Qeios

Peer Review

Review of: "Integrated Determinants of Persistent Wild Poliovirus Transmission in Pakistan and Afghanistan: The Roles of Cross-Border Mobility, Hard-to-Reach Populations, and Micro-Transmission Hotspots, 2010-2025"

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This paper is a strong and important review that looks at why wild poliovirus type 1 is still spreading in Pakistan and Afghanistan. The topic is highly relevant because these two countries are the last places in the world where polio has not been eliminated. The authors clearly explain that polio continues not because of one single problem, but because several issues happen together. These include frequent movement of people across the border, groups of children who are repeatedly missed by vaccines, and small areas where the virus continues to spread quietly. The review brings together evidence from many sources, such as genetic studies, environmental surveillance, vaccination data, and program reports, which makes the conclusions convincing and easy to follow. The paper also does a good job explaining what this means for polio eradication efforts. It shows that high national vaccination numbers can hide local gaps where children are not protected. The authors suggest practical solutions, such as better coordination between Pakistan and Afghanistan, focusing more on mobile and hard-to-reach communities, improving environmental surveillance, and strengthening routine immunization services. Overall, the study is well-written, thoughtful, and suitable for publication, and it can be very useful for policymakers and public health workers working to finally end polio.

A few areas could be improved, such as being clearer about when findings show association rather than cause and simplifying some repeated points like

doi.org/10.32388/GL9US8

1. Immunity Gaps / Hard-to-Reach Populations

Repeated points: Missed by campaigns, low routine coverage, low seroprevalence, silent circulation.

Simplification: Combine into one clear statement with key metrics.

"Nomadic, displaced, and low-income urban children often miss vaccination, with seroprevalence <70%. Environmental surveillance confirms ongoing silent WPV1 circulation."

2. Cross-Border Mobility / Pakistan–Afghanistan Block

Repeated points: Frequent viral exchange, high genomic linkage, unsynchronized campaigns, transit-point vaccination impact.

Simplification: Present as a concise narrative with key evidence.

"Pakistan and Afghanistan act as a single epidemiological block, with >85% of isolates linked. Synchronized campaigns and transit-point vaccination can reduce viral importation."

3. Micro-Transmission Hotspots

Repeated points: Persistent cities, hotspots despite high coverage, environmental detection, mobility/operational factors.

Simplification: Merge location, evidence, and contributing factors in one paragraph.

"Hotspots in Karachi, Peshawar, Quetta, and Kandahar sustain WPV1 circulation despite high coverage, reinforced by mobility patterns and operational constraints."

4. Operational / Health-System Constraints

Repeated points: Security, fatigue, funding, weak routine immunization, SIA disruptions.

Simplification: Summarize constraints and overall impact.

"Operational challenges—such as insecurity, staffing/funding gaps, weak routine immunization, and SIA disruptions—reduce campaign effectiveness and allow transmission to persist."

Including the following points can further strengthen this review…

- Add a simple figure showing how cross-border movement, immunity gaps, hotspots, and operational issues interact to sustain WPV1. This will help readers understand the problem quickly.
- Explain small immunity gaps in simple language, e.g., why and how even a small decline in vaccination coverage can keep transmission going. (You can explain immunity gaps simply like this: “Even when most children are vaccinated, some groups—such as nomads, displaced families, or children in poor urban areas—miss vaccines. These small unprotected pockets let the virus continue spreading quietly. Filling these gaps with targeted vaccination is essential to stop polio completely.”)

- Expand limitations slightly by noting reliance on secondary data, variable study quality, and possible urban bias in surveillance.
- Incorporating recent intervention evaluations, such as the effectiveness of transit-point vaccination, synchronized cross-border campaigns, mobile outreach outcomes, and community engagement studies, would strengthen practical recommendations. Adding case studies from comparable endemic regions and quantitative modeling of targeted strategies would provide evidence-based support for implementation and policy decisions.
- Add a short “Implications for Practice” section with the following practical takeaways for programs and policymakers. Policymakers should prioritize cross-border coordination, deploy mobile vaccination teams for nomadic and displaced populations, strengthen routine immunization alongside SIAs, expand environmental surveillance to rural areas, address local vaccine hesitancy through community engagement, and ensure sustained funding and microplanning for targeted hotspot interventions.

1. Target hard-to-reach populations with mobile teams, transit-point posts, and coverage targets ≥90%. (Practical solutions include transit-point vaccination, which reduced importation risk by ~28% in mobile border populations (2015–2025), and mobile vaccination teams reaching nomadic and displaced children, covering 2.1–3.4 million annually missed by routine campaigns. Community engagement in Karachi and Quetta also improved uptake in low-income urban clusters. The paper reports that unsynchronized supplementary immunization activities (SIAs) prolonged poliovirus circulation, whereas transit-point vaccination at border crossings reduced importation risk by ~28% in mobile populations. Phylogenetic studies also show >85% cross-border linkage, highlighting that coordinated timing and border-targeted vaccination effectively limit viral spread.)
2. Coordinate cross-border campaigns with synchronized SIAs, shared surveillance, and border vaccination points. (Specific examples include synchronized supplementary immunization campaigns between Pakistan and Afghanistan along the Torkham and Chaman corridors, which reduced WPV1 importation by ~28%. Joint border vaccination teams and shared surveillance data have also limited viral spillover, demonstrating that coordinated planning and real-time information exchange can effectively interrupt cross-border transmission.)
3. Expand environmental surveillance to peri-urban/rural areas with regular monitoring and clear reporting linked to rapid action.

4. Integrate with routine health services to reduce campaign fatigue and train frontline workers in conflict areas.
5. Allocate resources and monitor progress using indicators like zero-dose children reached and campaign disruptions.
6. Engage communities through culturally sensitive messaging, local leaders, and feedback mechanisms.

Declarations

Potential competing interests: No potential competing interests to declare.