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The legacy of the COVID-19 pandemic for childhood vaccination in the USA

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Introduction

Before the onset of the COVID-19 pandemic, achievements in childhood vaccine coverage in the USA and globally appeared imperiled. Misinformation about vaccines was pervasive.[1] Vaccine hesitancy—a motivational state of being conflicted about, or opposed to, vaccination—was a top ten global health threat.[2] And vaccine-preventable diseases, such as measles, re-emerged following decades of successful control.[3] Since the arrival of COVID-19, disruptions to childhood vaccine delivery have further jeopardised childhood vaccination efforts.[4]

However, the effects of the pandemic on childhood vaccination have the potential to extend beyond disruptions in vaccine delivery. What will be the legacy of the COVID-19 pandemic for childhood vaccination? In this Viewpoint, we discuss how the pandemic might affect trust, risk perception, mandates, and health equity in the context of childhood vaccination. We then propose several recommendations to mitigate potential negative effects and help sustain confidence in childhood vaccines.

Trust

Trust is essential for confidence in and uptake of childhood vaccines.[5] The development, approval, and dissemination of COVID-19 vaccines introduced Americans, many for the first time, to the processes of the US Food and Drug Administration (FDA) that are designed to ensure the safety and effectiveness of vaccines. However, the realisation that these processes might be vulnerable to political pressure generated concern among Americans that the FDA would rush to approve a COVID-19 vaccine without making sure that it is safe and effective.[6] Nearly a quarter of Americans had little trust in FDA recommendations or no trust at all by May, 2021.[7]

This distrust borne from perceptions that politics is driving public health might have profound long-term repercussions. One potential repercussion is the erosion of support for vaccination programmes in the USA more generally. This concern has surfaced before, following politicised debates regarding human papillomavirus (HPV) vaccine legislation in the USA in the 2000s. In that instance, investigators found that although the politicised debate undermined support for requiring HPV vaccination for school attendance, it did not result in a broader erosion of support of the general value of immunisations.[8]

Additionally, the current distrust in US institutions central to the vaccine enterprise could extend to affect the public's trust in science and clinicians more generally. Conspiratorial rhetoric (itself a marker of institutional distrust) that was amplified during the COVID-19 pandemic casts doubt on scientific consensus and spreads scepticism and uncertainty.[9] Although the majority of parents historically have had high levels of trust in a clinician's vaccine guidance for their child,[10] this reality could fall prey to the growing milieu of science denialism and misinformation.

Risk perception

The low prevalence of vaccine-preventable diseases in the USA in the past 20 years—largely due to high vaccine coverage—has been an important driver of parental refusal and delay of vaccines for their children. In fact, among some parents, concerns about the risks of vaccines outweigh concerns about the risks of diseases that vaccines prevent, as these risks are rarely encountered in a highly vaccinated population.[11] Given strong evidence supporting a relationship between risk perception and vaccination behaviour,[12] it is possible that the pandemic could change a parent's perception of their child's susceptibility to disease, and result in increased vaccine uptake.

Although some data suggest this scenario might be the case,[13] a recent USA analysis found that the onset of the COVID-19 pandemic had only a fleeting positive effect on parent general vaccine attitudes.[14] Indeed, among parents who have not yet vaccinated their eligible children against COVID-19, a common reason is not being worried about the disease.[15] Analyses from past outbreaks of vaccine-preventable diseases offer few insights. For instance, although there was improvement in parent general vaccine attitudes and beliefs after the 2014–15 Disneyland measles outbreak,[16] no significant change in vaccine coverage for pertussis-containing vaccines was observed after the 2011–12 pertussis epidemic in Washington, USA.[17]

Mandates

State-based mandates requiring children to be vaccinated before school entry have been a key component of US vaccination policy since the 1960s. However, these school vaccine mandates are frequently contested as they represent a tension between the preservation of individual liberty (or parental rights) and the protection of public health. From 2014 to 2018, the trend generally favoured the protection of public health: no legislation introduced during this period that aimed to reduce the difficulty in

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opting out of school mandates for non-medical reasons was passed or accepted by a state government body.[18] However, this might now be changing. The increase in harassment of public health officials,[19] new laws to curtail local and state health emergency powers,[20] and increasing contentiousness of mask mandates all represent efforts portraying public health powers as overly intrusive upon individual freedoms.

