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The National Immunisation Programme in the Netherlands

Surveillance and developments in 2025-2026

RIVM report 2026-0117



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Synopsis

The National Immunisation Programme in the Netherlands
Surveillance and developments in 2025-2026

Every year, RIVM tracks how many people fall ill due to a disease against which vaccination is included in the National Immunisation Programme (NIP).

In 2025, fewer people contracted mumps (150), pertussis or whooping cough (333), severe pneumococcal disease (1,941) or a rotavirus infection than in previous years. The numbers for diphtheria (7), acute hepatitis B (100), meningococcal disease (137) and tetanus (3) were similar to earlier years. As in recent years, there were no cases of rubella or polio. More people fell ill with *Haemophilus influenzae* type b (Hib, 73) than in the past three years. Noteworthy was the number of measles cases (539), which was much higher than in 2023–2024. Most cases occurred among unvaccinated children. One adult died from measles.

In 2025, more than 1 million children up to 18 years of age were vaccinated as part of the NIP. They received a total of over 2.4 million vaccinations. Also, more than 100,000 pregnant women were vaccinated against influenza and/or pertussis. They received a total of over 130,000 vaccinations. These vaccinations protect their baby in the first months after birth against influenza and pertussis.

Several aspects of the NIP changed in 2025 and 2026. Since autumn 2025, babies receive an injection against RSV in their first year of life. This virus can cause serious respiratory infections in young children. In the winter of 2025–2026, far fewer babies with this virus were admitted to intensive care.

The timing of childhood vaccinations (the vaccination schedule) has also been adjusted to offer children even better protection. For example, children now receive their second vaccination against mumps, measles and rubella (MMR) at three years instead of at nine years. Furthermore, a new pneumococcal vaccine is being used that protects against more serotypes.

Keywords: vaccination, surveillance, National Immunisation Programme, *Haemophilus influenzae* type b, HPV, pertussis, measles, pneumococcal disease, Respiratory Syncytial Virus, rotavirus

Publiekssamenvatting

Het Rijksvaccinatieprogramma in Nederland

Surveillance en ontwikkelingen in 2025-2026

Het RIVM houdt elk jaar bij hoeveel mensen een ziekte krijgen waartegen het Rijksvaccinatieprogramma (RVP) vaccineert.

In 2025 kregen minder mensen bof (150), kinkhoest (333), ernstige pneumokokkenziekte (1.941) of een infectie door het rotavirus dan in de jaren ervoor. De aantallen voor difterie (7), acute hepatitis B (100), meningokokkenziekte (137) en tetanus (3) waren ongeveer hetzelfde als in eerdere jaren. Net als in de afgelopen jaren kwamen rodehond en polio niet voor. Meer mensen werden ziek van *Haemophilus influenzae* type b (Hib, 73) dan de afgelopen drie jaar. Opvallend was het aantal mensen met mazelen (539). Dat waren er veel meer dan in 2023–2024 en het waren vooral kinderen die niet zijn gevaccineerd. Eén volwassene is aan mazelen overleden.

In 2025 zijn meer dan 1 miljoen kinderen tot 18 jaar gevaccineerd binnen het RVP. Zij kregen samen meer dan 2,4 miljoen vaccinaties. Ook zijn meer dan 100.000 zwangeren gevaccineerd tegen griep en/of kinkhoest. In totaal kregen zij meer dan 130.000 vaccinaties. Deze vaccinaties beschermen hun baby in de eerste maanden na de geboorte tegen deze ziekten.

In 2025 en 2026 zijn een aantal zaken veranderd in het RVP. Sinds de herfst van 2025 krijgen baby’s in hun eerste levensjaar een prik tegen het RS-virus. Dit virus kan bij jonge kinderen ernstige infecties aan de luchtwegen veroorzaken. In de winter van 2025-2026 kwamen veel minder baby’s met dit virus op de intensive care terecht.

Ook zijn de momenten waarop kinderen de vaccinaties krijgen (het vaccinatieschema) aangepast om hen nog beter te beschermen. Kinderen krijgen bijvoorbeeld hun tweede vaccinatie tegen bof, mazelen en rodehond (BMR) nu als ze drie jaar zijn in plaats van negen jaar. Verder wordt een nieuw pneumokokkenvaccin gebruikt dat tegen meer typen beschermt.

Kernwoorden: vaccinatie, surveillance, Rijksvaccinatieprogramma, *Haemophilus influenzae* type b, HPV, kinkhoest, mazelen, pneumokokkenziekte, Respiratoir Syncytieel-virus, rotavirus

Preface

This report presents an overview of surveillance data on and developments in 2025 and the first four to six months of 2026 that are relevant for the Netherlands with respect to diseases included in the current National Immunisation Programme (NIP): COVID-19, diphtheria, *Haemophilus influenzae* disease, hepatitis B, human papillomavirus (HPV) infection, measles, meningococcal disease, mumps, pertussis, pneumococcal disease, poliomyelitis, respiratory syncytial virus (RSV) infection, rotavirus infection, rubella, and tetanus. It also describes surveillance data for a potential target disease: varicella zoster virus (VZV) infection. In addition, the report presents an update of information on vaccines in development for infectious diseases that have reached the clinical testing phase and are relevant for the Netherlands.

For developments with regard to influenza and tuberculosis, please refer to the reports issued by the RIVM Centre for Infectious Disease Control (CIb), Nivel, and the KNCV Tuberculosis Foundation (See Chapter 1 for these references.)

The report is structured as follows:
Chapter 1 contains a summary introduction of the NIP organisation, new recommendations from the Health Council, and new decisions issued by the Ministry of Health, Welfare and Sports. Recent data regarding vaccination coverage are discussed in Chapter 2. Chapter 3 focusses on public acceptance of vaccination and NIP communication. The burden of diseases covered by the NIP are described in Chapter 4, whilst information on adverse events following immunisation is presented in Chapter 5. Chapter 6 focuses on current NIP target diseases, including COVID-19. The diseases are presented in alphabetical order. For each disease, the section starts with key points outlining the most prominent findings followed by figures and tables. An update of information on epidemiology, the pathogen, the outcome of recent and ongoing studies, and international developments is provided. Vaccination coverage and developments in relation to current NIP target diseases in the Caribbean part of the Kingdom of the Netherlands are presented in Chapter 7. Chapter 8 describes potential new target diseases that are under consideration for (future) vaccination. Lastly, Chapter 9 presents an update of information on vaccines in development for infectious diseases that have reached the clinical testing phase and are relevant for the Netherlands.

Appendix 1 describes the surveillance methods used to monitor the NIP. Appendix 2 reports on mortality and morbidity figures from 2015 onwards, based on various data sources. Appendix 3 provides an overview of changes in the NIP since 2010, whilst Appendix 4 presents the composition of the vaccines used in the 2025–2026 period. Appendix 5 provides an overview of recent publications on vaccination by the National Institute for Public Health and the Environment (RIVM), and Appendix 6 lists relevant websites.

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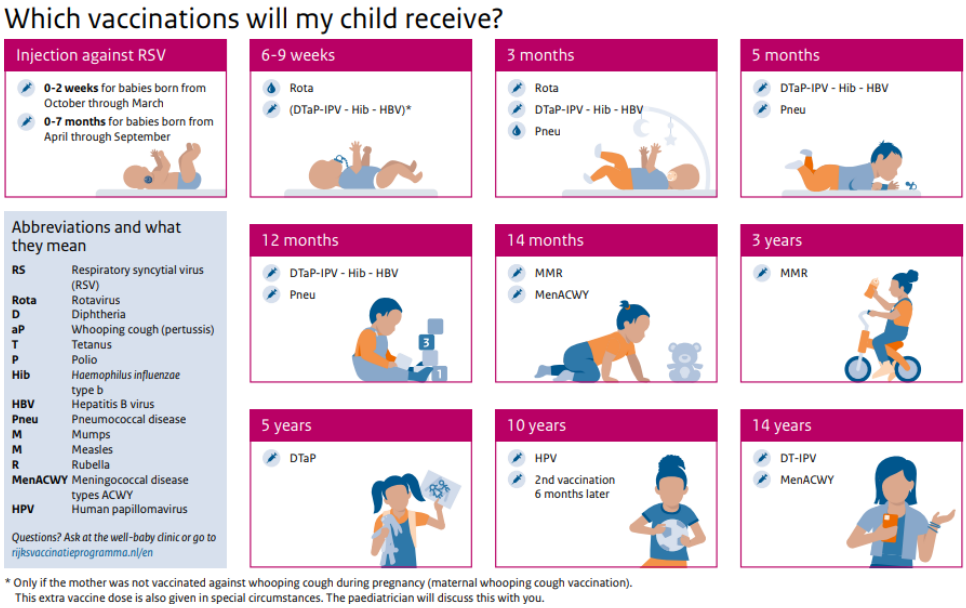
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Comprehensive summary

Current NIP vaccination schedule

Figure 1 The NIP vaccination schedule for 2025 and 2026



Source: Vaccination schedule in English: Vaccination schedule in English: Which vaccinations will my child receive? | Rijksvaccinatieprogramma.nl

As of 2025, changes have been made to the ages at which children receive their vaccinations. Children born from 1 January 2024 onwards will now receive their DTaP-IPV-Hib-HBV and pneumococcal vaccines at 12 months rather than 11 months. Children born from 1 January 2016 onwards will now receive the second MMR vaccine at age three rather than age nine, whilst the DT-IPV vaccine eligibility age has shifted from nine to 14 years of age. For children born from 1 January 2021 onwards, the DTaP vaccine is now administered when they are five, rather than four as it was previously. Furthermore, from autumn 2025, all infants in their first year of life are now offered immunisation against RSV.

Vaccination coverage

Approximately three-quarters of infants received the rotavirus vaccine and RSV (respiratory syncytial virus) immunisation, which were added to the NIP in 2024 and 2025. The coverage was lower than that observed for other infant vaccines.

Changes in vaccination coverage compared to the previous reporting year varied by vaccine. It appears that slightly fewer infants and toddlers were vaccinated. Additionally, probably fewer pregnant people were vaccinated against pertussis. Influenza vaccination coverage among pregnant people remains low, although it does appear to have increased slightly. It is also likely that more ten-year-olds received an HPV vaccine, and more 14-year-olds received the MenACWY vaccine.

The coverage for DTP and MMR vaccination for nine-year-olds appears relatively unchanged.

For several years now, the developments in vaccination coverage have been based upon estimates. Since 2022, some vaccinations are reported to RIVM anonymously and are therefore not included in the figures. Registered vaccination coverage is therefore less accurate and lower than the true coverage, with the exception of overall RSV immunisation and maternal influenza vaccination. Encouragingly, the proportion of anonymous vaccinations continues to decline.

The COVID-19 vaccination coverage for the autumn 2025 round for people aged 60 years and older was 41.7%.

Acceptance of vaccination

The SocioVax programme implemented an annual, representative survey monitor among parents in order to gain longitudinal insights into their willingness to vaccinate and participate in the NIP. The results from 2025 indicate that the key socio-psychological determinants of NIP participation remained very stable: most parents consider vaccination to be important, perceive it as a social norm, are satisfied with vaccination services, and trust healthcare professionals. Healthcare professionals also remain a key informational source for parents when they are making vaccination-related decisions.

Furthermore, the results from 2025 indicate that vaccine hesitancy is most pronounced among parents who partially vaccinate their children. Vaccine hesitancy is most prevalent among parents living in highly urbanised areas and Dutch parents of non-Dutch origin, and tends to increase with the child’s age.

A preliminary analysis of the SocioVax survey among parents with a lower socioeconomic position and parents of Moroccan and Turkish origin shows that the majority are willing to have their child receive all recommended vaccinations. General practitioners are accorded the highest level of trust, whilst government is trusted the least. Using official information sources is positively associated with willingness to vaccinate, whereas relying on critical websites, social media, or no sources is negatively associated with willingness. Most parents report no practical barriers, and parents who do not experience practical barriers are more likely to be willing to vaccinate compared to those who experience at least one barrier.

A SocioVax rapid scoping review (2025) on individuals with a lower socioeconomic position and non-Western origin, identified several key determinants of vaccination uptake. Factors negatively associated with willingness and uptake include lower risk perception, misconceptions, negative attitudes, fear of side effects, distrust, limited health literacy, and practical and language barriers. Positively associated factors include culturally sensitive care, community-based education, clear recommendations from healthcare professionals, and accessible, tailored services that support higher willingness and uptake.

Burden of disease

In the year 2025, the estimated total burden of disease caused by (partially) vaccine-preventable diseases, excluding COVID-19 and influenza, was highest for HPV (17,600 disability adjusted life years (DALYs), invasive pneumococcal disease (9200 DALYs), invasive *Haemophilus influenzae* disease (1,300 DALYs), invasive meningococcal disease (900 DALYs), and rotavirus infection (840 DALYs). Although the disease burden for COVID-19 and influenza in 2025 was not yet available, these diseases ranked among the three conditions with the highest disease burden in the last four years, together with HPV-infection. It is likely they will also rank high in 2025.
For measles, the estimated burden in 2025 was considerably higher than in 2024. For pertussis and rotavirus infection, the estimated burden in 2025 was considerably lower than in 2024.

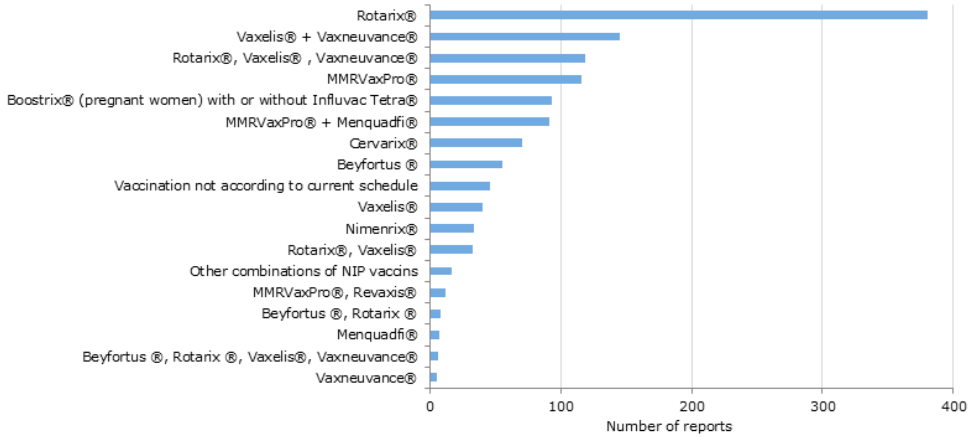
Adverse events

In 2025, Lareb received 1,277 reports representing a total of 4,198 adverse events following immunisation (AEFI) concerning vaccinations for all vaccines included within the NIP, excluding reports related to COVID-19 vaccination. Despite changes within the NIP in 2025, such as the introduction of RSV immunisation, the number of reports decreased by approximately 8%. The number of reported AEFIs per report was between three to four, which is similar to earlier years.

The most frequent local and systemic reactions following COVID-19 vaccination reported to Lareb concerning vaccinations administered between 1 May 2025 and 30 April 2026 were malaise, headache, and fatigue.

Overall, in 2025, no new signals of potentially serious adverse events were found for any vaccine included within the NIP.

Figure 2 Number of adverse event reports for each suspected vaccine in 2025[1]



[1] The number of reports following COVID-19 vaccinations are not shown in this figure. Lareb received a total of 1,146 reports concerning COVID-19 vaccines administered between 1 May 2025 and 30 April 2026.
Source: Lareb.

Current NIP

COVID-19

The coronavirus does not (yet) have a stable seasonal pattern. Although an increase in SARS-CoV-2 circulation was observed from mid-September to the end of October 2025, with a light increase in SARI-ICU admissions, no excess mortality was recorded. From November 2025, circulation remained at a very low level throughout the first half of 2026.

During the autumn of 2025, COVID-19 vaccination was offered to adults aged 60 years and older, people aged 50–59 with a medical risk condition, children and adults with severe health conditions, and healthcare workers who are in contact with vulnerable patients, and/or clients. During autumn 2026 and 2027, the age limit for vaccination will be increased to 70 years, whilst the age limit for other target groups will remain the same as they were in 2025.

Seroprevalence data from the PIENTER Corona study was used to estimate that, between April 2023 and October 2024, 59% of the Dutch population had a SARS-CoV-2 infection; 55% were infected once and 3.7% were infected twice or more.

The effectiveness of COVID-19 vaccination during autumn 2024 against hospitalisation in the Netherlands among persons aged 60 and older was 62% in the low and intermediate medical risk groups, and 55% in the high medical risk group. Between 17 September and 31 December 2024, around 500 hospitalisations were estimated to have been prevented by vaccinations. The results from the prospective cohort study VASCO showed a vaccine effectiveness of 36% for LP.8.1 vaccination against SARS-CoV-2 infection among people aged 60 and older who received a vaccination during autumn 2025 compared to those who had only received their primary series and at least one booster (but not during autumn 2025).

Diphtheria

In the Netherlands, seven diphtheria patients were reported in 2025 (0.04 per 100,000 population). All cases had cutaneous disease and were aged 50–75 years. The number of patients is lower than in the years 2022-2023, which was eight and 14 patients, respectively, and higher compared to the years 2012–2021 and 2024 (between zero and five annually). Ongoing diphtheria outbreaks were experienced by several African countries in 2025. In addition, several European countries reported an increase in diphtheria among vulnerable population groups in 2025. There were no indications of an increase of diphtheria among vulnerable populations in the Netherlands in 2025.

Haemophilus influenzae disease

The overall incidence of invasive disease caused by *Haemophilus influenzae* serotype b (Hib) was 0.40 per 100,000 population (n = 73) in 2025. This marked a return to the high incidence observed in 2020 and 2021 (0.39 per 100,000, n = 67, and 0.40 per 100,000, n = 70, respectively), after three years of incidences around 0.32 per 100,000 between 2022 and 2024 (n = 58, 57 and 55 respectively). However, whilst the high incidence in 2020–2021 were primarily driven by cases in

children under the age of five years, in 2025, this was driven by cases aged 65 years and older. Vaccine effectiveness against invasive Hib disease has remained consistently high at around 90%. The increase in the incidence of invasive non-typeable *Haemophilus influenzae* (NTHi) disease halted in 2025, with an incidence of 1.08 per 100,000 population (n = 194) compared to 1.38 per 100,000 in 2024 (n = 248).

Hepatitis B
The incidence of 0.55 per 100,000 population (n = 100) of acute HBV notifications in 2025 is similar to 2024 when there was an incidence of 0.56 per 100,000 (n = 101). The incidence of acute HBV infections is higher among men than among women (0.87 per 100,000 among men and 0.24 per 100,000 among women). None of the reported acute HBV cases in 2025 involved individuals who were vaccinated against hepatitis B as part of the NIP since 2003. The number of newly diagnosed chronic HBV infections was 771 in 2025, which amounted to 4.3 per 100,000 population, which is comparable to 2024 (4.7 per 100,000, n = 842).

Human papillomavirus (HPV) infection
In 2025, the incidence of cervical cancer was 8.78 per 100,000 women, which was slightly lower compared with the incidence of 10.02 per 100,000 women in 2024. Among women aged 25 to 34 years (i.e., women who were eligible for HPV vaccination within the NIP), the downward trend in incidence observed within the previous years continued in 2025.

The results of a prospective cohort study showed that the vaccine effectiveness (VE) of the bivalent HPV vaccine against genital persistent vaccine-targeted HPV types 16 and 18 remained high (≥91%) up to 11 years after vaccination with a two-dose regimen. In a nationwide population-based study among women who were offered the bivalent HPV vaccine in a three-dose schedule, the incidence of cervical intraepithelial neoplasia grade 3 or worse (CIN3+) and cervical cancer prior to the start of population-based cervical cancer screening (i.e., before age 30) was 76% and 83% lower, respectively, in women vaccinated with three doses compared to women who received no dose.

In a prospective cohort study among boys and girls who received two doses of the bivalent vaccine at 9–10 years and 12–13 years of age, respectively, seropositivity for HPV16/18 was 100% up to ten years after the first dose for girls and 100% up to three years after the first dose for boys. Geometric mean concentrations (GMCs) of HPV16 antibodies at three years post-vaccination were slightly lower in boys compared to girls, whilst the antibody concentration against HPV18 was slightly higher in boys compared to girls.

From September 2026 onwards, the nonavalent vaccine, which offers protection against nine HPV types, instead of the bivalent HPV vaccine is offered within the NIP.

Measles
A large increase in the incidence of measles cases was observed in 2025 (n = 539, 2.39 per 100,000 population) compared to previous years, with 205 cases in 2024 and seven cases in 2023. This increase halted as

six cases were reported in the first four months of 2026. The increase in the incidence of measles in 2025 was mostly among unvaccinated primary school children in the GGD regions Rotterdam, Amsterdam, and Flevoland, with the majority of cases involving people from a migration background. A relatively large number were cases who had been infected abroad, resulting in a variety of molecular sequences observed among the reported cases. One of the adult measles cases in 2025 died as a result of the infection.

Meningococcal disease
In 2025, invasive meningococcal disease (IMD) incidence was 0.76 per 100,000 population (n=137), with 84% due to serogroup B (IMD-B; n=115, 0.64 per 100,000). Whilst the IMD-B incidence had been increasing in 2023 and 2024, it did not increase further in 2025 and the first four months of 2026. The incidence of IMD-ACWY was similar to previous years, and has been low since the introduction of the MenACWY vaccine in 2018. For IMD-B, the incidence was highest among <2-year-olds (5.70 per 100,000 population), followed by those aged 15–24-year-olds (1.45 per 100,000) and children aged 5–14 years (1.33 per 100,000). National developments include an advice published by the Health Council of the Netherlands not to include meningococcal serogroup B vaccination within the NIP. Some of the reasons for this advice were: the low number of cases in the targeted age group; the lack of indirect protection and high fever in infants being a relatively common side effect of the vaccine. Internationally, an outbreak of IMD-B occurred among young adults in England in March 2026. In response, MenB vaccines have been made available for 17–18-year-olds and young adults starting university or other further education up until the end of 2026.

Mumps
In 2025, mumps notifications decreased to 150 cases (0.83 per 100,000 population), compared to 597 in 2024 (3.3 per 100,000). Among the cases, 43% were aged 15 years or younger, 71% were unvaccinated, and more than halve were resident in the Bible Belt region (54%). The Bible Belt epidemic, which began in the final quarter of 2023 and peaked in June 2024, ended in August 2025. In the first three months of 2026, the trend of low mumps transmission observed in the second part of 2025, continued with 15 reported cases.

Pertussis
In 2025, a total of 333 pertussis cases were notified, which corresponds to an incidence of 1.8 per 100,000 population. These numbers are remarkably low compared to the epidemic in 2024, when 18,213 pertussis cases were reported, with an incidence of 102 per 100,000. In 2025, the highest incidence was observed among infants aged 0–5 months (15.7 per 100,000 infants, n=13) and 6–11 months (7.2 per 100,000 infants, n=6). According to notification data, no pertussis deaths were reported in 2025. However, based on preliminary data from Statistics Netherlands (CBS), one infant is reported to have died from pertussis in 2025.

Several European countries recently reported macrolide-resistant B. pertussis (MRBP) strains. Thus far, none of the Dutch pertussis isolates

were MRBP. In 2026, RIVM validated a qPCR-assay to rapidly identify macrolide-resistance in clinical samples. The VE estimate of maternal Tdap vaccination against notification of pertussis infection among 0–2 month-olds with disease onset between 1 April 2020 and May 2026 was 91% (95% CI: 88 to 93%). VE estimates of the infant vaccination series remained high up until the booster dose, which is administered at four years of age, ranging from 96–99% for cases in 2024–2026. Following the booster, VE gradually declined.

Pneumococcal disease
From June 2025 to May 2026 (2025–2026), invasive pneumococcal disease (IPD) incidence was 10.8 per 100,000 population (n=1941), which was lower than in 2024–2025 (12.6 per 100,000). The incidence was lower among all age groups in 2025–2026 compared to 2024–2025. The decrease was largest in <5-year-olds (from 8.6 to 5.2), followed by those aged 65 years and older (from 36.4 to 29.4), 5–49-year-olds (from 3.5 to 3.1) and 50–64-year-olds (from 14.7 to 13.4). The 15-valent Pneumococcal Conjugate Vaccine (PCV15) was introduced within the NIP in the autumn of 2024 and replaced PCV10 which had been in use since 2011. Whilst its introduction has likely contributed to the lower IPD incidences, it is too early to determine the full effects of PCV15.

Poliomyelitis
Since 1994, no cases of poliomyelitis have been reported in the Netherlands, and environmental and enterovirus surveillance in 2025 confirmed the absence of poliovirus circulation. Afghanistan and Pakistan remained polio-endemic. As in 2024, cVDPV2 detections in sewage samples were reported by Germany, Poland, and the United Kingdom in 2025 and WPV1 was detected by the routine environmental surveillance in Germany in October 2025. No poliomyelitis cases were reported in these three countries.

Respiratory syncytial virus (RSV) infection
In the respiratory season 2025–2026, the peak in RSV laboratory detections was in week six, which is later than in previous years. Furthermore, the circulation of RSV appeared to be somewhat lower in this season compared to previous seasons.

In 2025–2026, 87 children <1 year of age were admitted to the pediatric intensive care unit (PICU) with RSV, which was 53–61% lower than in 2022–2023 and 2024–2025 (184 and 222, respectively). This decrease can at least partly be ascribed to the implementation of RSV immunisation in September 2025.

The effectiveness of RSV immunisation against RSV-associated hospitalisation in 2025–2026 was estimated at 82% (95% CI: 56–93%) in children <1 year of age in a preliminary analysis of the Dutch ERIN-study. Sequencing of a respiratory sample of 19 children hospitalised for RSV (from the ERIN-study) showed in one RSV-B sample a substitution (K68E) that is known to be associated with decreased sensitivity to nirsevimab. The child related to this sample was immunised with nirsevimab.

In the BRICK-2 study, 31% (26/83) of children admitted to the PICU with RSV were ≤14 days old at admission. In the ERIN study, 35% (12/34) of children born during the RSV season and admitted to the hospital with RSV were ≤14 days old at symptom onset. Earlier administration of RSV immunisation could prevent some of these cases.

Rotavirus infection
In 2024, 921 rotavirus detections were reported in virological laboratory surveillance, which was lower than the average of 1,091 seen in pre-vaccination years 2018–2019 and 2023 (959 detections). In 2025, this number further decreased to 807 detections.

In 2025, 5,961 all-cause gastroenteritis consultations at general practitioners (GPs) were reported per 100,000 children under the age of five. This was lower than in 2018–2019 (8,876 per 100,000 children), 2023 (7,032 per 100,000), and 2024 (6,613 per 100,000).

In 2025, the estimated number of rotavirus-related hospitalisations among children under five years of age was 2,059, a 13% decrease compared with 2024 (2,350), a 16% decrease compared with 2023 (2,447), and approximately 40% lower than the average of 3,425 hospitalisations in 2018–2019. Similar to 2022–2024, rotavirus genotype G3P8 was the most prevalent in 2025 (67%).

Following the introduction of universal rotavirus vaccination in 2024, a modest decline in rotavirus disease burden has been observed. The impact of vaccination, including its effectiveness, is currently being researched.

Rubella
Since 2015, no new cases of rubella have been reported in the Netherlands. In 2024, one case of congenital rubella syndrome (CRS) was reported in the child of an asylum seeker.

Tetanus
Three tetanus patients, aged 60–85 years, were reported in the Netherlands in 2025, which corresponds to an incidence of 0.02 per 100,000 population. One of the patients died due to the tetanus infection. The three patients were either born prior to the introduction of childhood tetanus vaccinations or their vaccination statuses were unknown.

Immunisation programme in the Caribbean part of the Kingdom of the Netherlands

In general, vaccination coverage of both the NIP for infants, toddlers, schoolchildren, and adolescents within the Caribbean Netherlands and the local national immunisation programmes of the Caribbean countries within the Kingdom of the Netherlands is high. However, due to differences in target groups and vaccination schedules, data on vaccination coverage is not always easy to compare. Overall, the vaccination coverage for COVID-19 vaccination among people aged 60 and older was low, <10% on the three islands where data were available.

In 2026, there were several changes to the vaccination schedules of all islands compared to 2025. These changes differed across the islands. Among other changes, RSV immunisation was added to the schedule of Bonaire, Saba, and Sint Eustatius.

In April 2026, the Health Council advised not to include dengue vaccination in the NIPs of the Caribbean part of the Kingdom of the Netherlands, on the grounds that the benefits may not outweigh the potential risks. The Health Council recommended careful monitoring of dengue epidemiology. New data could lead to a revised recommendation.

In 2025, it was not possible to provide data on notifiable diseases within the NIP for Aruba, Curaçao, Sint Eustatius and Sint Maarten. There were no cases on Saba. On Bonaire, there were two adult cases of pertussis.

Potential NIP candidates

Varicella zoster virus (VZV) infection (varicella and herpes zoster)
The incidence of varicella was 230 per 100,000 population in 2025, which is comparable to the incidence prior to 2020. This may indicate a stabilisation after strong fluctuations between 2020 and 2024. In 2025, an unprecedentedly high incidence of herpes zoster general-practitioner consultations was observed, with 790 per 100,000 compared to 610 per 100,000 in 2024 and between 500 and 600 per 100,000 in 2015-2023. This increase occurred among all age groups above 60 years. The reason for this increase is unknown, but could be related to media attention around herpes zoster vaccination and its potential protective effects against dementia. Two randomised controlled trials have been initiated to evaluate the effect of herpes zoster vaccination on dementia.

Uitgebreide samenvatting

Huidige RVP vaccinatieschema

Figuur 1 Het RVP vaccinatieschema voor 2025 en 2026



* Alleen als de moeder tijdens de zwangerschap niet is gevaccineerd tegen kinkhoest (kinkhoestprik). En in bijzondere situaties. De jeugdarts bespreekt dit met je.

Bron: Vaccinatieschema vanaf augustus 2025 | Rijksvaccinatieprogramma.nl

Vanaf 2025 zijn er wijzigingen aangebracht in de leeftijden waarop kinderen hun vaccinaties ontvangen. Kinderen geboren op of na 1 januari 2024 krijgen de DKTP-Hib-HepB- en pneumokokkenvaccinaties nu op de leeftijd van 12 maanden in plaats van 11 maanden. Kinderen geboren op of na 1 januari 2016 krijgen de tweede BMR-vaccinatie nu rond de leeftijd van 3 jaar in plaats van negen jaar, terwijl de leeftijd voor de DTP-vaccinatie is verschoven van negen naar 14 jaar. Voor kinderen geboren op of na 1 januari 2021 wordt het DKT-vaccin nu gegeven op vijfjarige leeftijd, in plaats van op vierjarige leeftijd. Daarnaast wordt sinds het najaar van 2025 aan alle zuigelingen in hun eerste levensjaar immunisatie tegen RSV aangeboden.

Vaccinatiegraad

Ongeveer driekwart van de zuigelingen kreeg de rotavirusvaccinatie en de RSV-immunisatie, die in 2024 en 2025 aan het RVP zijn toegevoegd, al was de deelname lager dan die aan andere zuigelingenvaccinaties.

Veranderingen in de vaccinatiegraad ten opzichte van het vorige verslagjaar verschilden per vaccin. Het lijkt erop dat iets minder zuigelingen en kleuters zijn gevaccineerd.
Ook zijn zwangeren waarschijnlijk wat minder vaak tegen kinkhoest gevaccineerd. De vaccinatiegraad van de griepprik voor zwangeren is laag, maar lijkt wel iets toegenomen.

Verder kregen waarschijnlijk meer kinderen van 10 jaar de HPV-vaccinatie en meer kinderen van 14 jaar de MenACWY-vaccinatie. Voor de DTP- en BMR-vaccinaties voor 9-jarigen lijkt de vaccinatiegraad ongeveer hetzelfde te zijn gebleven.

De ontwikkeling in de vaccinatiegraad is sinds een paar jaar een zo goed mogelijke inschatting. Sinds 2022 ontvangt het RIVM een deel van de vaccinaties anoniem, waardoor ze niet kunnen worden meegeteld. De geregistreerde vaccinatiegraad is daardoor minder precies en lager dan de werkelijke vaccinatiegraad, met uitzondering van de totale RSV-immunisatie en de maternale griepvaccinatie. Positief is dat het aandeel anonieme vaccinaties blijft afnemen.

De COVID-19-vaccinatiegraad in de najaarsronde van 2025 onder mensen van 60 jaar en ouder was 41,7%.

Acceptatie van vaccinatie

Binnen het SocioVax-programma is een jaarlijkse, representatieve vragenlijstmonitor onder ouders opgezet om langetermijninzichten te verkrijgen in hun bereidheid tot vaccineren en deelname aan het RVP. De resultaten uit 2025 laten zien dat de belangrijkste socio-psychologische determinanten van deelname aan het RVP zeer stabiel zijn gebleven: de meeste ouders vinden vaccinatie belangrijk, zien vaccinatie als sociale norm, zijn tevreden over de vaccinatiedienstverlening en hebben vertrouwen in zorgprofessionals. Zorgprofessionals blijven een belangrijke informatiebron voor ouders bij het nemen van vaccinatiebeslissingen.

De resultaten uit 2025 laten verder zien dat vaccinatietwijfel het sterkst is onder ouders die hun kinderen gedeeltelijk laten vaccineren. Deze twijfel komt vaker voor bij ouders in sterk verstedelijkte gebieden en bij Nederlandse ouders met een niet-Nederlandse achtergrond, en neemt toe naarmate het kind ouder wordt.

Een voorlopige analyse van de SocioVax-enquête onder ouders met een lagere sociaaleconomische positie en ouders van Marokkaanse en Turkse herkomst laat zien dat de meerderheid bereid is hun kind alle aanbevolen vaccinaties te laten krijgen. Huisartsen genieten het grootste vertrouwen, terwijl de overheid het minst wordt vertrouwd. Het gebruik van officiële informatiebronnen hangt positief samen met de bereidheid om te vaccineren, terwijl het vertrouwen op kritische websites, sociale media of helemaal geen bronnen negatief samenhangt met die bereidheid. De meeste ouders rapporteren geen praktische barrières; ouders die geen praktische barrières ervaren, zijn vaker bereid om te vaccineren dan ouders die ten minste één barrière ervaren.

Een verkennende literatuurstudie SocioVax (2025) naar mensen met een lagere sociaaleconomische positie en met een niet-westerse achtergrond identificeerde verschillende belangrijke determinanten van vaccinatiebereidheid en -deelname. Factoren die negatief samenhangen met bereidheid en deelname zijn onder andere een lage risicoperceptie, misvattingen, negatieve attitudes, angst voor bijwerkingen, wantrouwen, beperkte gezondheidsvaardigheden en praktische en

taalbarrières. Positief samenhangende factoren zijn cultureel sensitieve zorg, voorlichting in de gemeenschap, duidelijke aanbevelingen door zorgprofessionals en toegankelijke, op maat gemaakte voorzieningen die een hogere vaccinatiebereidheid en -deelname ondersteunen.

Ziektelast

In 2025 was de geschatte totale ziektelast veroorzaakt door (deels) door vaccinatie te voorkomen ziekten, exclusief COVID-19 en influenza, het hoogst voor HPV (17.600 disability adjusted life years (DALYs)), invasieve pneumokokkenziekte (9.200 DALYs), invasieve *Haemophilus influenzae*-ziekte (1.300 DALYs), invasieve meningokokkenziekte (900 DALYs) en rotavirusinfectie (840 DALYs). Hoewel de ziektelast voor COVID-19 en influenza in 2025 nog niet beschikbaar was, behoorden deze ziekten in de afgelopen vier jaar, samen met HPV-infectie, tot de top drie ziekten met de hoogste ziektelast. Het is waarschijnlijk dat de ziektelast ook in 2025 hoog zal zijn. Voor mazelen was de geschatte ziektelast in 2025 aanzienlijk hoger dan in 2024. Voor kinkhoest en rotavirusinfectie was de geschatte ziektelast in 2025 juist aanzienlijk lager dan in 2024.

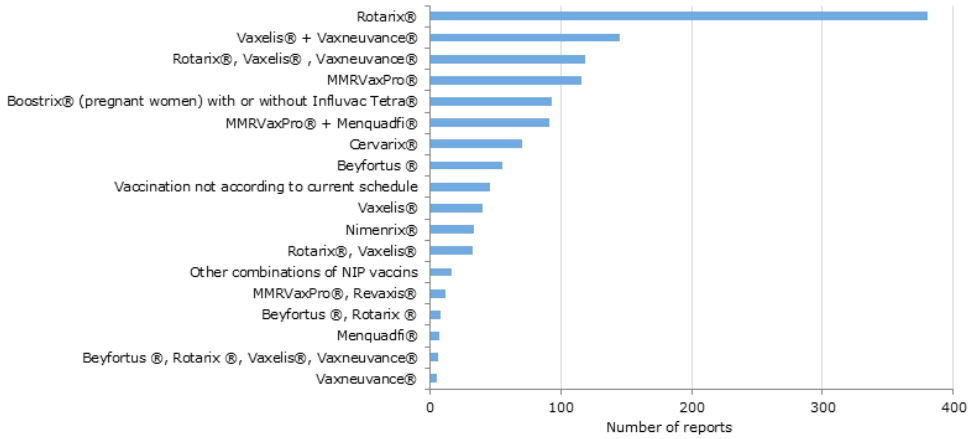
Bijwerkingen

In 2025 ontving bijwerkingencentrum Lareb 1.277 meldingen met in totaal 4.198 mogelijke bijwerkingen na vaccinatie van alle vaccins in het RVP, exclusief meldingen gerelateerd aan COVID-19-vaccins. Ondanks wijzigingen in het RVP in 2025, zoals de introductie van RSV-immunisatie, daalde het aantal meldingen met ongeveer 8%. Het aantal gemelde mogelijke bijwerkingen per melding lag tussen de drie en vier, vergelijkbaar met eerdere jaren.

De meest gemelde lokale en systemische reacties na COVID-19-vaccinaties toegediend tussen 1 mei 2025 en 30 april 2026 waren malaise, hoofdpijn en vermoeidheid.

In 2025 werden geen nieuwe signalen gevonden van mogelijk ernstige bijwerkingen voor vaccins in het RVP.

Figuur 2 Aantal meldingen van mogelijke bijwerkingen per vaccin(s) in 2025[1]



[1] Het aantal meldingen na COVID-19-vaccinatie is niet weergegeven in deze figuur. Lareb ontving in totaal 1,146 meldingen over COVID-19-vaccins die zijn toegediend tussen 1 mei 2025 en 30 april 2026.
Bron: Lareb.

Surveillance en ontwikkelingen – Huidige RVP

COVID-19

Het coronavirus vertoont (nog) geen stabiel seizoenspatroon. Hoewel er tussen medio september en eind oktober 2025 een toename in de circulatie van SARS-CoV-2 werd gezien, met een lichte stijging in SARI-IC-opnamen, werd er geen oversterfte geregistreerd. Vanaf november 2025 bleef de circulatie op een zeer laag niveau gedurende de eerste helft van 2026.

