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37th Meeting of the International Task Force for Disease Eradication, 11–12 June 2024

The 37th meeting of the International Task Force for Disease Eradication (ITFDE)¹ was convened in a hybrid (virtual and in-person) format at the Carter Center in Atlanta (GA), USA, on 11–12 June 2024, to discuss the “status of hepatitis B and hepatitis C elimination”.

Current status of global hepatitis B and hepatitis C elimination

The global distribution of hepatitis B virus (HBV) and hepatitis C virus (HCV) varies significantly, with the highest concentrations of infections found in low- and middle-income countries (LMICs) in the African and South-East Asian regions. Ten countries account for nearly two thirds of the global burden of viral hepatitis B and C: Bangladesh, China, Ethiopia, India, Indonesia, Pakistan, Philippines, Nigeria, Russian Federation and Viet Nam. In 2022, an estimated 304 million people were living with chronic HBV and HCV infections, yet a substantial portion remain undiagnosed and inadequately linked to care, resulting in a combined total of 1.3 million deaths that year.² The serious consequences of HBV and HCV infections, including liver disease, cirrhosis

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to be transformed, from prolonged therapy to short, well-tolerated regimens. Highly effective antiviral therapies cure 95–100% of people with HCV within 8–12 weeks. Egypt, once the country with the highest prevalence of HCV, is the first to have achieved WHO Gold Tier status for HCV elimination, in October 2023. This achievement was due to scientific advances paired with a national commitment for effective hepatitis prevention and care. Through the National Committee for Control of Viral Hepatitis, established in 2006, Egypt started a national testing and treatment programme at no expense to patients. The price of the first approved HCV medications in Egypt was 1% of the average wholesale price in the USA. This was followed by introduction of other approved antiviral therapies and locally manufactured generic medicines at less than US\$ 100 per patient. By 2018, almost all patients who were aware of their diagnosis had been treated (2.4 million), although it was estimated that 2–3 million patients remain undiagnosed. To meet WHO targets for HCV elimination, between October 2018 and April 2019, Egypt screened approximately 50 million adults and 7 million adolescents for HCV and identified 2.4 million seropositive and 1.7 million viraemic patients, who were evaluated and treated, achieving a 98.8% standard virological rate. As a result, the prevalence of viraemic HCV decreased from 93% in 2015 to 0.4% in 2022.⁶ Pakistan, which has the second highest burden of HCV globally, is currently planning to launch a national HCV elimination programme with Government funding, in a 2-phase screening and treatment campaign for the population aged >12.⁷ These initiatives demonstrate the value of political commitment, community engagement, sustainable financing and multifaceted strategies in achieving elimination goals for HBV and HCV.

Challenges in HBV and HCV elimination

Despite these advances, significant challenges remain on the path towards HBV and HCV elimination. Access to a single POC test to detect an active HCV infection is still necessary to prevent patients from disengaging with health care in the current 2-step process, in which initial POC antibody screening is followed by a confirmatory HCV RNA or antigen test.

A cure for HBV remains elusive, and a vaccine to prevent chronic HCV infection is still urgently needed as the number of new HCV infections continues to rise. Worldwide, the prevalence of HCV has decreased slightly, except among people who inject drugs (PWID)

who have the highest HCV incidence and represent a logical, feasible target population for a vaccine. Furthermore, evidence shows that immunity against chronic HCV infection can be lost, thus requiring vaccine development, even though the mechanism is poorly understood.⁸ A T-cell vaccine has been tested in a phase-2 trial, which found some evidence of immunogenicity but not efficacy.⁹ Follow-up studies with combined B and T cell targets are justified. Human challenge studies are a possible means to accelerate development.

Barriers to achieving universal access to prevention, testing and treatment, due to inadequate financing, low awareness, stigmatization and weak health-care infrastructure, threaten the goal of hepatitis elimination, to ensure universal delivery of BD HBV vaccine, maintain high vaccination coverage for all age groups and identify and treat people with HCV through population screening.

Stigmatization and discrimination can significantly limit patient access to health care and their ability to achieve important life goals, such as securing housing, forming intimate relationships and obtaining employment. Populations who face inequities in HBV disease burden include children born to HBsAg+ mothers, migrant populations (refugees and immigrants), endemic populations in LMICs and unvaccinated people with high-risk behaviour. For HCV, such inequity is greatest for PWID, incarcerated populations and people with iatrogenic exposure in health systems and from traditional healers. Efforts should be enhanced to reduce stigmatization through workplace policies, immigration rules and elimination of other legal protection from discriminatory practices among people living with chronic hepatitis. Low political and community awareness and visibility of hepatitis hamper disease control efforts. The lack of high-level celebrity, regional and international champions to raise the profile of viral hepatitis further exacerbates the issue.

