Humanitarian Vaccination in War: An Exploration of Médecins Sans Frontières' Role in Gaza's Poliomyelitis Epidemic

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DOI: 10.33178/SMJ.2026.13

Abstract

Médecins Sans Frontières (MSF) is an independent and impartial humanitarian organisation that delivers healthcare in areas of crisis, providing medical assistance regardless of race, gender, political stance, or religion. Since 2024, MSF has implemented polio vaccination campaigns in the Gaza Strip to increase population immunity against circulating vaccine-derived poliovirus type 2 (cVDPV2), which has re-emerged amid ongoing violent conflict. This paper examines the public health impact, logistical considerations, and operational challenges associated with these vaccination campaigns.

This paper highlights three primary operational challenges of vaccine delivery in crisis settings: ensuring the safety of patients and healthcare workers, maintaining the cold chain, and managing limited resources. We also examine key mitigation strategies, including continuous threat surveillance, coordination among humanitarian services, and community engagement, all of which have been shown to improve the effectiveness of vaccination efforts in conflict-affected regions.

Although ongoing turmoil has limited the accuracy of vaccination coverage data, an estimated 600,000 children have been immunised in the Gaza Strip since the onset of hostilities. Given polio's re-emergence approximately 25 years after its initial eradication, sustained vaccination efforts are critical to protecting population health in Palestine.

Effective vaccine delivery in conflict-affected settings requires a flexible logistical framework combined with sensitivity to patient and community factors. Despite significant operational barriers, MSF's polio vaccination campaign in Gaza demonstrates the feasibility of large-scale immunisation in humanitarian emergencies. Insights from this campaign may help inform future vaccination strategies in conflict and disaster settings.

Introduction

The ongoing conflict in Gaza constitutes a profound humanitarian crisis marked not only by mass civilian casualties but also by the progressive collapse of a healthcare system. This environment enabled the re-emergence of previously eradicated, vaccine-preventable diseases. Poliovirus, a highly contagious pathogen that primarily affects children, has re-emerged in Gaza approximately 25 years after eradication [1].

Prior to the 2024 outbreak, multiple environmental surveillance samples detected the presence of circulating type 2 poliovirus, alongside one confirmed case of poliomyelitis and three suspected cases of acute flaccid paralysis among children in the region [1, 2]

Polio is a preventable disease through routine immunisation. The ongoing outbreak reflects significant disruption to public health infrastructure associated with prolonged hostility. Gaza had remained polio-free since 2010, achieving vaccination coverage of approximately 99.6% [1].

However, escalating violence following October 7th, 2023, has substantially compromised access to healthcare services, resulting in an estimated 16,854 children missing routine, lifesaving vaccinations [3]. Widespread population displacement, destruction of essential infrastructure, and limited access to safe water and sanitation have further increased the risk of faecal–oral transmission of the virus [1, 2].

Polio Vaccination Response by MSF

In collaboration with local and international partners, MSF has supported vaccination campaigns, disease surveillance, and community-based public health outreach in Gaza. Since the onset of the conflict, there has been an estimated 14% decrease in the proportion of infants receiving their first dose of the polio vaccine, reversing public health achievements made after poliomyelitis was eliminated from Gaza and the West Bank approximately 25 years ago [1]. In September 2024, MSF began their polio vaccination campaign, which has facilitated the immunisation of approximately 600,000 children to date [4]. Continuously worsening violence has limited reliable public health data collection, making it difficult to determine if these efforts have resulted in a meaningful reduction in infection rates. Despite this, the campaign's high coverage represents an important step towards strengthening population immunity and reducing transmission risk.

The first round of vaccination campaigns facilitated the administration of novel oral polio vaccine type 2 (nOPV2) to 558,963 children across central, southern, and northern Gaza between 1 and 12 September 2024 [5]. A second round conducted between October and November 2024 reached a further 556,774 children, despite significant access constraints [6]. In February 2025, a five-day vaccination campaign delivered nOPV2 to approximately 600,000 children across all five governorates, following a temporary improvement in humanitarian access [4]. As repeated doses of the vaccine are necessary to achieve immunity, staggered campaigns allow for effective protection against poliomyelitis.