In het najaar van 2025 werd COVID-19-vaccinatie aangeboden aan volwassenen van 60 jaar en ouder, mensen van 50–59 jaar met een medisch risico, kinderen en volwassenen met ernstige gezondheidsproblemen, en zorgmedewerkers die contact hebben met kwetsbare patiënten en/of cliënten. In het najaar van 2026 en richting 2027 wordt de leeftijdsgrens voor vaccinatie verhoogd naar 70 jaar, terwijl de leeftijdsgrenzen voor de overige doelgroepen gelijk blijven aan die van 2025.

Seroprevalentiegegevens uit de PIENTER Corona-studie werden gebruikt om te schatten dat tussen april 2023 en oktober 2024 59% van de Nederlandse bevolking een SARS-CoV-2-infectie had doorgemaakt; 55% was één keer geïnfecteerd en 3,7% twee keer of vaker.

De effectiviteit van COVID-19-vaccinatie in het najaar van 2024 tegen ziekenhuisopname in Nederland bij personen van 60 jaar en ouder was 62% voor mensen met een laag of gemiddeld medisch risico, en 55% voor de groep met een hoog medisch risico. Tussen 17 september en 31 december 2024 werd geschat dat ongeveer 500 ziekenhuisopnames zijn voorkomen door vaccinatie. Resultaten uit de prospectieve cohortstudie VASCO lieten een vaccineffectiviteit (VE) van 36% zien voor LP.8.1-vaccinatie tegen SARS-CoV-2-infectie bij mensen van 60 jaar en ouder die in het najaar van 2025 een vaccinatie ontvingen, vergeleken met mensen die alleen hun primaire serie en ten minste één booster hadden gekregen (maar niet in het najaar van 2025).

Difterie
In Nederland werden in 2025 zeven difteriegevallen gemeld (0,04 per 100.000 inwoners). Alle patiënten hadden een cutane infectie en waren tussen de 50 en 75 jaar oud. Het aantal patiënten was lager dan in 2022 en 2023 (respectievelijk acht en veertien patiënten) en hoger dan in de periode 2012–2021 en in 2024 (tussen nul tot vijf gevallen per jaar). In 2025 deden zich aanhoudende difterie-uitbraken voor in meerdere Afrikaanse landen. Daarnaast meldden verschillende Europese landen een toename van difterie onder kwetsbare bevolkingsgroepen. In Nederland waren er in 2025 geen aanwijzingen voor een toename van difterie onder kwetsbare groepen.

Haemophilus influenzae-ziekte
De totale incidentie van invasieve ziekte door *Haemophilus influenzae* serotype b (Hib) was 0,40 per 100.000 inwoners in 2025. Dit betekent een terugkeer naar de hoge incidentie die in 2020 en 2021 werd gezien (respectievelijk 0,39 per 100,000, n = 67, en 0,40 per 100.000, n = 70), na drie jaren met incidenties rond de 0,32 per 100.000 tussen 2022 en 2024 (n = 58, 57 en 55, respectievelijk). Waar de hoge incidentie in 2020–2021 vooral werd gedreven door gevallen bij kinderen jonger dan 5 jaar, werd de hogere incidentie in 2025 vooral veroorzaakt door gevallen bij mensen van 65 jaar en ouder. De vaccineffectiviteit tegen invasieve Hib-ziekte bleef stabiel hoog rond 90%. De toename in de incidentie van invasieve niet-typeerbare *Haemophilus influenzae* (NTHi)-ziekte kwam in 2025 tot stilstand, met een incidentie van 1,08 per 100.000 inwoners (n = 194) vergeleken met 1,38 per 100.000 (n = 248) in 2024.

Hepatitis B
De incidentie van acute hepatitis B-meldingen was 0,55 per 100.000 inwoners (n = 100) in 2025, vergelijkbaar met 2024 (0,56 per 100.000, n = 101). De incidentie van acute HBV-infecties is hoger bij mannen dan bij vrouwen (0,87 per 100.000 bij mannen en 0,24 per 100.000 bij vrouwen). Geen van de acute HBV-gevallen die in 2025 werden gemeld betrof personen die sinds 2003 voor hepatitis B-vaccinatie in het RVP in aanmerking kwamen. Het aantal nieuw gediagnosticeerde chronische HBV-infecties was 771 in 2025, overeenkomend met 4,3 per 100.000 inwoners, vergelijkbaar met 2024 (4,7 per 100.000, n = 842).

Humaan papillomavirus (HPV)
In 2025 was de incidentie van baarmoederhalskanker 8,78 per 100.000 vrouwen, wat iets lager was dan de incidentie van 10,02 per 100.000 vrouwen in 2024. Bij vrouwen van 25–34 jaar (de vrouwen die in aanmerking kwamen voor HPV-vaccinatie binnen het RVP) zette de dalende trend in incidentie, die in voorgaande jaren werd gezien, in 2025 door.

De resultaten van een prospectieve cohortstudie lieten zien dat de vaccineffectiviteit (VE) van het bivalente HPV-vaccin tegen persisterende genitale HPV-vaccintypen 16 en 18 hoog bleef (≥91%) tot 11 jaar na vaccinatie met een tweedosesschema. In een landelijke populatiebrede studie onder vrouwen aan wie het bivalente HPV-vaccin in een driedosesschema werd aangeboden, was de incidentie van cervicale intra-epitheliale neoplasie graad 3 of hoger (CIN3+) en van

baarmoederhalskanker vóór de start van het bevolkingsonderzoek baarmoederhalskanker (dus vóór de leeftijd van 30 jaar) respectievelijk 76% en 83% lager bij vrouwen die drie doses hadden ontvangen vergeleken met vrouwen die niet waren gevaccineerd.

In een prospectieve cohortstudie onder jongens en meisjes die twee doses van het bivalente vaccin kregen op respectievelijk 9–10- en 12–13-jarige leeftijd, was de seropositiviteit voor HPV16/18 bij meisjes tot tien jaar na de eerste dosis 100% en bij jongens tot drie jaar na de eerste dosis 100%. De geometrische gemiddelde concentraties (GMC's) van antistoffen tegen HPV16 drie jaar na vaccinatie waren iets lager bij jongens dan bij meisjes, terwijl de antistofconcentraties tegen HPV18 juist iets hoger waren bij jongens dan bij meisjes.

Vanaf september 2026 wordt binnen het RVP het nonavalente vaccin, dat bescherming biedt tegen negen HPV-typen, aangeboden in plaats van het bivalente HPV-vaccin.

Mazelen
In 2025 werd een sterke toename in de incidentie van mazelen gezien (n=539, 2,39 per 100.000 inwoners) vergeleken met voorgaande jaren, met 205 gevallen in 2024 en zeven gevallen in 2023. Deze toename kwam tot stilstand: in de eerste vier maanden van 2026 werden zes gevallen gemeld. De toename in 2025 betrof vooral niet-gevaccineerde basisschoolkinderen in de GGD-regio's Rotterdam, Amsterdam en Flevoland, waarbij de meerderheid van de gevallen mensen met een migratieachtergrond betrof. Een relatief groot deel van de gevallen was geïnfecteerd in het buitenland, wat resulteerde in een grote variatie aan moleculaire sequenties onder de gemelde gevallen. Eén volwassen mazelenpatiënt overleed in 2025 aan de infectie.

Meningokokkenziekte
In 2025 was de incidentie van invasieve meningokokkenziekte (IMD) 0,76 per 100.000 inwoners (n=137), waarvan 84% werd veroorzaakt door serogroep B (IMD-B; n=115, 0,64 per 100.000). Terwijl de IMD-B-incidentie in 2023 en 2024 toenam, zette deze stijging in 2025 en in de eerste vier maanden van 2026 niet door. De incidentie van IMD-ACWY was vergelijkbaar met voorgaande jaren en is sinds de introductie van het MenACWY-vaccin in 2018 laag gebleven. Voor IMD-B was de incidentie het hoogst bij kinderen jonger dan 2 jaar (5,70 per 100.000 inwoners), gevolgd door jongeren van 15–24 jaar (1,45 per 100.000) en kinderen van 5–14 jaar (1,33 per 100.000).

Een belangrijke nationale ontwikkeling is het advies van de Gezondheidsraad om meningokokken B-vaccinatie niet op te nemen in het RVP. Redenen voor dit advies zijn onder andere het lage aantal gevallen in de beoogde leeftijdsgroep, het ontbreken van indirecte bescherming en het feit dat hoge koorts bij zuigelingen een relatief vaak voorkomende bijwerking van het vaccin is.

Internationaal werd in maart 2026 een uitbraak van IMD-B gemeld onder jongvolwassenen in Engeland. Als reactie daarop zijn MenB-vaccins tot en met eind 2026 beschikbaar gesteld voor 17–18-jarigen en

jongvolwassenen die starten met een universitaire of andere vervolgopleiding.

Bof
In 2025 daalde het aantal bofmeldingen tot 150 gevallen (0,83 per 100.000 inwoners), vergeleken met 597 in 2024 (3,3 per 100.000). Van de gevallen was 43% 15 jaar of jonger, 71% was niet gevaccineerd en meer dan de helft woonde in de Biblebelt-regio (54%). De bofepidemie in de Biblebelt, die begon in het laatste kwartaal van 2023 en een piek bereikte in juni 2024, eindigde in augustus 2025. In de eerste drie maanden van 2026 zette de trend van lage boftransmissie, die in de tweede helft van 2025 werd waargenomen, zich voort, met slechts 15 gemelde gevallen.

Kinkhoest
In 2025 werden in totaal 333 gevallen van kinkhoest gemeld, overeenkomend met een incidentie van 1,8 per 100.000 inwoners. Deze aantallen zijn opvallend laag vergeleken met de epidemie in 2024, toen 18.213 kinkhoestgevallen werden gemeld, overeenkomend met een incidentie van 102 per 100.000. In 2025 was de incidentie het hoogst bij zuigelingen van 0–5 maanden (15,7 per 100.000 zuigelingen, n=13) en 6–11 maanden (7,2 per 100.000 zuigelingen, n=6). Volgens de notificatiedata zijn er in 2025 geen kinkhoeststerfgevallen gerapporteerd. Op basis van voorlopige CBS-gegevens wordt echter gemeld dat één zuigeling in 2025 is overleden aan kinkhoest.

In meerdere Europese landen zijn recent stammen van macrolideresistente B. pertussis (MRBP) gemeld. Tot nu toe is er in Nederland geen MRBP aangetroffen in kinkhoestisolaten. In 2026 valideerde het RIVM een qPCR-test om macrolideresistentie in klinische monsters snel te kunnen aantonen.

De geschatte vaccineffectiviteit (VE) van maternale DKT-vaccinatie tegen een gemelde kinkhoestinfectie bij 0–2 maanden oude zuigelingen met een eerste ziektedag tussen 1 april 2020 en mei 2026 was 91% (95% BI: 88–93%). De VE-schattingen voor de zuigelingenvaccinatieserie bleven hoog tot aan de booster, die op 4-jarige leeftijd wordt gegeven, en varieerden tussen 96–99% voor gevallen in 2024–2026. Na de booster daalde de VE geleidelijk.

Pneumokokkenziekte
Van juni 2025 tot mei 2026 (2025–2026) was de incidentie van invasieve pneumokokkenziekte (IPD) 10,8 per 100.000 inwoners (n=1.941), lager dan in 2024–2025 (12,6 per 100.000). De incidentie was in alle leeftijdsgroepen lager in 2025–2026 dan in 2024–2025. De grootste daling werd gezien bij kinderen jonger dan 5 jaar (van 8,6 naar 5,2), gevolgd door personen van 65 jaar en ouder (van 36,4 naar 29,4), 5–49-jarigen (van 3,5 naar 3,1) en 50–64-jarigen (van 14,7 naar 13,4).

In het najaar van 2024 werd het 15-valente Pneumokokken Conjugaatvaccin (PCV15) binnen het RVP geïntroduceerd ter vervanging van PCV10, dat sinds 2011 in gebruik was. De introductie van PCV15 heeft waarschijnlijk bijgedragen aan de lagere IPD-incidenties, maar het is nog te vroeg om het volledige effect van PCV15 te bepalen.

Polio
Sinds 1994 zijn er in Nederland geen gevallen van polio gemeld, en rioolwater- en enterovirussurveillance bevestigden in 2025 de afwezigheid van poliovirusciculatie. Afghanistan en Pakistan bleven polio-endemisch. Net als in 2024 werd in 2025 cVDPV2 in rioolwater aangetoond in Duitsland, Polen en het Verenigd Koninkrijk, terwijl in oktober 2025 WPV1 werd gedetecteerd in routinematige rioolwatersurveillance in Duitsland. In geen van deze drie landen werden poliogevallen gemeld.

Respiratoir syncytieel virus (RSV)
In het respiratoire seizoen 2025–2026 lag de piek in RSV-laboratoriumdetecties in week 6, wat later is dan in voorgaande jaren. Daarnaast leek de circulatie van RSV in dit seizoen wat lager dan in eerdere seizoenen. In 2025–2026 werden 87 kinderen jonger dan 1 jaar met RSV opgenomen op een pediatrische intensive care (PICU), wat 53–61% lager was dan in 2022–2023 en 2024–2025 (respectievelijk 184 en 222 opnames). Deze daling kan ten minste gedeeltelijk worden toegeschreven aan de invoering van RSV-immunisatie in september 2025.

De effectiviteit van RSV-immunisatie tegen RSV-geassocieerde ziekenhuisopname in 2025–2026 werd in een voorlopige analyse van de Nederlandse ERIN-studie geschat op 82% (95% BI: 56–93%) bij kinderen jonger dan 1 jaar. Sequencing van een respiratoir monster van 19 met RSV opgenomen kinderen (uit de ERIN-studie) liet in één RSV-B-monster een substitutie (K68E) zien die geassocieerd is met een verminderde gevoeligheid voor nirsevimab. Het kind van wie dit monster afkomstig was, had nirsevimab gekregen.

In de BRICK-2-studie was 31% (26/83) van de kinderen die met RSV op de PICU werden opgenomen ≤14 dagen oud bij opname. In de ERIN-studie was 35% (12/34) van de kinderen die tijdens het RSV-seizoen werden geboren en later met RSV in het ziekenhuis werden opgenomen ≤14 dagen oud bij het begin van de symptomen. Vroegere toediening van RSV-immunisatie zou kunnen helpen om een deel van deze gevallen te voorkomen.

Rotavirus
In 2024 werden 921 rotavirusdetecties gemeld in de virologische laboratoriumsurveillance, lager dan het gemiddelde van 1.091 in de pre-vaccinatiejaren 2018–2019 en 2023 (959 detecties). In 2025 daalde dit aantal verder naar 807 detecties.

In 2025 werden 5.961 consulten voor gastro-enteritis van alle oorzaken bij huisartsen gemeld per 100.000 kinderen jonger dan 5 jaar. Dit was lager dan in 2018–2019 (8.876 per 100.000 kinderen), 2023 (7.032 per 100.000) en 2024 (6.613 per 100.000).

In 2025 werd het aantal rotavirus-gerelateerde ziekenhuisopnames bij kinderen jonger dan 5 jaar geschat op 2.059, een daling van 13% ten opzichte van 2024 (2.350), 16% ten opzichte van 2023 (2.447) en ongeveer 40% lager dan het gemiddelde van 3.425 ziekenhuisopnames

in 2018–2019. Net als in 2022–2024 was het rotavirusgenotype G3P8 in 2025 het meest voorkomend (67%).

Na de introductie van universele rotavirusvaccinatie in 2024 is een bescheiden daling in de rotavirusziektelast waargenomen. Het effect van de vaccinatie, inclusief de effectiviteit, wordt momenteel verder onderzocht.

Rodehond
Sinds 2015 zijn er in Nederland geen nieuwe gevallen van rubella gemeld. In 2024 werd één geval van het congenitaal rubellasyndroom (CRS) gemeld bij het kind van een asielzoeker.

Tetanus
In 2025 werden in Nederland drie tetanusgevallen gemeld bij patiënten van 60–85 jaar, overeenkomend met een incidentie van 0,02 per 100.000 inwoners. Eén patiënt overleed aan de tetanusinfectie. De drie patiënten waren of geboren vóór de introductie van tetanusvaccinatie in de kindertijd of hun vaccinatiestatus was onbekend.

Vaccinatieprogramma in het Caribische deel van het Koninkrijk der Nederlanden

Over het algemeen is de vaccinatiegraad van het RVP voor zuigelingen, peuters, schoolkinderen en adolescenten in Caribisch Nederland en binnen de lokale nationale vaccinatieprogramma's van de Caribische landen in het Koninkrijk der Nederlanden hoog. Door verschillen in doelgroepen en vaccinatieschema's zijn gegevens over vaccinatiegraad echter niet altijd goed met elkaar te vergelijken. De vaccinatiegraad voor COVID-19 onder 60-plussers was over het geheel genomen laag, <10% op de drie eilanden waarvoor gegevens beschikbaar waren.

In 2026 zijn de vaccinatieschema's op alle eilanden gewijzigd ten opzichte van 2025, waarbij de wijzigingen per eiland verschilden. Onder andere werd RSV-immunisatie opgenomen in de schema's van Bonaire, Saba en Sint Eustatius.

In april 2026 adviseerde de Gezondheidsraad om denguevaccinatie niet op te nemen in de RVP's in het Caribische deel van het Koninkrijk, omdat de baten mogelijk niet opwegen tegen de potentiële risico's. De Gezondheidsraad adviseerde om de dengue-epidemiologie zorgvuldig te blijven monitoren. Nieuwe gegevens kunnen leiden tot een herzien advies.

In 2025 was het niet mogelijk om gegevens over meldingsplichtige ziekten binnen het RVP te leveren voor Aruba, Curaçao, Sint Eustatius en Sint Maarten. Op Saba kwamen geen gevallen van meldingsplichtige ziekten voor. Op Bonaire waren er twee volwassen gevallen van kinkhoest.

Potentiële RVP-kandidaten

Varicella zoster virus (VZV) (waterpokken en gordelroos)
De incidentie van waterpokken was 230 per 100.000 inwoners in 2025, vergelijkbaar met de incidentie vóór 2020. Dit kan wijzen op een stabilisatie na sterke fluctuaties tussen 2020 en 2024. In 2025 werd een ongekend hoge incidentie van huisartsconsulten voor gordelroos gezien: 790 per 100.000, vergeleken met 610 per 100.000 in 2024 en tussen 500 en 600 per 100.000 in de periode 2015–2023. Deze toename werd gezien in alle leeftijdsgroepen ouder dan 60 jaar. De oorzaak van deze toename is onbekend, maar zou verband kunnen houden met media-aandacht voor gordelroosvaccinatie en de mogelijke beschermende effecten daarvan tegen dementie. Twee gerandomiseerde gecontroleerde onderzoeken zijn gestart om het effect van gordelroosvaccinatie op dementie te evalueren.

1 Introduction



1.1 NIP vaccination schedule

The vaccination of children against diphtheria, tetanus, and pertussis (DTP) was introduced in the Netherlands in 1952. The National Immunisation Programme (NIP) began in 1957, offering DTP and inactivated polio vaccination (IPV) to all children born from 1945 onwards within a programmatic approach. Today, the programme for all children includes vaccinations against 14 infectious diseases: diphtheria, *Haemophilus influenzae* serotype b (Hib), hepatitis B, human papillomavirus (HPV), measles, meningococcal disease, mumps, pertussis, pneumococcal disease, poliomyelitis, rotavirus, rubella, tetanus, and immunisation against respiratory syncytial virus (RSV) (Figure 1.1). In 2025 and 2026, the vaccination schedule for children consists of 17 doses for each child. Eight of these 17 doses are offered prior to the age of 12 months. In the Netherlands, NIP vaccines are offered, free of charge and on a voluntary basis, to all children up to the age of 18 who are residing in the Netherlands, including those living in the BES islands.

From December 2019, maternal vaccination against diphtheria, tetanus, and pertussis (Tdap) has also formed part of the NIP programme, whilst maternal vaccination against influenza has been offered to pregnant people within the NIP since 2023.

The vaccination schedule presented in Figure 1.1 shows the routine schedule offered to all children in 2025 and 2026. Within this schedule, DTaP-IPV-HBV-Hib vaccinations are offered at the ages of three, five, and 12 months. Children whose mothers did not receive a maternal Tdap vaccination at a sufficiently early moment during their pregnancies, and children who either had a low birth weight or were born prematurely (before 37 weeks' gestation), receive an additional DTaP-IPV-HBV-Hib vaccination at the age of six to nine weeks. Newborns of HBsAg-positive mothers are given an HBV vaccination and HBV immunoglobulin, preferably within two hours of birth, but no later than 48 hours after birth. These infants receive an additional DTaP-IPV-HBV-Hib dose at the age of two months.

If necessary, children who have recently immigrated to the Netherlands receive additional NIP vaccinations in order to provide them with long-term immunity against NIP target diseases. A Youth Health Care physician assesses their vaccination status and offers a personalised vaccination schedule, which includes an HBV vaccination series. Furthermore, all asylum seekers' infant children are offered an additional MMR dose at the age of nine months. For those children who travel to countries where measles is common, MMR vaccination is offered ahead of schedule.

1.1.1 Changes in the NIP vaccination schedule since 1 January 2025

From the beginning of 2025, there have been five adjustments implemented to children's vaccination ages. First, for all children born from 1 January 2024 onwards, the dose of DTaP-IPV-Hib-HBV and Pneu vaccine that was previously given at the age of 11 months, is now given at 12 months. Second, for children born from 1 January 2016 onwards, the dose of the MMR vaccination that was previously given at nine years

of age is now given when children are three. Third, for children born from 1 January 2021 onwards, the dose of the DTaP vaccine that used to be given at the age of four is now given when they are five years old. Fourth, for children born from 1 January 2016 onwards, the dose of DT-IPV vaccine that was previously given at nine years of age is now given at the age of 14. Fifth, from the autumn of 2025 onwards, immunisation against respiratory syncytial virus (RSV) with nirsevimab has been offered to all infants during the first year of their lives. Infants born between April and September 2025 were offered a dose in either September or October 2025. Immunisation was offered within two weeks of birth to those infants born in October, November, and December 2025 and January, February, and March 2026 (immunisation schedule RSV).

Table 1.1 Changes to the NIP vaccination schedule since 1 January 2025

Vaccine	New age	Previous age	Applies to children born on or after
DTaP-IPV-Hib-HBV and Pneu	12 months	11 months	1 January 2024
MMR	3 years	9 years	1 January 2016[1]
DTaP	5 years	4 years	1 January 2021
DT-IPV	14 years	9 years	1 January 2016
RSV[2]	2 weeks–7 months	-	1 April 2025

[1] Children born between 1 January 2016 and 31 December 2021 receive their second MMR vaccination between the ages of five and nine. Children born either on or after 1 January 2022 receive the second MMR vaccination when they are three years old.
[2] Not a vaccine, but a monoclonal antibody.

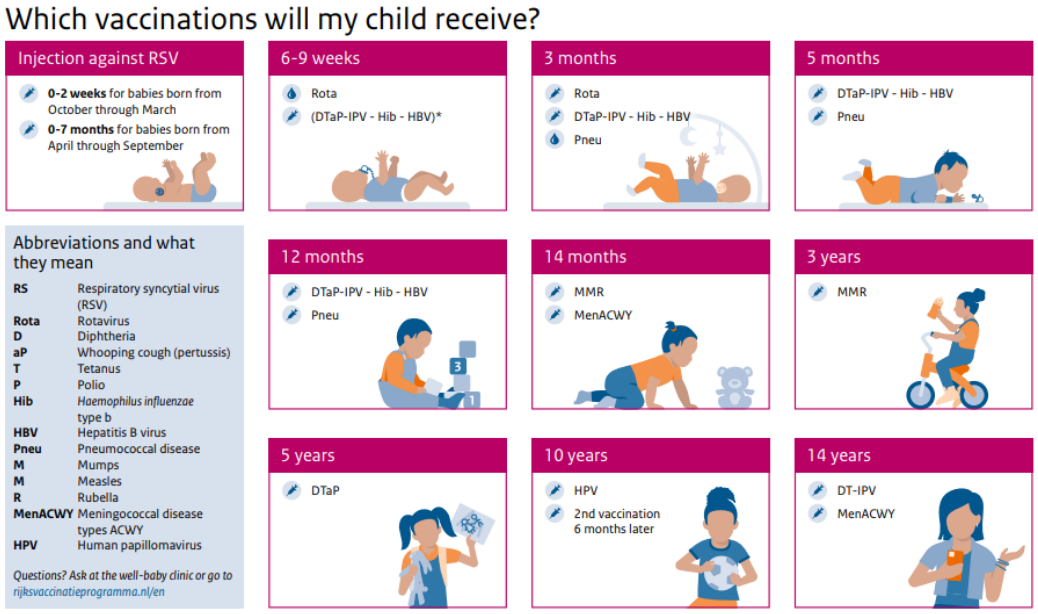
1.1.2 *Number of vaccinated children and pregnant people*

In 2025, the NIP vaccination schedule for children consisted of 17 doses per child. Eight of these 17 doses were offered in the first 12 months. In 2025, at least 1.04 million children (<18-years-old) were immunised under the Dutch NIP. In total, children received more than 2.43 million vaccine doses.

Pregnant people are offered a tetanus-diphtheria-and-acellular-pertussis (Tdap) vaccination 22 weeks into their pregnancy in order to protect their babies against pertussis. Since 2023, pregnant people have also been offered an influenza vaccine. In 2025, more than 108,000 pregnant people were immunised with either one or both vaccinations. In total, pregnant people received more than 134,000 vaccine doses.

Both the numbers of vaccinated children and pregnant people and the number of vaccine doses may be higher. Due to the implementation of informed consent for national registration, it is unknown whether vaccinations that were registered anonymously were offered within the context of the NIP or not (see Chapter 2.3.1.1.1 and the vaccination coverage report, reporting year 2026).

Figure 1.1 The NIP vaccination schedule for 2025 and 2026



Source: Vaccination schedule English: Which vaccines will my child receive? | Rijksvaccinatieprogramma.nl

1.2 New recommendations and decisions

1.2.1 Meningococcal B vaccination

On 27 May 2026, the Health Council advised not to include meningococcal B vaccination within the NIP, on the grounds that the potential health benefits at the population level do not outweigh the associated disadvantages. The epidemiology of invasive meningococcal B infections is carefully monitored, so any increase in the number of cases may prompt a reconsideration of this advice. The Health Council will also provide a new recommendation in the event that either a new vaccine becomes available or the dosage is revised.

1.2.2 Respiratory syncytial virus

1.2.2.1 Infants

On 14 February 2024, the Health Council advised that infants should be passively immunised against RSV within the NIP. For those infants born during the RSV season, the Health Council recommended offering nirsevimab as soon as possible (within two weeks of birth), while the rest should receive this at the beginning of their first RSV season. The Ministry of Health, Welfare and Sport decided to adopt this advice. In 2025, the Ministry of Health, Welfare and Sport asked the Health Council to advice on the use of clesrovimab within the NIP. On 23 June 2026, the Health Council advised that—like nirsevimab—clesrovimab can be used in the immunisation programme: https://www.gezondheidsraad.nl/documenten/2026/06/23/advies-inzet-clesrovimab-binnen-het-immunisatieprogramma-tegen-rsv

1.2.2.2 Older adults

On 27 March 2025, the Health Council advised to wait for further information about the long-term protection provided before implementing an RSV immunisation programme for people aged 75 and

older, medical risk groups and residents of long-term care facilities aged 60–75. The Ministry of Health, Welfare and Sport decided to adopt this advice.

1.2.3 Herpes Zoster vaccination

On 6 March 2025, the Ministry of Health, Welfare and Sport published an update about the herpes zoster vaccination for adults aged 60 and older, expressing its wish to offer this vaccination if it is cost-effective and funding can be secured. In the document 'additional health and welfare agreement', it is stated that the Ministry of Health, Welfare and Sport will provide funding for a programmatic herpes zoster vaccination programme for all 60-year-olds. The implementation is expected to be finalised no later than 2027.

1.2.4 NIP vaccination schedule

On 7 September 2022, the Health Council advised moving four vaccinations to a different age group and replacing one of them with another combination vaccine. This advice was based upon an extensive report. On 28 April 2023, the Ministry of Health, Welfare and Sport approved the recommended changes to the NIP, with the new NIP vaccination schedule being implemented from January 2025 onwards.

1.2.5 Pneumococcal vaccination for children

The Ministry of Health, Welfare and Sport decided to adopt the advised changes to the pneumococcal vaccine in order to protect children against the pneumococcal types that currently cause most invasive pneumococcal disease cases. From 1 September 2024 onwards, the PCV-15 vaccine has been used. In December 2025, the Health Council gave their advice on the new PCV-20 vaccine for children, recommending that PCV-20 should not be introduced for children at this time, as there was insufficient information available on both the effectiveness and level of protection. Furthermore, compared to the PCV-15 vaccine, an extra dose would be required at the age of two months. Once additional information about PCV-20 becomes available, the Health Council will reconsider their position and provide updated advice.

1.2.6 HPV vaccination

The Health Council advised that the 2-valent vaccine should be replaced by the 9-valent vaccine, with a 2-dose schedule. This vaccine protects against additional HPV types. Therefore, the protection against HPV-related cancer is expected to be higher than either the 2- or 4-valent vaccines. The Ministry of Health, Welfare and Sport decided to adopt this advice. The 9-valence vaccine will be used from 1 September 2026 onwards.

1.3 Vaccinations of risk groups

1.3.1 Influenza and pneumococcal vaccination

Influenza vaccination is offered through the National Influenza Prevention Programme (NPG) to individuals aged 60 and older, pregnant people and those at an increased risk of morbidity and mortality following influenza. For developments regarding influenza, please refer to the reports issued by the Centre for Infectious Disease Control (CIb)

and Nivel. See vaccination coverage influenza, surveillance acute respiratory infections, influenza information.

Pneumococcal vaccination for elderly people is offered as part of the National Programme Pneumococcal Vaccination (NPPV). Based on the advice of the Health Council in 2023, the 23-valent vaccine has been replaced by the 20-valent vaccine since the autumn of 2025. The vaccination is offered to those who are turning 60 this year and those born in 1947 or earlier.

1.3.2 Tuberculosis vaccination

Vaccination against tuberculosis is offered to those children whose parents originate from high-prevalence countries. For developments regarding tuberculosis, please refer to the reports issued by the Centre for Infectious Disease Control (CIb) and the KNCV Tuberculosis Foundation, see tuberculosis information.

1.3.3 COVID-19 vaccination

Legally speaking, the COVID-19 vaccination was placed within the Dutch NIP. However, it is important to note that whenever the NIP is mentioned in this report, this refers only to the childhood vaccination programme. Information about COVID-19 vaccination is provided in specific sections of Chapter 2, Vaccination Coverage; Chapter 3, Acceptance of vaccination; Chapter 4, Burden of disease and Chapter 5, Adverse events. Additional information can be found in Chapter 6.1, COVID-19.

1.3.4 Other

Besides including HBV vaccination within the NIP, the Netherlands also has an additional vaccination programme in place that targets groups who are at particular risk of HBV as a result of their sexual behaviour, namely men who have sex with men (MSM), transgender people and sex workers. The Minister of Health, Welfare and Sport decided to provide the combination hepatitis A/B vaccine rather than only hepatitis B to MSM from 1 June 2025 onwards. In 2026, the Health Council is expected to provide advice on the potential structural provision of the combined vaccine to the MSM group. To support this process, in 2026, the RIVM wrote a background document on hepatitis A vaccination for MSM.

Following the 2022 and 2023 pre-exposure prophylaxis (PrEP) vaccination campaigns against mpox in which specific populations were eligible for mpox vaccination, no mpox vaccination was offered in 2024. A new mpox vaccination programme began in the spring of 2025. Information on both the vaccination programme and reported cases of mpox in 2025 can be found in the RIVM report 'Sexually transmitted infections in the Netherlands in 2025'.

Information on vaccinations for both travellers and employees at risk of work-related infections can be found on the following website: www.rivm.nl/vaccinaties.

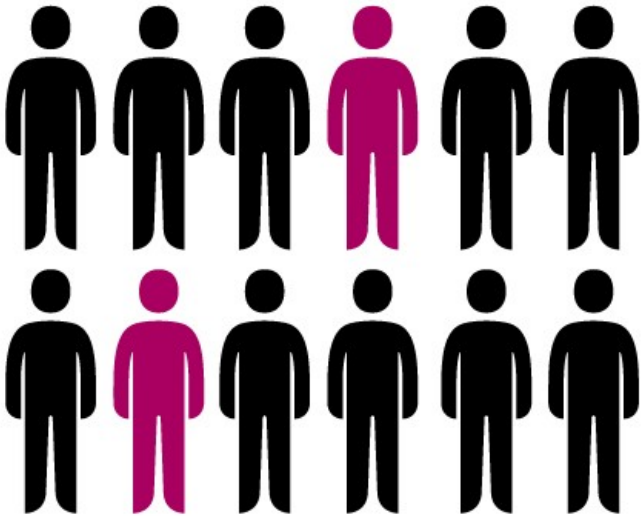
1.4 Vaccination outside of public vaccination programmes

Several registered vaccines in the Netherlands are available to the public outside of vaccination programmes. This includes vaccinations registered for use in children and teenagers (meningococcal B (MenB) vaccination and varicella zoster virus (VZV) vaccination).

For adults, vaccinations against hepatitis B, herpes zoster, HPV, influenza, pertussis, pneumococcal disease, RSV and VZV are available at one's own expense. An overview of these vaccinations can be found on the following webpage: Vaccinaties op eigen verzoek.

Guidelines for professionals for vaccinations against COVID-19, hepatitis A, hepatitis B, herpes zoster, HPV, influenza, MenACWY, MenB, pertussis, pneumococcal disease, RSV and VZV are available on the following website: https://lci.rivm.nl/. This website also provides guidelines for the vaccination of medical risk groups, such as, for example, patients with asplenia.

2 Vaccination coverage



2.1 Key points

- Approximately three-quarters of infants received the rotavirus vaccine and RSV (respiratory syncytial virus) immunisation, which were added to the NIP in 2024 and 2025, respectively.
- Changes in vaccination coverage compared to the previous reporting year varied by vaccine. It appears that slightly fewer infants and toddlers were vaccinated. Additionally, fewer pregnant people were probably vaccinated against pertussis. Influenza vaccination coverage among pregnant people remains low, although it does appear to have increased slightly.
- It is also likely that more ten-year-olds received an HPV vaccine, and more 14-year-olds received the MenACWY vaccine. The coverage for DTP and MMR vaccination for nine-year-olds appears relatively unchanged.
- For several years now, the developments in vaccination coverage have been based upon estimates. Since 2022, some vaccinations are reported to RIVM anonymously and therefore are not included in the figures. Therefore, the vaccination coverage reported in this chapter is both less accurate and also lower than the true coverage, with the exception of overall RSV immunisation and maternal influenza vaccination.
- Overall, vaccination coverage has not yet improved among infants and toddlers. Furthermore, coverage for the first birth cohorts eligible for RSV immunisation and rotavirus vaccination was lower than for other infant vaccines. Encouragingly, the vaccination coverage among adolescents is increasing, and the proportion of anonymous vaccinations continues to decline.
- The COVID-19 vaccination coverage for the 2025 autumn round for those aged 60 and older was 41.7%.

2.2 Tables and figures

Table 2.1 RSV immunisation coverage (%) and rotavirus vaccination coverage (%) for infants by RSV season or age cohort[#][1]

Reporting year	Infants*					
	RSV season	RSV catch-up group[a]	RSV primary group[b]	RSV overall	Cohort	Rota
2026	**2025/2026**	**77.1**	**72.6**	**75.0[c]**	**2024**	**72.8**

* Coverage is assessed at the end of the RSV season for RSV immunisation and at the age of 33 weeks for rotavirus vaccination.
[#]Informed consent affects these figures, excluding anonymous immunisations/vaccinations; underreporting of the actual immunisation/vaccination rate.
[a] Infants born between 1 April and 30 September 2025 who were offered RSV immunisation in September and October 2025.
[b] Infants born between 1 October 2025 and 31 March 2026 who were offered RSV immunisation within two weeks of birth.
[c] 77.1% including anonymous RSV immunisations.

Table 2.2 Vaccination coverage (%) per immunisation/vaccine for age cohorts of infants between 2006 and 2026 [1]

Reporting year	Infants*							
	Cohort	DTaP-IPV	Hib	HBV[a]	PCV **	MMR	MenC/ ACWY	Full ***
2006	2003	94.3	95.4	15.2	-	95.4	94.8	
2007	2004	94.0	95.0	17.1	-	95.9	95.6	
2008	2005	94.5	95.1	17.9	-	96.0	95.9	
2009	2006	95.2	95.9	18.6	94.4	96.2	96.0	
2010	2007	95.0	95.6	19.3	94.4	96.2	96.1	
2011	2008	95.4	96.0	19.4	94.8	95.9	95.9	
2012	2009	95.4	96.0	19.5	94.8	95.9	95.9	
2013	2010	95.5	96.1	19.7	95.1	96.1	96.0	
2014	2011	95.4	95.9	51.4	95.0	96.0	95.8	
2015	2012	94.8	95.4	94.5	94.4	95.5	95.3	
2016	2013	94.2	94.9	93.8	93.8	94.8	94.6	
2017	2014	93.5	94.2	93.1	93.6	93.8	93.5	91.2

Reporting year	Infants*							
	Cohort	DTaP-IPV	Hib	HBV[a]	PCV **	MMR	MenC/ ACWY	Full ***
2018	2015	92.6	93.4	92.2	92.8	92.9	92.6	90.2
2019	2016	92.4	93.1	92.0	92.6	92.9	92.6	90.2
2020	2017	92.6	93.5	92.3	93.0	93.6	93.2	90.8
2021	2018	93.1	93.8	93.0	93.3	93.6	93.3	91.3
2021	2018							(91.9)
2022	2019	92.2	92.9	92.2	92.5	92.3	92.0	90.1
2022	2019	(92.7)#	(93.3)#	(92.7)#	(92.6)#	(92.7)#	(92.8)#	(90.6)#
2023	2020	87.3#	89.0#	87.6#	90.0#	88.8#	88.3#	83.6#
2023	2020	(88.0)#	(89.6)#	(88.2)#	(90.0)#	(89.4)#	(89.4)#	(84.2)#
2024	2021	85.4#	87.2#	85.7#	87.8#	88.3#	88.0#	83.1#
2024	2021	(86.1)#	(87.8)#	(86.3)#	(87.9)#	(88.8)#	(88.9)#	(83.7)#
2025	2022	87.9#	88.6#	87.9#	87.8#	88.1#	87.7#	85.4#
2025	2022	(88.5)#	(89.2)#	(88.5)#	(87.8)#	(88.8)#	(88.7)#	(86.0)#
2026	**2023**	**86.8#**	**87.8#**	**87.0#**	**86.7#**	**87.3#**	**86.9#**	**84.6#**
2026	**2023**	**(87.4)#**	**(88.2)#**	**(87.5)#**	**(86.7)#**	**(87.9)#**	**(87.7)#**	**(85.0)#**

* Vaccination coverage is assessed at the age of two (infants). In grey and between brackets: vaccination coverage including vaccinations that were given later (2021 reporting year: situation on 2 March 2021, 2022 reporting year: situation on 3 March 2022, 2023 reporting year: situation on 7 March 2023, 2024 reporting year: situation on 5 March 2024, 2025 reporting year: situation on 4 March 2025, 2026 reporting year: situation on 9 March 2026).
** Only for infants born on or after 1 April 2006.
*** Key figure for full participation of infants: those who received all offered NIP vaccinations according to schedule at the age of two.
# The informed consent affects these figures, excluding anonymous vaccinations; underreporting of the actual vaccination coverage. The effect was limited for the 2019–2020 cohort. In addition, the DTaP-IPV-HBV-Hib figures for infants born between August 2020 and December 2021 were negatively affected if the youth health care indication for the DTaP-IPV vaccine schedule was missing, and the assessment of the vaccination status was too strict as a result.
[a] Percentage of the total cohort. Universal hepatitis B vaccination was introduced in 2011; previously only risk groups were vaccinated.