Additionally, funding for viral hepatitis elimination is inadequate when compared with the resources allocated for HIV, tuberculosis and malaria.¹⁰ Investments in hepatitis elimination offer significant economic benefits by reducing health-care costs, improving productivity and enhancing overall quality of life. Economic analyses in countries such as Brazil and Egypt show the cost-effectiveness of scaling up hepatitis interventions as

parmi les personnes qui s'injectent des drogues; cette population présentant la plus forte incidence de VHC, elle constitue un groupe cible privilégié pour la vaccination. En outre, il a été démontré que l'immunité contre l'infection chronique par le VHC peut disparaître; même si le mécanisme sous-jacent est mal compris, ce phénomène nécessite la mise au point d'un vaccin.⁸ Un vaccin à lymphocytes T a été testé dans le cadre d'un essai de phase 2 qui a mis en évidence des données d'immunogénéicité, mais pas d'efficacité.⁹ Des études de suivi avec des cibles combinées de lymphocytes B et T sont justifiées. Les études de provocation chez l'humain sont un moyen possible d'accélérer le développement d'un vaccin.

Les obstacles à l'accès universel aux services de prévention, de dépistage et de traitement, dus à un financement insuffisant, à une faible sensibilisation, à la stigmatisation et à la faiblesse des infrastructures de soins menacent l'objectif d'élimination de l'hépatite, qui implique d'assurer la vaccination universelle avec une dose à la naissance de vaccin contre le VHB, de maintenir une couverture vaccinale élevée pour toutes les tranches d'âge et d'identifier et de traiter les personnes infectées par le VHC grâce à un dépistage au sein de la population.

La stigmatisation et la discrimination peuvent limiter considérablement l'accès des patients aux soins de santé et leur capacité à atteindre des objectifs importants dans la vie, tels que trouver un logement, nouer des relations intimes ou obtenir un emploi. Les populations les plus concernées par la charge de morbidité du VHB sont les enfants nés de mères positives pour l'antigène de surface du VHB (AgHBs), les populations migrantes (réfugiés et immigrants), les populations vivant en zone d'endémie dans des pays à revenu faible ou intermédiaire et les personnes non vaccinées ayant un comportement à haut risque. En ce qui concerne le VHC, la charge de morbidité la plus importante touche les personnes qui s'injectent des drogues, les populations carcérales et les personnes exposées à une infection iatrogène au sein des systèmes de santé ou chez les guérisseurs traditionnels. Il est important redoubler d'efforts pour réduire la stigmatisation au moyen de politiques sur le lieu de travail, de règles en matière d'immigration et de toute autre protection juridique contre les pratiques discriminatoires à l'égard des personnes vivant avec une hépatite chronique. Le manque de sensibilisation et la faible visibilité de l'hépatite au niveau politique et communautaire entravent les efforts de lutte contre cette maladie. L'absence de personnalités de haut niveau et de défenseurs régionaux et internationaux pour attirer l'attention sur l'hépatite virale ne fait qu'exacerber le problème.

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⁸ WHO, *Global Hepatitis Report 2022*, 2023 (Geneva: WHO, 2023), p. 32. ⁹ WHO, *Global Hepatitis Report 2022*, 2023 (Geneva: WHO, 2023), p. 10. ¹⁰ WHO, *Global Hepatitis Report 2022*, 2023 (Geneva: WHO, 2023), p. 10. ¹¹ WHO, *Global Hepatitis Report 2022*, 2023 (Geneva: WHO, 2023), p. 10.