Will this advocacy for the preservation of individual liberty in the COVID-19 context transfer to the school setting? Recent legislative actions suggest that this is already occurring.[21] The broad public and bipartisan support for school vaccine mandates before the pandemic[22] might prove sufficient to sustain school mandates in the short term. Regardless, the pandemic might be an inflection point in the longer-term acceptability and sustainability of school vaccine mandates in the USA: it could usher in a new fervour for challenging school mandates and a rise in parents claiming exemptions from school mandates.

Health equity

Racism was a public health crisis long before the COVID-19 pandemic,[23] with well documented negative effects on the health of children.[24] Extensive efforts to reduce racial, ethnic, and socioeconomic disparities in US childhood vaccination coverage have made important gains.[25] The health inequities exposed by the pandemic at a time when the nation witnessed the killing of George Floyd in 2020 revealed how much work remains.

The pandemic has catalysed innovative approaches to reducing health inequities that could help mitigate childhood vaccine inequities. For instance, following implementation of a vaccine equity strategy in North Carolina, USA, that allocated additional COVID-19 vaccine supply to communities with larger population proportions of Black and Hispanic residents, vaccine administration to Black and Hispanic individuals approximately doubled.[26] Innovative private–public partnerships provided funds to community-based organisations to guide COVID-19 response and relief efforts in their own communities. For instance, Washington, USA, launched the All in WA campaign in May, 2020, that brought together private sector donors, public health officials, and community leaders to raise and distribute funds to community organisations to expand equitable access to vaccines in communities disproportionately affected by the COVID-19 pandemic.[27] Other strategies employed during the pandemic that could be carried over to the childhood vaccination context include the use of disadvantage indices[28] and explicit acknowledgment by clinicians during vaccine conversations with parents of the experiences of medical mistreatment and exclusion among people of colour and how this might undermine their trust in medical and public health authorities.[29]

The pandemic might also worsen some disparities. For instance, vaccination coverage before the pandemic was lower among children living in rural (*vs* urban) areas.[30] Given the current two-fold difference in COVID-19 vaccine receipt across this rural–urban continuum in the USA,[31] the gap in childhood vaccine coverage before the pandemic might widen in the future.

Recommendations

To promote a legacy of the COVID-19 pandemic that bolsters childhood vaccination coverage in the USA, we offer actionable recommendations anchored to the four areas of trust, risk perception, mandates, and health equity. These recommendations are predicated on public health being adequately funded at local, state, and federal levels and are meant to augment the work already underway at the US Centers for Disease Control and Prevention (CDC) in the US Department of Health and Human Services (HHS) to strengthen vaccine confidence.

First, the pandemic exposed the fragility of the public's trust in the vaccine enterprise. Trust in the childhood vaccine context is under studied.[32] HHS, through agencies such as the CDC, must monitor public trust in current vaccine development and approval processes and, where needed, modify them to better promote public trust. The CDC's Vaccinate with Confidence campaign, which has prioritised public trust in vaccines, should be adequately resourced to support these activities. Similarly, other HHS agencies, such as the US National Institutes of Health and the Agency for Healthcare Research and Quality, must invest in research to identify strategies for paediatric clinicians, public health officials, and community leaders that effectively nurture trust in the childhood vaccine enterprise among vaccine-hesitant parents. In addition, since scientific literacy is one of the best ways to protect against an erosion of trust in science,[33] HHS, in partnership with the US Department of Education, must make improving our ability to educate current and future parents about the social dimensions of scientific objectivity and truth a research priority: how to assess the reliability of an information source, how to determine whether an apparent expert is trustworthy, and how to distinguish scientific dissent from science denialism.[34]

