

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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Title: *Integrated Determinants of Persistent Wild Poliovirus Transmission in Pakistan and Afghanistan (2010–2025)*

Reviewer: Guillaume Ngoie Mwamba

Overall Assessment

This manuscript addresses a critically important topic for global polio eradication. It provides a comprehensive and timely synthesis of determinants sustaining WPV1 transmission in the last endemic corridor globally. The integration of genomic evidence, surveillance findings, immunity gaps, and operational constraints is policy-relevant and strategically framed.

I rate this work **4 out of 5 stars**. The manuscript is strong in scope and relevance but would benefit from deeper analytical rigor and methodological clarification to enhance its scientific contribution.

Major Comments

1. Methodological Transparency (PRISMA-ScR Implementation)

Although the authors state adherence to PRISMA-ScR guidelines, key elements require strengthening:

- A detailed table summarizing the 52 included studies (design, period, geography, main findings) is missing.
- No explicit quality appraisal or risk-of-bias assessment is presented.
- The rationale for excluding 248 full-text articles could be further clarified.
- Database-specific yield and grey literature proportions are not specified.

Improvement in methodological transparency would significantly increase credibility.

2. Analytical Depth Beyond Description

The review synthesizes important findings but remains largely descriptive. The manuscript would benefit from:

- Temporal trend analysis (e.g., evolution of cross-border linkage percentages over time).
- Clearer differentiation of WPV1 genetic lineages and transmission clusters.
- Comparative analysis of hotspot persistence (e.g., why Karachi vs. Kandahar differ operationally).
- Integration of modeling findings into a structured analytical framework rather than narrative reporting.

A conceptual model visually linking mobility, immunity gaps, and operational fragility could strengthen coherence.

3. WPV1–cVDPV2 Linkage Framing

The discussion correctly highlights the strategic linkage between WPV1 persistence and cVDPV2 emergence. However:

- The causal framing may oversimplify the dynamics.
- The role of the 2016 tOPV-bOPV switch and IPV gaps deserves more structured explanation.
- The immunological and ecological mechanisms linking WPV1 persistence to cVDPV2 outbreaks should be better delineated.

A clearer distinction between shared determinants and independent drivers would enhance accuracy.

4. Operational Determinants: Need for Greater Precision

Operational challenges are discussed broadly. The manuscript could benefit from:

- Differentiating rural insecurity barriers from urban delivery failures.
- Including quantitative references (e.g., impact of SIA disruption on coverage).

- Addressing governance transitions and funding volatility in Afghanistan post-2021.
- Clarifying surveillance sensitivity trends (AFP non-polio rate, ES positivity trends).

Greater operational granularity would improve practical applicability.

Minor Comments

1. Some references cited are modeling studies outside the Pakistan-Afghanistan context; clarify transferability where applicable.
2. Tables 2–5 are useful but could include time frames or citation columns.
3. Minor language refinements could improve flow in the Discussion section.
4. The conclusion could more explicitly articulate 3–4 prioritized policy recommendations.

Strengths of the Manuscript

- Highly relevant to global eradication strategy.
- Strong integration of genomic and surveillance evidence.
- Timely (updated to 2025).
- Policy-oriented framing.
- Clear narrative coherence.

Recommendation

The manuscript makes a meaningful contribution to understanding persistent WPV1 transmission in the final endemic corridor. With improved methodological detailing and deeper analytical synthesis, it could achieve stronger scientific impact.

I recommend **minor to moderate revisions** focused primarily on analytical depth and methodological transparency.

Declarations

Potential competing interests: No potential competing interests to declare.