Progress towards poliomyelitis eradication – Pakistan, January 2023–June 2024

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Abstract

Since its launch in 1988, the Global Polio Eradication Initiative (GPEI) has made substantial progress towards eradication of wild poliovirus (WPV), including eradicating 2 of the 3 serotypes and reducing the number of countries with ongoing endemic transmission of WPV type 1 (WPV1) to Afghanistan and Pakistan. The two countries are considered a single epidemiological block. Despite the occurrence of only a single confirmed WPV1 case during the first half of 2023, Pakistan experienced widespread circulation of WPV1 during the subsequent 12 months, specifically in the historical reservoirs of the cities of Quetta, Karachi and Peshawar. As of 30 June 2024, 8 WPV1 cases had been reported in Pakistan, as compared with 6 reported during all of 2023. These cases, and >300 WPV1-positive environmental surveillance (sewage) samples reported during 2023–2024, indicate that Pakistan is not on track to interrupt WPV1 transmission. The country's complex sociopolitical and security environment continues to pose formidable challenges to poliovirus elimination. To interrupt WPV1 transmission, sustained political commitment to polio eradication, including increased accountability at all levels is necessary. Systematic tracking and vaccination of children who are continually missed during polio vaccination activities should be enhanced by better addressing operational issues and the underlying reasons for community resistance to vaccination.

Introduction Since establishment in 1988, the global polio eradication effort has remained elusive. Indigenous WPV1 circulation has never been interrupted in Pakistan, and WPV1 remains endemic in Afghanistan.

^{1,2} The two countries (Pakistan and Afghanistan) constitute a single epidemiological block as a result of substantial cross-border population movement.

³ See No. 38, *Weekly Epidemiol Rec* 2024; 119(11):1–10. <https://doi.org/10.2471/PEM.24.0481>

Methods

Data sources

Poliovirus surveillance and vaccination information (campaign reports and routine immunization coverage surveys) as of June 2024 were provided by the Pakistan National Emergency Operations Centre and other GPEI partners, including the United Nations Children's Fund (UNICEF) and WHO. Weekly poliovirus country and regional surveillance reports were also reviewed.

Analysis

Genomic sequencing and analyses from the Pakistan National Institute of Health poliovirus laboratory determined the genetic relations among polioviruses identified in specimens collected from patients with WPV1 infection and from environmental sewage samples. Descriptive analysis of WPV1 patient characteristics, including age and routine immunization status, was conducted in Microsoft Excel®.

Results

Immunization activities

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WHO and UNICEF estimated that Pakistan's national coverage with 3 doses of oral poliovirus vaccine⁷ (OPV) and 1 dose of inactivated poliovirus vaccine (IPV, containing polio vaccine virus types 1, 2 and 3) by age 12 months was 86% for each during 2023; Pakistan introduced a second IPV dose in 2021, and 2-dose IPV coverage was estimated at 84%.⁸ A 2021 third-party survey sponsored by Gavi, the Vaccine Alliance,⁹ indicated that the proportion of children aged 12–23 months who had received 3 RI OPV doses ranged by province from 45.1% in Balochistan to 94.9% in Punjab. None of the districts in the provinces of Balochistan, Khyber Pakhtunkhwa or Sindh achieved 80% 3-dose RI OPV coverage, while 31 (86%) of 36 districts in Punjab province did so.

ing countries in 2016 after eradication of WPV type 2,¹⁰ polio SIAs¹¹ in Pakistan have been conducted primarily with bivalent OPV (bOPV; containing Sabin-strain types 1 and 3). During 2023, 3 national immunization day (NID) and 7 subnational immunization day (SNID) campaigns were conducted with bOPV. NIDs in Pakistan, targeted 45 million children aged <5 years, whereas the SNIDs targeted smaller populations, depending on the areas identified by ongoing risk assessments. Fractional-dose IPV¹² was administered during vaccination activities in 6 districts of south Khyber Pakhtunkhwa in June 2023, in Khyber and Peshawar districts of Khyber Pakhtunkhwa in August 2023, and in Chaman and Killa Abdullah districts of Balochistan province in October 2023.

To date in 2024, 2 NIDs (January and February), 2 SNIDs (April and June) and an outbreak response campaign in March have been conducted in Pakistan. In the 7 districts of south Khyber Pakhtunkhwa, an area facing considerable security challenges, as many as 706613 eligible children aged <5 years were not vaccinated during the January 2024 NID because SIAs could not be safely carried out in those areas. In Dera Ismail Khan, the district with the largest number of eligible children (372 726 children aged <5 years), campaigns could not be conducted during 3 of the 4 SIAs between November 2023 and April 2024. The programme continues to be hampered by repeated community boycotts during SIAs for reasons that are mainly unrelated to vaccination, such as requests for clean water and electricity services, which are provided selectively by the Government. Safety remains an ongoing concern for frontline polio programme workers in several priority areas.