Table 2.3 Vaccination coverage (%) for each vaccine for age cohorts of toddlers, schoolchildren, and adolescents between 2006 and 2026 [1]

Reporting year	Toddlers*				Schoolchildren*			Adolescents*				
	Cohort	DTaP-IPV[a]	DTaP-IPV[b]	DTaP-IPV[c]	Cohort	DT-IPV	MMR**	Cohort	HPV♀[d]	HPV♂	Cohort	MenACWY
2006	2000	92.5	1.4	93.9	1995	93.0	92.9					
2007	2001	92.1	1.6	93.7	1996	92.5	92.5					
2008	2002	91.5	1.6	93.1	1997	92.6	92.5					
2009	2003	91.9	2.0	93.9	1998	93.5	93.0					
2010	2004	91.7	2.6	94.3	1999	93.4	93.1					
2011	2005	92.0	2.6	94.7	2000	92.2	92.1					
2012	2006	92.3	2.1	94.4	2001	93.0	92.6	1997	56.0			
2013	2007	92.3	2.4	94.7	2002	93.1	92.9	1998	58.1			
2014	2008	92.0	2.4	94.4	2003	92.7	92.4	1999	58.9			
2015	2009	91.9	2.2	94.1	2004	92.7	92.7	2000	61.0			
2016	2010	91.5	2.1	93.7	2005	92.0	92.0	2001	61.0			
2017	2011	91.1	2.1	93.2	2006	90.8	90.9	2002	53.4			
2018	2012	90.4	2.3	92.7	2007	90.0	90.1	2003	45.5			
2019	2013	90.3	2.2	92.5	2008	89.5	89.5	2004	45.5			
2020	2014	89.9	2.4	92.2	2009	89.7	89.7	2005	53.0			
2021	2015	89.4	2.6	92.0	2010	88.9	89.0	2006	63.1			
2021					2010	(91.9)	(91.9)	2006	(68.0)			
2022	2016	88.5	2.3	90.8	2011	86.3	86.4	2007	47.6		2006	84.3
2022	2016	(89.0)[#]		(91.2)[#]	2011	(89.7)[#]	(89.7)[#]	2007	(66.4)[#]		2006	(85.3)[#]
2023	2017	86.6[#]	2.1[#]	88.7[#]	2012	82.5[#]	82.7[#]	2008	58.5[#]		2007	80.3[#]
2023	2017	(87.1)[#]		(89.1)[#]	2012	(85.0)[#]	(85.1)[#]	2008	(63.6)[#]		2007	(81.3)[#]
2024	2018	80.1[#]	1.8[#]	82.0[#]	2013	78.2[#]	78.5[#]	2012	51.8[#]	45.5[#]	2008	66.1[#]
2024	2018	(80.6)[#]		(82.4)[#]	2013	(81.1)[#]	(81.2)[#]	2012	(60.1)[#]	(54.1)[#]	2008	(68.6)[#]
2025	2019	78.4[#]	1.8[#]	80.2[#]	2014	78.2[#]	79.0[#]	2013	57.5[#]	53.7[#]	2009	69.0[#]

Reporting year	Toddlers*				Schoolchildren*			Adolescents*				
	Cohort	DTaP-IPV[a]	DTaP-IPV[b]	DTaP-IPV[c]	Cohort	DT-IPV	MMR**	Cohort	HPV♀[d]	HPV♂	Cohort	MenACWY
2025	2019	(78.9)[#]		(80.6)[#]	2014	(80.6)[#]	(81.2)[#]	2013	(62.9)[#]	(59.3)[#]	2009	(70.7)[#]
2026	**2020**	**78.9[#]**	**2.0[#]**	**81,0[#]**	**2015**	**78.3[#]**	**79.5[#]**	**2014**	**59.4[#]**	**55.6[#]**	**2010**	**70.6[#]**
2026	**2020**	**(79.4)[#]**		**(81.4)[#]**	**2015**	**(79.9)[#]**	**(81.3)[#]**	**2014**	**(64.5)[#]**	**(60.9)[#]**	**2010**	**(72.2)[#]**

* Vaccination coverage is assessed at the ages of five (toddlers), 10 (schoolchildren), 14/11 (adolescents, HPV), and 15 years (adolescents, MenACWY). In grey and between brackets: vaccination coverage including vaccinations that were given later (2021 reporting year: situation on 2 March 2021, 2022 reporting year: situation on 3 March 2022, 2023 reporting year: situation on 7 March 2023, 2024 reporting year: situation on 5 March 2024, 2025 reporting year: situation on 4 March 2025, 2026 reporting year: situation on 9 March 2026).
** Two MMR vaccinations (in the past, 'at least one MMR vaccination' was reported).
[#] The informed consent affects these figures, excluding anonymous vaccinations; underreporting of the actual vaccination coverage. The effect was limited for the 2016–2017 cohort (toddlers), 2011–2012 cohort (schoolchildren), 2007–2008 cohort (HPV), and 2006–2007 cohort (MenACWY) because it concerned children who largely reached the recommended vaccination age prior to 1 January 2022 (Paragraph 2.3.1.1.1.).
[a] Revaccinated toddlers.
[b] Toddlers who reached basic immunity at the age of 2–5 years were ineligible for revaccination at toddler age.
[c] Sufficiently protected toddlers (sum of [b] and [c]).
[d] From the 2012 cohort onwards, the vaccination coverage is reported at the age of 11 instead of 14 because the vaccination age was lowered.
Source: Præventis

Table 2.4 Estimation of registered vaccination coverage for maternal vaccinations (by cohort or influenza season) (excluding anonymous vaccinations for TDaP, and for maternal influenza vaccination, both with and without anonymous vaccinations)[1]

		Maternal vaccinations			
		TDaP		Influenza	
Reporting year	**Cohort[a]**	**%**	**Influenza season[b]**	**%**	**% incl. anonymous vaccinations**
2021	2020	70			
2022	2021	66[c]			
2023	2022	64[#]			
2024	2023	64[#]	2023/2024	15[#]	16
2025	2024	67[#]	2024/2025	18[#]	20
2026	**2025**	**65[#]**	**2025/2026**	**20[#]**	**22**

[a] 2025: women whose child was born between January and December 2025, 2024: women whose child was born between January and December 2024, 2023: women whose child was born between January and December 2023, 2022: women whose child was born between January and December 2022, 2021: women whose child was born between January and December 2021, 2020: women whose child was born between April and December 2020.
[b] For maternal influenza vaccination, the number of pregnant people eligible for vaccination was estimated at 40/52 of the denominator for maternal TDaP vaccination.
[c] Due to administrative issues, not all maternal TDaP vaccinations were registered in Præventis. In the 2023 reporting year, participation was re-estimated at 71%.
[#]Informed consent affects these figures (excluding anonymous vaccinations; underreporting of the actual vaccination rate).
Source: Præventis

Table 2.5 Overview and status of a selection of the WHO's European Immunisation Agenda 2030 (EIA2030) targets related to the vaccination coverage

WHO target	Definition	Status (reporting year)[a]
Sustained polio-free status	Country certified as having sustained polio-free status by the European Regional Certification Commission for Poliomyelitis Eradication (RCC).	Reached (2025)[b]
Achieved and sustained measles and rubella elimination	Confirmation from the Regional Verification Commission for Measles and Rubella Elimination (RVC) that measles and rubella have been eliminated* or elimination has been sustained.	Reached (2025)[b]
Achieved established hepatitis B control target	The validation process by the ETAGE Hepatitis B Working Group is based upon a composite assessment and focuses on: • ≤ 0.5% hepatitis B surface antigen (HBsAg) prevalence in vaccinated cohorts or in countries with low hepatitis B endemicity, among pregnant people; • ≥ 90% coverage with three doses of hepatitis B vaccine in infants; • ≥ 90% coverage with interventions to prevent perinatal transmission of hepatitis B.	Reached (2020)[c]
Achieved global HPV immunisation target	A coverage of at least 90% for girls aged 15 years who have received the last recommended dose of HPV vaccine.	Not reached (2026)[d]
Evidence of under-immunised populations at subnational levels	There is evidence of under-immunised** populations at the subnational level: • if < 90% of districts*** reach at least 95% coverage for DTP3[e]; or • if ≥ 90% of districts*** reach at least 95% DTP3 coverage, and have had evidence of outbreaks or endemic transmission**** of measles or polio at subnational level among < 5-year-old population in the past three years*****.	Yes, it is likely there are under-immunised populations (e.g., Bible Belt, areas in large cities) (2026)[f]

WHO target	Definition	Status (reporting year)[a]
Sufficient coverage with vaccines included in national immunisation schedules (DTP3, PCV3, MCV2, HPVc)	For the reporting year, a coverage of at least 90% achieved for all four vaccines – DTP3, PCV3, MCV2, and HPVc.	Not reached (2026)[d]

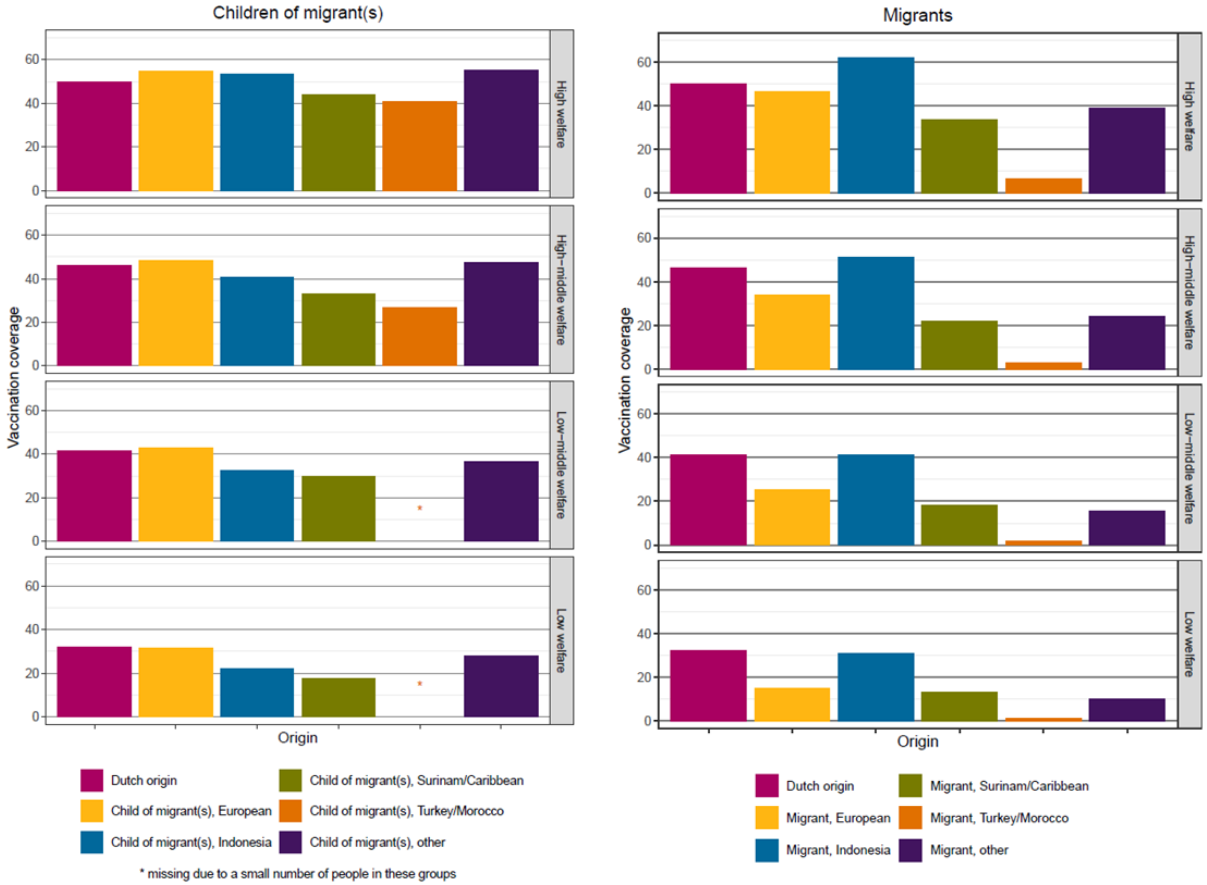
DTP3 = diphtheria/tetanus/pertussis vaccine, third dose; PCV3 = pneumococcal conjugate vaccine, third dose; MCV2 = measles-containing vaccine, second dose ; HPVc = HPV vaccine, completed series.
* Elimination is defined as endemic transmission being interrupted for at least 36 months. Countries that have interrupted endemic transmission for 12 months or 24 months are defined as being on the path to elimination.
** Under-immunised population is defined as those that had no access or some access to immunisation services but did not complete their vaccination schedule in the first year of life. For this indicator, they are operationally measured as those who did not receive DTP3.
*** District is a term that is used to indicate the third administrative level (municipality level in the Netherlands); the first administrative level is the nation.
**** Please refer to the *WHO Vaccine preventable diseases surveillance standards* to see the definition of an outbreak or endemic transmission.
***** Surveillance data of the past two years including the assessed year. For example, the status of 2022 was evaluated on the basis of 2021—2022 surveillance data.
[a] Based upon the most recent available data. When we refer to, for instance, '2024 reporting year', WHO refers to '2023 data'.
[b] The RCC and RVC typically gather in September to review the annual status updates of the WHO European Region Member States for polio, measles, and rubella. On the basis of what we know now, we expect to also reach these targets in the 2026 reporting year.
[c] The assessment by ETAGE is based upon these indicators in combination with the chosen strategy in a country. The Netherlands achieved the goal in 2020. To date, there are no concrete plans for reassessment in the future.
[d] Despite the informed consent (Paragraph 2.3.1.1.1), it is clear that the vaccination coverage for HPVc is below 90%. For the other vaccines, it is likely that 90% coverage is no longer reached. Hence, this target is not reached.
[e] This is the coverage for the 'primary series' determined at the age of 12 months [1]. In the Netherlands, we provide three doses by the age of 12 months, specifically at three, five, and 12 months (except for some extenuating circumstances in which the child also receives a dose at two months). Within this schedule, however, we regard the first two (or three) doses as the 'primary series' (coverage determined at the age of 12 months), and the first three (or four) doses as 'basic immunity' (coverage determined at the age of 24 months). Thus, part of the children for whom DTP3 coverage is presented to WHO fall into this category where the primary series consists of two doses instead of three. The DTP3 coverage presented from the 2020 cohort onwards mostly includes primary series of two doses, but there are also a small number of children who received a primary series of three doses.
[f] Despite the informed consent (Paragraph 2.3.1.1.1), it is unlikely that ≥ 90% of districts would reach at least 95% DTP3 coverage.
Sources:
World Health Organisation. Report of the thirty-ninth meeting of the European Regional Commission for Certification of Poliomyelitis Eradication: 23–24 September 2025. Copenhagen, Denmark 2026. Report No.: WHO/EURO:2026-13538-53312-83469.
World Health Organisation. 14th meeting of the European Regional Verification Commission for Measles and Rubella Elimination Copenhagen, Denmark: WHO Regional Office for Europe 2025 15–17 September 2025.
World Health Organisation. Immunisation Agenda (IA2030) Scorecard. Available from: https://scorecard.immunizationagenda2030.org/country/nld.
Khetsuriani N, Mosina L, Van Damme P, Mozalevskis A, Datta S, Tohme RA. Progress Toward Hepatitis B Control - World Health Organization European Region, 2016–2019. MMWR Morb Mortal Wkly Rep. 2021;70(30):1029–35.
World Health Organisation. Compendium of indicators for the monitoring and evaluation framework of the European Immunization Agenda 2030. Copenhagen, Denmark: WHO Regional Office for Europe 2024.

Table 2.6 Registered COVID-19 vaccination coverage for the autumn round in 2025, from week 38 up to and including week 49, 2025[1-2]

Age group (years)	Birth cohort	Vaccine coverage for the autumn round in 2025
60+	1965 or before	41.7%

[1] Data source: CIMS.
[2] The COVID-19 vaccination was available for people aged 60 and older, people between the ages of 50 and 59 who receive an annual invitation to have the flu vaccine, children and adults at a high medical risk for severe COVID-19 (such as severely immunocompromised persons) and healthcare workers who are in direct contact with vulnerable patients.

Figure 2.1 COVID-19 vaccination coverage for the autumn round in 2025 for people aged 60 years and older, by financial welfare[1] and country of origin[2]



[1] Financial welfare is a combined measure of the standardised disposable income of a household and household wealth (CBS). All households in the Netherlands are ordered on the basis of this combined measure and subsequently divided into ten groups (percentiles). In both figures, four financial welfare categories are shown. 'High welfare' comprises persons from the 20% of households with the highest financial welfare, 'High-middle' comprises persons from the subsequent 30% of households, 'Low-middle' comprises persons from the subsequent 30% of households, and 'Low welfare' comprises persons from the 20% of households with the lowest level of financial welfare. For 2.9% of the persons aged 60 and older, information about

their level of financial welfare was missing. These people are therefore not included in the Figures. This percentage is slightly higher for migrants and children of migrants (4.7%) than for persons of Dutch origin (2.6%)

[2] Migrant: Dutch citizen born abroad. Child of migrant: Dutch citizen with one or both parents born abroad. Dutch origin: person born in the Netherlands whose parents were both born in the Netherlands.

2.3 National developments

2.3.1 Vaccination coverage

2.3.1.1 Vaccinations for infants, toddlers, schoolchildren, adolescents and pregnant people

The vaccination coverage of the NIP is reported in the annual vaccination coverage report, and accompanied by comprehensive interpretation [1]. A brief summary of this report can be found below.

Changes in vaccination coverage compared to the previous reporting year varied by vaccine. Taking into account the number of anonymous vaccinations, it appears that slightly fewer infants and toddlers were vaccinated. Additionally, fewer pregnant people were probably vaccinated against pertussis. Influenza vaccination coverage among pregnant women remains low, although it does appear to have increased slightly.

It is also likely that more ten-year-olds received an HPV vaccine, and more 14-year-olds received the MenACWY vaccine. The coverage for DTP and MMR vaccination for nine-year-olds appears relatively unchanged. Immunisation against respiratory syncytial virus (RSV) and vaccination against rotavirus were added to the NIP in 2025 and 2024, respectively. In the first RSV season (2025/2026) in which RSV immunisation was offered, approximately three-quarters of infants received the immunisation. For eight out of ten children, the RSV immunisation was administered at the correct time according to the NIP guidelines. Within the catch-up group, this applied to over nine out of ten children if the extended period was also included (8 September to 22 October 2025 rather than 15 September to 15 October).
The coverage for the first birth cohort (2024) that was offered vaccination against rotavirus was slightly lower compared to RSV-immunisation coverage. However, slightly more children received the rotavirus vaccination at the correct time of administration according to the NIP guidelines, i.e. over nine out of ten children compared to the RSV immunisation.

Overall, vaccination coverage has not yet improved among infants and toddlers. Furthermore, coverage for the first birth cohorts eligible for RSV immunisation and rotavirus vaccination was lower than for other infant vaccines. Encouragingly, vaccination coverage among adolescents is increasing, and the proportion of anonymous vaccinations continues to decline.

2.3.1.1.1 *Limitations*

Informed consent
Since 1 January 2022, informed consent has been required to allow sharing of vaccination data, including personal identifiers, with RIVM. This informed consent also applies to COVID-19-vaccination (Paragraph 2.3.1.2). As a result, RIVM can no longer exactly determine vaccination coverage. Anonymous vaccinations cannot be included in vaccination coverage calculations, because year of birth, sex, place of residence, and vaccination dose are unknown. Therefore, the vaccination coverage RIVM reports is lower than the true vaccination coverage.

Furthermore, the proportion of anonymous vaccination differs across years. Consequently, it is difficult to compare vaccination coverage across years, because the influence of informed consent varies. It is possible for the registered vaccination coverage to increase due to a lower proportion of anonymous vaccination, whereas in actuality the vaccination coverage may be equal to or lower than that of the year before. Therefore, the process of interpreting the changes in vaccination coverage is complex.

In 2025, 2% of vaccinations administered within the NIP were reported anonymously, compared to 3% in 2024 [1]. For COVID-19 vaccination, 95% of those who were vaccinated at municipal health services during the autumn round in 2025 provided informed consent for registration in CIMS, compared to 98% the previous autumn.

2.3.1.2 COVID-19 vaccination for adults aged 60 and older

The autumn round in 2025 began on 15 September and ended on 5 December 2025. At the end of the autumn round in 2025, the vaccination coverage for persons aged over 60 was 41.7% (Table 2.6). The vaccination coverage differed by both age and region. Vaccination coverage among over-60 year olds was lowest for people aged 60–64 (24.7%) and highest for those aged 80–84 (55.8%). The vaccination coverage was lower than average in various large cities and in various municipalities in Friesland, Oost-Groningen, Overijssel and in the Bible Belt. Relatively high vaccination coverage was observed in various municipalities in Utrecht, Gelderland and Noord-Brabant. Further information is available in the report 'Deelname COVID-19-vaccinatie in Nederland' (in Dutch)'.

Vaccination coverage among the over-60s was 4.9% lower in the autumn round in 2025, compared to the previous year (41.7% versus 46.6%).

2.3.2 Vaccination coverage by sociodemographic determinants

2.3.2.1 Immunisation programme for infants, toddlers, schoolchildren, adolescents, and pregnant people

The ongoing RIVM 'Detervax' study aims to identify the sociodemographic factors that are associated with changes in childhood vaccination uptake over time. These findings aim to inform public health interventions and policies that set out to both improve MMR and DTaP-IPV vaccination coverage and reduce health inequities. This situational analysis is the first step in the WHO Tailoring Health Programmes (THP) approach. On the basis of these findings, further research in the SocioVax research programme (see Chapter 3) explores the decision-making process, barriers, and drivers in groups with lower coverage in order to inform targeted public health interventions. The implementation and evaluation of these interventions in collaboration with Youth Health Care organisations is the last phase of the WHO THP.

A recent study within Detervax used the CBS Remote Access Environment to link individual vaccination data from Praeventis with nationwide sociodemographic data, such as maternal education, income, urbanisation, and family size among all children born in the Netherlands between 2016 and 2024 [2]. The aim of the study was to evaluate both

the immediate and long-term impact of the COVID-19 pandemic upon first-dose DTaP-IPV vaccination uptake. The study demonstrated that vaccination uptake was highest in the pre-pandemic period and declined slightly both during and after the pandemic. Immediately after the onset of the pandemic, an initial significant drop in vaccination uptake was found (-1.15 percent points). Simultaneously, the increasing trend in vaccination uptake that was identified pre-pandemic significantly decreased after the beginning of the pandemic. At the end of the pandemic, a significant drop was again observed (-0.66 percent points). This also coincided with the start of informed consent, likely explaining the decline. Next, the already observed decrease in vaccination uptake during the pandemic dropped at an even faster rate after the end of the pandemic. When comparing siblings within families born in different phases of the pandemic, it became clear that children eligible during and after the pandemic had lower odds of being vaccinated compared to their pre-pandemic siblings. Moreover, later birth order (e.g., second child, third child, etc.) was also associated with lower odds compared to first-born siblings. Both analyses thus indicate that the COVID-19 pandemic had a negative impact upon childhood vaccination uptake, which may reflect lingering pandemic effects and/or new post-pandemic factors [2].

2.3.2.2 COVID-19 vaccination

The RIVM 'Co-Detervax' study aims to identify the sociodemographic factors that are associated with COVID-19 vaccination uptake. These findings can support public health interventions and policies to both optimise COVID-19 vaccination coverage and reduce health inequities. In this study, individual vaccination data from CIMS is linked with sociodemographic data in the CBS microdata environment. This is done, firstly, to assess vaccine coverage among key socio-demographic subgroups. Figure 2.1 presents the COVID-19 vaccination coverage for migrants by country of origin (left panel), where a migrant is defined as a person who is born outside of the Netherlands. Vaccination coverage is lower for all the subgroups compared to the previous year (2024), but the trends are similar. The coverage among migrants born in Turkey or Morocco is much lower than that of all the other groups. This difference occurs irrespective of the level of financial welfare. The right panel shows the same information for children of migrants: people born in the Netherlands, whose parents were both born abroad. Here, however, the differences are much less pronounced.

2.4 International developments

Vaccination coverage trends

According to the World Health Organization (WHO) and UNICEF, global childhood immunisation coverage slightly improved in 2025. Coverage for both the first dose of diphtheria, tetanus and pertussis (DTP1) vaccine and for the three-dose series increased by one percentage point. However, measles coverage stalled and did not increase compared to 2024: 84% of children received their first measles dose (MCV1). This is well below the WHO target of 95% that is needed to prevent outbreaks. As a result, 57 countries reported measles outbreaks in 2025. Additionally, despite a decline in the number of zero-dose children, there were still 13.5 million in 2025, with a disproportionate share living in

fragile, conflict-affected or vulnerable countries. During the Seventy-ninth World Health Assembly in May 2026, Member States warned that progress towards the Immunisation Agenda 2030 (IA2030) goals is off track amid declining routine coverage, growing inequalities in access and rising measles outbreaks.

In the WHO European region, childhood vaccination coverage has still not regained its 2019 pre-COVID-19 pandemic levels. Coverage for three of four key childhood and adolescent vaccinations remained unchanged from 2024: 91% for DTP3, 83% for the third dose of the pneumococcal conjugate vaccine (PCV3) and 89% for MCV2. For the completed series of human papillomavirus (HPVc) vaccine, coverage among girls increased slightly (from 39% to 41%), whilst coverage among boys remained at 26%. The WHO European immunisation agenda 2030 (EIA2030) aims to achieve at least 90% coverage for these vaccinations in order to achieve the full benefits of vaccination [3]. Although in the Netherlands it is not possible to obtain precise vaccination coverage figures due to informed consent (see paragraph 2.3.1.1.1), it is highly probable that this target has not been reached. Based upon individually registered vaccinations (excluding anonymous vaccinations), coverage for DTP3, PCV3 and MCV2 is at 87%, 87% and 80%, whilst HPVc coverage is 65% for girls and 61% for boys. Other selected EIA2030 targets as well as the extent to which they have been reached are presented in Table 2.5.

Varying degrees of political commitment, vaccine hesitancy and structural barriers among underserved populations in the WHO European region have contributed towards stagnating and unequal immunisation coverage, despite vaccines being widely available [4]. A 2025 Lancet article, which used the WHO Health System Building Blocks framework, proposed five recommendations to address this: grounding programmes in the fundamental and non-discriminatory right to health, establishing clear protocols, tailoring and co-creating strategies to local needs, integrating services into everyday settings, and strengthening data systems to track coverage (gaps). Investments should be made into a diverse, culturally competent health workforce, health promotion and disease prevention [4].

Recent EU-funded efforts in Romania illustrate the potential effectiveness of such interventions. Following qualitative research on barriers and enablers, a training programme was implemented for primary healthcare providers on MMR vaccination and empathetic communication. Preliminary monitoring showed an overall 20 percentage point increase in MMR1 coverage during the first quarter of 2026 in the targeted counties.

In the Netherlands, Youth Health Care Organisations, the Ministry of Health, Welfare and Sport and RIVM collaborate on tailored interventions designed to raise vaccination coverage within neighbourhoods and population groups with low uptake.

2.5 Literature

1.* van Lier EA, Holwerda MR, Westra M, Giesbers H, Hament J-M, van der Maas NAT, et al. Vaccinatiegraad Rijksvaccinatieprogramma Nederland - verslagjaar 2026 [Vaccination coverage National Immunisation Programme in the Netherlands. Reporting year 2026]. Bilthoven: National Institute for Public Health and the Environment 2026. Report No.: RIVM report 2026-0001.
2.* Pijpers J, Haverkate M, van Gaalen R, Hahne S, de Melker H, S vdH. Assessing the impact of the COVID-19 pandemic on routine childhood vaccination uptake, The Netherlands, 2016-2025. Eurosurveillance. Forthcoming.
3. World Health Organisation. European Immunization Agenda 2030. Copenhagen, Denmark: WHO Regional Office for Europe 2021.
4. Maassen A, Nejat A, de Zeeuw J, Tavoschi L, Karnaki P, Fiľakovská Bobáková D, et al. Why are Europe's underserved still unprotected? A call to address structural barriers to immunisation. The Lancet Primary Care. 2025;1(6).

*publication with RIVM authors.

3 Acceptance of vaccination



3.1 Key points

- The results from the annual representative SocioVax monitor suggest that the key socio-psychological determinants of NIP participation remained very stable during 2025. Most parents consider vaccinations to be important, perceive them as a social norm, and are satisfied with vaccination services.
- The results from the Sociovax monitor in 2025 indicate that vaccine hesitancy is most pronounced amongst parents who only partially vaccinate their children. Vaccine hesitancy is most prevalent amongst parents living in highly urbanised areas (compared to non-urban areas), Dutch parents from a non-Dutch origin, and when children age.
- SocioVax conducted a single survey study amongst parents with a lower socioeconomic position, Dutch parents of Moroccan origin, and Dutch parents of Turkish origin in order to gain insight into willingness to vaccinate and participation in the NIP.
- The SocioVax rapid scoping review (2025) of specific groups, individuals with a lower socioeconomic position and non-Western origin identified several key barriers to, and drivers of, vaccination uptake.
- SocioVax regional projects support tailored research into vaccination amongst specific groups within the NIP. Since 2025, MHS and YHC organisations have received funding to conduct four regional studies. These projects integrate practice-based insights with scientific evidence in an effort to better understand vaccination willingness and uptake amongst groups characterised by persistently low or declining uptake.

3.2 Childhood vaccinations

The RIVM conducts research as part of the SocioVax programme, which is a component of a governmental subsidised programme 'Moving Forward with Vaccination' initiative. This research sets out to examine which socio-psychological factors are associated with participation in the NIP. In recent years, several studies have been carried out as part of the SocioVax programme. The insights yielded from this research can be found on the SocioVax webpage. This report underscores a number of studies conducted in 2025. The results for RSV are presented in Chapter 6.12.

3.2.1 SocioVax monitor 2025: insight into vaccination willingness for the National Immunisation Programme (NIP)

SocioVax has implemented a survey monitor to study vaccination willingness within the specific context of the NIP. SocioVax repeats this survey annually amongst a representative sample of parents in the Netherlands. The questions address both vaccination willingness and participation, experiences with vaccination services, as well as various beliefs and opinions that parents may hold about vaccinations. The answers to these questions provide insight into what motivates parents' vaccination decisions as well as the practical considerations that influence their decision to vaccinate or not. It also sheds light on potential differences between groups of parents and helps explain these differences. Given that the survey is repeated amongst the same group of individuals, it is also possible to investigate whether any changes occur over time with respect to how parents perceive childhood vaccinations.

The trend analysis of the first three rounds of the survey monitor demonstrates that many determinants have remained highly stable over the period 2024–2025. For example, it still appears that:

- The vast majority of parents consider vaccinations to be important for protecting their children. In all of the subgroups - from different educational backgrounds and origins- parents perceive that most other parents within their social environment consider it important to have their children vaccinated.
- There are also discernible differences between parents with respect to both how important they consider vaccinations to be and the level of concern or trust they have in the government regarding vaccinations. These beliefs are associated with the willingness to vaccinate: the more positive parents are about vaccinations, the greater the likelihood that they will have their child fully vaccinated.
- The vast majority of parents, both those with vaccinated and either non-vaccinated or partially vaccinated children, find it reasonably or very easy to obtain a vaccination for their youngest child. Furthermore, most parents are reasonably or very satisfied with their most recent experience of vaccinations.

3.2.2 SocioVax monitor 2025: analysis of vaccine hesitancy

We also used the survey monitor to identify both the proportion of parents who are hesitant about vaccinating their child or children and the factors associated with this. It is important to stress that vaccine

hesitancy is not the same as vaccine refusal. By vaccine hesitancy, we refer to people who experience uncertainty about the decision to vaccinate their children or not. Parents who do not experience such uncertainty are referred to as non-hesitant, irrespective of whether they ultimately have their child vaccinated or not. Below are the key findings from the policy brief Results of the SocioVax Monitor 2025: Insight into Vaccine Hesitancy:

- Vaccine hesitancy is most prevalent amongst parents whose children are only partially vaccinated; four out of ten of these parents express hesitancy. Those parents who have their children receive either all or none of the recommended vaccinations, experience less doubt (less than two out of ten).
- Vaccine hesitancy is more prevalent amongst parents living in highly urbanised areas (compared to non-urban areas), Dutch parents from a non-Dutch origin, and when children age.
- Parents who are hesitant generally hold fewer positive beliefs about vaccinations than those who are not hesitant. There is not one specific belief that underpins vaccine hesitancy. The most notable differences between hesitant and non-hesitant parents pertain to both the degree of concern about vaccine safety (higher amongst hesitant parents) and the level of trust in health care providers and government regarding vaccinations (lower amongst hesitant parents).
- Parents who are hesitant and parents who are not hesitant most frequently refer to health care providers, government communications, vaccination invitations, and family and friends as being the most important sources of information. However, hesitant parents refer to government communications and vaccination invitations less often than parents who are not hesitant. Amongst the hesitant parents, one in ten refer to alternative websites or social media as an important source of information when making their vaccination decisions, which is more than amongst non-hesitant parents.

Based upon these findings, the recommendations for policy and practice are to, firstly, provide vaccine-specific information about the advantages and disadvantages of vaccines, especially for vaccines administered at older ages (such as DTP and HPV), as parents may have more doubts about these. Secondly, be transparent about the effectiveness, safety, and potential side effects of vaccines, and present this alongside the risks of not vaccinating their children. Thirdly, specific concerns and questions from parents should be addressed in all communications, being mindful of cultural norms and values. Take concerns seriously and avoid stigmatising parents who express hesitancy, as this helps to build trust.

3.2.3 *Understanding vaccine hesitancy, willingness, and experiences within specific Dutch population groups*

In addition to the SocioVax-survey monitor amongst the general Dutch population, SocioVax conducted a single survey study (n = 824) with specific groups within the population amongst whom childhood vaccination rates are decreasing and who are underrepresented in the SocioVax-survey monitor. These groups include parents with a lower socioeconomic position (SEP), Dutch parents of Moroccan origin and

Dutch parents of Turkish origin. The survey was conducted both through an online representative panel and via street interviews, in order to reach as many parents as possible from these specific groups. The survey questions addressed vaccination willingness and participation, experiences with vaccination services, use of information sources in decision-making as well as various beliefs and opinions parents may hold about vaccinations.

Although the data analysis of this single survey study amongst specific population groups is still ongoing, preliminary analyses of the single survey study (n = 824) indicate that 63.5% of parents reported that they were willing to have their child receive all recommended vaccinations. With respect to vaccination, parents reported the highest levels of trust in general practitioners, with 67.5% agreeing with this statement. On the contrary, only 38% of parents reported that they trusted the government, which was the lowest percentage out of all the institutions included. Regarding risk perception, 58.6% of parents agreed that an unvaccinated child is likely to contract one of the diseases that vaccines protect against, whilst 69.5% agreed that it is serious when a child contracts one of these diseases. In relation to social norms, 65% of parents stated that most parents they know in the Netherlands vaccinate their children. Moreover, 56.9% of parents thought that most of their friends and family in the Netherlands want them to vaccinate their own child.

With respect to the decision-making process, 28.2% of parents reported not using any information sources when deciding whether or not to vaccinate their child. The vaccination invitation and informational leaflet sent by post were the most frequently used information sources (45.4%), followed by the general practitioner or another health care professional (30.7%), and websites of the government, RIVM, or GGD (24.2%). These three information sources also had the strongest positive associations with vaccination willingness (all $r > 0.161$, all $p < 0.001$). The three sources with the strongest negative associations were: websites that are critical of vaccinations, social media, or no sources at all (all $r < -0.115$, all $p < 0.001$).

Furthermore, 75.8% of respondents reported experiencing no practical barriers to vaccination. The most frequently reported practical barrier was fear of needles amongst children (9.1%), which is in line with the SocioVax-monitor amongst the general population. Logistic regression analysis indicated that parents who experienced no practical barriers were nearly three and a half times more likely to be willing to have their children receive all of the recommended vaccinations compared to parents who experienced at least one practical barrier ($B = 1.230$, $Exp(B) = 3.422$, $p < 0.001$).

It is important to note that these findings apply to the entire sample. In an upcoming publication, a more detailed analysis will be presented as well as analyses for specific groups within the sample (parents with a lower SEP, Dutch parents of Moroccan origin and Dutch parents of Turkish origin).

3.2.4 *Rapid scoping review determinants of vaccination and interventions for specific groups*

In 2025, SocioVax conducted a rapid scoping literature review in order to gain insight into the determinants of vaccination amongst groups where vaccination coverage for NIP vaccines, is relatively low. The literature review focused on systematic reviews and meta-analysis pertaining to two key groups: individuals with a lower SEP and individuals with a non-Western origin. Literature searches were carried out in PubMed and PsycINFO, and only studies published from January 2014 up to January 2025 were included. Given cross-country differences in health systems, vaccination programmes and sociocultural contexts, findings from the included studies may not be directly comparable and should thus be interpreted with caution with respect to their applicability to the Dutch context. A detailed methodological breakdown and full results are available in the following policy brief: SocioVax literature review: Determinants of vaccination uptake in children.

Thinking and feeling

With respect to these groups, the findings indicate that a lower risk perception, certain misconceptions (notably regarding HPV and sexuality), and negative attitudes towards vaccination are important barriers to vaccine willingness and uptake. Such attitudes may be shaped by cultural or religious norms, whilst additional factors include fear of side effects, distrust in health care and science, and limited knowledge or health literacy.

Social processes

Social and cultural norms, alongside experiences of exclusion or discrimination, significantly influence vaccination decisions amongst these groups. Community-level attitudes, especially when these are rooted in cultural or religious beliefs, may in some contexts contribute towards lower uptake. For example, cultural or religious norms pertaining to sexuality may contribute to concerns about HPV vaccination, insofar as it might be viewed as encouraging premarital sex or sex with multiple partners, whilst there are settings in which sexuality is not openly discussed (‘cultural silence’). These findings do not imply that such norms are inherently negative; rather, they merely shed light on how HPV vaccination is perceived and discussed within specific families and communities. Conversely, higher levels of acculturation and bridging of cultural differences—such as the extent to which parents with a migration background have acquired language skills, and can effectively apply their skills, knowledge and experience from their country of origin within a new culture—can contribute to both a greater willingness to vaccinate and a higher vaccination uptake for HPV vaccines. Generally speaking, culturally sensitive health care, community-based education, and clear recommendations from health care professionals have a positive effect on both willingness and uptake.