These phased efforts reflect unstable area access and the need for repeated campaigns to achieve adequate coverage. For example, the initial campaign, which took place in September 2024, coincided with a brief military pause. Hostilities renewed soon after and again restricted access to healthcare delivery [4]. Persistent insecurity, including the risk of attack on healthcare personnel and facilities, necessitated multiple vaccination rounds to reach children who were previously inaccessible.

Logistical Challenges to Vaccine Delivery

Delivering vaccines in zones of active conflict presents substantial logistical, ethical, and operational challenges. Safety is a primary concern, as ongoing violence places patients, healthcare workers, and supply chains at constant risk. Recurrent attacks in areas designated for humanitarian care have resulted in a lack of consistently safe locations for healthcare delivery, leading to sporadic, unpredictable, and frequently interrupted services [4]. Between May 27th and October 9th 2025, 2,615 Palestinians were killed and 19,177 wounded while seeking aid at registered distribution points [7]. This instability erodes trust in healthcare services and undermines the delivery of routine preventive healthcare, including vaccination programmes.

Conflict-related violence has resulted in large-scale population displacement in Gaza. Over 82.6% of the Gaza Strip lies within the Israeli-militarised zone or under displacement orders, leading to the evacuation of approximately 90% of the population [8]. Such internal displacement of civilians disrupts vaccination schedules and limits continuity of care.

An additional major challenge is maintenance of the cold chain. The term cold chain refers to the coordinated storage and transportation of vaccines and other temperature-sensitive products between temperature-controlled environments to preserve efficacy [9]. When coordinating vaccination campaigns, the transport of cold boxes must be considered alongside vaccines, personal protective equipment, and syringes. Electricity outages, fuel shortages, and prolonged transport times are constant risk factors for compromising temperature stability.

Strategies to Improve Vaccine Delivery in Conflict Settings

Despite these and other challenges, several strategies have been shown to improve vaccine delivery in conflict zones. Continuous surveillance of local threat levels is necessary to identify windows of opportunity for safe vaccine administration. Coordination of vaccination activities with other humanitarian services, such as food distribution and water provision, has also been shown to increase accessibility and uptake of immunisation services.

Community engagement represents a further important strategy. The effectiveness of involving local community members in vaccination delivery has been demonstrated by the Volunteer Community Mobilizer (VCM) programme in Nigeria, which played a significant role in the successful eradication of poliomyelitis in that setting [10]. This programme involved training local women to deliver the polio vaccine, improving vaccination rates in volatile regions and isolated communities. This programme furthermore reduced vaccine hesitancy amongst locals and helped strengthen trust between communities and healthcare providers. Consideration of these and other strategies may improve vaccine administration and uptake, both in Gaza and in other areas of conflict.

Conclusion

The re-emergence of poliovirus in Gaza underscores the fragility of public health gains in settings affected by prolonged conflict and systemic disruption. Despite decades of successful eradication and high baseline vaccination coverage, the collapse of healthcare infrastructure, widespread population displacement, and sustained insecurity have created conditions in which vaccine-preventable diseases can resurface. The cVDPV2 outbreak in Gaza illustrates how rapidly progress can be reversed when routine immunisation services are interrupted and access to basic healthcare and sanitation services is compromised.

Within this challenging context, Médecins Sans Frontières' support of polio vaccination campaigns demonstrates both the feasibility and the limitations of large-scale immunisation efforts in conflict-affected settings. Through repeated vaccination rounds, coordination with humanitarian partners, and adaptive operational planning, MSF and collaborating organisations were able to reach hundreds of thousands of children despite severe access constraints. However, the need for multiple campaigns, persistent surveillance gaps, and ongoing threats to healthcare delivery highlight that emergency vaccination alone cannot fully mitigate the public health consequences of sustained conflict

Ultimately, sustained control of vaccine-preventable diseases in Gaza will depend not only on emergency immunisation campaigns but also on the restoration of safe healthcare access, reliable disease surveillance, and community trust

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