Second, globally and in the USA, the percentage of children who have received routine immunisations has declined since 2019, threatening to spur additional outbreaks of vaccine-preventable diseases.[35,36] Recent outbreaks of polio in the USA, UK, and Israel are cause for concern. There is little understanding of how to leverage changes in risk perception that can occur during infectious disease outbreaks into sustained changes in vaccine behaviour. To inform effective public health campaigns, HHS needs to invest in research examining the effects of outbreaks on parent risk perceptions, vaccine confidence, and behaviours. This investment should be accompanied by resources that translate these findings into effective communication strategies for use by clinicians, public health officials, and community leaders that

convey the risks of vaccine-preventable diseases and confer understanding of the effectiveness and safety of childhood vaccines for COVID-19 and other vaccine-preventable diseases. Given the need for post-pandemic recovery in vaccine confidence and uptake, this investment should occur immediately (by using, for example, Section 2302 funds from the 2021 American Rescue Act that are designated to strengthen vaccine confidence).

Third, from town halls to Twitter, we need to re-establish the importance of public health to preventing future outbreaks and sustaining childhood vaccine coverage. Public health practitioners, state and local elected officials, parents, clinicians, teachers, and other community leaders who can extol the value of public health need to intensify their efforts in engaging with their communities in civil discourse without elevating misinformation or perpetuating disinformation. Also, an HHS research priority should be to gain a better understanding of circumstances in which the benefits of mandates can be outweighed by backlash and learn how to effectively respond to that backlash.

Fourth, reducing inequities in childhood vaccination could restore trust in medicine and public health and effectively counterbalance forces labouring to erode parent trust in the childhood vaccine enterprise. There might be no better ballast for maintaining trust in the childhood vaccine enterprise than by achieving equity in childhood vaccine delivery and coverage. To this end, HHS, through research investments, should ensure that promising strategies launched during the pandemic to reduce COVID-19 vaccine disparities are trialled and tested in the routine childhood vaccine context. Local government and community leaders should help new partnerships that were effective at mitigating disparities during COVID-19 remain intact to continue to coordinate cross-sector responses to racism and social injustice. These strategies should be coupled with federal and state efforts to optimise the reporting of race, ethnicity, and socioeconomic data regarding childhood vaccines. This will help us better understand vaccine refusal patterns (eg, identify when vaccine refusers are not part of historically marginalised populations), and monitor progress towards eliminating disparities.

Smallpox, cholera, and influenza have reshaped society's relationship with public health. COV1D-19 is destined to do the same. It is important that we act now to ensure childhood vaccination—a cornerstone of public health— remains trusted, valued, and equitably accessed.

Contributors

DJO wrote the first draft of the manuscript, following input from a writing group comprised of NTB, AMB, TC, RMC, CC, JAE, LCF, APG, PJH, JLS, and SBO. All authors provided critical intellectual content for revising the draft manuscript. DJO further revised the manuscript following peer review. All authors had full access to the information described in this Viewpoint.

Declaration of interests

PJH is a developer of a COVID-19 vaccine construct, which was licensed by Baylor College of Medicine to Biological E, a commercial vaccine manufacturer for scale-up, production, testing, and licensure. NTB reports personal fees from WHO, CDC, and Merck, outside the submitted work. RMC reports receiving research grant funding from Novo Nordisk Foundation (Denmark), outside the submitted work. RL reports grants from Pfizer, GlaxoSmithKline, Sanofi Pasteur, and Merck, and personal fees from BIO, outside the submitted work. YAM is a member of a data safety monitoring board for Pfizer and a site principal investigator for a Pfizer vaccine trial, outside the submitted work. MMM reports personal fees from law firms representing retail pharmacies and generic drug companies that have sued other drug companies for antitrust law violations, outside the submitted work, and serves as an adviser to Verily Life Sciences on an app designed to facilitate safe return to work and school during the COVID-19 pandemic. DJO reports grants from the US National Institutes of Health, outside the submitted work. DAS reports grants from Merck and personal fees from Pfizer and Janssen, outside the submitted work. All other authors declare no competing interests.

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