Practical barriers

Language barriers and insufficient availability of information in the native language of the parents can limit people’s access to vaccination information and services. In addition, logistical factors—such as travel distance and appointment availability—may further hinder participation, despite the fact that vaccinations are provided free of charge under the

NIP. Tailored communication and accessible, culturally appropriate services have been shown to support higher uptake.

3.2.5 SocioVax regional projects: vaccination and specific groups

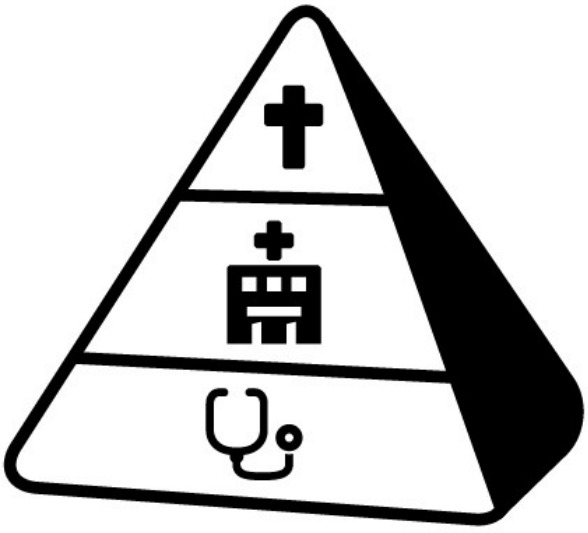
In September 2025, the RIVM, via a SocioVax project call, allocated funding to municipal health services (GGD) and youth health care organisations (JGZ) to conduct four research projects addressing the theme 'vaccination and specific groups' within the NIP. This call for project proposals originated from the SocioVax researchers' meeting on 'vaccination and specific groups' on 14 April 2025, which included participants from GGDs and JGZ organisations, universities, and research institutes. With these additional resources, regions have the opportunity to further investigate which approaches best suit different groups and situations. SocioVax aims to connect practical experience with scientific research, enabling studies into what may help increase vaccination coverage amongst groups with low and/or declining vaccination rates.

The selected projects are:

- TIJDs-Vac (GGD IJsselland & GGD Twente): involves young people from Protestant communities in developing suitable interventions through participatory research;
- VacciChat (GGD Rotterdam-Rijnmond & GGD Zuid-Holland Zuid): develops and evaluates an AI chatbot that provides reliable information on child vaccinations, working together with parents with a low SEP or Dutch parents from a non-Dutch origin in Rotterdam;
- SMINT (Municipality of Utrecht): focuses on both recognising and countering misinformation about vaccinations within the community of Dutch parents of Moroccan origin in Utrecht;
- SCHOOLVAX (GGD Zuid-Holland Zuid): investigates, together with primary and secondary schools in Zuid-Holland Zuid and Rotterdam-Rijnmond, the role that schools can play in promoting vaccination willingness.

In autumn 2026, a new funding round will be launched under the theme 'vaccination and specific groups'.

4 Burden of disease



4.1 Key points

- The estimated total burden of disease caused by (partially) vaccine-preventable diseases in 2025, excluding COVID-19 and influenza, was highest for HPV (17,600 disability-adjusted life years (DALYs); 70% among women), invasive pneumococcal disease (9200 DALYs), invasive *Haemophilus influenzae* disease (1300 DALYs), invasive meningococcal disease (900 DALYs), and rotavirus infection (840 DALYs).
- Although the disease burden for COVID-19 and influenza in 2025 was not yet available, these diseases ranked among the three conditions with the highest disease burden in the last four years, together with HPV-infection. It is likely they will also rank high in 2025.
- For measles, the estimated burden in 2025 was considerably higher than in 2024.
- For pertussis and rotavirus infection, the estimated burden in 2025 was considerably lower than in 2024.

4.2 Tables and figures

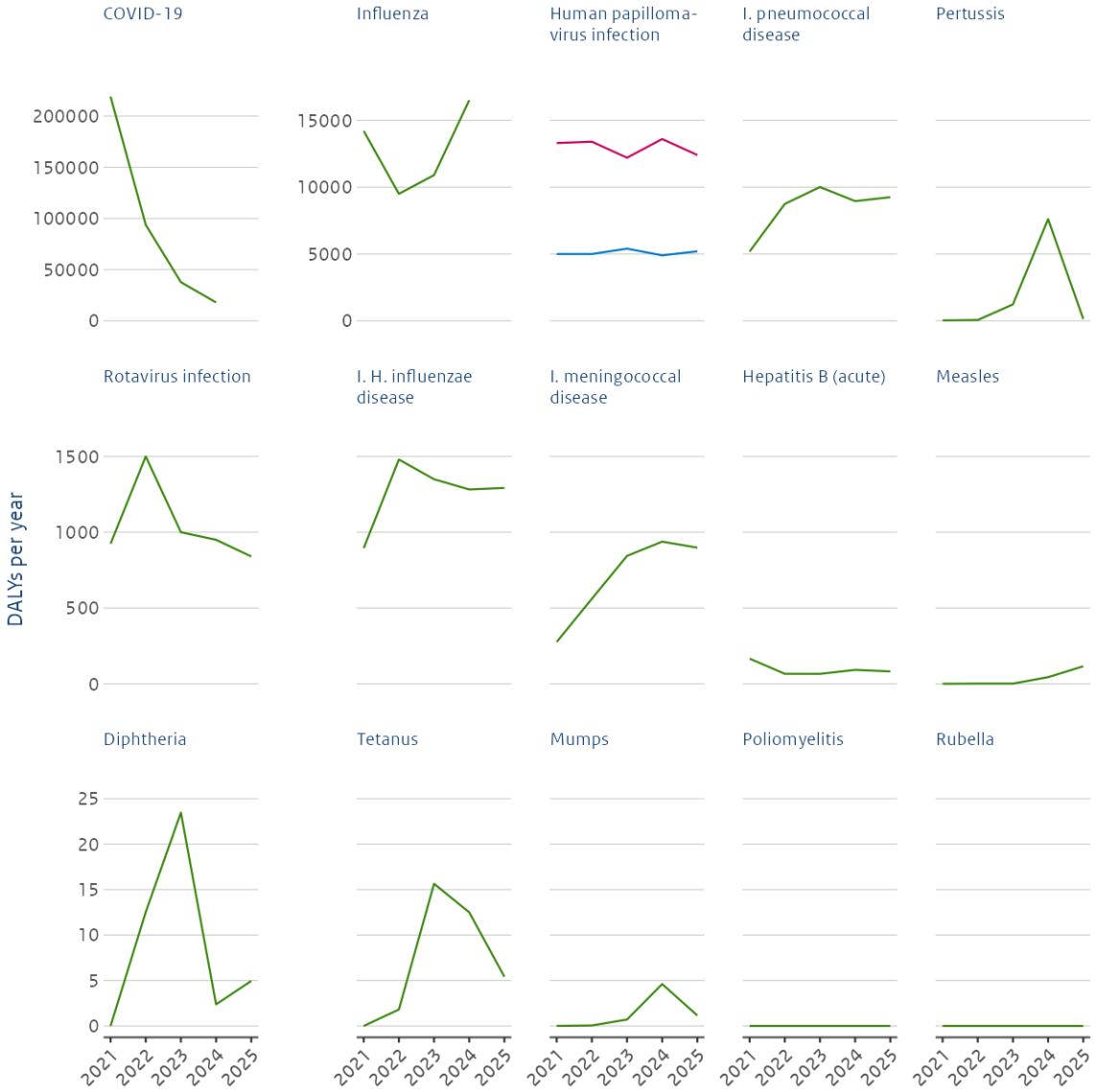
Table 4.1 Estimated annual burden of disease in DALYs between 2021 and 2025, and DALYs per 100 infections in 2025 in the Netherlands (with 95% uncertainty intervals) [1-3]

Disease	DALYs (95% uncertainty interval)					DALYs/100 infections in 2025
	2021	2022	2023	2024	2025	
COVID-19	219,000 (215,000–223,000)	93,800 (91,600–96,100)	37,800 (36,400–39,200)	18,000 (16,800–19,300)		n/a
Diphtheria	0 (0–0)	13 (10–15)	23 (19–28)	2 (2–3)	5 (4–6)	71 (60–82)
Hepatitis B (acute)	170 (150–180)	66 (61–71)	65 (62–69)	92 (85–98)	82 (77–86)	16 (15–17)
Human papillomavirus infection[a]						
- Females	13,300 (12,600–14,100)	13,400 (12,600–14,200)	12,200 (11,400–12,900)	13,600 (12,800–14,300)	12,400 (11,600–13,100)	n/a
- Males	5000 (4200–6000)	5000 (4200–6000)	5400 (4500–6400)	4900 (4100–5900)	5200 (4300–6100)	n/a
Influenza	14,200 (12,600–16,000)	9500 (8600–10,300)	10,900 (10,100–11,900)	16,500 (15,500–17,700)		n/a
Invasive *H. influenzae* disease	890 (840–950)	1500 (1400–1600)	1300 (1300–1400)	1300 (1200–1300)	1300[b] (1200–1400)	380 (360–400)
Invasive meningococcal disease	280 (190–380)	560 (440–700)	840 (690–1000)	940 (780–1100)	900[c] (740–1100)	620 (580–670)
Invasive pneumococcal disease	5200 (4900–5500)	8700 (8200–9300)	10,000 (9400–10,600)	9000 (8400–9500)	9200[d] (8700–9800)	370 (350–390)
Measles	0 (0–0)	1 (1–2)	1 (1–1)	44 (39–49)	120 (100–130)	2 (2–2)
Mumps	0.007 (0.006–0.008)	0.1 (0.1–0.1)	0.7 (0.7–0.7)	5 (4–5)	1 (1–1)	0.4 (0.4–0.4)

Disease	DALYs (95% uncertainty interval)					DALYs/100 infections in 2025
	2021	2022	2023	2024	2025	
Pertussis	35 (32–37)	66 (60–73)	1200 (1100–1300)	7600 (7200–8100)	140 (130–150)	1 (1–1)
Poliomyelitis	0 (0–0)	0[e] (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	n/a
Rotavirus infection	920 (360–1900)	1500 (580–3000)	1000 (400–2100)	950 (380–1900)	840 (330–1700)	0.5 (0.3–1)
Rubella	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	n/a
Tetanus	0 (0–0)	2 (2–2)	16 (14–17)	12 (11–14)	5 (5–6)	150 (140–160)

DALYs= disability-adjusted life years.
n/a = not applicable; either no cases occurred in 2025 (poliomyelitis and rubella), the number of infections was unknown (HPV) or the disease burden was not yet available (COVID-19 and influenza).
[a] To estimate the burden, the number of cases with cancer, anogenital warts and high-grade cervical lesions attributable to HPV were used. The most recent data available on the incidence of anogenital warts was from 2024. Therefore, the incidence for 2025 was estimated from previous years; in addition, the incidence for 2021–2025 was updated. The most recent data available on the incidence of high-grade cervical lesions was from 2024; the incidence for 2024 was thus carried forward to 2025.
[b] Proportion of disease burden due to disease caused by vaccine type b in 2025: 33%.
[c] Proportion of disease burden due to disease caused by the NIP vaccine serotypes ACWY together in 2025 is 7% (vaccine type C in 2025: 2%, type W in 2025: 2%, and type Y in 2025 2%); proportion caused by type B in 2025: 90%.
[d] Proportion of disease burden due to disease caused by PCV10 vaccine types 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, 23F in 2025: 12%; proportion caused by PCV15 vaccine types 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F, 33F in 2025: 44%; proportion caused by PPV23 vaccine types 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, 33F in 2025: 78%.
[e] There was one asymptomatic case for whom no burden was calculated.
Sources: Osiris, NRLBM, sentinel laboratory surveillance, national cancer registry, PALGA, NIVEL-LINH.

Figure 4.1 Estimated annual disease burden in DALYs in the Netherlands between 2021 and 2025 [1-3]



Notes:
1. DALYs= disability-adjusted life years.
2. Vaccination against rotavirus infection was added to the NIP in 2024.
3. For the three invasive bacterial diseases and HPV, only certain serotypes are covered by the vaccines that are currently used: *Haemophilus influenzae* serotype b (Hib), meningococcal serotypes A, C, W, and Y, PCV10 pneumococcal serotypes for children (PCV15 since autumn 2024), PPV23 serotypes for older adults (PCV20 since autumn 2025), and HPV16/18.
4. For HPV, the burden is based on the number of cases with cancer, anogenital warts and high-grade cervical lesions attributable to HPV. The pink line shows the burden for females, whilst the blue line shows the burden for males.
5. Note that the y-axes are not the same for all the diseases.
Sources: Osiris, NRLBM, sentinel laboratory surveillance, national cancer registry, PALGA, NIVEL-LINH.

4.3 Burden of NIP diseases

In this section, we present the disease burden of (partially) vaccine-preventable diseases during the period 2021–2025 in the Netherlands, which is expressed in disability-adjusted life years (DALYs). We present the same estimates that were published in the 'State of infectious diseases in the Netherlands, 2025' in which more detailed information about the parameters used can be found [1]. Estimates for rotavirus infection derived from the report '*Voedselgerelateerde en overige enterale infecties in Nederland. Jaarrapportage 2025*.' [3]. The estimates for human papillomavirus (HPV) infection came from a separate analysis [2] and were updated to include more recent years using the Global Burden of Disease (GBD) 2010 life expectancy. Please note that the calculation method used for HPV is not fully comparable to the one used for other diseases: rather than using the number of incident infections (which is unknown), the number of cases of cancer, anogenital warts and high-grade cervical lesions attributable to HPV was used. All DALY estimates were either rounded up or down to three significant digits for numbers ≥10,000, two significant digits for numbers ranging between 10 and 10,000, and one significant digit for numbers < 10.

Table 4.1 shows the estimated DALYs for each year between 2021 and 2025 (a measure of the disease burden at the population level) and the DALYs per 100 infections in 2025 (a measure of the disease burden at the individual patient level) in the Netherlands, with 95% uncertainty intervals. For poliomyelitis and rubella, the estimated disease burden in 2025 was zero because no cases were reported. For mumps, diphtheria, and tetanus, the disease burden in 2025 was estimated to be relatively low, whilst the highest burden, excluding COVID-19 and influenza, was estimated for HPV infection (70% among women), followed by invasive pneumococcal disease, invasive *Haemophilus influenzae* disease, invasive meningococcal disease, and rotavirus infection (see also Figure 4.1). Although the disease burden for COVID-19 and influenza in 2025 was not yet available, these diseases ranked among the three conditions with the highest disease burden in the last four years, together with HPV infection. It is likely they will also rank high in 2025.

For measles, the estimated burden in 2025 was considerably higher than in 2024. For pertussis and rotavirus infection, the estimated burden in 2025 was considerably lower than in 2024. In the case of rotavirus infection, this is most likely due to the introduction of the rotavirus vaccination in 2024.

Given that the MenC vaccination has been in place since 2002, serogroup C only amounted to < 1%, 1%, and 2% of the burden of invasive meningococcal disease in 2023, 2024, and 2025, respectively. The proportion of the burden of invasive meningococcal disease due to serogroup W decreased drastically from 42% in 2018, the year in which the MenACWY vaccination was introduced within the NIP, to 1%, 4%, and 2% in 2023, 2024 and 2025, respectively. Today, most of the burden due to meningococcal disease is caused by serogroup B (90% in 2025).

In 2025, the burden of invasive pneumococcal disease caused by the previously used PCV10-vaccine serotypes constituted only 12% of the total burden caused by invasive pneumococcal disease, whereas the burden of disease caused by the previously used PPV23-vaccine serotypes was 78%. Whilst the burden of invasive pneumococcal disease caused by the PCV15 pneumococcal serotypes remained 44% of the total burden due to invasive pneumococcal disease, this is expected to decrease in the future as a result of switching from the PCV10 to PCV15 vaccine for children in the autumn of 2024.

The proportion of invasive *H. influenzae* disease burden in 2025 due to the vaccine-preventable *H. influenzae* disease serotype b (Hib), was 33%, which is somewhat higher than in 2024 (24%).
The absolute number of DALYs due to Hib increased in 2020 and 2021 and remained relatively high in 2022 and 2023 (2018: 290 DALYs, 2019: 270 DALYs, 2020: 480 DALYs, 2021: 450 DALYs, 2022: 420 DALYs, 2023: 360 DALYs) before decreasing to 300 DALYs in 2024. In 2025, the absolute number of DALYs due to Hib increased once again to 430 DALYs.

It must be noted, here, that the total disease burden for pneumococcal disease, meningococcal disease, and *H. influenzae* disease is higher than presented here, insofar as the analyses were limited to laboratory-confirmed invasive diseases only. The disease burden related to hepatitis B is also underestimated due to the fact that the analyses only reflect the (future) burden of new cases of acute hepatitis B during the 2021–2025 period; the disease burden of chronic hepatitis B cases is not included. The burden for COVID-19 is also underestimated because the long-term consequences of the disease were not taken into account. Furthermore, there is insufficient data about both the epidemiology and long-term impact of COVID-19 at this juncture to be able to properly estimate the disease burden in DALY/100 cases. Moreover, it is possible that the role of COVID-19 as a causal pathway to death was both recognised and recorded less comprehensively than during the COVID-19 pandemic itself.

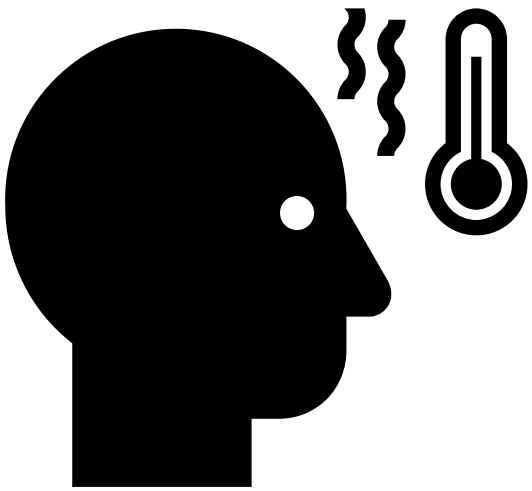
When taking these burden estimates into consideration, it is important to note several points. First, the burden is not fully vaccine-preventable because, firstly, not all strains/serotypes are covered by the vaccines that are used, and secondly, because the vaccination coverage and vaccine-effectiveness is not 100%. Second, for HPV, the burden remains high because the time between infection and disease (cancer) is much longer than with most other diseases; therefore, the HPV burden reflects cases who were mainly infected in the pre-vaccination era. Furthermore, for pertussis it is known that vaccine protection is not long-lasting, which results in epidemic years. The increasing burden of measles is likely to be related to suboptimal and declining vaccine coverage.

4.4 Literature

1.* *Staat van Infectieziekten in Nederland*, 2025 [State of Infectious Diseases in the Netherlands, 2025]. Bos J, editor. Bilthoven: National Institute for Public Health and the Environment (RIVM); 2026. RIVM report 2026–0105.
2.* McDonald SA, Qendri V, Berkhof J, de Melker HE, Bogaards JA. Disease burden of human papillomavirus infection in the Netherlands, 1989–2014: the gap between females and males is diminishing. Cancer Causes Control. 2017;28(3):203–14.
3.* Friesema I, Benincà E, Pijnacker R, Tulen AD, van den Berg OE, Meijs AP, et al. Annual report (2025) on enteric, vectorborne and zoonotic infections [*Voedselgerelateerde en overige enterale infecties in Nederland. Jaarrapportage 2025*]. Bilthoven: National Institute for Public Health and the Environment (RIVM); 2026 (RIVM report 2026–0096).

*publication with RIVM authors.

5 Adverse events



5.1 Key points

- In 2025, no new signals of potentially serious adverse events were found for any vaccines included within the NIP and COVID-19 vaccinations.
- In 2025, Lareb received 1,277 reports representing a total of 4,198 adverse events following immunisation (AEFI) concerning vaccinations included within the NIP, excluding the COVID-19 vaccination. Despite changes to the NIP in 2025, such as the introduction of RSV immunisation, the total number of reports decreased by approximately 8%. The number of reported AEFIs per report was between three to four, which is similar to earlier years.
- Malaise, headache, and fatigue were the most frequent local and systemic reactions reported to Lareb following COVID-19 vaccinations administered between 1 May 2025 and 30 April 2026.

5.2 Tables and figures

Table 5.1 Reports of adverse events following immunisation, the Netherlands 2025 [1]

	Total 2024	Total 2025	0–2m	3–4m	5–6m	7–9m	10–13m	14–17m	18–24m	2–6yrs	7–12yrs	13–18yrs	Pregnant people
Rotarix®	328	**380**	329	51									
Beyfortus ®		**55**	31	17	7								
Rotarix®, Vaxelis®	34	**33**	25	8									
Beyfortus ®, Rotarix ®		**8**	8										
Vaxelis®	46	**40**	7	9	4	1	12	4	3				
Beyfortus ®, Rotarix ®, Vaxelis®		**1**	1										
Rotarix®, Vaxelis® , Vaxneuvance®	3	**119**		119									
Vaxelis® + Vaxneuvance®	18	**145**		17	47	5	62	12	2				
Beyfortus ®, Rotarix ®, Vaxelis®, Vaxneuvance®		**6**		6									
Rotarix ®, Vaxneuvance®		**3**		3									
Beyfortus ®, Vaxelis®,Vaxneuvance®		**1**			1								

	Total 2024	Total 2025	0–2m	3–4m	5–6m	7–9m	10–13m	14–17m	18–24m	2–6yrs	7–12yrs	13–18yrs	Pregnant people
Vaxneuvance®	1	**5**			1		2	1	1				
MMRVaxPro®, Vaxelis® + Vaxneuvance®		**1**					1						
MMRVaxPro® + Menquadfi®	116	**91**						90	1				
MMRVaxPro®	14	**116**					2	9	2	61	42		
Menquadfi®	5	**7**					1	6					
Boostrix Polio®	70	**2**								2			
Cervarix®	171	**70**									67	3	
MMRVaxPro®, Revaxis®	119	**12**									12		
Revaxis®	3	**4**									4		
Cervarix®, MMRVaxPro®, Revaxis®		**1**									1		
Nimenrix®	34	**34**										34	
Cervarix®, Nimenrix®		**4**										4	
Boostrix® (pregnant women) with or without Influvac Tetra®	102	**93**											93

	Total 2024	Total 2025	0–2m	3–4m	5–6m	7–9m	10–13m	14–17m	18–24m	2–6yrs	7–12yrs	13–18yrs	Pregnant people
Vaccination not according to current schedule	35	**46**	3	8	5		3		1	7	15	4	
Vaccination errors	0	**0**											
Total	**1391**	**1277**	**404**	**238**	**65**	**6**	**83**	**122**	**10**	**70**	**141**	**45**	**93**

Table 5.2 Reported severe or remarkable adverse events following immunisation, the Netherlands 2025 per vaccination moment [1]

	0–2m	3–4m	5–6m	7–8m	9–10m	11–12m	13–14m	15–16m	17–23m	2–5yrs	6–9yrs	10–14 yr	15–18yrs	18yrs +	Unknown	Total
General disorders and administration site conditions																
Extensive swelling of vaccinated limb	1	4	3	1	0	3	6	2	2	0	3	2	0	2		29
Body temperature > 40°C	1	2	1	0	0	2	6	5	0	9	3	1	0	0		30
Screaming	7	4	0	0	1	0	2	0	0	0	0	0	0	0		14
Immune mediated disorders																
Autoimmune thyroiditis	0	0	0	0	0	0	0	0	0	0	0	2	0	0		2
Immune thrombocytopenia	0	0	0	0	0	0	1	0	0	0	0	0	0	0		0
Systemic lupus erythematosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Vaccine failure	2	0	0	0	0	0	0	0	0	0	0	0	0	0		2
Infections and infestations																
Abscess soft tissue	0	1	1	0	0	1	1	0	1	0	0	0	0	1		6
Encephalitis/meningitis	1	0	0	0	0	0	0	1	0	0	0	0	0	0		2
Metabolism and nutrition disorders																
Dehydration	3	1	0	0	0	0	1	0	0	0	0	0	0	0		4
Type 1 diabetes mellitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Intussusception	4	2	1	0	0	0	0	0	0	0	0	0	0	0		7

	0–2m	3–4m	5–6m	7–8m	9–10m	11–12m	13–14m	15–16m	17–23m	2–5yrs	6–9yrs	10–14 yr	15–18yrs	18yrs +	Unknown	Total
Musculoskeletal and connective tissue disorders																
Fibromyalgia	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Juvenile idiopathic arthritis	0	0	0	0	0	0	0	1	0	0	0	0	0	0		1
Neurologic symptoms																
Ataxia, spasms, tics	0	0	0	0	0	0	0	0	0	2	0	0	0	1		3
Autism spectrum disorder	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Delirium febrile	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Febrile convulsion, seizures, tonic convulsion, epilepsy	0	1	0	0	0	2	7	3	0	3	2	0	0	0		18
Facial paralysis/Bell’s palsy	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Hypotonic-hyporesponsive episode/paralysis	5	20	3	1	0	2	1	0	0	0	0	0	0	0		32
Migraine	0	0	0	0	0	0	0	0	0	0	0	0	0	1		1
Status epilepticus	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
(Pre)syncope	2	1	1	0	1	1	0	0	0	0	7	5	0	2		20
Complex regional pain syndrome (CRPS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Respiratory symptoms																
Apnoea, Dyspnoea, Irregular breathing	8	3	1	0	0	0	1	2	0	1	2	0	0	5		23
Breath holding spells	1	1	1	0	0	0	1	0	0	0	0	0	0	0		4

	0–2m	3–4m	5–6m	7–8m	9–10m	11–12m	13–14m	15–16m	17–23m	2–5yrs	6–9yrs	10–14 yr	15–18yrs	18yrs +	Unknown	Total
Skin conditions																
Rash, eczema	7	13	6	1	1	4	21	15	1	11	16	5	0	1		102
Skin discolouration	2	10	1	0	0	0	0	0	0	0	0	0	0	0		13
Urticaria	4	1	1	0	0	2	4	2	1	3	5	2	0	0		25
Henoch-Schönlein purpura	0	0	1	0	0	0	0	0	0	0	0	0	0	0		1
Acute haemorrhagic oedema of infancy	1	0	0	0	0	0	0	0	0	0	0	0	0	0		1
Vascular Disorders																
Kawasaki’s disease	0	0	1	0	0	0	0	0	0	0	0	0	0	0		1
Postural orthostatic tachycardia (POTS)	0	0	0	0	0	0	0	0	0	0	0	1	0	0		1
Death																
Sudden Infant Death Syndrome (SIDS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Death	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
Adverse events concerning pregnancy																
Foetal death*														0		0
Stillbirth*														0		0
Premature baby														1		1
Small for dates baby	1													0		0
Chorioamnionitis														0		0
Guillain-Barré syndrome														0		0

** For a full description of the cases of death, see the Lareb annual report [1]

Table 5.3 Number of reports to Lareb following COVID-19 vaccinations administered between 1 May 2025 and 30 April 2026

Vaccine	Number of reports	Number of reported events
Pfizer/BioNTech LP.8.1	1,145	4,589
Bimervax LP.8.1	1	8
Total	1,146	4,597

Source: Lareb, reporting date 19 May 2026.

*Table 5.4 Most frequent local reactions and systemic events reported to Lareb following COVID-19 vaccinations administered between 1 May 2025 and 30 April 2026**

Adverse event	Number of reports
Malaise	492
Headache	394
Fatigue	382
Myalgia	359
Chills	306
Arthralgia	244
Injection site pain	236
Nausea	221
Pyrexia	177
Injection site inflammation	125

Source: Lareb, reporting date 19 May 2026.
* For the most up-to-date information, see the Lareb page on side effects following COVID-19 vaccination.

Figure 5.1 Reported local adverse events (AE) by 12,300 VASCO participants one month after receiving the BioNTech/Pfizer (Comirnaty) - LP.8.1 vaccine during the autumn campaign in 2025 (September–December 2025)

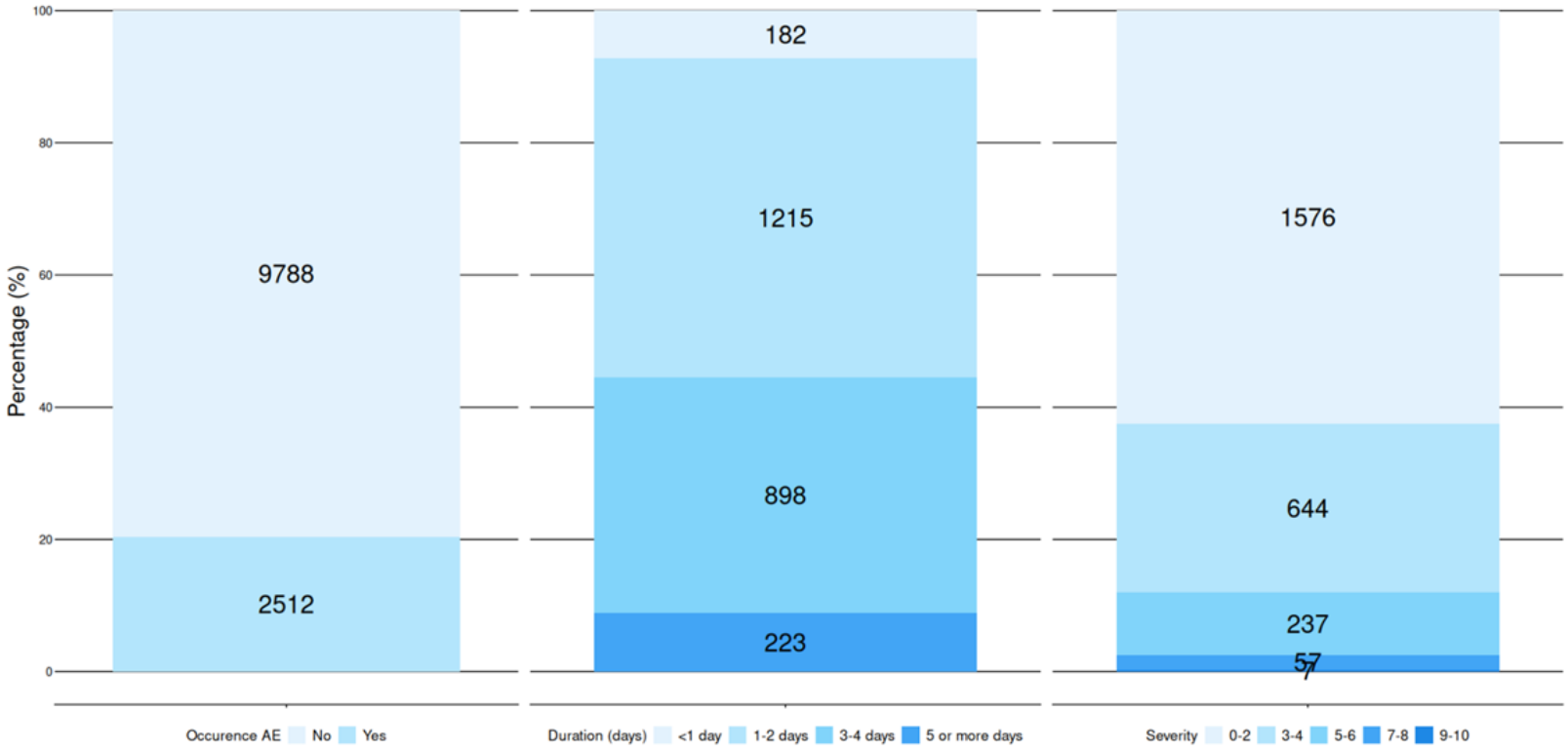


Figure 5.2 Reported systemic adverse events (AE) by 12,297 VASCO participants one month after receiving the BioNTech/Pfizer (Comirnaty) - LP.8.1 vaccine during the autumn campaign in 2025 (September–December 2025)

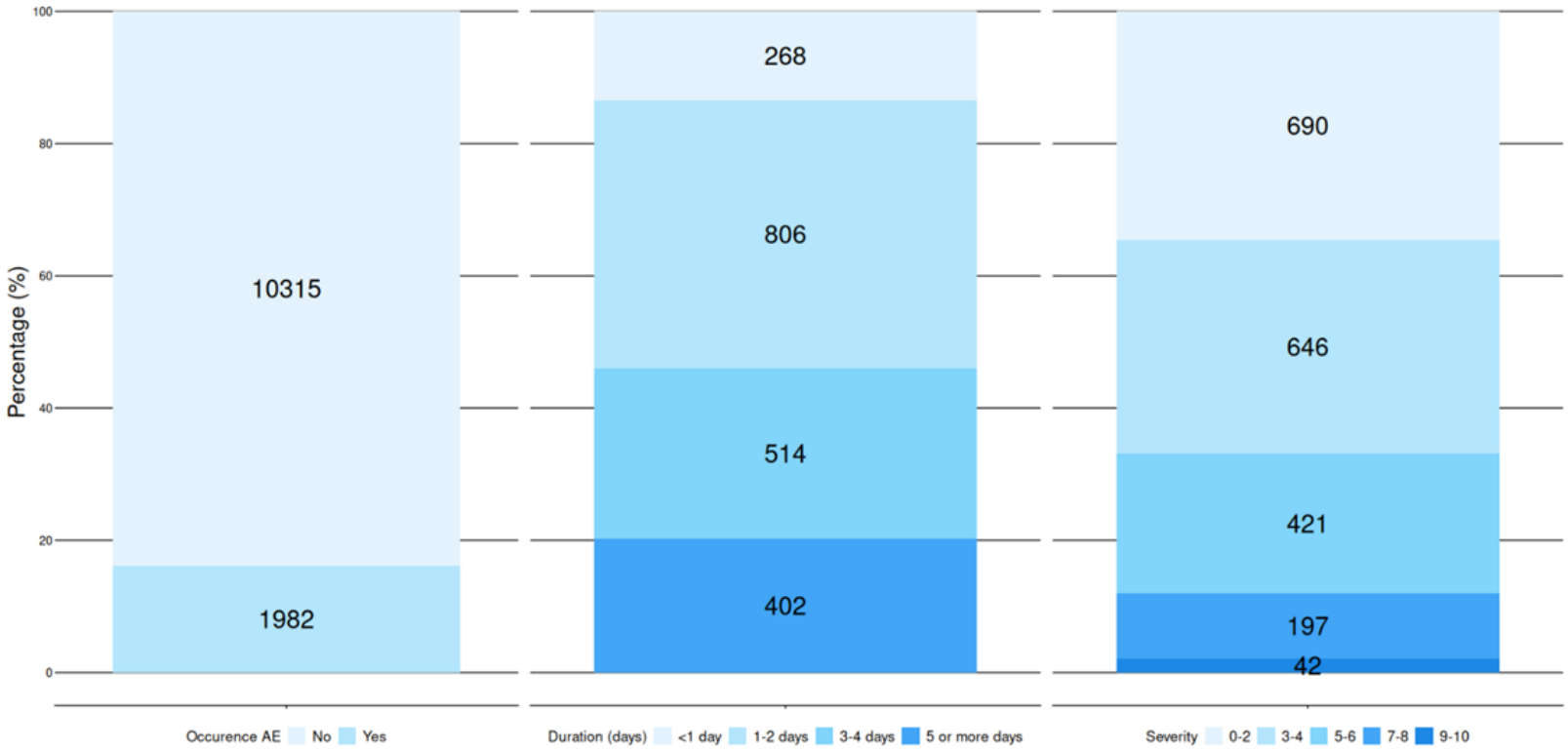
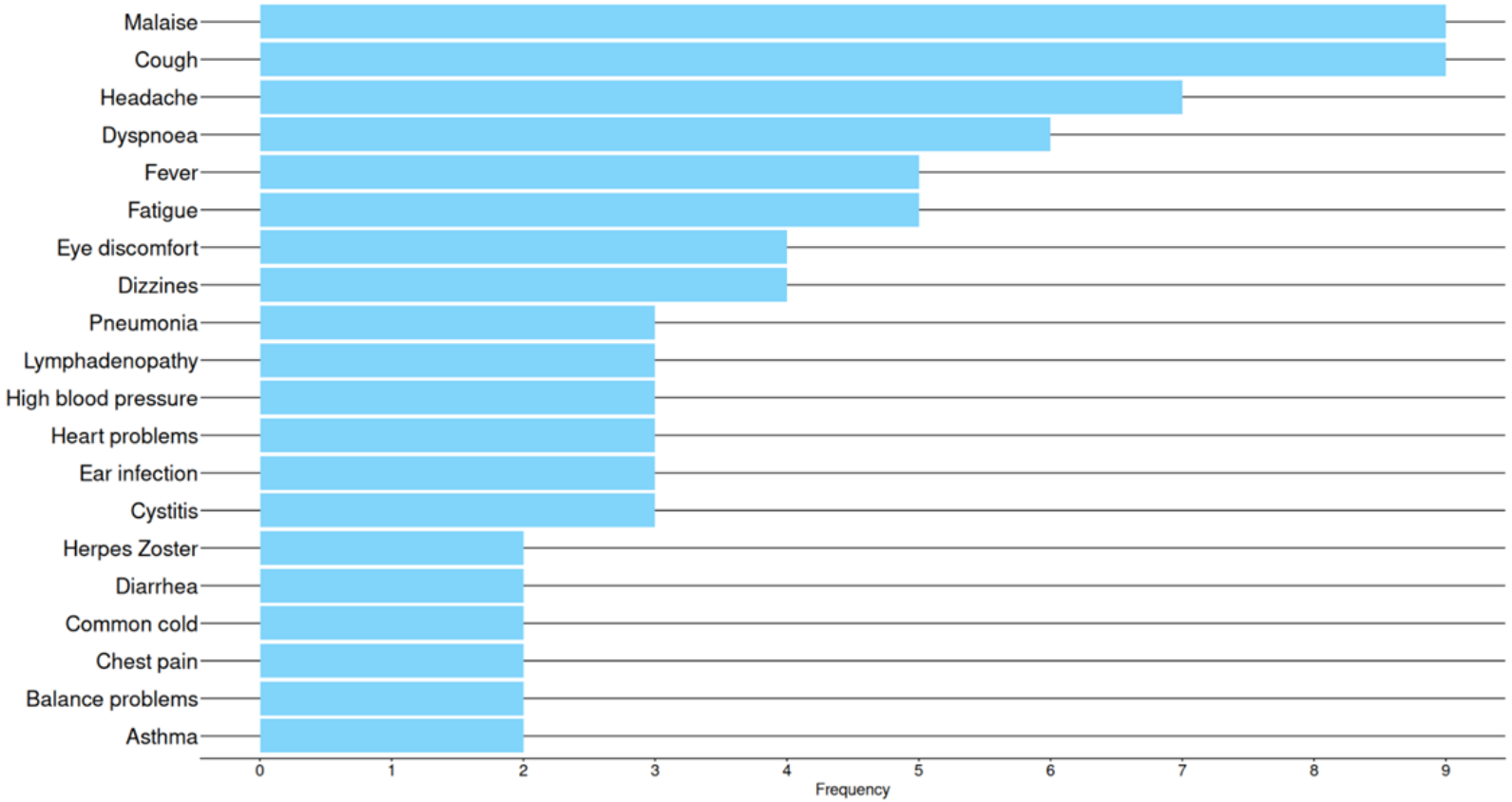


Figure 5.3 Top 20 reported adverse events for which contact was sought with a healthcare professional among 12,300 VASCO participants who received the BioNTech/Pfizer (Comirnaty) – LP.8.1 vaccine during the autumn campaign in 2025 (September–December 2025). Out of these, 91 participants (0.74%) sought medical care following vaccination



5.3 Spontaneous Reporting System

5.3.1 Reports

The enhanced passive surveillance system managed by the National Pharmacovigilance Centre Lareb receives adverse events following immunisation (AEFI) reports. In Chapter 5.3.1.1, background information on these reports is provided for the vaccines included within the NIP, except for the COVID-19 vaccine, which is described in Chapter 5.3.1.2.