Lot quality assurance sampling (LQAS)¹³ surveys, to assess SIA quality, continue to indicate substantial gaps in the quality of vaccination campaigns. According to a 90% pass threshold (surveyed by marking a child's fingernail with indelible ink by vaccinators as an indicator of having recently received OPV), the proportion of subdistrict union councils that reached the threshold ranged from 82% in Balochistan province to 89% in Punjab province during the June 2024 SNIDs; however, at district level, pass rates were as low as 25% in Loralai district and 37.5% in Killa Abdullah district, both in Balochistan province. A total of 599 105 children (3.3%

souches Sabin de types 1, 2 et 3) après l'éradication du PVS de type 2,¹⁰ les AVS contre la poliomyélite¹¹ menées au Pakistan ont principalement utilisé le VPO bivalent (VPOb, contenant les souches Sabin de types 1 et 3). Au cours de l'année 2023, des campagnes de vaccination par le VPOb ont été effectuées dans le cadre de 3 journées nationales de vaccination (JNV) et 7 journées locales de vaccination (JLV). La population visée par les JNV au Pakistan se compose de 45 millions d'enfants âgés de <5 ans, tandis que les JLV ciblent des populations plus restreintes, en fonction des zones identifiées par une évaluation continue des risques. Des doses fractionnées de VPI¹² ont été administrées lors d'activités de vaccination menées dans 6 districts du sud du Khyber Pakhtunkhwa en juin 2023, dans les districts de Khyber et de Peshawar du Khyber Pakhtunkhwa en août 2023, et dans les districts de Chaman et de Killa Abdullah du Baloutchistan en octobre 2023.

Depuis le début de l'année 2024, 2 JNV (janvier et février), 2 JLV (avril et juin) et 1 campagne de riposte à une flambée épidémique (mars) ont été organisées au Pakistan. Dans les 7 districts du sud de la province de Khyber Pakhtunkhwa, où règnent des problèmes de sécurité considérables, près de 706 613 enfants âgés de <5 ans éligibles à la vaccination n'ont pas été vaccinés lors de la JNV de janvier 2024, car il n'a pas été possible de mener des AVS de manière sûre dans cette zone. À Dera Ismail Khan, le district qui compte le plus grand nombre d'enfants éligibles à la vaccination (372 726 enfants âgés de <5 ans), les campagnes n'ont pas pu être menées pour 3 des 4 AVS dans la période de novembre 2023 à avril 2024. Le programme continue de se heurter à des boycotts répétés des AVS de la

of the target population) were missed during the June 2024 SNIDs, including 51 199 refusals.

et 37,5% dans le district de Killa Abdullah, tous deux situés

Poliovirus surveillance

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A reported nonpolio AFP (NPAFP)¹⁴ rate of 2 cases per 100 000 children aged < 15 years is the WHO benchmark for surveillance sufficiently sensitive to detect an occurring case of poliomyelitis. Pakistan reported a national NPAFP rate of 20.2 cases per 100 000 children aged < 15 years in 2023 (); provincial rates ranged from 11.6 to 33.1, exceeding the recommended benchmark. As of 9 June 2024, the annualized 2024 national NPAFP rate is 17.4. Stool specimen adequacy¹⁵ during 2023 and 2024 exceeded the 80% target nationally and in each province, except in Islamabad (76.9%). District performance indicators continue to indicate gaps in surveillance quality, especially in programme priority areas.

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A network of 124 ES (sewage) collection sites in Pakistan is used to supplement poliovirus surveillance. Sewage samples collected monthly at these sites are tested for polioviruses and other enteroviruses. During 2023, of 2563 sewage samples tested, 126 (5%) were positive for WPV1, as compared with 37 (3%) of 1325 in 2022. To date in 2024, among 942 tested sewage samples, 203 (22%) have tested positive for WPV1. As of 30 June 2024, ES samples positive for WPV1 had been identified in Sindh (mostly in Karachi), Balochistan, Islamabad, Khyber Pakhtunkhwa and Punjab, indicating widespread circulation of the virus in the country. Approximately 60% of all WPV1-positive ES isolates were reported from the traditional polio reservoirs in the cities of Karachi, Peshawar and Quetta.

