



Nurses’ Knowledge of Contact-Transmitted Healthcare-Associated Infections: A Cross-Sectional Study Based on WHO Guidelines

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Background

The years 2020–2025 have been a turning point for immunization systems in Europe. The COVID-19 pandemic profoundly disrupted routine vaccination services, diverted healthcare resources, and challenged the resilience of national immunization infrastructures. While health authorities were mobilized to deliver large-scale COVID-19 vaccination campaigns, many countries simultaneously experienced a decline in coverage of routine vaccines such as measles–mumps–rubella (MMR) and influenza. In Poland, as in several European countries, the number of vaccine refusals increased and delays in administering scheduled doses became more frequent, resulting in widening immunity gaps. These disruptions have contributed to a worrying resurgence of vaccine-preventable diseases—most notably measles, which in 2024 reached its highest incidence in the WHO European Region since 1997. At the same time, the post-pandemic recovery period has fostered positive innovations. Poland has introduced new solutions, including a nationwide free human papillomavirus (HPV) vaccination programme for adolescents, expanded pharmacy-based vaccination, and updates to the national immunization schedule. Lessons from the pandemic era have emphasized the importance of flexible, well-funded, and trusted immunization systems capable of maintaining both emergency and routine vaccine delivery even during health crises.

Methods

Study design:

Narrative review of immunization programmes in Poland and Europe (2020–2025).

Data sources:

PubMed (research articles and reviews),
European Centre for Disease Prevention and Control (ECDC),
WHO Regional Office for Europe,
European Commission,
National Institute of Public Health – National Institute of Hygiene (Poland).

Inclusion criteria:

Documents published between **2020–2025** reporting on:
implementation of routine or COVID-19 vaccination,
vaccination coverage, schedule changes, vaccine refusals, delays,
catch-up strategies and programme reforms in Poland and other European countries.

Analysis:

Extracted data were grouped into domains:
COVID-19 vaccine rollout,
continuity and recovery of routine immunization,
introduction of new programmes (e.g. HPV, pharmacy-based vaccination),
coverage gaps and outbreaks of vaccine-preventable diseases,
policy responses and public-health lessons.

Aim:

To review the implementation of routine and COVID-19 vaccinations in Poland and Europe between 2020 and 2025, with particular focus on programme changes, vaccination coverage, inequities, recovery actions and future priorities.



Results

- The **EU Vaccines Strategy (June 2020)** enabled a rapid, coordinated roll-out of COVID-19 vaccines across EU Member States.
- At the same time, **routine immunization coverage declined** in many European countries, especially for **MMR** and **seasonal influenza**, reflecting service disruptions and increasing vaccine hesitancy.
- In **Poland**, vaccination **refusals increased**, and **childhood vaccinations were more often delayed or missed**, leading to widening **immunity gaps**, particularly among children and adolescents.
- Positive developments included the launch (June 2023) of a **nationwide, publicly funded HPV vaccination programme** for 12–13-year-olds and **catch-up elements** added to the **2025 national immunization schedule** to address delayed or missed routine doses.
- At European level, the consequences of disrupted routine vaccination were evident in **2024**, when the **WHO European Region reported 127,350 measles cases**, more than twice the 2023 figure and the highest since 1997.
- Overall, while large-scale COVID-19 vaccination campaigns were successfully implemented, they were accompanied by **declining routine coverage, rising vaccine refusals and measurable immunity gaps**, prompting new programmes and reforms aimed at **rebuilding and modernising immunization systems** in the post-pandemic era.

Conclusions

- Between 2020 and 2025, immunization systems in Poland and Europe proved capable of rapidly implementing large-scale COVID-19 vaccination, but this was accompanied by a decline in routine vaccination coverage and growing immunity gaps.
- Increased vaccine refusals and delayed childhood vaccinations contributed to the resurgence of vaccine-preventable diseases, including a record measles burden in the WHO European Region in 2024.
- In Poland, the introduction of a nationwide, publicly funded HPV vaccination programme and the inclusion of catch-up elements in the immunization schedule are important steps towards rebuilding and modernising vaccination services.
- Future strategies should focus on systematically closing immunity gaps, ensuring stable organisation and financing of routine and catch-up vaccination, and strengthening evidence-based communication to maintain public confidence in vaccines.

Practical Recommendations

- Implement **routine catch-up vaccination campaigns** for children and adolescents, with active recall of those who missed or delayed doses.
- Use **diverse delivery settings** (primary care, school-based clinics, pharmacies) to improve access to both routine and booster vaccinations.
- Strengthen **surveillance and monitoring systems** for vaccination coverage, refusals and delays, enabling early identification of immunity gaps.
- Develop and maintain **consistent, evidence-based communication** addressing vaccine hesitancy and misinformation, using trusted local health professionals as key messengers.
- Integrate lessons from COVID-19 into national immunization plans to ensure that **emergency vaccination efforts do not undermine routine programmes** in future crises.

Bibliography

World Health Organization Regional Office for Europe. Guidance on routine immunization services during COVID-19 pandemic in the WHO European Region. Copenhagen: WHO Europe; 2020.
World Health Organization Regional Office for Europe. Guidance on developing national COVID-19 vaccination policy in the WHO European Region. Copenhagen: WHO Europe; 2023.
World Health Organization Regional Office for Europe. European Immunization Agenda 2030 (EIA2030): technical progress report 2024. Copenhagen: WHO Europe; 2024.
European Centre for Disease Prevention and Control. Overview of the implementation of COVID-19 vaccination strategies and deployment plans in the EU/EEA. Stockholm: ECDC; 14 June 2021.
European Commission. State of Health in the EU: Companion Report 2021. Luxembourg: Publications Office of the European Union; 2021.
National Institute of Public Health NIH – National Research Institute. Szczepienia ochronne w Polsce w 2022 roku. Warsaw: NIPH–NRI; 2023.
National Institute of Public Health NIH – National Research Institute. Szczepienia ochronne w Polsce w 2023 roku. Warsaw: NIPH–NRI; 2024.
Jankowski M, Grudziąż-Sękowska J, Wrześniewska-Wal I, et al. National HPV Vaccination Program in Poland—Public Awareness, Sources of Knowledge, and Willingness to Vaccinate Children against HPV. *Vaccines*. 2023;11(8):1371.
Wrześniewska-Wal I, Religioni U, Merks P, et al. Public Knowledge and Beliefs Regarding Pharmacy-Based Vaccination in Poland. *Vaccines*. 2024;12(8):835.
Aguinaga-Ontoso I, Guillen-Aguinaga S, Guillen-Aguinaga L, et al. The Impact of COVID-19 on DTP3 Vaccination Coverage in Europe (2012–2023). *Vaccines*. 2025;13(1):6