5.3.1.1 All vaccines except for COVID-19 vaccine

In 2025, Lareb received 1,277 reports (Table 5.1) with a total of 4,198 AEFIs [1]. This number of reports was lower than the number of reports received in earlier years (2023: n=1,439; 2024: n=1,391). The most reported AEFIs were malaise (n=525), fever (n=404), diarrhoea (n=311), fatigue(n=277), injection site reactions (n=250), and nausea (n=250).

For most of the vaccines, the number of reports fall within the range of previous years. However, the changes to the NIP in 2025 make it difficult to compare the number of reports to those from previous years. In 2024, there was a clear shift in the pattern of AEFIs after the first vaccination moment at the age of 0-2 months, with gastrointestinal complaints often coming to the forefront. This was also evident in 2025. The number of reported AEFIs per report was three to four, which is similar to previous years. Due to the implementation of informed consent for data exchange with RIVM in January 2022, it is not possible to determine precisely how many vaccine doses are administered. Therefore, it is not possible to reliably estimate the number of AEFIs per vaccine dose.

Table 5.2 summarises the severe or remarkable adverse events per vaccination moment that were reported to Lareb. These events are included because of both their severity and known or perceived relation to vaccination. In general, the spectrum of reported AEFIs is mostly in line with previous years. In 2025, there were seven reports of intussusception after rotavirus vaccination, compared to two reports in 2024, ranging from mild to very severe presentations and with varying latency periods. Five infants recovered, and no follow-up information could be obtained for the remaining two infants. It is important to note that intussusception also occurs spontaneously in the Netherlands in around 64 babies each year, i.e., without vaccination and often without any clear cause (https://rijksvaccinatieprogramma.nl/vaccinaties/rotavirus).

Alongside the spontaneous reporting system, Lareb conducts four monitoring studies that collect information on potential adverse events following vaccination. The NIP Monitor 2022 focuses on AEFIs in children aged zero to six years. The results for the vaccination moments at six to nine weeks, three months, five months, and 11 months are now known.

The most frequently reported complaints are fever, reactions at the injection site, and crying, which are well-known side effects (https://www.lareb.nl/media/elljo1bv/rijksvaccinatieprogramma-rvp-monitor-2022-cohort-1-interim-analyse-vaccinatiemomenten-2-3-5-en-11-maanden.pdf). This study is still ongoing.

In the RVP Monitor 2024, 6,211 children (86% of the 7,244 registrations) were followed during their first three vaccination moments at the ages of two, three, and five months, with a particular focus on complaints after administration of the rotavirus vaccine. Most of the reported complaints during all the vaccination moments were in line with the side effects listed in the vaccine informational leaflet. During the first vaccination moment, when only the rotavirus vaccine was administered, diarrhoea (30%) and abdominal pain or cramps (21%) were the most reported complaints. Although there were a small number of children for whom intussusception was suspected (n=11), no confirmed cases of intussusception were reported (https://www.lareb.nl/Knowledge/FilePreview?id=57013&p=52).

The HPV Monitor focused on children aged nine and ten who had received the MMR, DTP, and HPV vaccinations. The results showed that children experienced complaints that were known and listed in the official package leaflets of the MMR, DTP, and HPV vaccines. The percentage of children who experienced complaints after the MMR-DTP vaccination moment was higher than after the HPV vaccination. For the HPV vaccination, more complaints were reported after the first vaccination than after the second. Girls reported complaints slightly more often than boys after receiving their HPV vaccination. No complaints were reported that indicate either new or concerning potential side effects (https://www.lareb.nl/Knowledge/FilePreview?id=54192&p=44).

The NIP Monitor 2025 focuses on RSV immunisation for children up to the age of one. This study is ongoing.

To date, the cohort study ‘Mothers of Tomorrow’ has revealed no evidence of adverse pregnancy outcomes following DTP vaccination during pregnancy [1].

Overall, no new signals of disturbing adverse events have yet been found.

5.3.1.2 COVID-19

Lareb received a total of 1,146 reports concerning COVID-19 vaccines administered between 1 May 2025 and 30 April 2026, which represent a total of 4,597 AEFIs. The number of reports is higher than last year (2024–2025, n=1,001), but lower than the year before that (2023–2024, n=1,540). Detailed results of the reports for each administered vaccine along with the top ten most reported adverse events are presented in Tables 5.3 and 5.4, respectively. The top ten most reported adverse events is the same as last year’s (Chapter 5).

5.3.2 Signals/Overviews

Based on the reports, the following analyses were conducted by Lareb in 2025:

Rotavirus vaccination and gastroenteritis
Reports of vomiting in combination with diarrhoea were investigated. Whilst diarrhoea is listed in the package leaflet as a known side effect, gastroenteritis is only mentioned as a side effect in children with a severe immune disorder. The Medicines Evaluation Board is aware of the analysis and has compared the results with the Periodic Safety Update Reports (PSUR). This analysis did not give rise to further action at that time, insofar as vomiting and diarrhoea are frequently reported events within the PSUR and thus do not constitute new important safety information.

Hypotonic-hyporesponsive episode
At the end of 2025, Lareb conducted an analysis of the spontaneous reports they had received since 2012 of HHE following the administration of vaccines provided within the NIP. In their analysis of 294 reports, the median latency time was four to eight hours, with a median duration of three to 30 minutes. These data are largely consistent with figures from the literature. Fifty-five per cent of the reports involved a combination of the DTaP-IPV-HBV-Hib vaccine Infanrix hexa® and the pneumococcal vaccine Synflorix®, a combination that has not been administered for several years. In 21% of the reports, the combination concerned the DTaP-IPV-HBV-Hib vaccine Vaxelis® and the pneumococcal vaccine Synflorix®, which are also no longer used in combination with one another. The median age of the children was nine weeks. In around one-third of the cases, parents sought medical assistance. A scientific publication based upon these findings is currently in preparation. This information could be used in communications with both healthcare providers and parents.

Reported AEFIs amongst premature infants
In 2025, Lareb conducted a comparative analysis of spontaneous reports they had received since 2012 of AEFIs related to infants born prematurely and term-born infants. The pattern of adverse events in prematurely born infants did not differ much from term-born infants: crying, fever, and injection site reactions were the most reported complaints. Cardiorespiratory reactions, including apnoea, were reported more often in prematurely born babies, especially in the group who were severely or extremely premature, and after the first vaccination. The reaction of apnoea was reported 24 times in prematurely born children (15.8%) and only six times in term-born infants (0.1%). In 23 reports, the degree of prematurity was known. Apnoea mainly occurred in premature infants who were born after a gestational age of less than 34 weeks (n=22) and rarely in premature infants born after a gestational age of more than 34 weeks (n=1). Bradycardia and/or desaturation were also primarily reported in the group of children born after a gestational age of less than 34 weeks. This supports the finding in the literature that cardiorespiratory reactions are mainly observed cases of extreme and severe prematurity [2].

Reported complaints after both the second MMR vaccination at three years of age and the catch-up campaign (birth cohort 2016–2021)
Since 2025, children born from 2022 onwards have been vaccinated at the age of three with a booster MMR vaccine. For the cohorts 2016–2021, an MMR catch-up campaign was organised in 2025, 2026, and 2027. In the analysis, a distinction was drawn between children who received the vaccination in their third year of life and those who were four years or older. There were 59 reports concerning three-year-olds and 44 reports for children aged four or older. For both age groups, the most reported AEFIs were (high) fever, headache, malaise, chills, fatigue, drowsiness, and nausea. This pattern is to be expected after this vaccination. Whilst it is well-established that symptoms after the MMR vaccine typically occur five to12 days after vaccination, some of the complaints, such as fever and rashes, were reported as starting earlier, namely within one to three days post-vaccination. There is little information about this in the literature [3–7]. Lareb will continue to monitor the pattern of these AEFIs after the second MMR vaccination in the coming years.

RSV immunisation
Given that RSV immunisation includes groups of children of varying ages (primary group and catch-up group), a separate analysis was carried out to better map out the reported complaints. In total, 72 reports were received, with only nirsevimab being administered in 55 of those cases. In the remaining 17 reports, this was combined with other vaccines provided within the NIP. Of the 55 reports that only included nirsevimab, 16 involved children from the primary group, whilst the other 39 reports involved children from the catch-up group. The reported AEFIs largely correspond to the expected side effects listed in the package leaflet. Out of the 55 children who received only nirsevimab, the average latency was 23 hours, and the median latency was 12 hours. The average duration of the complaints was 53 hours, and the median duration was 48 hours.

5.4 Research

5.4.1 Adverse events reported in VASCO

The Vaccine Study Corona (VASCO) is a population-based cohort study, aimed at assessing the long-term effectiveness of COVID-19 vaccines among ~45,000 community-dwelling persons aged 18–85 [8]. The participants are requested to complete a questionnaire one month after their vaccination in which they are asked about any potential adverse events (AE) following their vaccination. A distinction was drawn between local - at injection site - and systemic reactions. Participants were asked both how severe their reactions were and how long they lasted. The questionnaires that were completed by participants who received the BioNTech/Pfizer (Comirnaty) – LP.8.1 vaccine during the autumn campaign in 2025 were included. Overall, 12,300 participants reported having received the vaccine and completed an AE questionnaire regarding this vaccine.

Local reactions
Twenty per cent of the participants reported injection-site reactions following COVID-19 vaccination (Figure 5.1). Participants under the age of 60 years reported injection-site reactions more frequently (30%) than those aged over 60 (18%), whilst women reported injection-site reactions more frequently than men (26% vs 13%).

According to almost half of the participants, injection-site reactions lasted between one to two days (48%). An additional 36% of the participants reported injection-site reactions lasting three to four days. Regarding the severity of the reactions, more than half the participants (63%) rated the reactions as one or two on a ten-point scale, where one indicates extremely mild and ten indicates an extremely severe reaction. A further 26% rated their reactions as three or four in terms of severity.

The results were comparable to those reported following the JN.1 vaccine, which was administered in the autumn campaign in 2024, when 24% of all the participants reported injection-site reactions and 61% of the participants rated these reactions as either a one or a two on a ten-point scale (see last year's report, Chapter 5.4).

Systemic reactions
Sixteen per cent of the participants reported systemic reactions following their COVID-19 vaccination (Figure 5.2). Participants under the age of 60 reported more systemic reactions (22%) than those aged over 60 (15%), whilst women also reported more systemic reactions than men (19% vs 12%). Forty-one per cent of the participants reported that their systemic reactions lasted between one and two days, whilst 26% reported a duration of three to four days. Most participants rated the severity of these reactions as either a one or a two (35%) or a three or a four (32%) on a ten-point scale, where one indicates extremely mild and ten indicates extremely severe reactions. Notably, 12% of the participants rated the severity as seven or higher.

The results were comparable to those reported following the JN.1 vaccine, which was administered in the autumn campaign in 2024, when 16% of participants reported systemic reactions (see last year's report, Chapter 5.4).

General practitioner contact
Out of all the participants who completed the questionnaire, 0.7% contacted their general practitioner (GP) for a (potential) AE. Women contacted their GP slightly more often (0.79%) than men (0.68%) did, whilst those aged over 60 (0.71%) did so less often than those under 60-years-old (0.90%). The participants contacted their GPs most frequently due to experiencing malaise, coughs, or headaches (Figure 5.3).

5.5 International Developments

5.5.1 Vaccines targeting diseases included within the current NIP

5.5.1.1 Meningococcal ACWY vaccines

No new safety issues were reported for conjugate meningococcal ACWY in infants, children, and adults [9–14]. The same applies to MenACWYX vaccines [15], a candidate MenCC-Bio vaccine in healthy children [16], and a meningococcal A and C polysaccharide conjugate vaccine in infants [17].

5.5.1.2 MMR/MMRV vaccines

Although non-serious and self-limiting AEFIs frequently occur after MMR vaccination [18], this vaccine is generally safe [19], even in pregnant people [20–22] and patients with underlying diseases [22-28], or when administered by a needle-free injection system [29].

One study described a cluster of mumps infections after MMR mass vaccination in practical nursing students in Thailand. One potential risk factor was a history of prior MMR vaccination, although this finding proved to not be conclusive, insofar as the statistical significance varied across different methods of handling missing data. Another risk factor was the delay time from vial retrieval to vaccine administration within no cold-chain-controlled settings, which could lead to temperature-related changes in vaccine virus activity during mass campaigns [30].

The safety of MMRV vaccines was demonstrated in both healthy children [31] and people with underlying diseases [26, 32]. A real-world pharmacovigilance analysis confirmed the expected safety profile of a MMRV vaccine whilst drawing attention to additional signals of adverse events that warrant both further clinical investigation and potential regulatory attention, like febrile convulsions, epilepsy and cyanosis [33, 34]. The co-administration of MMRV with an inactivated polio vaccine and HepA vaccine was well tolerated [35].

5.5.1.3 Pneumococcal vaccines

Several studies have demonstrated the safety of pneumococcal vaccines generally [36] and more specifically with respect to PCV10-SII [37, 38], PCV13 [39–46], PCV14 [47], PCV15 [41], PCV20 [48–50], PCV21 [50–55], PPV23 [39, 41–44, 51, 54, 56–61], PCV24 [62], and a candidate PCV31 vaccine [63]. Co-administration with other vaccines also demonstrated a favourable safety profile for PCV13 [64], PCV20 [65], [66]), PCV21 [67], PPV23 [68], and unspecified pneumococcal vaccines [69, 70]. One study observed a higher frequency of fever when PCV13, Hib and DTaP-IPV were administered together [71], whilst age-specific patterns of adverse events following Synflorix vaccination were also observed, with infants and toddlers showing higher intensities of systemic reactions [72].

5.5.1.4 DTaP-IPV-HBV-Hib vaccines

Favourable safety profiles have been shown for penta- and hexavalent vaccines [73–76], although a heterologous hexavalent two-dose schedule was shown to be less reactogenic than a homologous two-dose schedule [77]. In addition, hexavalent vaccination was shown to induce stronger disproportionality signals in younger infants compared to

pentavalent vaccinations[75]. In hospitalised premature infants, the odds of experiencing apnoea within 48 hours were higher after receiving a vaccination at the age of two months compared to not receiving a vaccination [78]. Surveillance data showed that both non-serious and self-limiting AEFIs frequently occurred after DTaP-IPV-HBV-Hib [79] and DT-IPV [18] vaccines.

DTaP vaccinations were well tolerated in pregnant people [80] and children with underlying diseases [28]. A systematic review demonstrated the safety of various polio immunisation methods in infants [81]. Co-administration of inactivated polio vaccine with DTaP and HepA or with MMRV and HepA vaccine in children exhibited an acceptable safety profile [35, 82].
As demonstrated in earlier studies, Tdap vaccination is safe in adults, in pregnant people, and with immunocompromised people, or when co-administrated with other vaccines [20, 21, 69, 83–89].

5.5.1.5 Hepatitis B vaccines

Several studies have demonstrated the safety of hepatitis B vaccines [90–92], even in patients with underlying diseases [28, 93]. Other studies have suggested potential associations between hepatitis B vaccines and (autoimmune) disorders [94–97], with one study identifying unexpected AEs after hepatitis AB vaccination [98]. Given that most of these studies are based upon pharmacovigilance databases, further investigation is required to prove a conclusive link between these vaccines and the recorded side effects.

5.5.1.6 HPV vaccines

2-valent (v) HPV, 4vHPV and 9vHPV vaccines
2vHPV vaccines were well tolerated [99–105] with a higher reactogenicity after the first dose [101], in girls compared to boys [101] and in younger age groups [105]. A good safety profile has also been found for both 4vHPV vaccines [103, 104, 106, 107] and 9vHPV vaccines [100, 103, 104, 108–111], even in pregnant people [112]. Transient neuropsychiatric events have been shown to be benign and self-limiting [113].
One study described a case with segmental vitiligo after 9vHPV vaccination. However, the current evidence base is insufficient to establish causality [114]. A questionnaire survey designed to reassess the occurrence of serious AEs after 2vHPV and 4vHPV vaccination in 30,793 women aged 15–21 suggests that HPV vaccination may influence the occurrence of some symptoms and might be associated with them, including chronic pain, motor impairment, memory impairment, poor concentration, visual disturbances, and autonomic neuropathy. However, since this study is based upon questionnaire data, the robustness of the evidence is limited, and future research should be conducted [115].

The results from a study using data from a claims database showed that HPV vaccinations were associated with a higher risk of autonomic dysfunction and menstrual irregularities. The authors concluded that further studies are required to demonstrate this association [116], especially in light of the fact that another study using data from a claims database demonstrates that diverse symptoms similar to AEs following

HPV vaccination are also found in adolescents who have not received the HPV vaccine [117]. Studies on pharmacovigilance data suggest associations with HPV vaccination and (auto) immune disorder [94–97, 118, 119]. Another pharmacovigilance-based study concluded that the HPV vaccine has a good safety profile [120].
Several reviews provide evidence that HPV vaccination has a favourable safety profile, with severe AEs appearing exceedingly rare [121–127]. One review reported a potential association between HPV vaccination and ocular adverse events, although causality remains unproven [128].

In clinical trials, a novel Escherichia coli-produced 9vHPV vaccine demonstrated an acceptable safety profile [129–131]. The same applies to the Escherichia coli-produced 2vHPV vaccine [127, 132], a pichia pastoris-expressed 2vHPV vaccine [102], and a novel 9vHPV vaccine candidate manufactured in Saccharomyces cerevisiae using a new heating-chilling process [133].

5.5.1.7 Rotavirus vaccines

Several studies have demonstrated the safety of monovalent [134], pentavalent [135], or unspecified rotavirus vaccines [136]. This even holds true for preterm infants [137], for TNFi-exposed infants [138], or when rotavirus vaccine was co-administered with PCV13 [64]. No association was found between rotavirus vaccine and the risk of early-onset celiac disease [139]. Three studies suggested that (mainly monovalent) rotavirus vaccines may be associated with a small increased risk of intussusception [140-142]. One study demonstrated the safety of novel parenteral rotavirus subunit vaccine [143].

5.5.1.8 RSV immunisation

In 2025, the Netherlands introduced nirsevimab, a monoclonal antibody for RSV prophylaxis in infants. Many studies have demonstrated a favourable safety profile for this immunisation product [144-155], even in preterm infants [145, 156, 157] or in combination with maternal RSV vaccination [158]. One case report described hypotonia and unresponsiveness after administration of nirsevimab in a 13-day-old infant [159] so continued monitoring of side effects remains essential. Another monoclonal antibody, palivizumab, also supports the safety in children [160]. Nirsevimab was observed to have a safety profile compared with palivizumab [161-163]. Clesrovimab, a third monoclonal antibody, showed favourable safety in healthy preterm and full-term infants [164-166]. No safety concerns were found for a candidate live-attenuated intranasal RSV vaccine for infants and toddlers [167].

5.5.2 Vaccines targeting diseases that may be included in the NIP in the future

5.5.2.1 Varicella vaccines

Several studies demonstrated the safety of live attenuated varicella vaccines [168-174], including in pregnant people [20, 22], in patients with underlying diseases [26, 27, 175, 176], or when co-administrated with influenza vaccine [177]. The use of a recombinant zoster vaccine in varicella-zoster virus naive paediatric patients demonstrated an acceptable safety profile [178]. The safety of a MAV/06 strain-based vaccine has been confirmed through various clinical trials and post-marketing studies [179]. A novel candidate v7D vaccine demonstrated to be well tolerated in healthy children aged 1-12 years [180], and an

investigational varicella vaccine showed an acceptable safety profile in toddlers [181].

5.5.2.2 Herpes Zoster vaccines

Surveillance data have demonstrated the safety of herpes zoster vaccines [182], with even a reduced risk of mortality and several cardiovascular events [183]. Favourable safety profiles were also found for recombinant zoster vaccines (RZV) in adults [170, 184, 185], in patients with underlying diseases [186–200], 11 years post-vaccination [201], or when co-administered with other vaccines [202–204]. Acceptable safety profiles were also found for live attenuated herpes zoster vaccines (LZV) [205–208], even when co-administered with other vaccines [203]. The risk of solicited AEs were shown to be higher for RZV vaccines compared to LZV vaccines [209], with RZV-associated AEs manifesting as transient reactogenicity, whereas LZV showed stronger associations with herpes zoster reactivation along with neurological and ophthalmic complications [210]. Other studies found a transient increase in shingles shortly after RZV vaccination [211] or RZV-related flares in patients with lupus [212]. Case reports described a RZV vaccine induced lupus case [213] as well as a case of myasthenia gravis one week after receiving a LZV vaccine [214]. One review suggests that there was an association between RZV and uveitis, particularly in elderly or immunocompromised individuals [128]. A novel vaccine candidate (LZ901) exhibited a better safety profile than RZV in adults aged over 50 [215].

5.5.2.3 Hepatitis A vaccines

No new safety issues were reported for hepatitis A vaccines [90, 216–218], even when co-administered with other childhood vaccines [35, 82]. Other studies suggest potential associations between hepatitis A vaccines and (autoimmune) disorders [94, 95]. One study on pharmacovigilance data identified several unexpected AEs after HepAB vaccination such as, for example, endocrine disorders [98]. Future evidence-based surveillance for this vaccine is recommended.

5.5.2.4 Meningococcal B vaccines

Several studies demonstrated the safety of meningococcal B vaccines [219–227]. The pentavalent MenABCWY vaccine has also been found to have an acceptable safety and tolerability profile in adolescents and high-risk populations [219, 228]. Experimental vaccines that include outer membrane vesicles and detoxified lipooligosaccharide were well tolerated [229].

5.5.2.5 COVID-19 vaccines

Since the NIP report 2024–2025, several studies have been published on adverse events following COVID-19 vaccinations. Most of these studies confirm and/or further quantify already known AE following COVID-19 vaccinations. No new serious AE have been identified.

Scott et al. conducted a systematic review on US-licensed immunisations against COVID-19 [153]. They found that the safety profiles were consistent with previous evaluations. The known AE of myocarditis associated with COVID-19 vaccines BNT162b2 (Pfizer/BioNTech), and mRNA-1273 (Moderna) occurred at rates of 1.3

to 3.1 per 100,000 doses among male adolescents, with longer dosing intervals being associated with considerably lower risk. No significant excess myocarditis risk was observed for XBB1.5-adapted vaccines (used in the autumn vaccination round in 2023 in the Netherlands). Furthermore, receiving a COVID-19 vaccination during pregnancy was not associated with miscarriage, congenital anomalies, or stillbirth. The latter was also found by Bernard et al., who studied the association between exposure to mRNA COVID-19 vaccines during the first trimester of pregnancy and the risk of major congenital malformations in over half a million live-born infants [230]. They concluded that exposure to COVID-19 vaccinations during pregnancy was not associated with an increased risk of any major congenital malformations, overall, by organ group, or by individual major congenital malformation.
A study in the Netherlands by Woestenberg et al. used data from the Dutch Pregnancy Drug Register and the cohort event monitoring study on COVID- 19 vaccines [231]. Self-reported AE were compared between pregnant women (n=2204) and non-pregnant women (n=2684). Pregnant women reported comparable or fewer AE after receiving their mRNA COVID-19 vaccination compared to non-pregnant women. The four most frequently reported AE were injection-site reaction, myalgia, fatigue, and headaches.

Mohammadi et al. conducted a systematic review and meta-analysis of 120 observational studies and randomised controlled trials (RCTs) in order to assess the rates of AE among special groups like individuals with specific medical conditions, infants, children, pregnant people, and socioeconomically disadvantaged individuals, who are often not included in RCTs [232]. Lymphadenopathy, autoimmune disease, multiple sclerosis flare-ups, and cardiac symptoms were the most prevalent severe AE reported. The overall incidence of serious AE was low in children and adolescents, pregnant people, autoimmune, and cancer patients; thus emphasising the significance of the overall advantages of COVID-19 vaccination.

Nasreen et al. studied the incidence of Guillain-Barré syndrome (GBS) within a 42 day period of receiving a COVID-19 vaccination in a case series study at 20 global sites within the Global Vaccine Data Network [233]. They found that there was a significant increased risk of confirmed GBS after receiving the AstraZeneca vaccine, and a significant decreased risk after receiving the Pfizer/BioNTech vaccine. However, the latter might be due to a decreased risk of SARS-CoV-2 infection after vaccination, or to some residual bias.

A large cohort study in France among 28 million individuals by Semenzato et al. investigated the association between COVID-19 mRNA vaccines and the long-term (four year) risk of all-cause mortality [234]. Using Cox models weighted for sociodemographic characteristics and 41 comorbidities, they found that there was no increased risk of all-cause mortality up to four years after being vaccinated, thus supporting the safety of the mRNA vaccines.

5.6 Literature

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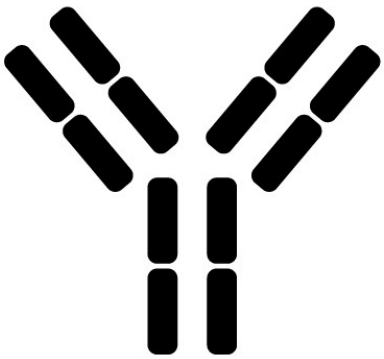
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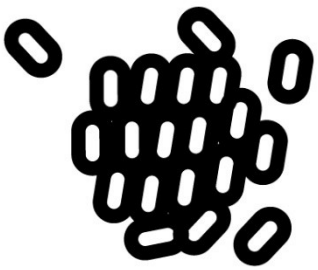
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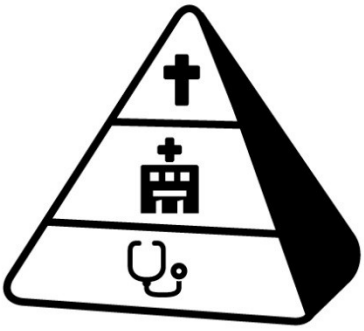
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6 Current National Immunisation programme







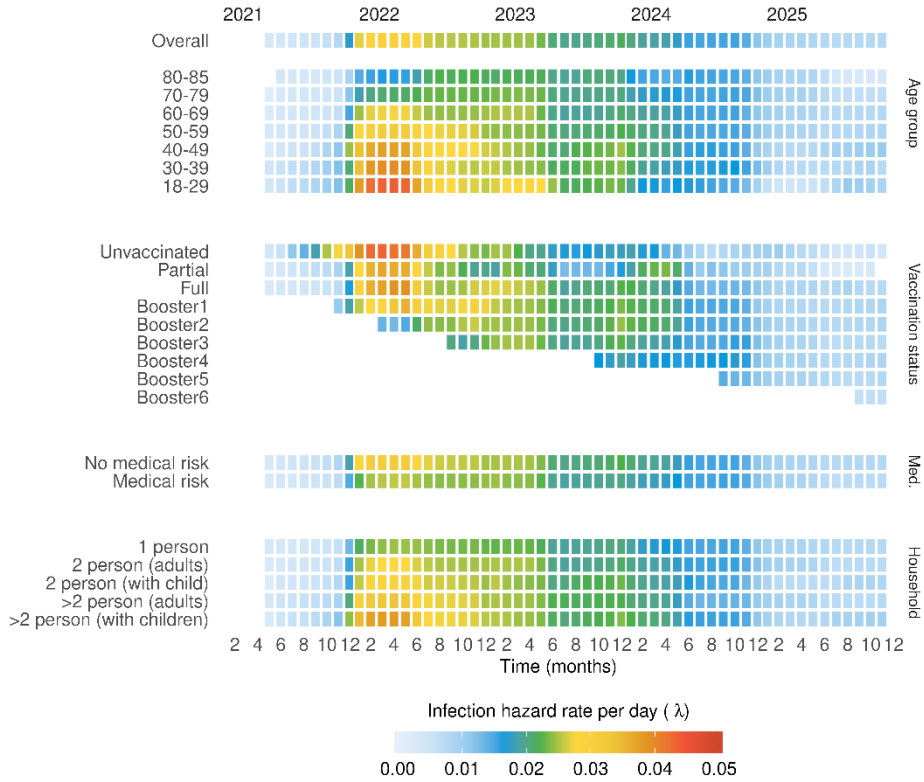
6.1 COVID-19

6.1.1 Key points

- In the autumn of 2025, COVID-19 vaccination was offered to adults aged 60 years and older and people aged 50 years and older with a medical risk condition. Furthermore, children and adults with severe health conditions and healthcare workers who are in contact with vulnerable patients were offered a vaccine.
- The Health Council of the Netherlands advised COVID-19 vaccinations during the autumn of 2026 and 2027 for people aged 70 years and older, people aged 50 years and older with a medical risk condition, children and adults with severe health conditions and healthcare workers who are in contact with vulnerable patients. The Minister of Health, Welfare and Sport adopted this advice.
- Between April 2023 and October 2024, the weighted SARS-Cov-2 infection incidence in the Netherlands based on serological data (PIENTER-Corona study) was 59.1% [56.8–61.4]; 55.4% were infected once and 3.7% were infected twice or more.
- The effectiveness of COVID-19 vaccination during autumn 2024 against hospitalisation in the Netherlands among persons aged 60 years and older was 62% in the low and intermediate medical risk groups (95% CI: 44–74% and 56–67%, respectively), and 55% (43–65) in the high medical risk group. Between 17 September and 31 December 2024, around 500 hospitalisations were estimated to have been prevented by vaccination.
- The effectiveness of LP.8.1 vaccination (autumn 2025) against SARS-CoV-2 infection among persons aged 60 years and older was 36% (95% CI: 25–45) based on data from the Dutch VASCO study.

6.1.2 *Tables and figures*

Figure 6.1.1 Infection hazard rates by calendar month, overall and across age group, vaccination status, medical risk group, or household composition, based on serology data from the VASCO cohort



Estimated daily infection hazard rates (λ) are visualised as heatmap tiles, where each tile represents the mean daily hazard rate within a given month. Only tiles with at least ten person-months of data are included.

6.1.3 *Epidemiology and pathogen*

SARS-CoV-2 does not (yet) have a stable seasonal pattern and increased circulation has also been observed outside the respiratory season. In autumn 2025, from mid-September to the end of October, an elevation was observed. SARS-CoV-2 circulation began to decrease in October and circulation subsequently stayed at a very low level throughout the first half of 2026. The increase observed in the autumn of 2025 was lower than the increase seen in the autumn of 2024.

In mid-September, although a slight increase was seen in the number of SARI-ICU admissions, these admissions remained at a low level during the autumn elevation of SARS-CoV-2 (based on data from 42 ICUs). Excess mortality was not observed during the increase of SARS-CoV-2 circulation during the autumn of 2025.

For further details on the surveillance of SARS-CoV-2 in the Netherlands, please see the overview for the respiratory season 2025/2026 on the following webpage: Surveillance of respiratory infections – COVID-19.

6.1.4 Vaccination strategy

The aim of the Dutch vaccination strategy in 2025 was the same as it was in previous years: to prevent severe illness and death as a result of COVID-19.

During the autumn of 2025, COVID-19 vaccination was offered to people aged 60 and older and people aged 50–59 with a medical risk condition. Furthermore, children and adults with severe health conditions and healthcare workers who are in contact with patients or clients were also offered the vaccine.

The autumn 2025 vaccination round took place from 16 September until 5 December 2025. Persons aged 60 and older received a personal invitation letter to have their vaccination. People who had been vaccinated previously in the autumn of 2024 received a pre-booked COVID-19 vaccination appointment. The pre-booked COVID-19 vaccination appointments included a pre-booked vaccination date, a timeslot, and a location for vaccination, which could be changed if needed. If it was not possible to schedule a pre-booked appointment, then these people received an invitation letter without a date, timeslot, and location. Persons aged 50–59 with a medical risk condition were primarily informed of their eligibility for a COVID-19 vaccine via a general communication campaign. They did not receive a personal invitation. Adults and children in the medical high-risk groups were recommended by their treating physician to receive a COVID-19 vaccine, whilst healthcare workers were informed by their employer. The vaccination coverage of the autumn 2025 round is described in Chapter 2.3.

For the autumn 2026 and 2027 rounds of vaccinations, the Health Council of the Netherlands advised that people aged 70 and older, people aged 50 and older with a medical risk condition, other children and adults with severe health conditions, and healthcare workers who are in contact with vulnerable patients or clients should be vaccinated (link to advice). The Minister of Health, Welfare and Sport decided to adopt this advice. The decision to change the age limit from 60 to 70 was based upon the assessment of the COVID-19 disease burden in 2023 and 2024, which showed that the risk of hospitalisation due to COVID-19 increases from 70 years of age.

6.1.5 Current/ongoing research

6.1.5.1 Seroepidemiology

Data from the PIENTER-Corona cohort study—a nationwide prospective population-based cohort study that was set up in the Netherlands during the early stages of the COVID-19 pandemic—was used to estimate the SARS-CoV-2 infection incidence during 2023–2024. Blood samples were collected in four rounds during the period April 2023–October 2024 and tested for IgG antibodies against Spike-S1 (S1) and Nucleoprotein (N). Infections were identified through anti-N and/or anti-S1 (if not vaccinated) seroconversion or ≥4-fold increase, and self-reported positive tests. The weighted infection incidence in 2023–2024 (N=4261) within the Dutch population as a whole was estimated, and stratified by age, sex, ethnicity, comorbidities and healthcare profession. Between April 2023 and October 2024, the weighted infection incidence was

59.1% (56.8–61.4); 55.4% were infected once and 3.7% were infected twice or more during this period. Higher infection rates during that period were observed in 30–60 year-olds (ranging from 63.3 to 68.5%), those without comorbidities (62.0%) and those not working within the healthcare sector (62.9%).

Whilst serological data offer a complementary opportunity through which to detect infections, this remains challenging due to individual heterogeneity in baseline antibody levels, antibody waning and boosting. A new Bayesian mixture method was developed that better accounts for this heterogeneity by providing data-driven probabilistic estimates of SARS-CoV-2 infections rather than using fixed serological thresholds (e.g., cutoffs or fold-increases). Data from the VASCO study were used for these purposes. VASCO is a prospective cohort study conducted in the Netherlands in which adult participants completed quarterly questionnaires, performed rapid antigen SARS-CoV-2 self-tests upon respiratory symptoms, and provided serological samples every six months during the 2021–2026 period. The model estimates the probability of infection based upon changes in nucleoprotein antibody concentrations, which it does by distinguishing between two individual-specific dynamics: the antibody decay rates and infection-related antibody boosting. The model outcomes were compared with reported infections based upon self-testing. A total of 36,965 participants with ≥2 antibody measurements were included with an average of 5.9 (min-max, 2–10) measurements for each participant. Among those participants with a reported high intention to self-test, in 58% of intervals with an estimated >90% probability of infection, an infection was actually reported, whereas in 96.2% of intervals with a <10% probability of infection, no infection was reported. Estimated daily infection rates overall ranged from 0.0030 (95% CI: 0.0022–0.0037) to 0.030 (95% CI: 0.030–0.031) over time; during the period of highest transmission, young adults reached 0.0437 (95% CI: 0.042–0.046) and older adults reached 0.021 (95% CI: 0.020–0.022, Figure 6.1.1). Infection rates also varied by vaccination status, medical risk, and household composition. Individuals who were recently vaccinated exhibited lower infection rates. This method provides fully self-contained estimates of infection and allows for uncertainty in the inference of infection. These continuous estimates enable the analysis of the force of infection (population-level rate of infection per day) by, for example, time period and age group.

6.1.5.2 Vaccine effectiveness

The effectiveness of COVID-19 vaccination in the autumn 2024 round against COVID-19 hospitalisation was estimated in persons aged 60 and older in the Netherlands by medical risk category [1]. Hospitalisation data from Dutch Hospital Data up to December 2024 were linked with vaccination data from the national COVID-19 vaccination register (CIMS). Medical risk groups were identified using healthcare utilisation data from 2019 to 2023 and categorised as low, intermediate, and high risk. Cox regression was performed with calendar time as underlying time scale and vaccination as time varying exposure. Age, sex, region, and household socio-economic status were included as potential confounders. Of all persons aged 60 and older, 47% had a registered COVID-19 vaccination during the autumn 2024 round.

Vaccination coverage did not differ substantially between the medical risk groups. The effectiveness of COVID-19 vaccination during the autumn 2024 round, which included data up to December 2024, was 62% in the low medical risk group and in the intermediate medical risk group (95% CI: 44–74% and 56–67%, respectively). In the high medical risk group, effectiveness was 55% (43–65). Between 17 September and 31 December 2024, around 500 hospitalisations were estimated to have been prevented by vaccination.

COVID-19 vaccination during pregnancy was recommended in the Netherlands between April 2021 and March 2024. We estimated the vaccine effectiveness (VE) of maternal COVID-19 vaccination against COVID-19 hospitalisations in both infants aged <6 months and pregnant women in the Netherlands. The study population consisted of 1) singleton infants born after ≥24 weeks' gestation and 2) all women whose singleton pregnancy began and reached ≥24 weeks of gestation between September 2021 and December 2022 in the Netherlands. For this study, data from the national perinatal register (Perined), CIMS and COVID-19 hospitalisation (NICE) registers were linked in the protected environment of Statistics Netherlands. In total, 424 of 71,084 pregnant women and 1,151 of 134,338 infants were hospitalised for COVID-19 between September 2021 and December 2022. No association was found between COVID-19 vaccination during pregnancy and COVID-19 hospitalisation during pregnancy (6% (95% CI: -26%-30%). Vaccination during pregnancy was associated with a reduced risk of infant COVID-19 hospitalisation, with an estimated VE of 46% (95% CI: 37–54%). Specifically, among infants of mothers who did not have a SARS-CoV-2 infection and who were also not vaccinated against COVID-19 prior to pregnancy, the effectiveness of vaccination during pregnancy was 51% (95% CI: 40–61%). Among infants of mothers who received a vaccination and/or were infected prior to pregnancy, VE was insignificant and lower. One potential explanation for this is that vaccination during pregnancy has less added benefit when infants are already protected by maternal antibodies developed prior to the pregnancy [2]. No significant differences in VE against maternal or infant COVID-19 hospitalisation were observed between the trimesters of vaccination.