Six WPV1 cases were reported in Pakistan in 2023, as compared with 20 cases in 2022, 1 in 2021 and 84 in 2020^{5, 16} (). As of 30 June 2024, 8 WPV1 cases had been reported in 2024, as compared with a single case reported during the same period in 2023. Among the 6 WPV1 cases reported in 2023, 3 were in Bannu district, Khyber Pakhtunkhwa province, 2 in Karachi East district, Sindh province, and one in Orakzai district, Khyber Pakhtunkhwa province. Of the 8 cases reported to date in 2024, 6 were reported from Baloch-

Table 1 **Acute flaccid paralysis (AFP) surveillance indicators and numbers of wild poliovirus (PVS) and circulating vaccine-derived poliovirus (cVDPV) cases reported, by province and surveillance period – Pakistan, January 2023–June 2024**

Tableau 1 **Indicateurs de surveillance de la paralysie flasque aiguë (PFA) et nombre de cas de poliomyélite dus aux poliovirus sauvages (PVS) et aux poliovirus circulants dérivés d'une souche vaccinale (PVDVc), par province et par période de surveillance – Pakistan, janvier 2023-juin 2024**

istan province and 2 from Sindh province. Among the 14 WPV1 cases identified during January 2023–June 2024, the age of patients ranged from 9 to 144 months (i.e. 12 years; median, 30 months); 7 patients had never received OPV during RI, 2 had received 1–2 doses, while the remaining 5 had received 3 RI OPV doses. No cases due to circulating vaccine-derived poliovirus type 2 (cVDPV2)¹⁷ have been reported in Pakistan since 23 April 2021, when the last of 165 cVDPV2 cases that occurred during July 2019–April 2021 was reported (Figure 1, Map 1, Table 1).

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Analysis of the region that codes the VP1 capsid protein of WPVs is used to classify them into genetic clusters (i.e. those that share 95% sequence identity). Of the 6 WPV1 cases and 126 WPV1-positive ES isolates reported in 2023, 9 belonged to groups of viruses derived from the YB3C cluster, which is endemic to Pakistan; the other 123 belonged to groups of viruses derived from the YB3A cluster, which co-circulates in eastern Afghanistan. Of the 8 WPV1 cases reported to date in 2024, 6 belonged to the YB3A4A cluster and 2 to the YB3A4B cluster. Additionally, 6 orphan viruses (>1.5% VP1 nucleotide divergence, indicating gaps in AFP surveillance) were identified during the preceding 12 months.

Discussion

In comparison with the previous reporting period (January 2022–June 2023), more extensive WPV1 transmission has been seen in Pakistan, beginning in the

tan et 2 dans celle du Sindh. Parmi les 14 cas de PVS1 identifiés entre janvier 2023 et juin 2024, l'âge des patients variait entre 9 mois et 144 mois (soit 12 ans) (âge médian=30 mois); 7 patients n'avaient jamais reçu de VPO dans le cadre de la vaccination systématique, 2 avaient reçu 1-2 doses, tandis que les 5 autres avaient reçu 3 doses. Aucun cas dû à des poliovirus circulants dérivés d'une souche vaccinale de type 2 (PVDVc2)¹⁷ n'a été signalé au Pakistan depuis le 23 avril 2021, date de notification du dernier des 165 cas de PVDVc2 survenus entre juillet 2019 et avril 2021 ().

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L'analyse de la région codant pour la protéine de capsid VP1 des PVS permet de les classer en groupes génétiques (groupes de virus possédant des séquences identiques à 95%). Parmi les virus isolés chez les 6 cas de PVS1 et dans les 126 échantillons environnementaux positifs au PVS1 signalés en 2023, 9 appartenaient

