Qeios

Peer Review

Review of: "Novel Technologies for Intradermal Delivery of Fractional-Dose Inactivated Poliomyelitis Vaccine: A Review of Implementation Research and Implications for Equitable Vaccine Access"

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The manuscript addresses an important and timely topic and provides a useful synthesis of implementation research; however, revisions are required to improve methodological transparency, balance across delivery technologies, and cautious interpretation of observational findings.

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Peer Review Report (Qeios)

Manuscript title

Novel Technologies for Intradermal Delivery of Fractional-Dose Inactivated Poliomyelitis Vaccine: A Review of Implementation Research and Implications for Equitable Vaccine Access

Title

The title is generally well aligned with the manuscript content; however, the implications for “equitable vaccine access” are discussed largely in inferential and policy-oriented terms rather than being directly evaluated in the reviewed studies. The authors may wish to consider a slight moderation of the title or clarify the inferential nature of equity-related conclusions within the text.

Overall Assessment

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This manuscript presents a narrative review of implementation research on novel intradermal (ID) delivery technologies for fractional-dose inactivated poliovirus vaccine (fIPV). The topic is timely, highly relevant to the polio endgame, and well aligned with ongoing global discussions on dose-sparing strategies, IPV affordability, and vaccine delivery innovation. The paper is clearly written, well-referenced, and explicitly oriented toward policy and programmatic decision-making.

However, the review is heavily weighted toward a single commercial technology. The available implementation evidence is concentrated largely on Tropis®, which limits balanced comparative assessment across alternative intradermal delivery options. In addition, given the significant conflict-of-interest considerations declared by the authors and the absence of a systematic or scoping review framework, the manuscript does not yet demonstrate the level of methodological rigor expected of a contemporary implementation-focused review. Addressing these issues would substantially strengthen the manuscript's credibility and usefulness for policymakers.

Major Comments

1. Conflict of Interest and Balance

While conflicts of interest are transparently declared, the review places disproportionate emphasis on the Tropis® (PharmaJet) device, particularly with respect to coverage, cost, training, acceptability, and policy implications. Other technologies (Bioject devices, ID adapters, and microneedles) are comparatively underexplored, often reflecting limited available data, but this imbalance is not sufficiently acknowledged in the narrative.

Recommendations:

• Explicitly acknowledge how funding sources and author affiliations may have influenced the depth and scope of analysis.

• Moderate promotional or assertive language (e.g., "paradigm shift," "highly effective") in favor of more neutral comparative phrasing.

• Consider adding a summary table distinguishing volume of evidence from strength of evidence for each delivery technology.

2. Methodological Limitations of the Review

The review does not follow a systematic or scoping review framework (e.g., PRISMA-guided methods), which limits reproducibility, transparency of study selection, and formal grading of evidence strength.

Many implementation findings—particularly those related to coverage, acceptability, feasibility, and child distress—are derived from secondary analyses of randomized controlled trials designed primarily for safety or immunogenicity, as well as from observational campaign reports. These designs are inherently subject to selection bias, reporting bias, and confounding.

Recommendations:

• Clarify explicitly that this is a narrative implementation review rather than a systematic or scoping review.

• Add a brief discussion of evidence strength or risk of bias to help readers interpret the relative robustness of different findings.

• Explicitly caution readers against causal interpretation of observed associations, particularly for coverage and acceptability outcomes.

3. Interpretation of Implementation Outcomes (Causality vs Association)

While the manuscript reports improvements in coverage, reductions in refusals, and equity-relevant outcomes, these findings are derived largely from observational and programmatic data. As such, they support associational relationships rather than causal inference. In several sections, the language could be moderated to more clearly distinguish observed associations from causal effects attributable to the delivery technologies themselves. This clarification would strengthen both methodological rigor and policy relevance.

4. Coverage and Equity Claims

Claims regarding improved coverage, enhanced equity, and feasibility of house-to-house delivery are largely based on campaign-level observational studies with limited adjustment for contextual confounders such as campaign intensity, social mobilization strategies, security conditions, and baseline health system performance.

Recommendations:

• Reframe conclusions to emphasize associations rather than demonstrated causal effects.

• Clearly distinguish device-related contributions from broader programmatic or contextual factors.

• Add a brief paragraph identifying equity dimensions not directly assessed (e.g., zero-dose reach, socioeconomic gradients, gender, urban–rural differentials).

5. Limited Engagement With Country-Level Decision Constraints

While global policy guidance is well summarized, the manuscript gives limited attention to practical constraints faced by low- and middle-income countries, including:

• Procurement and supply chain integration

• Device maintenance, servicing, and replacement

• Regulatory approval beyond WHO prequalification

• Health worker scope-of-practice and task-shifting regulations

Recommendation:

Include a dedicated subsection on operational, regulatory, and governance barriers to adoption, particularly in settings such as Nigeria, Pakistan, and the Democratic Republic of Congo.

Minor Comments

1. Some repetition exists between the Introduction and policy sections and could be streamlined.

2. Tables are information-rich but dense; improved formatting or visual summaries would enhance accessibility.

3. The term “quasi-scientific” should be replaced with a more standard methodological descriptor.

4. Consider more clearly separating immunogenicity evidence from implementation outcomes to avoid conceptual overlap.

Strengths of the Manuscript

• Timely and highly relevant to polio eradication and IPV transition.

• Strong synthesis of WHO, SAGE, and GPEI policy evolution.

• Clear focus on implementation research, an area often underrepresented in vaccine delivery literature.

• Useful for donors, policymakers, and program managers evaluating fIPV strategies.

Conclusion

This manuscript makes a valuable contribution to discussions on intradermal fIPV delivery and dose-sparing strategies. With revisions to improve balance, methodological transparency, and cautious interpretation of implementation outcomes, it has the potential to serve as a strong and credible resource for global immunization stakeholders.

Overall Recommendation

Major revisions

The manuscript addresses an important and timely topic, but revisions are required to strengthen methodological transparency, temper overinterpretation of observational findings, and ensure balanced treatment of delivery technologies in light of declared conflicts of interest.

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Examples to address imbalance in coverage of technologies

While the manuscript correctly notes that Tropis has the largest body of implementation research, it would be helpful to more explicitly state how this concentration of evidence limits balanced comparative interpretation across delivery technologies and constrains conclusions about relative performance.

The authors could add a short statement in the Methods or Discussion explicitly noting that the implementation evidence is disproportionately concentrated on Tropis®, and that this reflects evidence availability rather than demonstrated superiority. A summary table distinguishing volume of evidence (number of studies, settings, outcomes assessed) from strength of evidence across delivery technologies would also help contextualize comparisons. Where evidence is sparse for other devices (e.g., ID adapters, microneedles), this should be clearly stated alongside conclusions.

Methodological details to enhance transparency and reproducibility

To improve transparency, the authors could clarify that this is a narrative implementation review, describe the study selection process more explicitly (including reasons for exclusion), and add a brief discussion of evidence strength or risk of bias for key outcome domains. Explicitly stating that many implementation outcomes derive from secondary analyses or observational campaign reports would further support appropriate interpretation.

Declarations

Potential competing interests: No potential competing interests to declare.