The effectiveness of Omicron LP.8.1 vaccination against SARS-CoV-2 infection was investigated between September 2025 and March 2026 in VASCO (VAccine Study COvid-19), a prospective cohort study that began in May 2021. VASCO participants were included in the current analysis if they were aged 60 or older, had previously completed a primary vaccination series, and had received at least one booster vaccination. In VASCO, regular questionnaire and serology data are collected and self-tests are provided. Participants are instructed to perform a self-test when they experience symptoms. Vaccine effectiveness was estimated using Cox regression with LP.8.1 vaccination as time-varying exposure and calendar time as underlying time scale, with adjustments being made for sex, age group, medical risk condition, education, and infection history. Infection history was based on self-reported positive tests or anti-nucleoprotein antibodies. A total of 19,056 ≥60-year-olds were included, of which 12,432 (62%) reported being vaccinated. During the study period, 982 infections were reported. The adjusted VE was 36% (95% CI: 25–45%). Estimates were

lower at 7–12 weeks after vaccination compared to up to 6 weeks after vaccination (33% (95% CI: 13–49%) vs 38% (95% CI: 26–49%)). The protection provided by a prior infection less than one year earlier, either with or without LP.8.1 vaccination, was 59% (95% CI: 21–79%) and 50% (95% CI: 20–68%), respectively. The effectiveness of 36% of the 2025 LP.8.1 booster was higher than the effectiveness of the 2024 JN.1 booster (estimated at 16%) and somewhat lower than the effectiveness of the 2023 XBB1.5 booster (estimated at 50%). These differences may derive from a (mis)match between the vaccine and the circulating variants. SARS-CoV-2 infection dynamics could also play a role: for example, just prior to the 2024 JN.1 booster campaign there was an infection wave which may have lowered the effectiveness of the vaccine.

6.1.6 (Inter)national developments

A study from the Canadian Sentinel Practitioner Surveillance Network estimated the effectiveness of LP.8.1 vaccination against medically attended COVID-19 during the 2025–2026 season using a test-negative case-control design [3]. A total of 3,802 patients presenting with acute respiratory illness between October 2025 and March 2026 were included in the study, of which 26% were aged 65 or older. Of the 310 COVID-19 cases registered in the study, 29 (9%) were vaccinated; of 3,492 controls, 577 (17%) were vaccinated. VE was 44% (95% CI: -12 to 72) in 12-64 year-olds and 53% (21 to 73) among those aged 65 or older.

Another study used data from VEBIS—a multi-centre test-negative case control study including data from France, Germany, Ireland, Italy and Spain—to estimate the effectiveness of COVID-19 vaccination administered during the autumn/winter of 2025–2026 against medically attended symptomatic SARS-CoV-2 infection among older adults [4]. Logistic regression was used to estimate VE with adjustment for study site, symptom onset, age, and sex. In total, 2,046 patients were included during September 2025 to January 2026. Of the 125 COVID-19 cases, 6% were vaccinated and 19% of 1,921 controls were vaccinated. Overall, VE was 59% (95% CI: 14–83) and was stable up to 83 days after vaccination.

A study from the US estimated the early VE of the LP.8.1 vaccine against emergency department and outpatient visits using a test-negative case-control design [5]. From September to November 2025, 34,455 episodes of acute respiratory infection were included, of which 69% were emergency department visits and primarily involved persons aged 65 or older (54%). Among the 3,696 COVID-19 cases and 30,759 controls, 1.2% and 2.6% received the LP.8.1 vaccine. Vaccine effectiveness was 57% (95% CI: 39–70) against emergency department visits and 54% (15–75) against outpatient visits at approximately four weeks after vaccination.

Another test-negative study from the US assessed the effectiveness of the LP.8.1 vaccine against hospitalisation among immunocompetent adults between September and December 2025 [6]. Of the 1,022 hospitalised SARS-CoV-2 positive cases, 6% were vaccinated during the 2025 campaign. Of the 25,051 SARS-CoV-2 negative controls, 12% were vaccinated. The estimated VE was 55% (95% CI: 41–66). Among

patients aged 65 or older (67%), effectiveness against hospitalisation was 53% (37–65).

6.1.7 Literature

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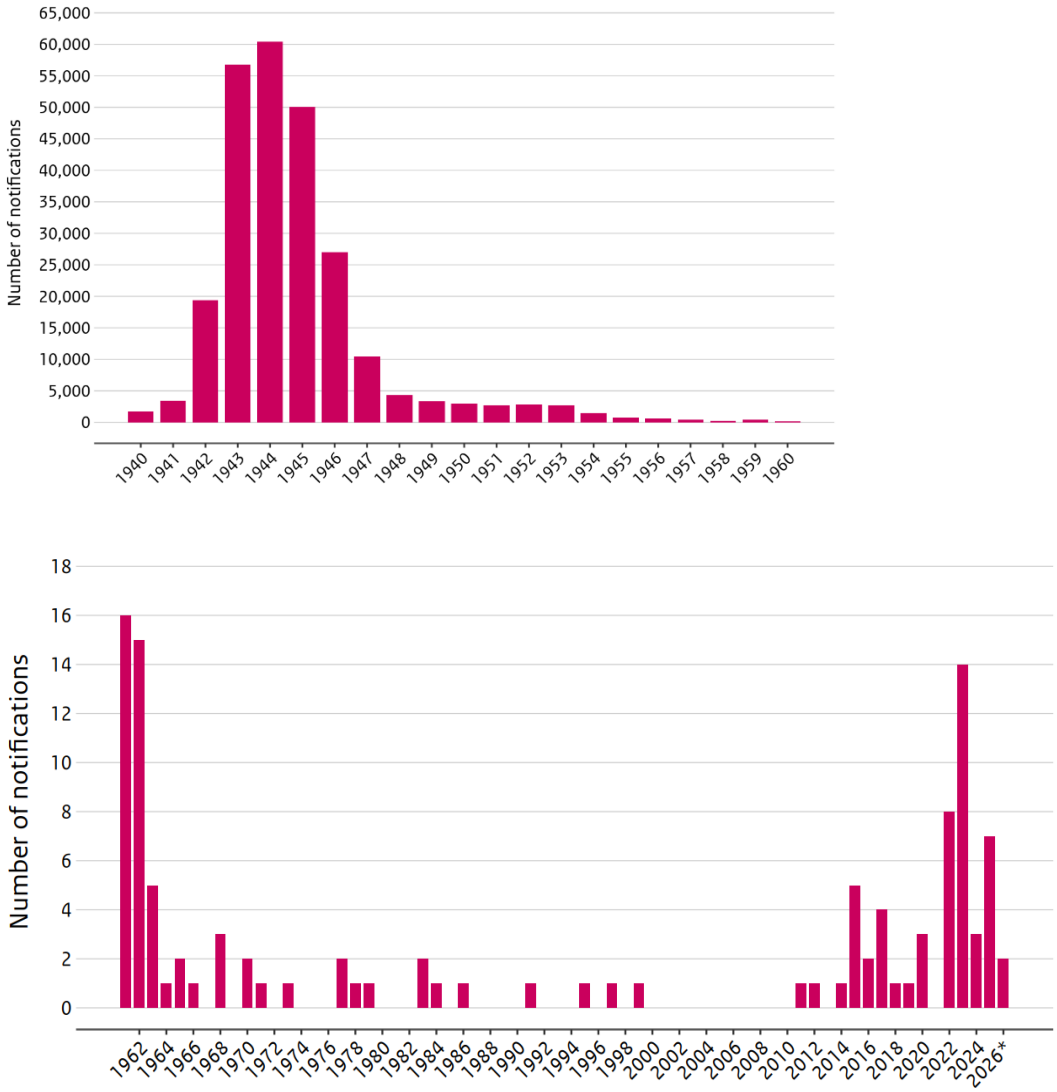
6.2 Diphtheria

6.2.1 Key points

- In the Netherlands, seven diphtheria patients were reported in 2025 (0.04 per 100,000 population). All of the cases had cutaneous disease and were aged between 50 and 75.
- The number of patients is lower than that observed in 2022–2023 (eight and 14 patients, respectively) and higher compared to 2012–2021 and 2024 (between zero and five annually).
- In 2025, several European countries reported an increase in diphtheria among vulnerable population groups. There were no indications of an increase of diphtheria among vulnerable populations in the Netherlands in 2025.
- Ongoing diphtheria outbreaks were experienced by several African countries in 2025.
- From 2025 onwards, vaccination doses for diphtheria are given at the ages of two, three, five, and 12 months, five years, and 14 years rather than at two, three, five, and 11 months, four years, and nine years.

6.2.2 *Tables and figures*

Figure 6.2.1 Annual numbers of diphtheria notifications for both 1940–1960 (above) and 1961–2026 (below)



*For the year 2026, notifications up to and including 20 April are included.
Until 2009, only infections with *Corynebacterium diphtheriae* were notifiable. From 2009 onwards, infections with *C. ulcerans* are also notifiable. From 2024 onwards, all Corynebacterium species that are potentially toxic gene-positive (*C. diphtheriae, C. belfantii, C. rouxii, C. ulcerans, C. pseudotuberculosis, C. silvaticum, and C. ramonii*) are notifiable. Patients are classified by year in order of the data availability: date of symptom onset, date of diagnosis, date of notification. Source: Osiris.

Table 6.2.1 Laboratory results of confirmation testing for C. diphtheriae/C. belfantii/C. rouxii and C. ulcerans at RIVM for 2016–2026***

	*Corynebacterium diphtheriae / C. Belfanti / C.rouxii**					*Corynebacterium ulcerans*				
	PCR		Elek			PCR		Elek		
	Neg	Pos	Pos	NC	Neg	Neg	Pos	Pos	NC	Neg
2016	12	1	1	0	0	2	1	0	1	0
2017	9	1	0	0	1	0	2	0	2	0
2018	7	0	n/a	n/a	n/a	1	2	1	1	0
2019	7	0	n/a	n/a	n/a	8	0	n/a	n/a	n/a
2020	3	1	0	1	0	5	1	0	1	0
2021	7	0	n/a	n/a	n/a	2	0	n/a	n/a	n/a
2022	9	5	3	0	2	2	1	0	0	1
2023	17	13	11	0	2	5	1	1	0	0
2024	17	2	0	1	1	7	1	0	0	1
2025	31	4	3	0	1	5	4	2	0	2
2026***	0	0	n/a	n/a	n/a	4	2	2	0	0

Date of arrival at the laboratory is used for the year of classification. Repeated isolates from the same person were counted once. ELEK test only performed on PCR-positive isolates.
Pos = positive, Neg = negative, NC = non-conclusive, n/a = not applicable
*For the sake of comparability, from 2022 onwards, strains include *C. belfantii* and *C. rouxii* since these were identified as *C. diphtheriae* biovar Belfanti in previous years. There were no detections of the additional species that became notifiable in 2024.
** PCR-confirmed strains reported to RIVM. *** Strains that were sent to RIVM up to May 2026.

6.2.3 *Epidemiology*

Seven diphtheria patients were reported in 2025 and two in 2026 up to and including 20 April (Figure 6.2.1). All cases had cutaneous disease. *C. diphtheriae* was the causative pathogen in three of the cases in 2025, with *C. ulcerans* the causative pathogen in the other six cases. The cases in 2025 were aged between 50 and 75, whilst the cases in 2026 were aged between 15 and 40. The vaccination status was unknown for four patients, whilst the other patients were vaccinated with >3 doses. The time interval between vaccination and disease onset was unknown.

The three patients in which *C. diphtheriae* was the causative pathogen were most likely infected outside Europe, in countries were *C. diphtheriae* is known to be endemic. This is supported by the whole genome sequencing (WGS) results.

6.2.4 *Pathogen*

In case of suspected diphtheria, strains can be sent to RIVM for confirmation. In 2025, RIVM received a total of 44 strains, which were subdivided into 34 C. diphtheriae, one C. rouxii and nine C. ulcerans strains isolated from wounds (mostly on lower body), ulcers or tissue, blood cultures, and ear cultures. The total number of isolates that were sent to the RIVM with suspected Corynebacterium was higher than in previous years. Out of the eight PCR-confirmed toxin gene-positive strains in 2025, three strains had negative test results related to exotoxin production as determined by the ELEK-test. The eight toxin gene-positive strains in 2025 refer to eight patients reported in 2025, of whom one patient, who was infected with C. diphtheriae, had symptom onset in 2024. In 2026, for the period up to and including April, RIVM

has received six C. ulcerans strains, of which two were PCR-confirmed toxin gene-positive and refer to the two reported patients in 2026. See Table 6.2.1 for details on the laboratory results for the respective strains.

6.2.5 *(Inter)national developments*

In 2025, several European countries reported an increase in diphtheria cases caused by *C. diphtheriae*, primarily amongst vulnerable population groups such as recently arrived migrants, homeless people, and individuals who use drugs or alcohol. Germany, Czech Republic and Poland documented cases with sequence type (ST) 574, a ST that was first observed during the outbreak among migrants in 2022–2023, indicating ongoing transmission in recent years. France also reported a higher number of cases among vulnerable population groups in 2025, with infections also being linked to a strain initially found in the migrant outbreak of 2022–2023. In Belgium, there has been a rise in diphtheria among homeless individuals, with most cases belonging to the same genetic cluster (ST100 of *C. diphtheriae*), which is indicative of local transmission.

In 2025, ongoing diphtheria outbreaks were experienced by several African countries. Specifically, between January and November 2025, Algeria, Chad, Guinea, Mali, Mauritania, Niger, Nigeria, and South Africa collectively reported over 20,000 suspected diphtheria cases and more than 1,200 deaths. In addition, Somalia reported over 3,000 suspected cases of diphtheria in 2025. In response, the WHO Regional Office for Africa organised a meeting in December 2025, which brought together Ministers of Health and senior representatives from the affected countries, UNICEF, GAVI, and Africa CDC. The Ministers of Health reaffirmed government leadership in order to both intensify coordinated action and strengthen immunisation systems. GAVI and UNICEF reaffirmed their support to increase immunisation coverage.

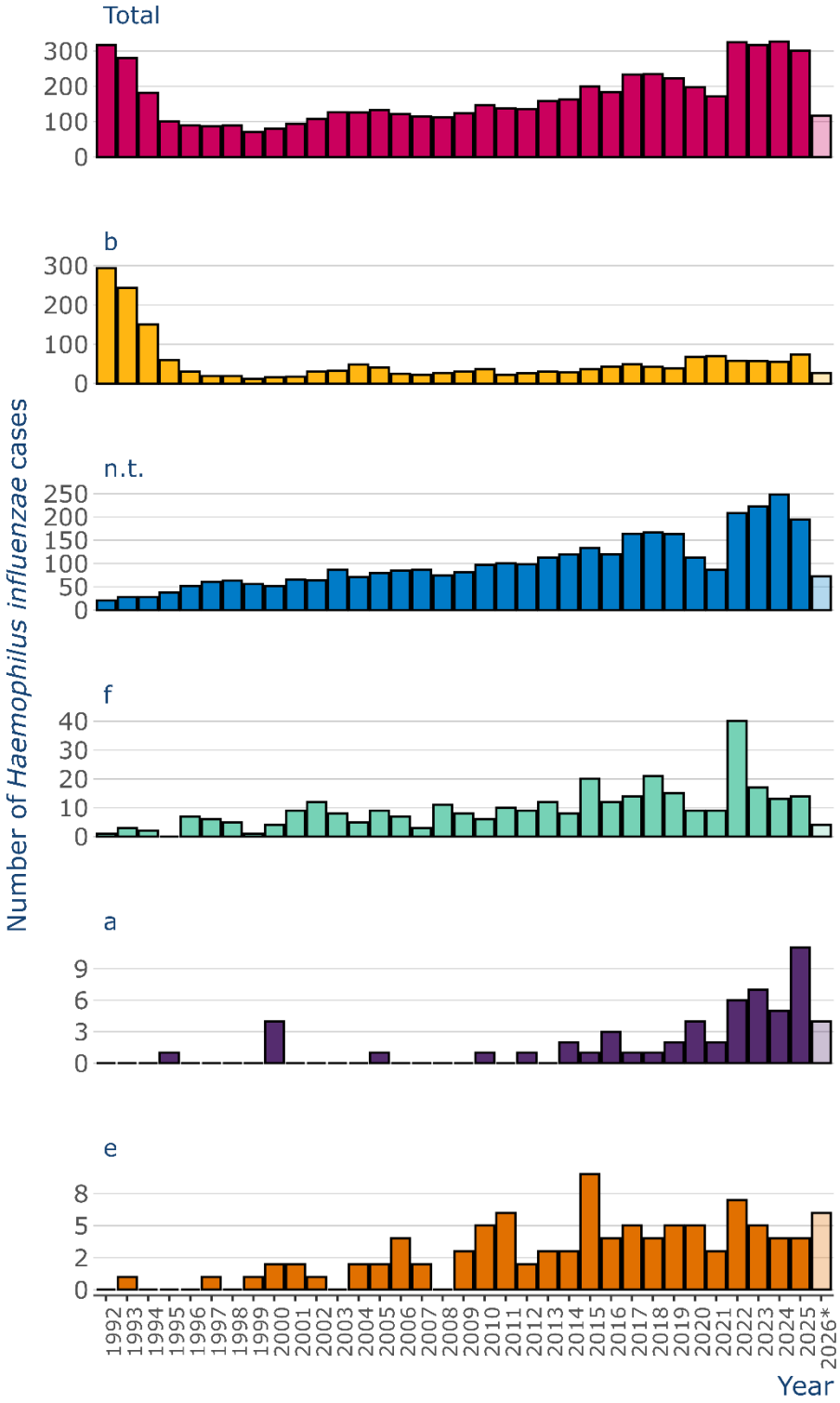
6.3 *Haemophilus influenzae* disease

6.3.1 Key points

- In 2025, 73 cases of invasive *Haemophilus influenzae* serotype b disease (Hib) were diagnosed. This is the highest annual number of Hib cases recorded in the Netherlands since 1995 and is comparable to the peak of 70 cases in 2021.
- The incidence of Hib in 2025 was 0.40 per 100,000 population. In 2024, the incidence was 0.31 per 100, 000.
- Whilst the high Hib incidence in 2020-2024 was primarily attributable to cases in young children, the high number of cases in 2025 was largely due to an increase in the incidence among people aged 65 and older.
- The steadily increasing incidence of non-typeable *Haemophilus influenzae* halted in 2025, with an incidence of 1.08 per 100,000 population, compared to 1.38 per 100,000 in 2024.
- Vaccine effectiveness against invasive Hib disease has remained consistently high at around 90%.
- From 2025 onwards, vaccination doses for *Haemophilus influenzae* serotype b are given at the ages of two, three, five, and 12 months, rather than at two, three, five, and 11 months.

6.3.2 *Tables and figures*

Figure 6.3.1 Number of Haemophilus influenzae invasive disease cases per serotype, January 1992–April 2026



Please note the different y-axis ranges. * Up to and including April 2026.

Figure 6.3.2 Age-specific incidence of Haemophilus influenzae type b (Hib) invasive disease per 100,000 population, 2002–2025

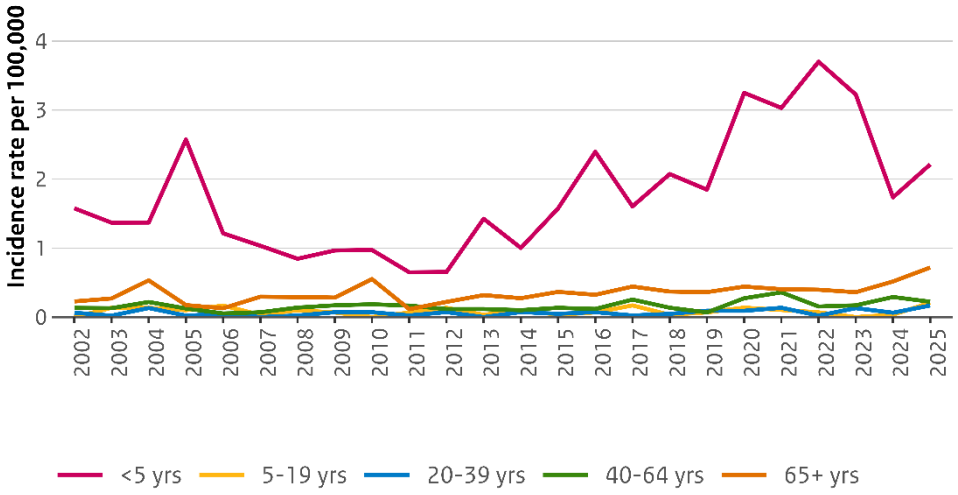
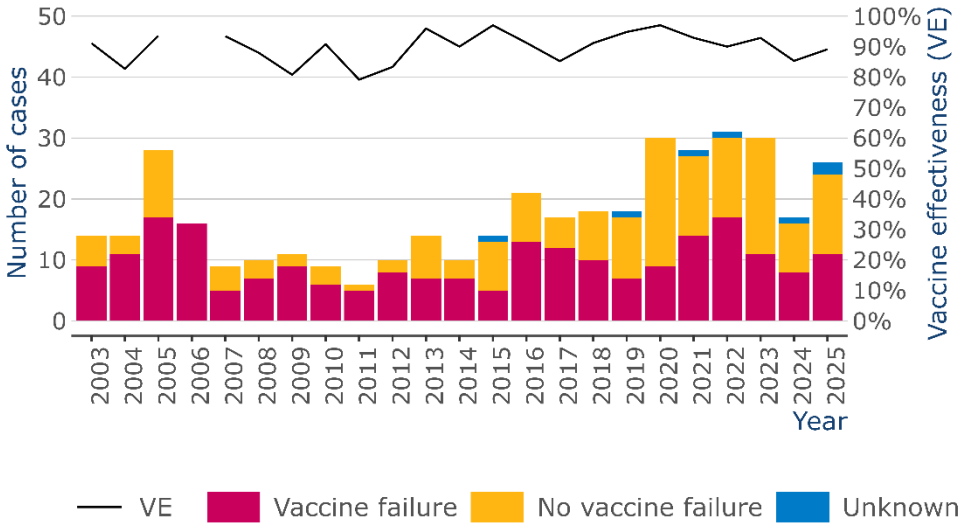


Figure 6.3.3 Number of Haemophilus influenzae type b (Hib) cases in cohorts eligible for vaccination (i.e., born either on or after 1 April 1993) and aged at least three months, by vaccination status, and the vaccine effectiveness estimated by use of the screening method, 2003–2025



Note: in 2006, VE could not be estimated because 100% of the cases were vaccinated.

Figure 6.3.4 Age-specific incidence of non-typeable Haemophilus influenzae disease (NTHi), 2002–2025

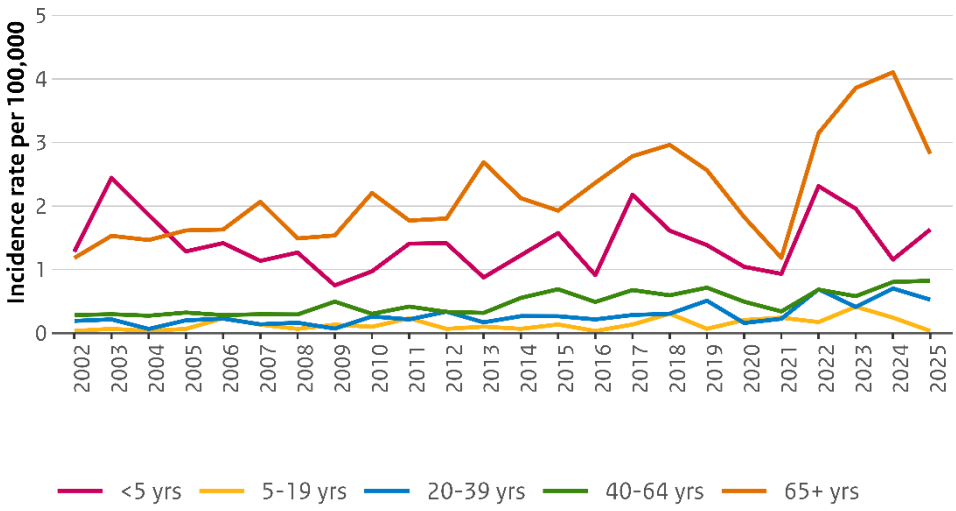
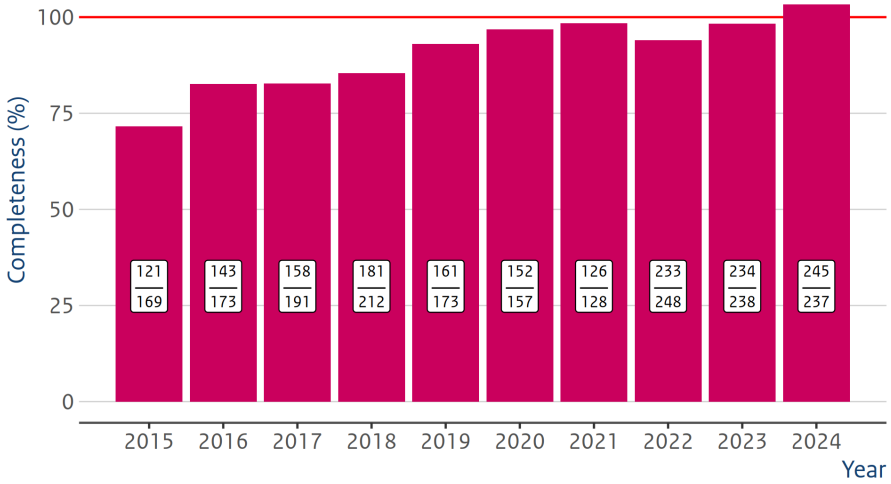


Figure 6.3.5. Completeness of Haemophilus influenzae isolate submission to the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM, denominator), compared to data from the antibiotic susceptibility surveillance system ISIS-AR (numerator), 2015–2024



Note, only isolates originating from blood or cerebrospinal fluid were considered for this figure. The red horizontal line indicates 100% completeness. Completeness exceeds 100% if more isolates are received by NRLBM than included in ISIS-AR.

6.3.3 *Surveillance*

Invasive disease caused by *Haemophilus influenzae* serotype b (Hib) often presents itself as epiglottitis, meningitis, sepsis, pneumonia, and septic arthritis. In order to confirm an infection with Hib, the *Haemophilus influenzae* (Hi) isolate is serotyped by the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM) (see Appendix 1).

6.3.4 Epidemiology

6.3.4.1 Incidence

Hib vaccination was introduced in the Netherlands in April 1993. After a large decrease in incidence following the introduction of vaccination, the number of Hib cases fluctuated around 30 cases per year between 1996 and 2019, corresponding to an incidence of around 0.18 per 100,000 population (Figure 6.3.1). During the COVID-19 pandemic in 2020 and 2021, the overall Hib incidence increased to 0.38 and 0.40/100,000 (n=67 and 70), respectively. Between 2022–2024, the total number of cases amounted to 58, 57, and 55, respectively, which corresponds to incidences of 0.33, 0.32, and 0.31 per 100,000 population. In 2025, the number of Hib cases increased again to 73, with an overall incidence of 0.40 per 100,000. During the first four months of 2026, 27 Hib cases were diagnosed, compared to 24 cases in the first four months of 2025.

Notable age-specific fluctuations in Hib incidence have occurred (Figure 6.3.2). Among <5-year-olds, the incidence peaked in 2005 and showed a steady increase in the 2012–2022 period up to 3.2 per 100,000 population, followed by a significant decrease in 2024 to 1.7 per 100,000. However, in 2025 the incidence increased again to 2.2 per 100,000 (n=19, Figure 6.3.2). In 2026, up to and including April, the number of Hib cases amongst <5-year-olds was 7. For the age group 65 years and older, the Hib incidence peaked in 2004 and 2010, then showed a slow increase between 2011 and 2024, with a notable further increase from 0.52 per 100,000 population in 2024 to 0.72 per 100,000 population in 2025 (n=27).

6.3.4.2 Disease outcome and underlying medical conditions

Disease outcome is known for 65 out of the 73 Hib patients in 2025. Out of these, two young children and two older adults died.
During the first four months of 2026, no deaths from Hib were notified.
Data on the presence of underlying medical conditions was available for 77% of the Hib patients in 2025; of those, 32% had comorbidities. For the 19 Hib patients aged <5 years, no comorbidities were reported.

6.3.4.3 Vaccination status and vaccine effectiveness

In 2025 and 2026 (up to and including April), 26 and 10 Hib cases, respectively, were reported among vaccine-eligible cohorts (born from 1 April 1993 onwards) and aged at least four months (the first dose is provided at three months in the standard schedule; Figure 6.3.3). Vaccine failure was defined as a Hib case having received their last dose at least 14 days prior to the date used for statistics (DUFS) plus any of the following: any dose received after the age of 12 months; four doses received; three doses with the latest dose received at nine months of age or older; age <12 months with at least two doses received. Out of the 26 cases in 2025, 13 were not or not fully vaccinated and 11 were fully vaccinated (two had an unknown vaccination status). The overall vaccine effectiveness (VE) of Hib vaccination in 2025 among those eligible for vaccination and aged >3 months was estimated using the 'screening method' (see Appendix 1). The estimated VE in 2025 was 89% (95% CI: 76–95) (Figure 6.3.3), which is similar to earlier years. As of 1 January 2025, the recommended age for the booster dose was changed from 11 to 12 months. This applies to children born from 1 January 2024 onwards. No cases of Hib vaccine failure at the age of 11

months, nor following the booster dose at 12 months, were reported in either 2025 or the first four months of 2026.

6.3.5 Haemophilus influenzae disease caused by non-b serotypes

In 2025, 194 cases of invasive non-typable Hi (NTHi) disease were reported, resulting in an incidence of 1.08 per 100,000 population. This incidence is lower than in 2024, which had the highest incidence thus far at 1.38 per 100,000 (n = 248, Figure 6.3.4).
Other non-b serotypes that were observed in 2025 were serotype f (Hif; n=14), a (Hia; n=11) and e (Hie; n=4) (Figure 6.3.1). For Hia, this is the largest annual number of cases observed in the Netherlands thus far. Following a peak in Hif cases in 2022 (n=39), fewer Hif cases were observed in 2023–2025. No Hi serotype d disease has been found since 2017.

6.3.6 Current/ongoing research

6.3.6.1 Accuracy of Hib serotyping methods

Despite similar vaccination rates across Europe, the Netherlands has consistently reported the highest incidence of *Haemophilus influenzae* type b (Hib), accounting for approximately 30% of all cases reported to the ECDC since 2010. In order to investigate whether differences in Hib agglutination testing methods amongst European reference laboratories contribute to these observed variations, a comparative assessment was conducted. A survey was sent to 20 European reference laboratories, with 14 of them subsequently completing the survey on the serotyping practices for invasive Hi surveillance (response rate of 70%). Of the 14 participating European laboratories, 11 (79%) reported the use of agglutination assays using type-specific antisera for serotyping. Nine of these (82%) reported supplementing agglutination with PCR confirmation. Based on their responses, two commercial agglutination assays and one Dutch in-house agglutination assay were selected for evaluation and subsequently blindly applied to 163 Dutch invasive Hi isolates (68 serotype b, 95 non-serotype b). To exclude unspecific agglutination, the Hi isolates were tested for autoagglutination and antisera of the Hi serotype f were included as a control. Sensitivity and specificity were determined using PCR-based capsular typing as the reference standard. The performance of the in-house assay was then compared to the two commercial assays using McNemar's Chi-squared test. Testing of the 95 non-type b Hi isolates with all three agglutination assays resulted in no false positives, thus indicating 100% specificity. The Dutch in-house assay demonstrated 100% sensitivity (68/68 Hib isolates detected), compared to 99% sensitivity (67/68 Hib isolates, p=1.0) and 91% sensitivity (60/68 Hib isolates, p=0.013) for the two commercial assays, respectively.
Relying solely on agglutination for serotyping can lead to misclassification and underestimation of Hib incidences depending on the diagnostic assay used. Minor differences in assay sensitivity on cultures may only partially explain the higher incidence in the Netherlands compared to other European countries. Harmonising laboratory techniques by using well-performing agglutination assays and combining phenotypic with molecular approaches can improve the comparability of surveillance data.

6.3.6.2 Completeness of isolate submission

As also described for meningococcus and pneumococcus, the completeness of *H. influenzae* isolate submission to the NRLBM was evaluated by RIVM, by comparing the number of isolates submitted to NRLBM to the number of isolates reported in ISIS-AR, the national surveillance system for antimicrobial susceptibility testing (for methods, see Appendix 1). Up until 2022, surveillance only focused on isolates from blood or CSF, before subsequently expanding to all isolates from normally sterile sites. Considering only isolates from blood or cerebrospinal fluid, the completeness increased from 72% in 2015 to 103% in 2024 (Figure 6.3.5), which means NRLBM received more isolates than were reported to ISIS-AR. The largest increase in completeness was seen in the age group 65 years and older, which may have contributed to the larger incidence observed in this age group. Completeness has been consistently high for 0–4-year-olds. Completeness of *H. influenzae* laboratory surveillance based on isolates from all normally sterile sites increased from 50% in 2015 to 78% in 2024.

6.3.7 (Inter)national developments

In France, the incidence of Hib among children aged under five years increased during 2018–2024, peaking in 2021 [1]. The majority of cases was correctly vaccinated. As in the Netherlands [2], VE against invasive disease did not decrease during this time, although these VE estimates have large confidence intervals. The reason for the Hib increase, both in France and the Netherlands, remains unknown. Further studies on vaccine effects on carriage and transmission could help elucidate this [3]. As we reported before [4], Hib isolates received by NRLBM were ST-6 clonal complex and no association between genotype and vaccine failure was seen.

A Polish surveillance study using data from 2018–2023 found the majority of invasive Hi isolates to be NTHi (86%) [5]. Among capsulated Hi, serotype f was most common, followed by e, b and d.

6.3.8 Literature

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4.* Pluijmaekers AJM, De Melker HE. The National Immunisation Programme in the Netherlands. Surveillance and developments in 2021-2022. Bilthoven: RIVM2022. Report No.: 2022-0042.

5. Kiedrowska M, Blaszczyk K, Golebiewska A, Hryniewicz W, Kuch A, Ronkiewicz P, et al. Characteristics of *Haemophilus influenzae* Isolates Responsible for Invasive Infections in Poland in 2018-2023. Infect Dis Ther. 2026;15(3):683–700.

*publication with RIVM authors.

6.4 Hepatitis B

6.4.1 Key points

- In 2025, 891 hepatitis B virus (HBV) infections were reported to RIVM, out of which 791 (89%) were chronic/unknown infections, and 100 (11%) were acute infections. The incidence of 0.55 per 100,000 population of acute HBV notifications in 2025 is similar to 2024 when there was an incidence of 0.56 per 100,000.
- None of the reported acute HBV cases in 2025 were involved individuals who had been vaccinated against hepatitis B as part of the national immunisation programme introduced in 2003.
- In 2025, genotype A continued to be the dominant genotype among acute HBV cases, accounting for 57% of the 81 genotyped cases.
- From 2025 onwards, vaccination doses for hepatitis B are given at the ages of two, three, five, and 12 months, rather than at two, three, five, and 11 months.

