




Negative impact of the COVID-19 pandemic on routine childhood immunization: experience from Pakistan

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The COVID-19 pandemic has disrupted routine childhood immunization coverage for many vaccine-preventable diseases at the global, regional and national levels. In Pakistan, more than 40 million children were unable to receive measles vaccination and around 50 million children missed polio vaccination in 2020. Moreover, more than 36 million children did not receive vitamin A supplementation in 2020. Implementing catch-up vaccination services to prevent outbreaks of vaccine-preventable diseases, particularly polio and measles, in malnourished children is urgently required to prevent a global resurgence of these deadly diseases.

Vaccines are a crucial component of disease control and prevention measures and are considered to be one of the most cost-effective investments in health and economic development. Vaccines save millions of lives each year. For example, the measles vaccine has prevented 25.5 million deaths since 2000, and enormous progress has been made towards the eradication of polio by reducing polio cases worldwide by 99% since 1988, when 350,000 children were paralysed by the disease each year¹. It has been projected that, between 2000 and 2030, vaccination will prevent 120 million deaths, 56 million of which will be in children less than five years of age². Nevertheless, an estimated 1.5 million children under five years of age still die each year as a result of vaccine-preventable diseases (VPDs) including measles.

The recent ongoing COVID-19 pandemic is disrupting lifesaving immunization services globally, but with a particular impact in lower-income countries including Pakistan. It is reported that more than 60 campaigns of lifesaving vaccines have been postponed in 50 countries, putting around 228 million children at risk for VPDs, including measles and polio³. More than 90% of countries across the globe are still reporting disruption to essential health systems, including vaccination and nutrition, as a result of the pandemic⁴. The largest number of unimmunized children live in South Asia, with 97% of them living in India, Pakistan and Afghanistan. Recently, outbreaks of VPDs including measles have already been reported from Bangladesh, Pakistan and Nepal⁵.

From 2000 to 2016, as a result of vaccination the number of reported measles cases globally decreased 84% from

853,479 to 132,490. Surprisingly, however, between 2016 and 2019 the number of measles cases increased 656% from 132,490 to 869,770, the highest recorded figure since 1996. Globally, the number of deaths due to measles has increased by 50% since 2016, with an estimated 207,500 deaths in 2019 compared with 89,780 deaths in 2016 (REF.⁶). Poor coverage of routine immunization for measles and other VPDs has resulted from several factors, including low levels of investment in the health sector, a lack of commitment from national governments, vaccine hesitancy and refusal, lack of education and poverty. Worryingly, evidence from previous Ebola epidemics has demonstrated that even temporary interruptions of routine immunization services can lead to secondary public health crises such as outbreaks of VPDs, thereby amplifying the morbidity and mortality associated with the epidemic. For example, owing to the disruption to routine immunization caused by the Ebola outbreak in West Africa in 2014–2015, measles alone killed an estimated 6,500 children — far more than were killed by Ebola itself — in the Democratic Republic of Congo⁷.

Pakistan is the fifth most populous country in the world. It spends less than 1% of its gross domestic product (GDP) on health services, whereas the World Health Organization recommends a minimum allocation of 6% of GDP. Owing to the low levels of investment in the health sector, many VPDs are still endemic in Pakistan. There are repeated measles outbreaks every year, with more than 7,783 measles cases reported in 2019 and 6,485 cases in 2020. In 2021, the gaps in vaccination coverage as a result of the COVID-19 pandemic have

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<https://doi.org/10.1038/s41577-021-00627-7>

led to more than 16,000 measles cases being reported in Pakistan in the first eight months of the year. Measles vaccination coverage in Pakistan was already very low but there has now been a further 65% decline in vaccination owing to the pandemic. More than 40 million children in Pakistan remain unvaccinated against measles in 2020 owing to the suspension of routine immunization activities⁸.

In addition to poor vaccination coverage, Pakistan has the third highest percentage (54%) of malnourished children in the world, after India and Nigeria, and the COVID-19 pandemic has further increased the extent of malnutrition. More than 250 million children globally have missed the benefits of vitamin A supplementation owing to the COVID-19 pandemic, and more than 36 million children in Pakistan alone did not receive vitamin A drops in 2020 (REF.⁹). Vitamin A supplementation has a key role in reducing the overall mortality and complications from measles and other childhood infections, particularly in populations with nutritional deficiencies. The measles mortality rate in children living in lower-income countries is around 10%, but this can increase to more than 70% for malnourished and vitamin A-deficient children. Furthermore, measles infection has been shown to suppress the immune response to other infections, which can put measles-infected individuals at risk for infection with other pathogens. The decline in immunization coverage combined with high rates of malnutrition and vitamin A deficiency is likely to increase the morbidity and mortality of children owing to measles this year in Pakistan and other measles-endemic countries.

Pakistan, together with Afghanistan, is one of the two countries in the world where polio virus is still endemic. The polio vaccination programme in Pakistan successfully reduced the number of reported cases from 306 in 2014 to only 12 in 2018 (REF.¹⁰). Unfortunately, as is the case for measles, there was a resurgence of polio cases to 147 in 2019, and 84 polio cases were reported in 2020. The coverage of routine polio immunization in Pakistan is far lower than the 90% that is required for herd immunity, and immunization against polio has further declined by more than 50% during the COVID-19 pandemic, when more than 50 million Pakistani children did not receive a polio vaccination owing to the suspension of immunization activities. On average 12,000 to 15,000 children are born in Pakistan every day, and the suspension of door-to-door polio immunization campaigns has left a huge and growing pool of young children who are susceptible to polio. When the virus finds them, it will tear through the unprotected population and may lead to more polio outbreaks in the future.

The decline in routine childhood immunization coverage at national and international levels has placed the global community at potential risk for outbreaks of VPDs that are more deadly, more contagious and have a higher reproductive rate among children than COVID-19. In the immediate future, the most threatening VPD

outbreaks will be of measles and polio, as the number of unimmunized children grows. If the circulation of measles and polio is left unchecked in countries such as Pakistan, this situation poses an increasingly high risk of explosive outbreaks and potentially further international spread of both measles and polio. Failing to eradicate polio now would open the door to a resurgence of this disease, which could paralyse thousands of children per year, and the virus will likely spread to countries that are now polio free.

In the twenty-first century, there has been unprecedented progress in preventing childhood mortality from infectious diseases through vaccination. But even before the pandemic, declining vaccination levels were starting to reverse some of this progress and lead to disease outbreaks. Local and international health authorities must not permit the COVID-19 pandemic to make this situation worse and allow VPDs, especially measles and polio, to resurge. We cannot afford for a legacy of this pandemic to be increased disability and mortality from VPDs. Alongside proven strategies, such as the commitment, willingness and unity of the government against the common threat of VPDs, sustainable investment in the health sector and integration of immunization programmes with other health-care programmes is needed. Surveillance and monitoring of vaccination coverage can be achieved through innovative actions including machine learning, digital data recording using mobile phones to crowdsource birth reporting data and optical scanning of vaccination cards. We must ensure that vaccination reaches all children, because nobody is safe until everybody is safe.

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Competing interests

The authors declare no competing interests.