

# **Accepted commentary – In Press**

## **Mass vaccination against COVID-19 may require replays of the polio vaccination drives**

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The Global Polio Eradication Initiative (GPEI) was built on the wisdom gained from smallpox eradication programs.<sup>1</sup> In 1980s, polio used to cause paralysis of >1000 children daily but since then GPEI has achieved >99% reduction in polio. Surge in SARS-CoV-2 infections have catalysed numerous vaccine development projects. However, deployment of an efficacious COVID-19 vaccine will need resolution of several notable issues on which preparatory analysis must be initiated now. Risk groups including the elderly, those with co-morbidities and healthcare workers may be prioritized. Widening the vaccine target groups will increase supply chain burden. As COVID-19 vaccination window may be short, there will be added pressure on supply chains. Dosages (single versus multiple) and routes of administration will have direct consequences for costs and logistics. Route(s) of administration including injectable, intranasal, microneedle array patches, next-generation jet injectors, oral tablets or sublingual oral gels would necessitate additional training of healthcare workers.<sup>2</sup> Robust epidemiological estimates of herd immunity will be required to optimize population coverage, though individual protection for target groups will remain pivotal. Indeed, high vaccine coverage may be targeted to ablate reservoirs of infection.

Since 2000, the Expanded Programmes on Immunizations have grown their antigen spectrum from six to a dozen for vaccine delivery.<sup>3</sup> This formidable portfolio will need to cater to COVID-19 vaccine. The additional challenges will include maintenance of cold chains, risks of imbalanced stocking, stocking of PPEs, back-ups for logistical burnouts, optimization of transport capacities, and the urgent need to establish electronic surveillance.<sup>4</sup> Despite prioritization for high risk groups, there would be additional costs of price per dose, vaccine devices, storage, transport and labour. Given the requirements for large demographic coverage, each country can expect egregious financial burden with the potential to adversely impact poorer nations. Thus, financial considerations will be vital during vaccine rollout. Therefore, vaccine deployment planning must start urgently so to avoid a repeat of the legacy where the brunt of past pandemics was borne by the economically weaker sections in societies, even in developed countries.<sup>5</sup> While the COVID-19 vaccine is needed globally, there is the risk that high-income countries may monopolise supply chains resulting in suboptimal vaccine allocation and hence residual reservoirs of infection.<sup>6,7</sup>

The interplay of ethno-social-economic factors can also hinder vaccine access.<sup>8</sup> Polio campaigns have revealed that vaccine acceptance by communities was threatened by anti-vaccination movements, conspiracy theories, miscommunication, religious dogma and rumours. The same negativity may shadow rollout of COVID-19 vaccination. In addition, the already noted public suspicion due to the pace of COVID-19 vaccine development may enhance vaccination hesitancy.<sup>9</sup> This may lead to delays in development of herd immunity, persistence of infection, vulnerability to outbreaks, deaths in high-risk groups, enhanced risks for migratory workforce and imminent threats of economic paralysis as witnessed during lockdowns.

Global success against the poliovirus has been built on many facets including extensive international partnerships, strong political wills, financing via philanthropic organizations, equitable vaccine allocations, vaccine provisions via governmental schemes (i.e. gratis), robust logistics, rigorous administrative planning, deployment of trained healthcare workforce, high population coverage, strong monitoring, public health dynamism, extensive public communication, community engagement, sustained adherence to public health strategies, catering to domestic migrants and international travellers, and declaration of polio vaccination as national health priority in most countries. We feel that distillation of lessons from the worldwide rollout of polio immunization projects can provide valuable guidance for future COVID-19 vaccine. The vaccine deployment logistics are similar for the two public health challenges of COVID-19 and polio. Thus countering the COVID-19 pandemic also needs mirroring of successful public health approaches from the polio eradication campaigns. A rewind of lessons from polio vaccination drives, and a replay of its most impactful measures, may allow equitable, rapid and timely delivery of the much awaited COVID-19 vaccine.

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### **Authors Contributions**

MR and AS conceived the idea and wrote the paper. The opinion expressed in the paper are authors' and do not represent respective views of the organizations or of any government.

## Declaration of Interest

The authors declare that there is no conflict of interest.

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