6.4.2 *Tables and figures*

Figure 6.4.1 Incidence of acute HBV infections in men and women by year in the Netherlands during the period 1976–2025, and chronic HBV infections during the period 2000–2025

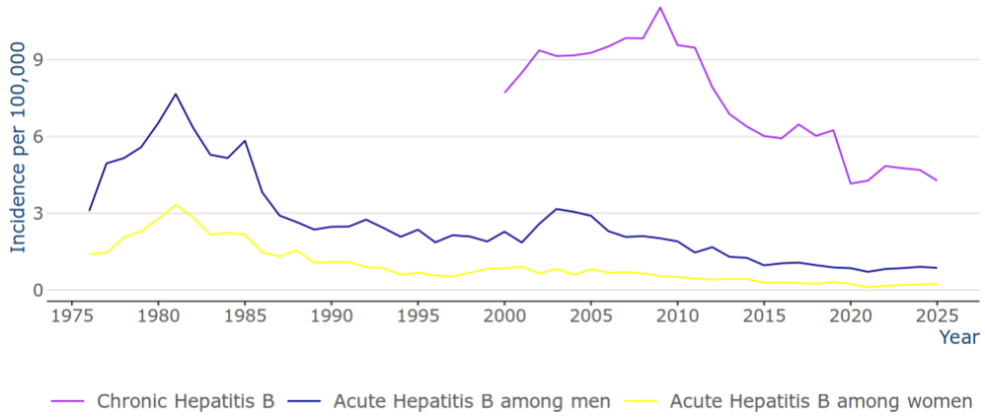


Figure 6.4.2 Number of acute HBV infections in men and women by both age and vaccination status in the Netherlands in 2025

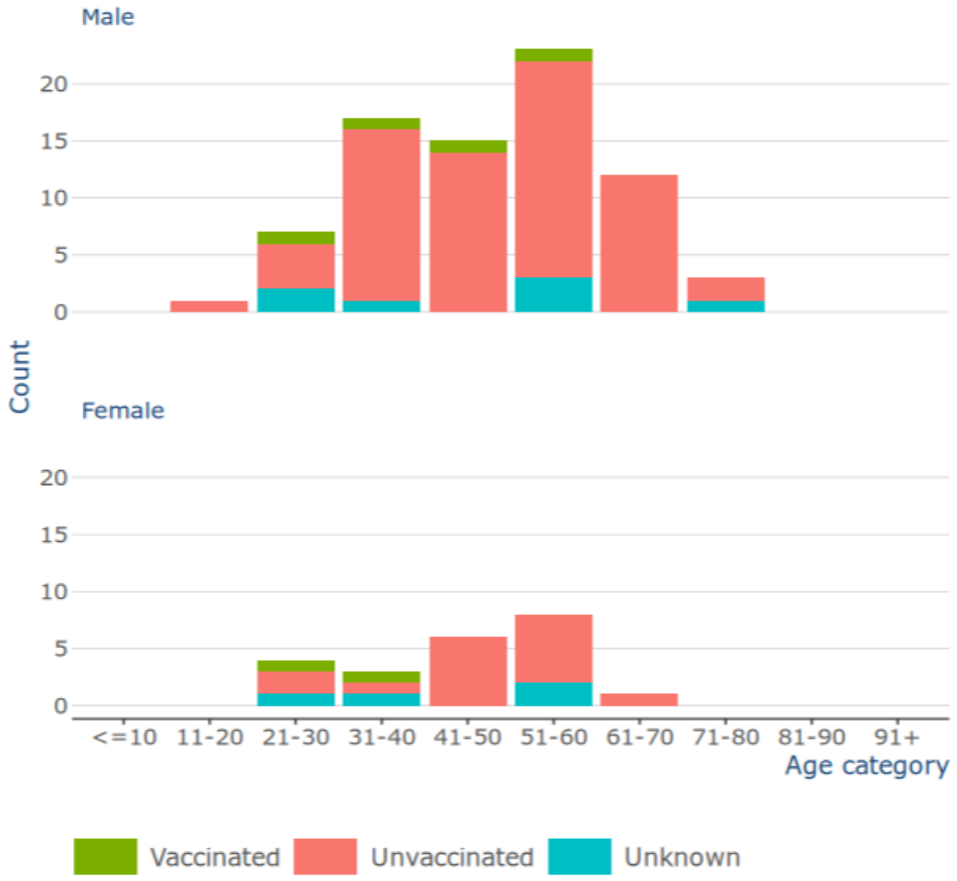


Figure 6.4.3 Optimised maximum parsimony tree based upon the full length-sequence of HBV cases in the Netherlands in 2025 by reported transmission route (n=88); Letter=genotype

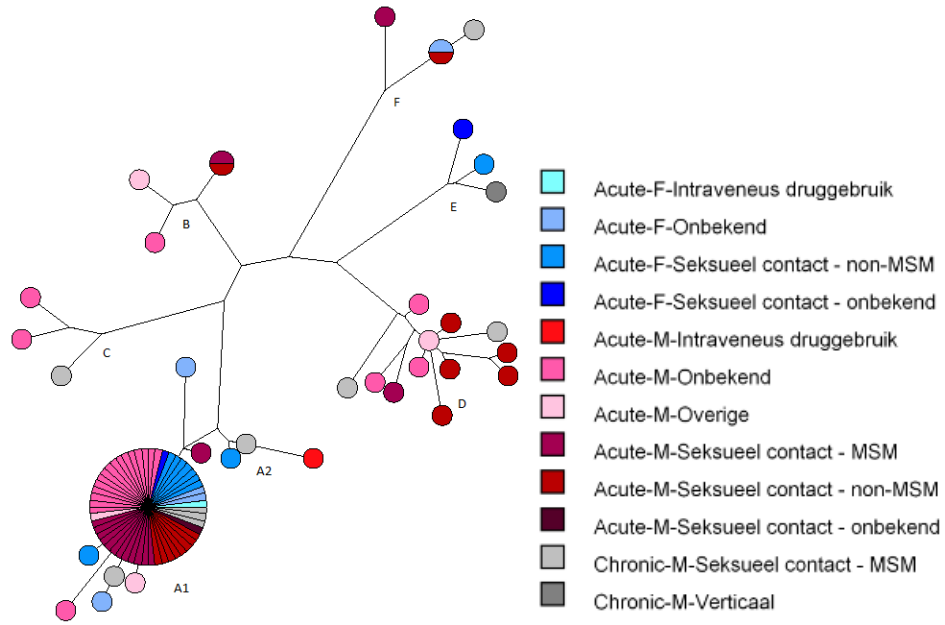


Figure 6.4.4 Genotype distribution of acute HBV cases in the Netherlands from 2004 to 2025

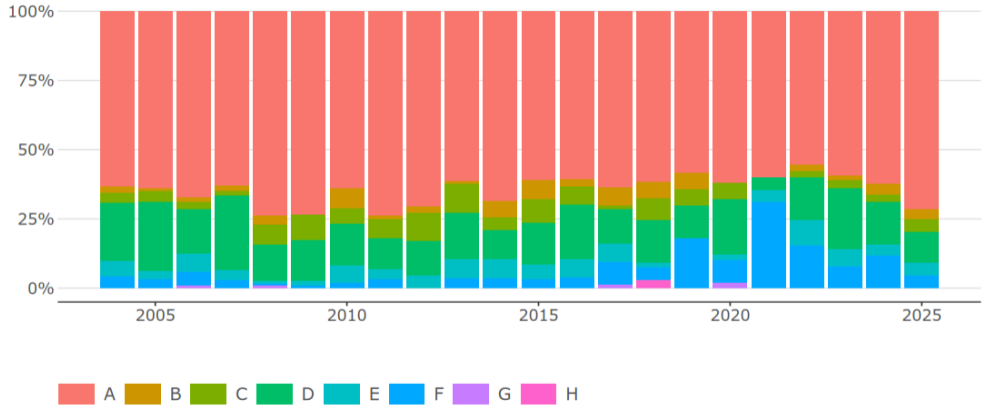
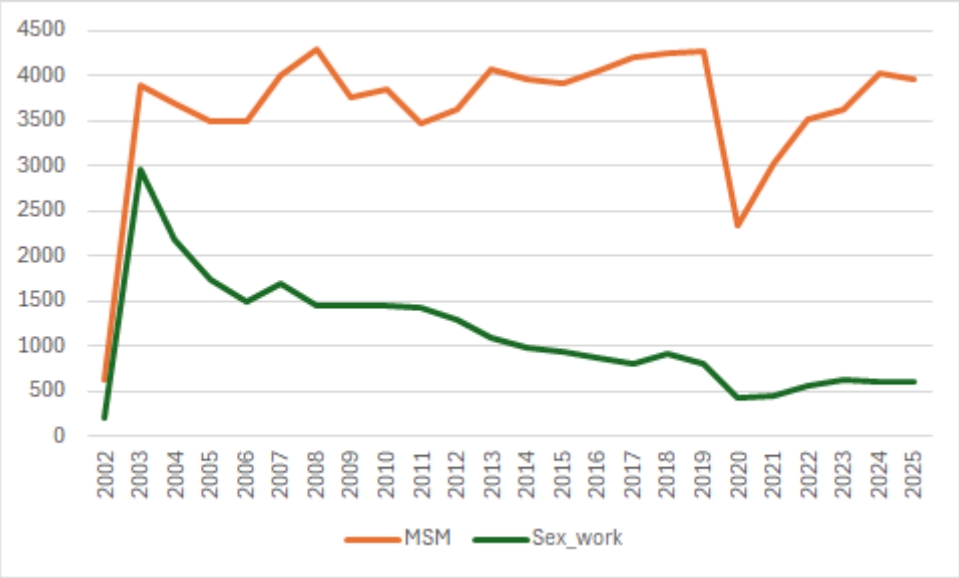


Figure 6.4.5 Number of first vaccinations each year from 2002 up until 2025 within the programme for MSM and sex workers. Since June 2024, a combination vaccine against hepatitis A and B has been temporarily offered free of charge to MSM as part of the programme. Since then, approximately 80% of the administered vaccinations have been the A/B combination vaccine



6.4.3 *Epidemiology*

In 2025, 891 hepatitis B infections were reported to RIVM, 791 (89%) of which were chronic/unknown infections, and 100 (11%) were acute infections.

Acute HBV epidemiology

Since 2011, hepatitis B vaccination has been part of the national immunisation programme. Prior to this, the hepatitis B vaccination was offered via targeted campaigns aimed at key groups within the population. In 2003, children of migrants from countries with either a moderate or high HBV prevalence were offered the hepatitis B vaccine as part of the NIP. There were 100 reported acute HBV infections in 2025, which is comparable to the 101 reported cases in 2024. The incidence of acute HBV notifications in 2025 was 0.55 per 100,000 population, 0.87 per 100,000 among men and 0.24 per 100,000 among women (Figure 6.4.1). The mean age of patients with acute HBV infection was 48 years (range: 17–75) and was higher in men (48 years) than women (45 years). One case of acute hepatitis B was reported among 0–20-year-olds; this patient was 17-years-old and was unvaccinated (Figure 6.4.2). Out of all 89 cases with a known vaccination status, six were vaccinated at least once (7%). One case had received 1 dose, two cases received 2 doses and three had received 3 doses or more. The youngest vaccinated patient was born in 2000, which is well before the introduction of universal hepatitis B vaccinations. In 2025, most acute HBV infections (58%) were acquired through sexual contact. For 33% of the reports of acute HBV infection, the most likely route of transmission remained unknown despite source tracing. The majority of patients with acute hepatitis B were born in the Netherlands (77%). Twenty-six (26%) patients with acute hepatitis B

were admitted to the hospital in 2025. One patient died due to hepatitis B being either the primary or secondary cause of death.

Chronic HBV epidemiology
The number of chronic HBV notifications was around 1,000–1,100 per year between 2014 and 2019 (incidence 5.8–6.4 per 100,000 population) but declined to 724 and 747 cases in 2020 and 2021, respectively, after which it again increased to 851 and 848 cases in 2022 and 2023, respectively (Figure 6.4.1). More recently, the incidence was somewhat lower with 842 chronic HBV notifications in 2024 (incidence of 4.7 per 100,000) and 771 in 2025 (incidence of 4.3 per 100,000). It is important to note, here, that there is a reporting delay for chronic HBV, insofar as cases are often found at a Dutch municipal health service sometimes weeks to several months after laboratory confirmation (these are often performed in another country). In 2025, 92% of the chronic HBV patients, whose country of birth was known, were born abroad. The number of newly diagnosed chronic HBV infections among people born abroad is around 70 times higher than among people born in the Netherlands (28.5 compared to 0.5 per 100,000 population, respectively). The number of notifications across different countries of birth fluctuates over time. In 2025, the most frequently reported countries of birth were Turkey (n=63, 8%), China (n=61, 8%), the Netherlands (n=57, 8%), Syria (n=38, 5%), and Ghana (n=34, 5%). A considerable proportion of cases (40%) acquired chronic HBV infection through vertical transmission. In 41% of the reported chronic HBV infections, the most likely route of transmission was unknown. Whilst sexual contact was the source of infection for 7% of cases, transmission also occurred via other routes, such as, for example, needlestick injuries (1%), via injecting drugs (IDU, 1%), and other routes (9%). Among those who acquired their infection vertically (n=346), none of them were reported in young children (<2-years-old).

6.4.4 Pathogen

Samples for genotyping are collected from all acute HBV infections, from chronic infections in MSM, and in people detected through the vaccination programme for behavioural risk groups. In 2025, 84 samples out of the 100 acute HBV cases (84%) were sent for molecular typing. PCR amplification and sequencing provided results for 81 samples of acute HBV infections for the full-length genome and for 12 of the chronic cases. An optimised maximum parsimony tree of these sequences by the most likely transmission route is presented in Figure 6.4.3. In 2025, six different genotypes were found among notified acute cases (Genotype A: 62, B: 3, C:3, D:8, E:2, F:3) and five different genotypes among notified chronic cases of HBV (Genotype A: 6, C:1. D:2, E:2, F:1). As observed in previous years, the most widely detected genotype was A (Figure 6.4.4).

6.4.5 (Inter)national developments

HBV vaccination programme for risk groups
In 2025, the number of first vaccinations stabilised with 3,950 vaccinations (Figure 6.4.5). With respect to sex workers, this has remained relatively stabilised at around 500 from 2020 onwards.
In the Netherlands, the number of first vaccinations given as part of the HBV vaccination programme for groups engaging in high-risk behaviour

has varied for MSM and sex workers over the years up until 2019; whilst for MSM this remained relatively constant at around 4,000, for sex workers this decreased to approximately 800. The decrease in vaccinations in 2020 and 2021 is most likely associated with the COVID-19 pandemic. In 2022, 2023, and 2024, the number of vaccinations (in 2023: 4,020 first vaccinations were given to MSM) rose once again for MSM and reached similar levels as observed prior to 2020, when more than 4,000 first vaccinations were given on an annual basis.
Since June 2025, a combination vaccine against hepatitis A and B has been temporarily offered free of charge to MSM as part of the programme for risk groups. The Ministry of Health, Welfare and Sport has asked the Health Council for advice on whether to structurally offer the combined hepatitis A/B vaccination to the MSM group. Approximately 80% of the administered vaccinations have been the A/B combination vaccine since June 2025 [1,2]. Hepatitis A is a disease that occurs more frequently among MSM through sexual practices involving contact with faeces. By offering it free of charge, more MSM are vaccinated, especially younger MSM, who otherwise might not have chosen to be vaccinated.

Antenatal screening
In 2024, 0.19% of pregnant people (321/170,218) tested positive for hepatitis B in the Netherlands [1]. This percentage was similar in the preceding years, namely 0.19 in 2023, 2022 and 2021. Prior to that, this percentage decreased somewhat from 0.29% to 0.22% in 2020. Furthermore, 203 out of 283 (71.7%) babies born to hepatitis B-positive mothers were immunised with hepatitis B immunoglobulin within two hours and 286 out of 292 (99.5%) within 48 hours in order to prevent mother-to-child transmission.

Trends in Hepatitis B Seroprevalence in the Netherlands [4]
In this study, HBV seroprevalence was estimated, along with its determinants, and trends over a twenty-year period were assessed. Data from three nationwide cross-sectional serosurveys (PIENTER: 1995–1996, 2006–2007, and 2016–2017) were used. Weighted HBV seroprevalence remained stable across the surveys (3%–5% past or present infection; <0.4% active infection). HBV prevalence was highest among first-generation migrants, those who are older in age, and for participants with an STI history. Only 9% of active HBV cases reported being aware of their status. Overall, HBV seroprevalence remained low in the Netherlands, albeit concentrated within specific groups with limited awareness. These findings support targeted prevention, screening, and linkage-to-care strategies in order to both achieve the 2030 WHO elimination goals and underscore the importance of continued population-based (sero-)monitoring to guide public health policy.

6.4.6 Literature

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6.5 Human papillomavirus

6.5.1 Key points

- The vaccine effectiveness of the bivalent human papillomavirus (HPV) vaccine (2vHPV) against genital persistent vaccine-targeted HPV types 16 and 18 remained high (100%) up to 11 years after vaccination with a two-dose regimen with a two-year lag-time for vaccination status.
- Three years after vaccination, the geometric mean concentrations of antibodies against HPV16/18 among boys vaccinated at age 9–10 years were similar to those in girls vaccinated at age 12–13 years.
- Using pathology results from clinically initiated cervical samples, preliminary analyses showed that 2vHPV vaccination with a three-dose regimen vs. no vaccination reduced the incidence of both CIN3+ by 76% and of cervical cancer by 83% prior to 30-years of age, that is, the age at which women are first invited for population-based cervical cancer screening.
- From September 2026 onwards, the nonavalent (9vHPV) instead of 2vHPV vaccine is offered within the NIP.

6.5.2 Tables and figures

Table 6.5.1 Vaccine effectiveness (VE) against incident and persistent HPV infections (twelve months) among young women, born in 2001, who were eligible for two doses of HPV vaccination within the HAVANA2 study up to ten years after vaccination (2014–2024)[α]

	Crude VE (95%CI)	
	Incident infections	**Persistent infections**
Vaccine types (16/18)	91% (78, 96%)	91% (67, 97%)
Cross-protective types (31/33/45)	26% (-8, 50%)	70% (40, 85%)
hrHPV types	8% (-5, 19%)	29% (9, 44%)
hrHPV types 9-valent vaccine[§]	32% (17, 44%)	44% (22, 60%)
With two-year lag-time for vaccination status		
Vaccine types (16/18)	91% (76, 96%)	100%
Cross-protective types (31/33/45)	33% (1, 54%)	74% (42, 88%)
hrHPV types	10% (-2, 20%)	28% (8, 43%)
hrHPV types 9-valent vaccine[§]	28% (13, 41%)	50% (30, 65%)

CI: confidence interval; VE: vaccine effectiveness; hrHPV: high-risk HPV types 16/18/31/33/35/39/45/51/52/56/58/59. §High-risk types covered in the 9-valent vaccine: 16/18/31/33/45/52/58.

[α] In 2024, 1,113 women submitted a vaginal sample. Of these women, 600 (54%) were vaccinated aged 12–13 years in 2014, 43 (4%) were vaccinated in 2015–2022, 232 (21%) were vaccinated during the catch-up campaign in 2023–2024, and 238 (21%) remained unvaccinated.

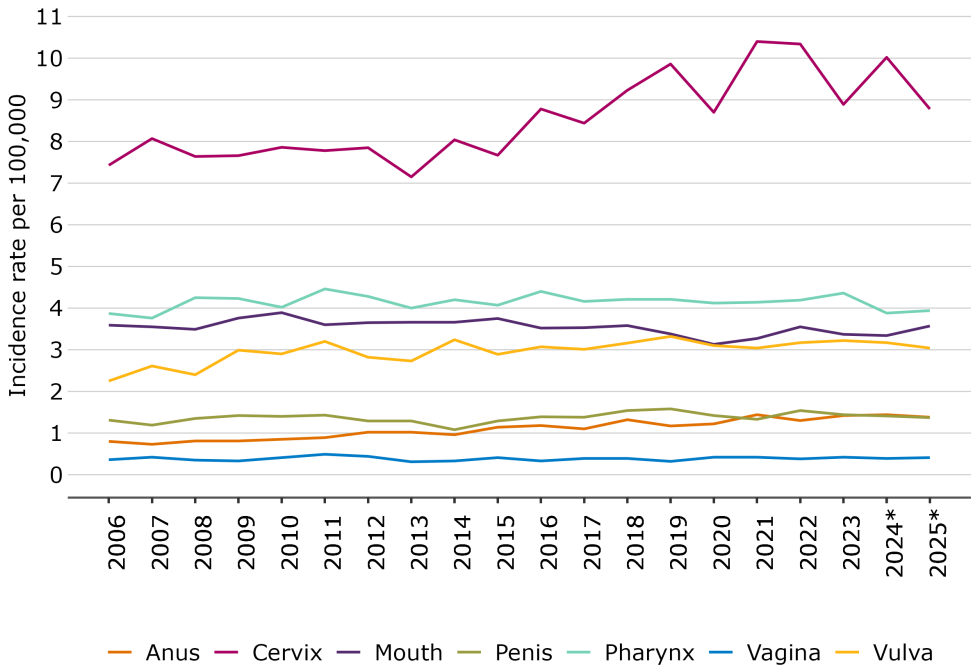
Table 6.5.2 Vaccine effectiveness (VE) against incident and persistent HPV infections (twelve months) among young women, born in 2001, who were eligible for two doses of HPV vaccination within the HAVANA2 study up to 11 years after vaccination (2014–2025)[α]

	Crude VE (95%CI)	
	Incident infections	**Persistent infections**
Vaccine types (16/18)	90% (79, 95%)	91% (67, 97%)
Cross-protective types (31/33/45)	26% (-5, 49%)	58% (24, 77%)
hrHPV types	7% (-6, 18%)	22% (3, 38%)
hrHPV types 9-valent vaccine[§]	29% (14, 41%)	34% (11, 51%)
With two-year lag-time for vaccination status		
Vaccine types (16/18)	89% (77, 95%)	100%
Cross-protective types (31/33/45)	30% (0, 51%)	61% (27, 79%)
hrHPV types	8% (-3, 19%)	22% (3, 37%)
hrHPV types 9-valent vaccine[§]	25% (10, 38%)	42% (21, 57%)

CI: confidence interval; VE: vaccine effectiveness; hrHPV: high-risk HPV types 16/18/31/33/35/39/45/51/52/56/58/59. §High-risk types covered in the 9-valent vaccine: 16/18/31/33/45/52/58.

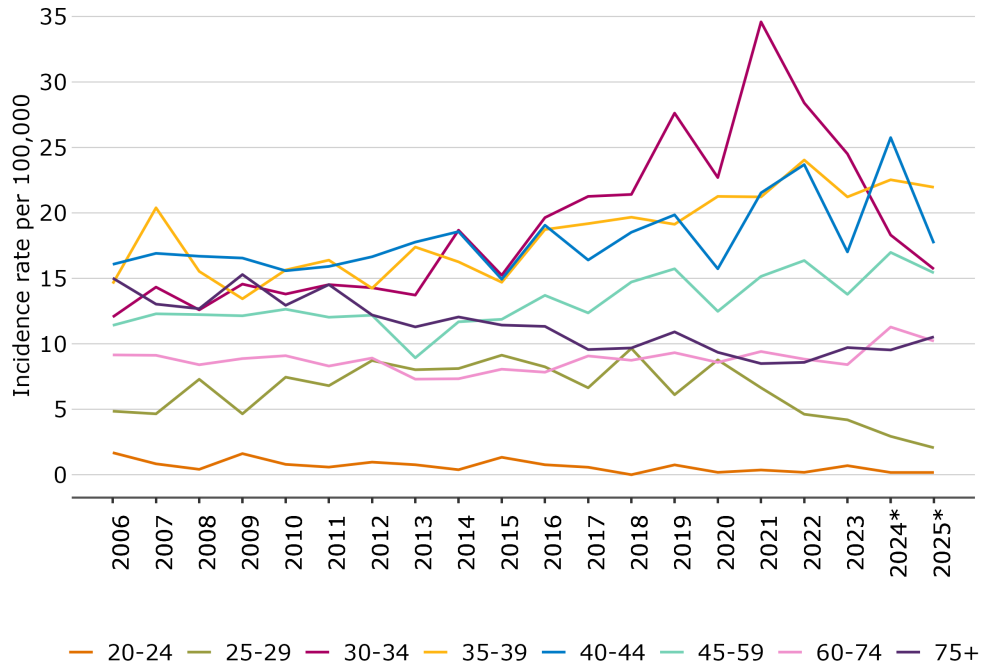
[α] In 2025, 921 women submitted a vaginal sample. Of these women, 487 (53%) were vaccinated aged 12–13 years in 2014, 37 (4%) were vaccinated in 2015–2022, 211 (23%) were vaccinated during the catch-up campaign in 2023–2024, and 186 (20%) remained unvaccinated.

Figure 6.5.1 Incidence[a] (per 100,000 population, standardised by European standardised rates) of cervical, vulvar, vaginal, penile, anal, mouth/oral, and pharyngeal cancer in the Netherlands, 2006–2025



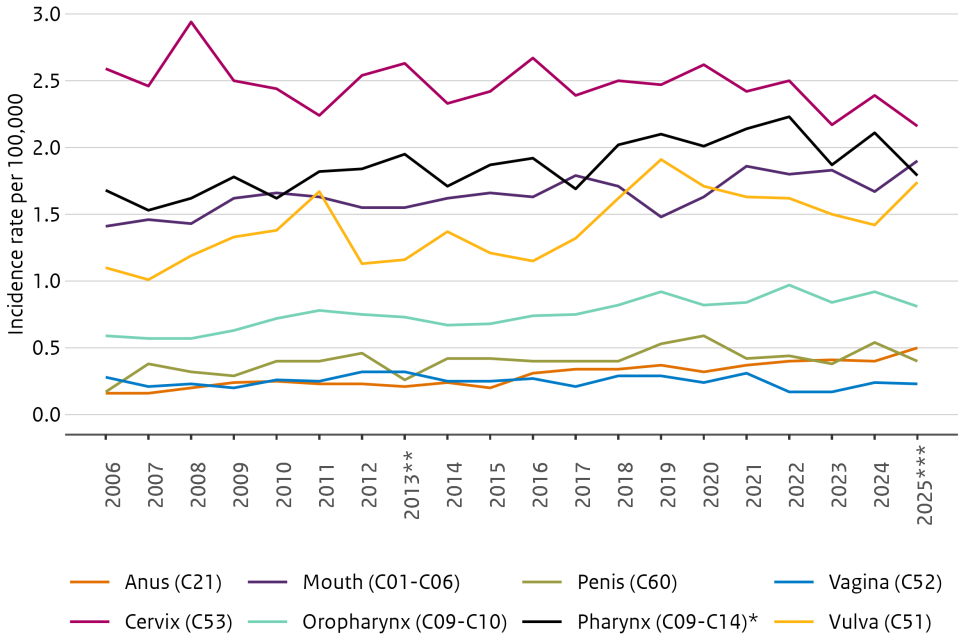
* Preliminary incidences. [a] Incidences were obtained from the Netherlands Cancer Registry, IKNL (iknl.nl/nkr-cijfers, accessed 7 May 2026).

Figure 6.5.2 Incidence[a] (per 100,000 population, standardised by European standardised rates) of cervical cancer in the Netherlands by age group, 2006–2025



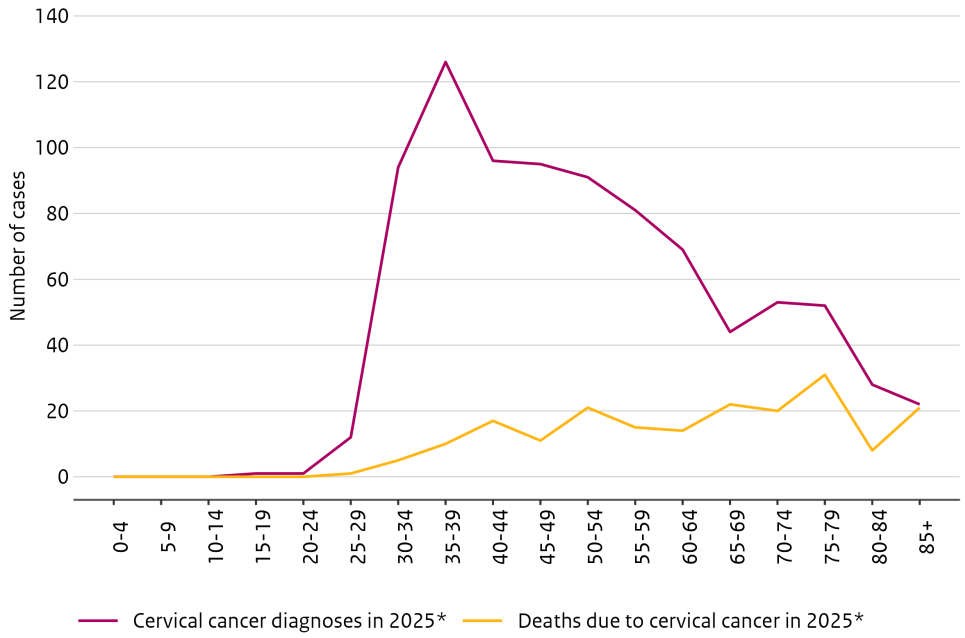
* Preliminary incidences. [a] Incidences were obtained from the Netherlands Cancer Registry, IKNL (iknl.nl/nkr-cijfers, accessed 7 May 2026).

Figure 6.5.3 Incidences (per 100,000 population) of deaths related to cervical, anogenital, mouth, oropharyngeal, and pharyngeal cancers in the Netherlands, 2006–2025



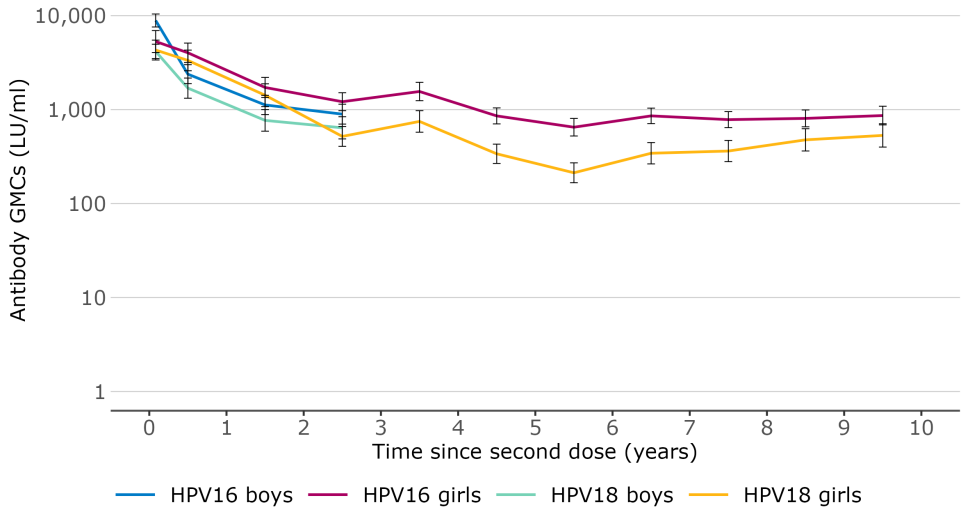
*The number of deaths due to pharynx cancer includes the number of oropharynx cancer deaths.
**In 2013, CBS began using international software to automatically code causes of death to make the data more reproducible and internationally comparable. Due to this change, there have been some significant shifts in the causes of death.
***Preliminary incidences.

Figure 6.5.4 Absolute number of newly diagnosed cervical cancer cases and absolute number of deaths due to cervical cancer by age group in 2025.



* Preliminary data.

*Figure 6.5.5 Antibody geometric mean concentrations (GMCs; LU/mL) of HPV types 16 and 18 up to 10 years after the first dose among fully vaccinated girls and up to 3 years after the first dose among fully vaccinated boys in the HPV2D study**



* Preliminary data. Girls were vaccinated at 12–13 years of age; boys were vaccinated at 9–10 years of age.

6.5.3 Epidemiology

In 2025, the incidence of HPV-related cancers in the Netherlands ranged from 0.41 new diagnoses per 100,000 women for vaginal cancer to 8.78 new diagnoses per 100,000 women for cervical cancer (preliminary data, Figure 6.5.1). The incidence of cervical cancer was lower in 2025 compared to 2024 (10.02 per 100,000 women, Figure 6.5.1) and also lower than the five-year average in 2020–2024 (9.67 per 100,000), albeit the annual incidences fluctuated during this period. Within both the 25–29 and 30–34-year cohorts (women in these age groups were eligible for HPV vaccination within the NIP), the downward trend in incidences observed over previous years continued in 2025 (Figure 6.5.2). For the other age groups, the incidence of cervical cancer remained stable compared to the previous year. The incidences of other HPV-related cancers remained stable in 2025 compared to previous years. Preliminary mortality rates for 2025 were estimated at 2.16 per 100,000 women for cervical cancer. This was lower than in 2024 (2.39 per 100,000), and similar to the rate observed in 2023 (Figure 6.5.3). After several years of declining mortality from vulvar cancer, the incidence increased again in 2025. A slight increase in incidence was also seen for cancer of the mouth. In contrast, mortality rates for vaginal, anal, penile, and oropharyngeal cancers remained comparable to previous years, while the mortality rate for pharyngeal cancer declined. The absolute number of newly diagnosed cervical cancers in 2025 peaked at 35–39 years with 126 diagnoses, whilst the number of deaths due to cervical cancer peaked at 75-79 years (n = 31) (Figure 6.5.4).

6.5.4 Current/ongoing research

6.5.4.1 Vaccine effectiveness (VE) of three doses [preliminary results]

Bivalent HPV vaccination was offered in a three-dose schedule to girls born between 1993–2000. Given that most of these women had not yet reached the population-based cervical cancer screening age of 30 years, the effect of a three-dose schedule on CIN3+ and cervical cancer was estimated within this population by using pathology results of clinically initiated cervical samples. HPV vaccination information registered in Praeventis was individually linked to both(cyto-)histological results of cervical samples within the Dutch Nationwide Pathology databank (Palga) and sociodemographic data from Statistics Netherlands (CBS). A Cox regression was performed with HPV vaccination status as time-dependent variable. Attained age was used as the time axis, and the analyses were stratified by birth cohort and adjusted for the individual's migration status, parental education level, maternal income source, and parental household income. Women were followed from 1 January of the calendar year that they could be invited for HPV vaccination until a CIN3+ or cervical cancer diagnosis, or one of the following censoring events: 1) receiving quadrivalent (4vHPV), nonavalent (9vHPV) or an unspecified type of HPV vaccination; 2) emigration; 3) death; 4) clear cell carcinoma of the cervix; 5) on 31 December of the preceding calendar year in which they would first be invited to participate in population-based cervical cancer screening (i.e., 31 December 2022 and 31 December 2023 for women born in 1993 and 1994, respectively); or 6) the end of the study, i.e., 31 March 2024. Analyses were performed

whilst including the entire follow-up period and, for CIN3+ only, separately for follow-ups ending at each yearly age between 23 and 30. Of the 767,390 women included in the study, 262,567 remained unvaccinated whilst 426,625 received three doses. CIN3+ and cervical cancer were diagnosed in 1,673 and 69 women, respectively. Adjusted hazard ratios (HRs) for CIN3+ and cervical cancer were 0.24 (95% CI: 0.22, 0.27) and 0.17 (95% CI: 0.09, 0.33) after three doses compared to no dose, respectively. Reduction of CIN3+ was observed from 23 years of age onwards. The use of clinically initiated cervical samples allowed us to demonstrate the effect of the HPV vaccination programme several years prior to women reaching the screening age of 30. This is important for evaluating cervical cancer prevention programmes which are offered in a two-dose schedule for birth cohorts ≥ 2001.

6.5.4.2 Vaccine effectiveness of two doses

In 2016, a second prospective cohort study (HAVANA2) was initiated among vaccinated and unvaccinated girls who were eligible for the two-dose HPV vaccination schedule in 2014 (birth cohort 2001). In 2023–2024, a catch-up campaign was conducted in the Netherlands offering HPV vaccination to unvaccinated and partially vaccinated men and women born between 1996 and 2003 (which includes the HAVANA2 birth cohort). The HAVANA2 participants are requested to complete a questionnaire and hand in a vaginal self-swab annually. The VE against both incident and persistent HPV infections were calculated. An incident infection was defined as being positive for an HPV type, preceded by a negative sample for that particular HPV type in the previous study round. Persistence was defined as being positive for two consecutive years, preceded by a negative sample. The VE could be estimated up to eleven years post-vaccination, whilst VE calculations included within the previous NIP report were based in part upon HPV detection performed with an assay that, in study round 9 (2024), was found to have reduced sensitivity [1]. This resulted in an underestimation of the number of HPV infections for round 9, whilst data from earlier rounds were not affected. The measurements of round 9 have therefore been repeated, and in this year's report we present the corrected VE estimates for study rounds up to and including rounds 9 (2024, Table 6.5.1) and 10 (2025, Table 6.5.2).

In 2025, 921 women submitted a vaginal swab during the tenth study round. Over half of these women received their first HPV vaccination at 12–13 years of age (n=487; 53%), 37 (4%) were vaccinated in 2015-2019, 211 (23%) were vaccinated during the catch-up campaign in 2023–2024 and 186 (20%) were unvaccinated. Eight women had an incident vaccine type infection (HPV16/18) in the tenth study round, whilst no new persistent vaccine type infections were identified. The crude VE against incident vaccine type infections (HPV16/18) was 91% (95% CI: 78, 96) (Table 6.5.2). The VE estimate for 12-month persistent HPV16/18 infections was 91% (95% CI: 67, 97). We implemented a two-year lag on vaccination status, delaying the effective vaccination date by two years and treating the initial two years post-vaccination as unvaccinated person-time, to minimise the misattribution of (especially persistent) infections to a vaccinated state. This was particularly relevant given the substantial number of participants who received the first HPV vaccination as part of the catch-up campaign after

their first sexual encounter. The VE calculated with the two-year lag-time was 100% for persistent HPV16/18 infections (the model did not converge due to the absence of persistent HPV16/18 infections). The VE against cross-protective HPV types 31/33/45 was 26% (95% CI: -8, 50) for incident infections and 70% (95% CI: 40, 85) for 12-month persisting infections. When applying the two-year lag-time these estimates were 33% (95% CI: 1, 54) and 74% (95% CI: 42, 88), respectively. These results demonstrate sustained protection against infections with vaccine types for 11 years following vaccination, as previously reported by Middeldorp et al. [2]
Type-specific crude VE estimates up to 11 years post-vaccination against incident infections were 87% (95% CI: 65, 95) for HPV16 (with 2-year lag-time VE 88%; 95% CI: 66, 96), 93% (95% CI: 81, 98) for HPV18 (with lag-time VE 91%; 95% CI: 77, 97), 39% (95% CI: 6, 60) for HPV31 (with lag-time VE 41%; 95% CI: 8, 62), 32% (95% CI: −25, 63) for HPV33 (with lag-time VE 12%; 95% CI: −58, 51), and 29% (95% CI: −87, 73%) for HPV45 (with lag-time VE 76%; 95% CI: 31, 92). The VE against persistent infections was 84% (95% CI: 39, 96) for HPV16 (with lag-time VE 100%), 79% (95% CI: 37, 93) for HPV31 (with lag-time VE 91%; 95% CI: 59, 98), 22% (95% CI: −116, 72) for HPV33 (with lag-time VE -17%; 95% CI: −220, 57), and 65% (95% CI: −160, 95) for HPV45 (with lag-time VE 81%; 95% CI: −86, 98). No persistent infections against HPV18 were detected among vaccinated participants.

6.5.4.3 Immunogenicity of a two-dose schedule (HPV2D)

A cohort study was initiated in 2014 to monitor both the kinetics and quality of the immune response among girls (born in 2001) who received two doses of the 2vHPV vaccine at 12–13 years of age. In 2022, a similar cohort study was launched among boys (born in 2012) who received two doses of the 2vHPV vaccine at nine to ten-years of age. The participants in both of these cohort studies were requested to both complete an online questionnaire annually and provide a self-collected finger-prick blood sample. The study was conducted up to ten years after the first dose was administered among girls, and up to three years after the first dose among boys (until 2024 and 2025, respectively). Among girls/women, the seropositivity of the vaccine types HPV16/18 was 100% up to 10 years after the first dose (Figure 6.5.5). For boys for whom data was available up to three years after the first dose, the seropositivity of HPV16/18 was also 100%. In the first three years after vaccination, the GMCs for HPV16 and HPV18 declined among both girls and boys. At three years post-vaccination, the GMC for HPV16 was slightly lower among boys compared to girls (895 versus 1214 LU/mL), whilst HPV18 was slightly higher among boys than girls (640 versus 519 LU/mL).

6.5.4.4 Anogenital warts in the Netherlands

An anogenital infection with the low-risk HPV types 6 and/or 11 can cause anogenital warts (AGWs). Although this is a benign condition, it can be a burden to those affected by it. HPV vaccination with the 2vHPV vaccine, which is currently used within the NIP, is not targeted at preventing HPV6/11 infections. Both the 4vHPV and 9vHPV vaccines are registered to prevent HPV6/11 infections. Given that the 9vHPV vaccine will be offered within the NIP from September 2026 onwards [3], gaining insight into the occurrence of AGWs is highly relevant. Both the

absolute number and number of episodes per 1,000 people aged 15–64 years (reporting rate) are reported in the annual RIVM report 'Sexually transmitted infections in the Netherlands'. The total number of AGW episodes reported at general practitioners (GPs) was 46,900 in 2024 and 48,600 in 2023 [4]. From 2020 until 2024, the reporting rate of AGWs ranged from 4.0 to 4.2 per 1,000 people.

6.5.5 (Inter)national developments

In October 2025, the Health Council of the Netherlands recommended: 1) to broaden the aim of offering HPV vaccination within the NIP to all HPV-related diseases rather than HPV-related cancer only; 2) to switch from offering the 2vHPV vaccine within the NIP to the 9vHPV vaccine and 3) to keep on offering a two-dose schedule rather than switching to a one-dose schedule [3]. Therefore, the 9vHPV vaccine is offered in a two-dose schedule from September 2026 onwards.