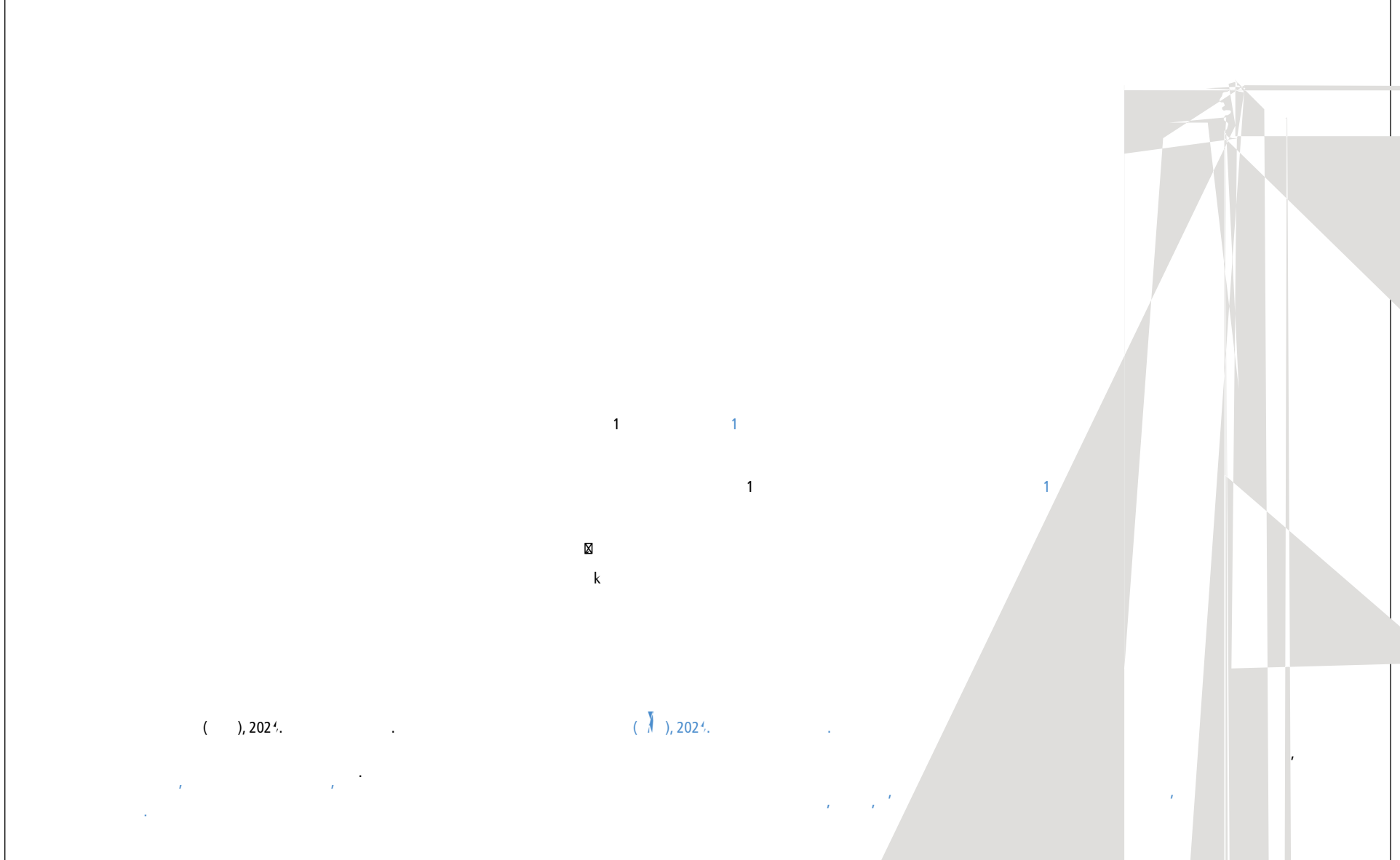
Map 1 **Cases of wild poliovirus type 1 (WPV1), by province and period, Pakistan, January 2023–June 2024**

Carte 1 **Cas de poliomyélite dus aux poliovirus sauvages de type 1 (PVS1), par province et par période, Pakistan, janvier 2023-juin 2024**

January–June 2023 – Janvier-juin 2023

July–December 2023 – Juillet-décembre 2023

January–June 2024 – Janvier-juin 2024



second half of 2023 through the first half of 2024. The

accurately reflect the actual vaccination status of the child, as some children receive finger-marking even when they have not received a vaccine dose.

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Implications for public health practice

The safety of Pakistan's frontline workers continues to be imperilled by challenging conditions. Although transmission is unlikely to be interrupted by the end of 2024, Pakistan maintains a strong political commitment to achieving the goal in the near future. Addressing community demands for essential services, such as clean water and electricity, could help improve community participation in vaccination activities. This, with concerted efforts to track and vaccinate repeatedly missed children, will help to bring the goal of eradication within reach for Pakistan and the GPEI.

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enfant est marqué pendant une AVS, ce qui est censé attester de l'administration du vaccin, ce marquage peut ne pas refléter le statut vaccinal réel de l'enfant, car il arrive qu'un marquage L (e)-9s i (or D9 (mm)25 (u(ol25 (r)51.4.9TJTT0 .n)8 é m57 (s)TJmi)-

