vaccine coverage improvement and system strengthening in consideration of the COVID-19 pandemic (Table 1).

In the expanded framework, we consolidated action areas from GRISP, WHO guidelines for immunization services and campaigns during the COVID-19 pandemic, and the Global Polio Eradication Initiative guidelines. We present an adapted tool that builds upon the existing GRISP framework and bears the potential of dampening the increasing strains imposed by the ongoing COVID-19 pandemic on health systems, especially in the developing world. A prepared health system is required to respond to crisis-related immunization challenges and would be paramount for the successful and equitable rollout

of the novel monovalent oral polio vaccine (mOPV) and a potential COVID-19 vaccine when available.

### Compliance with Ethical Standards

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### Key Messages

- The mitigation measures adopted to control the COVID-19 pandemic threaten to undo the progress achieved in the control of vaccine-preventable diseases in low- and middle-income countries and high-income countries.
- An expanded framework based on the Global Routine Immunization Strategic Plan (GRISP), and incorporating recent guidelines on immunization during the pandemic can help service providers and decision makers quickly close the emerging gaps in vaccination coverage.

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