6.5.5.1 Impact of HPV vaccination

In Sweden, the risk of invasive cervical cancer was investigated in a nationwide register-based cohort study up to 18 years after 4vHPV vaccination [5]. Between 2007 and 2015, 4vHPV vaccination was offered in a three-dose schedule to girls born in 1989 or later. Since 2015, a two-dose schedule has been offered. The 4vHPV vaccine was replaced by the 9vHPV vaccine in 2019. In total, 926,362 girls and women who resided in Sweden between 2006 and 2023, were born in 1985–1988 (opportunistic cohort), 1989–1992 (subsidised cohort), 1993–1998 (catch-up cohort), or 1999–2001 (school-based cohort), and who had no previous HPV vaccination or diagnosis of invasive cervical cancer at the start of follow-up, were included in the study. Incidence rate ratios (IRRs) were estimated, also by time since vaccination classified into three-year intervals. Overall, 365,502 (39.5%) girls/women received at least one dose of the 4vHPV vaccine, and 930 cases of invasive cervical cancer were identified, including 97 among vaccinated and 833 among unvaccinated individuals. Among individuals vaccinated before 17 years of age, the overall fully adjusted IRR compared with the unvaccinated group was 0.21 (95% CI: 0.13, 0.32), with sustained protection for 13–15 years after vaccination (IRR 0.23, 95% CI: 0.11, 0.46). For individuals vaccinated at 17 years or older, the overall fully adjusted IRR was 0.63 (95% CI: 0.49, 0.81) compared to the unvaccinated group, with significant incidence reductions observed during the years 10–12 (IRR 0.54, 95% CI: 0.33, 0.86), and 13–15 (IRR 0.23, 95% CI: 0.08, 0.60) after vaccination. Compared to the opportunistic cohort, the school-based cohort was at a 72% (95% CI: 11, 91) lower risk of cervical cancer after adjustment for covariates. The authors concluded that 4vHPV vaccination reduced the risk of invasive cervical cancer without any indication that the protection waned up to 18 years of follow-up.

In Scotland, the long-term effectiveness of 2vHPV vaccination against cervical intraepithelial neoplasia (CIN) grade 2 or worse was retrospectively investigated at the population level [6]. Data were collected from women born either in or after 1988 up until 6 June 2016 who were eligible for the national cervical cancer screening programme. The cohort to be evaluated included women who were not eligible for HPV vaccination (born in 1988–1990), women who were offered

vaccination as part of a catch-up programme during 2008 and 2009, given at ages 14–18 years (born in 1991–1994), and the routine programme from 2008 onwards, administered at ages 12–13 (born in 1995–1996). Analyses were conducted using only women who had attended the cervical cancer screening programme at least once during the observation period. Cytology-based screening for the included women began at age 20. Women were offered a three-dose schedule and analysed as unvaccinated, incompletely vaccinated (one dose or two doses one month apart) and completely vaccinated (either two doses at least five months apart or three doses). Herd protection was investigated by comparing the CIN incidence among unvaccinated women in the 1991–1992, 1993–1994, and 1995–1996 cohorts (i.e., women who were eligible for either catch-up or routine vaccinations) with unvaccinated women in the 1988–1990 cohort. For completely vaccinated women, an adjusted VE following vaccination at age 12–13 of 72.6% (95% CI: 67.7, 76.8) against CIN2+ was observed and of 63.2 (95% CI: 60.4, 65.8) following vaccination at age 14–16. For CIN3+, the corresponding VEs were 81.7 (95% CI: 76.2–78.6; age 12–13) and 68.1 (95% CI: 64.1, 71.6; age 14–16). Adjusted VE following two doses administered one month apart or one dose only at age 14 was 20.5 (95% CI: 6.1, 32.6) for CIN2+ and 34.9 (95% CI: 17.0, 48.9) for CIN3+. No benefit was seen with vaccination above the age of 18 years. The most deprived women showed the highest incidence of CIN2+ and CIN3+, and the greatest reduction in CIN2+ and CIN3+ following complete immunisation. Herd protection was observed in all immunised cohorts with HRs ranging from 0.28 to 0.75 for CIN2+ and 0.14 to 0.76 for CIN3+. Finally, HRs decreased with a younger age at vaccination for the vaccinated members of the corresponding birth cohort, which suggests greater herd protection among individuals vaccinated earlier during adolescence. This population-based analysis confirms the long-term effectiveness of the 2vHPV vaccine, especially among women from the most deprived areas and thus reinforces the importance of ensuring high vaccine uptake rates at an early age.

In Sweden, a population-based cohort study was conducted by Deng et al. to evaluate the association between 4vHPV vaccination and high-grade vulvovaginal lesions [7]. Furthermore, the population-level incidence reduction among birth cohorts eligible for various vaccination programmes was assessed. Nationwide population and health care registers were linked at the individual level. Women born between 1985 and 1998 who were residing in Sweden between 2006 and 2022 were included in the study. Data were analysed from February to October 2025. HPV vaccination was treated as a time-varying exposure, with people who received at least one dose considered to be vaccinated. Birth cohorts corresponded to different vaccination programmes: opportunistic vaccination (1985–1988), subsidised vaccination (1989–1992) and catch-up vaccination (1993–1998). Out of the 778,943 women included in the study, 256,353 (32.9%) received at least one dose. High-grade vulvovaginal lesions were found in 98 vaccinated women and 547 unvaccinated women. Compared to unvaccinated women, the fully adjusted IRR of high-grade vulvovaginal lesions was 0.63 (95% CI: 0.50, 0.81) among vaccinated women. When stratified by the age at vaccination, the IRRs for those vaccinated at 10 to 16 years and 17 years or older were 0.45 (95% CI: 0.32, 0.65) and 0.80 (95%

CI: 0.61, 1.06), respectively. Compared with women born between 1985 and 1988, the IRRs for those born in 1989 to 1992 and 1993 to 1998 were 0.81 (95% CI: 0.67, 0.97) and 0.62 (95% CI: 0.49, 0.80), respectively. The authors concluded that their findings support that scaling up coverage of HPV vaccination at younger ages may help prevent high-grade vulvovaginal lesions.

In England, population-based trends in cervical cancer mortality rates between 2001 and 2024 were estimated for women aged 20–24, 25–29, and 30–34 years [8]. England introduced a national school-based HPV vaccination programme in 2008 for girls aged 12–13 years, with a catch-up campaign in 2008–2010 for girls aged 14–18 years. 2vHPV was offered until August 2012. Thereafter, 4vHPV was offered until it was subsequently replaced by 9vHPV in July 2019 [9]. Boys have been offered HPV vaccination since 2019. No deaths due to cervical cancer occurred among women aged 20-24 years between 2020 and 2024, whilst 23.1 deaths were expected based upon historical rates, which corresponds to a reduction of 100% (95% CI: 84, 100). Vaccine coverage among these women was 88–90%. In earlier birth cohorts, who were offered vaccination up to 18-years of age with coverage of around 63–87%, mortality reductions of 80% (95% CI: 51, 94) in women aged 20–24 years in 2015–2019, and 69% (95% CI: 55, 79) in women aged 25–29 years in 2020–2024 were observed. The relative risk reduction among vaccinated women was estimated from population-level data to be 100% (95% CI: 81 to 100) among women aged 20–24 years, 100% (95% CI: 89, 100) in those aged 25–29, and 63% (95% CI: –13, 100) in those aged 30–34. Up until the end of 2024, HPV vaccination in England was associated with a reduction of around 199.6 cervical cancer deaths (95% CI: 125.0, 274.2). The authors concluded that their findings - that high HPV vaccination coverage is associated with a decrease in cervical cancer deaths among women aged 20-29 years - support the benefit of HPV vaccination in reducing not only the incidence of but also mortality from cervical cancer.

6.5.5.2 Single-dose schedule

Barnabas et al. conducted a study to evaluate no vs. single-dose HPV vaccination for 1) vaccine efficacy durability at 54 months and 2) VE for a cohort 15–23 years [10]. A randomised crossover trial was used in which 2,275 healthy young women aged 15–20 years were recruited through community-based screening and randomly allocated to 1) immediate 9vHPV or 2vHPV HPV vaccination and delayed control vaccination (meningococcal vaccination) at either 30 or 36 months (aged 17–23 years), or 2) immediate control vaccination and delayed 9vHPV vaccination. Clinician-taken cervical swabs or participant-collected vaginal swabs were collected every six months and tested for HPV DNA to determine incident persistent HPV infection. Cox proportional hazard models with time-varying covariates for HPV vaccine status and time were used. Negative coefficients were used for time since vaccination indicated durability. Overall, VE was 99.3% (95% CI: 96.2, 99.9) against incident persistent HPV16/18 infections and 98.9% (95% CI: 94.9, 99.8) for incident persistent HPV16/18/31/33/45/52/58 infections. The coefficients for time since vaccination were -0.0014 (95% CI: -0.0027, -0.0002) for HPV16/18 and -0.0016 (95% CI: -0.0028, -0.00004) for HPV16/18/31/33/45/52/58 incident persistent

infection. The authors concluded that single-dose HPV vaccination is highly efficacious and durable over 54 months among young women.

Noninferiority of a one-dose vs. a two-dose schedule was investigated by Kreimer et al. [11]. In total, 20,330 girls aged 12–16 years were randomly assigned, in a 1:1:1:1 ratio, to receive one or two doses of the 2vHPV, or one or two doses of the 9vHPV vaccine (at zero and six months). The primary end point was new HPV type 16 or 18 infection occurring from month 12 to 60 months and persisting for at least six months. For the 9vHPV vaccine only, the secondary end point was new HPV type 16, 18, 31, 33, 45, 52 or 58 infection occurring from month 12 to 60 months and persisting for at least six months. Infections were measured in participant-collected cervicovaginal specimens as soon as the participants reached the age of 15 years. The prespecified noninferiority margin was 1.25 infections per 100 participants for HPV16/18 infections and 2.55 infections per 100 participants for HPV16/18/31/33/35/45/52/58 infection. In other words, a lower effectiveness of one dose compared with two doses was considered acceptable (non-inferior) if the upper bound of the CI did not exceed the non-inferiority margin, which means that among every 100 women the one-dose group could have no more than 1.25 additional 2vHPV infections or 2.55 additional 9vHPV infections compared to the two-dose group. Furthermore, VE was estimated by comparing HPV16 or HPV18 infections among the trial participants with infections among 3,005 girls and women aged 16–21 years who were enrolled in a non-randomised survey. One vaccine dose appeared to be non-inferior to two doses in preventing HPV16 or HPV18 infection. The difference in the incidence between one and two doses of the 2vHPV vaccine was −0.13 infections per 100 participants (95% CI: −0.45, 0.15; p<0.001 for noninferiority), whilst the difference in the incidence between one and two doses of the 9vHPV vaccine was 0.21 infections per 100 participants (95% CI: −0.09, 0.51; P<0.001 for noninferiority). One dose of the 9vHPV vaccine was also found to be non-inferior to two doses in preventing HPV16/18/31/33/35/45/52/58 infection with a difference of 1.08 (95% CI: 0.56, 1.11; p<0.001 for noninferiority). The VE against HPV16/18 infection was at least 97% in each of the four trial groups and at least 94.5% for HPV16/18/31/33/35/45/52/58 infection after one or two doses of the 9vHPV vaccine. Among those participants who received the 2vHPV vaccine, the difference in the incidence for HPV31 infection (which is not targeted by the 2vHPV vaccine) with respect to one and two doses suggested that protection against this type may be larger after two doses vs. one dose (incidence difference of one minus two doses 3.05, 95% CI: 2.30, 3.85) whilst the effectiveness against HPV45 infection was 58.8% (95% CI: 28.4, 78.5) with one dose and 72.1% (95% CI: 46.0, 87.1) with two doses. The authors concluded that one dose of either a 2vHPV or 9vHPV vaccine provided protection against HPV16 or HPV18 infection, and that this protection was not inferior to two doses.

6.5.5.3 Immunology

Prophylactic HPV vaccines induce robust and sustained antibody responses over time. One driver of these responses is memory B-cells (MBCs), which are primed during initial HPV-vaccine exposure. As part of the DoRIS trial, vaccine-specific MBCs were evaluated in peripheral

blood mononuclear cells by enzyme-linked immunosorbent spot assay at baseline and at month 1, 7, 12, 24 and 36 post-first vaccine dose among 930 girls aged 9–14 years who were randomly allocated to receive three doses, two doses, or one dose of the 2vHPV or 9vHPV vaccine [12]. For the per protocol (PP) analyses, girls were ELISA antibody negative and DNA negative at baseline for the HPV genotype that was under analysis. At the end of the first month, the mean proportion of responders (participants who had a demonstrable MBC response) across the arms in the PP cohort ranged from 71.0% to 78.7% (2vHPV, HPV16), 66.2–71.0% (2vHPV, HPV18), 78.8–83.8% (9vHPV, HPV16), and 66.2–72.3% (9vHPV, HPV18). Maximum responses were observed by the seventh month. There was a significant difference in HPV-specific geometric mean MBC ratios between one and three doses of both vaccines at all timepoints. Geometric mean MBC frequencies were significantly lower in the one-dose arms than the two-dose arms from the seventh month to the twenty-fourth month. At 36 months, there was no evidence of a difference in HPV-specific geometric mean MBC frequencies between the one-dose and two-dose arms for the 2vHPV vaccine for HPV16 or HPV18, or for the 9vHPV vaccine for HPV18. The difference was only of borderline significance for HPV16 for the 9vHPV vaccine (geometric mean MBC ratio 0.55, 95% CI: 0.32, 0.96). The authors concluded that the clinical significance of the single-dose response remains to be evaluated; however, the presence of MBCs within the circulation after three years with a single vaccine dose is encouraging in terms of generating long-lasting protection with a one-dose vaccination strategy.

Kemp et al. evaluated both the seropositivity levels and durability of the antibody responses to HPV types targeted by the 9vHPV vaccine among 150 girls aged 9–14 years who were randomised to and received either one or two doses of the 9vHPV vaccine within the aforementioned DoRIS trial [13]. Blood samples for antibody measurements were collected at 0, 7, 12, 24 and 36 months. All participants were HPV16, HPV31, and HPV58 seropositive at month 36. For the one-dose group, 96.8–98.2% of girls were seropositive for HPV11, HPV18, and HPV33, whilst 73.0–87.7% were seropositive for HPV6, HPV45 and HPV52. For the two-dose group, all participants were HPV6, HPV11, HPV16, HPV18, HPV31, HPV33 and HPV58 seropositive, whilst 98.6% of the participants were seropositive for HPV 45 and HPV 52. Finally, GMCs were higher among the two-dose group compared to the one-dose group, but all GMCs in the one-dose group had plateaued by the twenty-fourth month and remained stable to 36 months. The authors concluded that one dose of the 9vHPV vaccine offers sustained immune responses when given to girls within the current primary target age range for vaccination.

The persistence of antibodies against HPV16/18 following one dose of HPV vaccination and the immune response to a delayed dose administered at least three years later was studied by Guzun et al. [14]. Sixty girls and 141 boys were included at least three years after receiving their first dose of 4vHPV vaccination in the case of the girls and 9vHPV vaccination in the case of the boys. Girls were aged 8.9–17 at the time of their first dose. Boys were aged 9.0–10.6 years. Blood samples were collected from each of the participants prior to administering the second dose, which was a 2vHPV vaccination for the

boys and a 9vHPV vaccination for the girls. A second blood sample was then collected one month after they received their second dose. Blood samples were tested for HPV6/11/16/18/3133/45/52/58 IgG antibodies. Four years after the initial 9vHPV dose among boys, 96.5% and 97.9% had detectable antibodies against HPV16 and HPV18, respectively. Among the girls vaccinated 3–10 years prior with one 4vHPV vaccine dose, 95.0% (HPV16) and 93.3% (HPV18) had detectable antibodies. One-month post-second dose being administered, all the participants were seropositive for HPV16/18, with significant increases in GMCs ranging from 150.7 (HPV18, girls) to 405.3 (HPV16, boys). All the participants were also seropositive for the other measured HPV types, with significant increases in GMCs ranging from 2.5–129.8. The authors concluded that a single dose induces a strong and lasting immune response in girls (4vHPV) and boys (9vHPV), which both demonstrate the potential for a single-dose or a delayed booster strategy for both sexes and supports studies showing the effectiveness of single-dose schedules.

6.5.5.4 Type replacement/unmasking

Morel et al. [15] compared genotype prevalence results and HPV-associated CIN2+ results for low-vaccine and high-vaccine coverage populations in the US. The 4vHPV vaccine had been the predominant HPV vaccine between 2006 and 2014, before subsequently being replaced by the 9vHPV vaccine. The low-vaccine coverage population consisted of baseline results of women aged ≥21 years who were participating in a prospective randomised trial conducted between 2013 and 2015 among women participating in routine cervical cancer screening. Cervical samples were tested for HPV16/18/31/33/35/39/45/51/52/56/58/59/66/68. The results from the high-vaccine coverage population were obtained across three clinical laboratories as part of real-world cervical cancer screening from 2021–2023. HPV16/18 genotype prevalence was found to be significantly lower within the high-vaccine coverage population for individuals aged 21–29 years (2.3% vs. 5.4%; $p<0.001$) and 30–39 years (2.5% vs. 3.6%; $p<0.001$), whereas the prevalence of the other twelve genotypes was significantly higher (29.8% vs. 22.2%; $p<0.001$) only among the 21–29-year age group. The overall prevalence of any HPV was higher within the high-vaccine coverage populations for the 21–29 age group (31.1% vs. 25.4%; $p<0.001$). HPV16 prevalence among CIN2+ cases aged 21–29 years was 16.6% lower in the high-vaccine coverage compared to low-vaccine coverage population ($p=0.042$). Conversely, the HPV non-16 genotypes prevalence among CIN2+ cases was approximately 22% higher in the high-vaccine coverage population than in the low-vaccine coverage population aged 21–29 years ($p<0.001$). No significant difference in either HPV16 or non-HPV16 genotype prevalence within CIN2+ cases was observed between the high-vaccine and low-vaccine coverage populations in both the 30–39 and ≥40-year age groups. The authors reported that the results confirm earlier observations that HPV vaccination profoundly impacts upon genotype prevalence and disease within the post-vaccination era, and that future research should seek to understand HPV viral ecology.

Potential HPV type replacement was investigated within a cross-sectional repeated survey (NHANES) that spanned the twelve-year period

immediately following the introduction of the HPV vaccine in the US [16]. Routine HPV vaccination has been recommended for girls aged 11–12 years with catch-up options through 26 years, from 2006 onwards. Boys and men were included in the vaccination programme in 2011. The 4vHPV vaccine had been the predominant HPV vaccine between 2006 and 2014, before then being replaced by the 9vHPV vaccine. The prevalence of fourteen HPV types (HPV16/18/31/33/35/39/45/51/52/56/58/59/66/68) was measured among 14–29-year-old women in 2015–2018 (post-vaccine era) and 2003–2006 (pre-vaccine era). HPV prevalence was measured via self-collected cervicovaginal swabs. Self-reported HPV vaccine coverage (≥1 dose) was 51.4% during the post-vaccine era. Overall, HPV16/18 prevalence was lower during the post-vaccine era (4.3% vs. 12.3%, prevalence ratio (PR) 0.35, 95% CI: 0.21, 0.57), whilst no non-vaccine-hrHPV types increased. Although type replacement was not observed overall, HPV68 did increase among non-Hispanic White women (7.0% vs. 3.0%, PR 2.35, 95% CI: 1.02, 5.38) but not in non-Hispanic Black women, whilst the opposite was observed for HPV35 (3.4% vs. 1.0%, PR 3.55, 95 % CI 1.03, 12.21). The authors concluded that type replacement was not observed overall and that their findings did not raise any concerns.

6.5.6 Literature

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*publication with RIVM authors.

6.6 Measles

6.6.1 Key points

- In 2025, 539 cases were reported in the Netherlands (incidence: 2.98 per 100,000 population), which represents a significant increase compared to previous years.
- The reported cases in 2025 largely involved children below the age of 12 years (69%), and unvaccinated people (84%).
- In June 2025, a fatal case was reported in an adult with underlying diseases who had been vaccinated once.
- In the first four months of 2026, the number of reported measles cases decreased significantly to only six reported cases.
- Since 2025, the second dose of MMR is offered around a child's third birthday rather than at the age of nine years. This applies to children born from 1 January 2016 onwards.

6.6.2 *Tables and figures*

Figure 6.6.1 Annually reported measles cases since 1976. For 2026, cases were included up to and including 31 March 2026

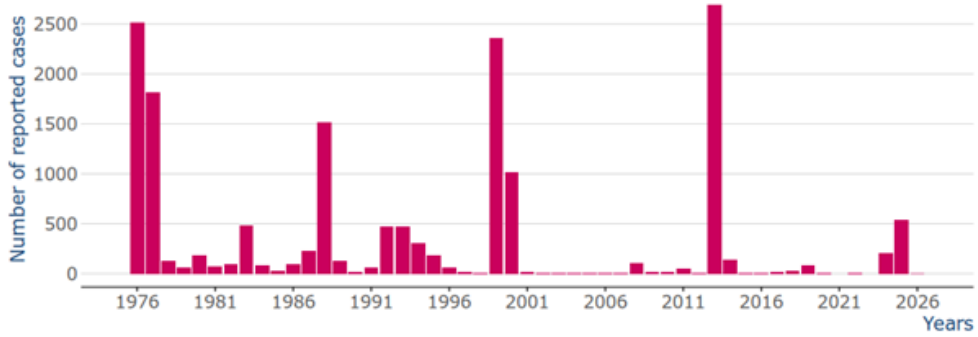


Figure 6.6.2 Age distribution and vaccination status of measles cases reported in the Netherlands in 2025 (n= 539)

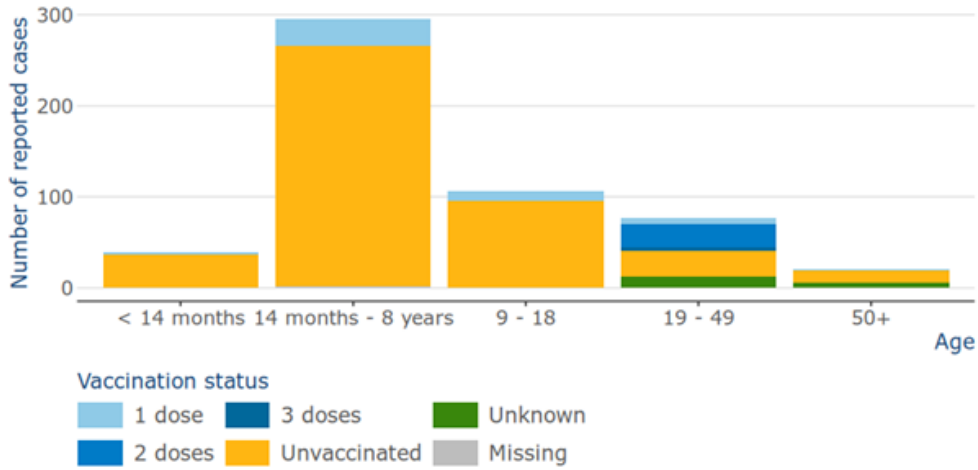


Figure 6.6.3 Measles incidence in 2025 per 100,000 population in the Netherlands by GGD-region

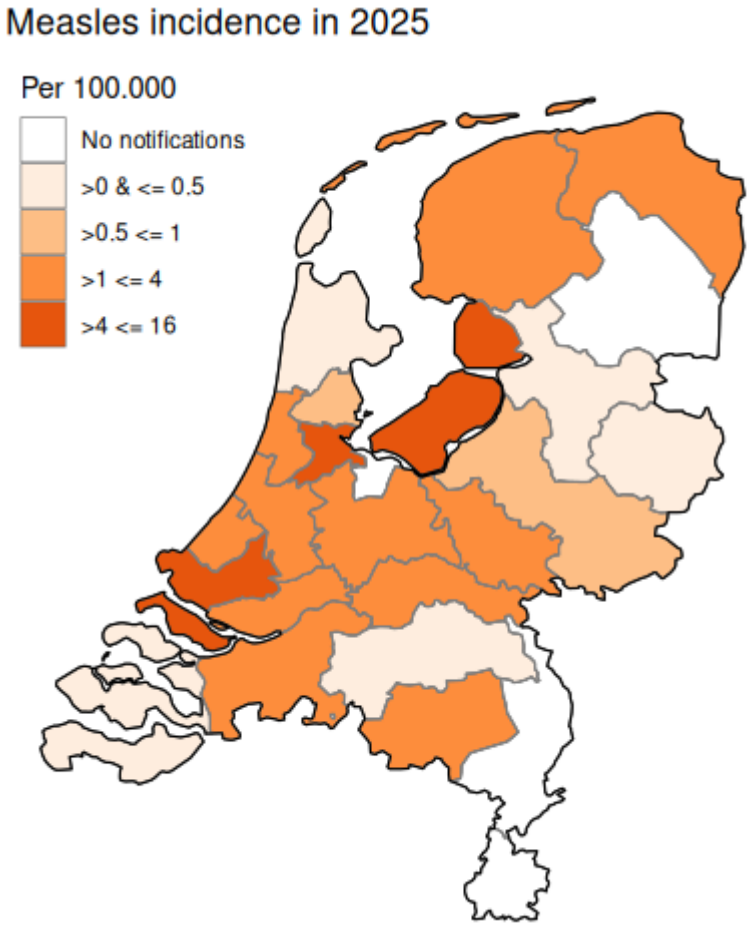
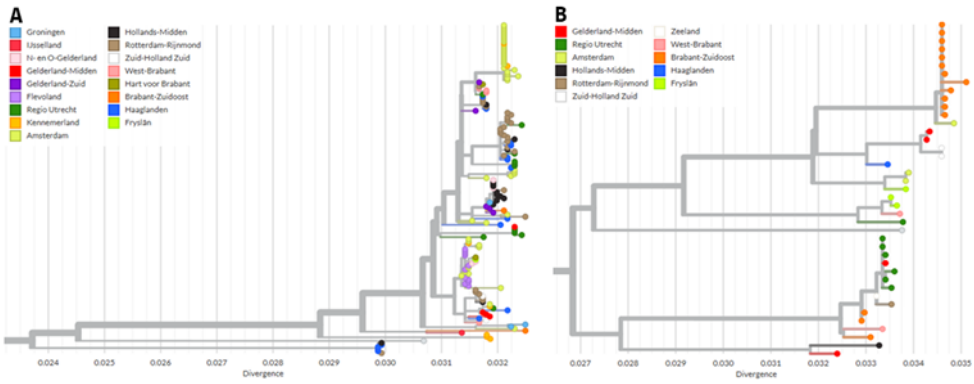


Figure 6.6.4 Phylogenetic analyses of the complete measles virus genomes genotype B3 (A) and D8 (B) detected in the Netherlands in 2025 and the first quarter of 2026 using Nextstrain (n=228)



6.6.3 *Epidemiology*

In the four years prior to 2024, the annual number of reported cases were below ten. In 2024, a total of 205 cases were reported (Figure 6.6.1, incidence: 1.14 per 100,000 population) followed by a consecutive increase to 539 cases in 2025 (incidence 2.98 per 100,000).

This represents a large increase compared to those years immediately proceeding the most recent large outbreak in 2013/2014. Transmission has decreased in the first four months of 2026 with only six reported cases. Data on measles incidence is updated on the RIVM website: https://www.rivm.nl/mazelen/actueel).
The mean age of the reported cases in 2025 was 12-years-old (median: 7), ranging from 0 to 64 years (Figure 6.6.2). Out of all the cases, 77% (413) were below 12-years-old, 5% (28) were aged between 12 to 19, and 18% (98) were aged 19 or older. Out of the reported cases, 51% (274) were men and 49% (264) were women (the sex was unknown for one of the cases). The highest incidence was observed in GGD Rotterdam-Rijnmond (13.0 per 100,000 population), GGD Amsterdam (9.4 per 100,000), and GGD Flevoland (7.7 per 100,000). These three GGDs accounted for 60% (326) of all the reported cases in 2025. Most cases were lab-confirmed (n= 385, 71%), whilst 29% (155) were notified based upon an epidemiological link.

The vaccination statuses of the reported cases in 2025 were as follows: 436 (84%) had received 0 doses, 52 (10%) had received one dose, 27 were vaccinated twice (5%), and four cases were vaccinated on three occasions (1%). Although two of the cases were vaccinated, the number of doses was unknown, whilst for 18 cases, the vaccination statuses were unknown. Among the unvaccinated cases (n= 436), 36 (8%) were too young to be vaccinated (<14 months) and 11 (3%) were born prior to the introduction of measles within the NIP (1,976). Amongst the reported cases from a known risk group (n= 414, 77%), 236 (57%) held critical attitudes towards vaccinations, for 143 patients (35%) no particular risk group was known, 24 (6%) patients reported as orthodox Protestants, 11 (3%) patients belonged to the anthroposophical community, and for 125 cases the risk group was unknown. Among the cases including information on migration status (n= 447, 83%), 121 (27%) did not come from a migration background and 326 (73%) patients came from a migration background. For 92 patients, their migration background was either unknown or missing. Many of the cases involving people from a migration background were of Moroccan (67%) or Turkish (18%) origin. Most cases (n= 474, 88%) were acquired in the Netherlands, followed by 39 in Morocco (7%), and 5 (1%) in Romania. Twelve other countries were reported as the country of infection in 19 (4%) cases. The country of infection was unknown for two of the cases.

Regarding severity, for 55 out of the 508 cases in which data were available, a complication was reported (11%). The reported complications were pneumonia (n= 30), otitis media (n= 11), and other (n= 18). Among those that reported another complication, the majority pertained to dehydration (n= 11). For 100 of the cases, a hospital admission was reported (18%, 100/532); for 28% (28) of these cases, dehydration was stated as the reason for hospital admission. Among the cases that necessitated hospital admission, 13% were vaccinated, in comparison to 21% of those who were not hospitalised. In June 2025, a fatal case was reported involving an adult with underlying diseases who had been vaccinated once.

In summary, the increase in the incidence of measles in 2025 mostly involved unvaccinated primary school children in the GGD region of

Rotterdam, Amsterdam, and Flevoland, with the majority of cases being from a migration background. One of the adult measles cases in 2025 died as a result of the infection. In the first quarter of 2026, only six cases were reported.

6.6.4 Pathogen

A genotype was determined for the measles viruses detected in 224 (42%) of the 539 cases reported in 2025. In 189 of these cases, genotype B3 was detected (84%), whilst in 35 cases (16%) genotype D8 was detected. During the first four months of 2026, out of the four cases in which a genotype was available, three were genotype D8 and one was genotype B3.

Additional analyses of the N450 sequence variants within each genotype indicated that the measles virus genotype B3 sequence variant MVs/Quetta.PAK/44.20 was most frequently detected in 2025. This sequence variant was detected in 99 of the cases. This variant was also the most frequently detected variant in 2024. Other sequence variants were less frequently detected in 21 or fewer of the measles cases.

Additional insights into the circulation of the measles viruses were obtained via the analysis of 202 complete genomes of measles viruses obtained from measles cases in 2025 (n=201) and 2026 (n=1). Phylogeographic analysis of the complete genomes of the detected measles viruses using Nextstrain largely supported the epidemiological data: minimal or no sequence variation was observed in viruses within the epidemiological clusters, whilst generally, more sequence variation was detected in virus genomes across either the various clusters or individual cases (Figure 6.6.4).

6.6.5 Current/ongoing research

6.6.5.1 The waning of maternal measles antibodies: A multi-country maternal-infant seroprevalence study [1]

This study assessed the geographical variation in maternal measles antibody levels from birth to nine months of age across eleven countries in order to inform recommendations for the timing of the first measles vaccine dose. Stored infant serum samples from eleven countries taken at delivery and/or follow-up time points prior to measles vaccination (n=2845) were tested for measles plaque reduction neutralisation (PRNT) and measles, mumps, and rubella immunoglobulin G at RIVM. Antibody decay in infants was modelled using linear mixed-effects models with participant-level random intercepts and random slopes. The proportion of infants with antibody concentrations above the clinical protection threshold (0.12 IU/mL) were estimated at each age. At six months, <50% of infants had PRNT ≥0.12 IU/mL in all countries with the exception of Pakistan. In the Netherlands, the estimated proportion of infants protected at six months was 15% (95% CI: 7%-23%). Given both the high proportion of infants with maternal antibody concentrations below the threshold of clinical protection and high risk of measles infection at 6–9 months of age within high-incidence settings, early vaccination could potentially provide protection at this vulnerable age. This, however, needs to be weighed against the risk of inducing lower measles antibody levels among young infants.

6.6.5.2 The changing mortality burden of measles, pertussis, and diarrheal disease in Amsterdam, 1856–1920 [2]

The mortality burden declined markedly in the late 19th and early 20th centuries. Here, the authors investigated patterns in the disease burden of measles, pertussis, and diarrheal diseases in Amsterdam. Based upon the Amsterdam Cause-of-death Database, which includes 481,990 individual death records from 1856 to 1920, researchers were able to estimate the mortality burden for measles, pertussis, and diarrheal disease in years of life lost up until age 20. All-cause mortality burden declined from almost eight life years lost per birth in 1856 to slightly over two years in 1920. The mortality burden for measles was relatively stable, albeit the mean age at death declined over time from three years in 1855 to ~1.76 years in the 1900s. As a result, the contribution of measles mortality to the total burden was around 4% from 1855 to 1895, and around 7% in the 1900s up until 1915. The authors hypothesise that the lower age at death might be explained by increased transmission due to increases in population size, crowding, household size, and school enrolment.

6.6.5.3 Projected increase in risk of large measles outbreaks in the Netherlands as susceptible children enter secondary school in 2025/26 [3]

Many unvaccinated children acquired immunity through infection during the last national measles epidemic in the Netherlands (2013/14). The author investigated both how susceptibility among school-aged children in key under-vaccinated populations is likely to have changed and how this could impact the risk of outbreak during the period 2014 to 2030. A network was constructed, reflecting the risk of transmission both within and between schools in the Netherlands, in order to estimate school-level susceptibility and annual outbreak risk from 2014 onwards. An important assumption in the model is that all susceptible children were effectively immunised in the 2013/14 epidemic, whilst it could be argued that children in primary school during the epidemic were exposed to a greater risk of infection than children under the age of four. The author found that an elevated risk of large measles outbreaks was associated with susceptible children entering secondary schools in 2025/26.

6.6.5.4 Evaluation of measles and rubella population-wide immunity in the Netherlands

Using data from a Sero-survey administered in 2016/17, we assessed the prevalence of IgG antibodies to measles virus (MeV). In addition to a bead-based immunoassay to assess the presence of IgG antibodies, we also measured functional immunity within a subset of samples of individuals born between 1965 and 1999. The sero-prevalence of MeV-specific IgG was 97.3% (95% CI:96.9-98.0). In birth cohorts 1965-1999, the estimated prevalence of MeV-specific neutralising antibodies above the cut-off for protection (0.12 IU/ml) was high (96.8% (95% CI:96.1-97). Vaccination programmes implemented since the 1970s provide long-lasting protection against measles.

6.6.5.5 Rapid waning of functional T cell responses after early measles immunisation

This RIVM study investigated how both the age someone is during their first MMR vaccination and the number of vaccine doses impact upon the strength, quality, and persistence of measles virus-specific CD4 T cell

immunity in children. During the 2013/14 measles outbreak in the Netherlands, infants living in the measles outbreak area were invited to receive an additional early MMR dose between six and 12 months of age, prior to receiving the routine first dose at 14 months. It was found that MMR vaccination between six and 12 months of age, which was previously shown to have come at the expense of a faster decline of antibodies, could induce functional measles virus-specific CD4 T cell responses. However, infants vaccinated prior to eight and a half months of age exhibited a faster decline in these responses. In contrast, children vaccinated between eight and a half and 12 months showed more persistent and functional T cell and antibody responses, with stable cellular-humoral correlations, thus suggesting robust long-term immunity. When viewed together, these patterns suggest that whilst early MMR vaccination induces strong initial cellular immunity, the durability of this response may be reduced when vaccination occurs at a younger age, which is a similar pattern to what has been observed with neutralising antibody levels.

6.6.5.6 Whole genome sequencing of measles viruses: the benefit for outbreak investigation, the Netherlands, 2013–2014 [4]
Instead of sequencing the 450 nucleotide region at the C terminal, as per the recommendations by WHO, nearly complete whole MV genome sequencing (nWGS) was applied to samples collected during the epidemic of 2013-14. Based upon the N450 region, this epidemic was considered as one with limited sequence variation, whereas nWGS identified different molecular clusters. The analysis of nWGS genomes suggested that the epidemic began with either a single unnoticed introduction into the Netherlands and a few unnoticed generations or with at least two introductions at the same time, with the latter option being supported by epidemiological data. These results can aid attempts to interpret MV sequence variation during transmission chains, outbreaks and epidemics in those countries or regions that are approaching measles elimination.

6.6.6 (Inter)national developments
The preliminary data for 2025 show a significant decline in the number of reported measles cases across the European Union and the European Economic Area (EU/EEA) countries compared to 2024 (2024: 35,212 cases; 2025: 7,655 cases [5]. Of the 7,655 cases in which age was known, 3072 (40%) involved children under five; 2,674 (35%) cases involved individuals aged 15 or older. The highest reported rates were observed among infants under one year old (261.6 cases per million population) and children aged one to four (127.4 cases per million population). Of the 7,210 cases (94% of all cases) in which both age and vaccination status were known, 5,764 (80%) were unvaccinated, 743 (10%) were vaccinated with one dose of a measles-containing vaccine, 571 (8%) were vaccinated with two or more doses, and 122 (2%) were vaccinated with an unknown number of doses. During the 12-month period, eight deaths (case fatality rate (CFR): 0.105%) attributable to measles were reported to ECDC by France (4), Romania (3), and the Netherlands (1).
In the WHO European region, measles cases across Europe and Central Asia declined significantly in 2025 compared to 2024, according to preliminary data reported by 53 countries [6]. Countries in Europe and

Central Asia reported 33,998 measles cases in 2025 —a nearly 75% drop compared to 127,412 in 2024. In the WHO European region, several countries lost their measles elimination status in 2024, including Austria, Spain, and the UK. The status of measles in the Netherlands is 'eliminated', insofar as the absence of continued measles virus transmission for a 12-month period in the Netherlands was demonstrated by a well-performing surveillance system. Worldwide, the number of reported cases also decreased from 2024 to 2025 [7]. In 2024, 359,450 cases were reported to WHO, followed by 276,240 in 2025. The highest incidences during the period February 2025 to January 2026 were reported by Mongolia (3,780 per million), Kyrgyzstan (902 per million), and Yemen (706 per million). Since March 2026, a large measles outbreak has been ongoing in Bangladesh, with up to 596 suspected deaths and 93 confirmed deaths due to measles according to a UN report.

6.6.7 Literature

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*publication with RIVM authors.

6.7 Meningococcal disease

6.7.1 Key points

- In 2025, 137 invasive meningococcal disease (IMD) cases were reported, of which 115 (84%) cases were caused by serogroup B (IMD-B).
- The overall IMD incidence was 0.76 per 100,000 population in 2025. The incidence was 0.64 per 100,000 for IMD-B and 0.09 per 100,000 for the NIP-vaccine serogroups ACWY.
- While the IMD-B incidence increased in both 2023 and 2024, it did not increase further in either 2025 or the first four months of 2026. The incidence of IMD-ACWY was similar to previous years, and has been low since MenACWY vaccine introduction in 2018.
- The IMD-B incidence in 2025 was highest among <2-year-olds (5.7 per 100,000), followed by those aged 15–24 years (1.45 per 100,000) and children aged 5–14 years (1.33 per 100,000). In 2025, one of the 16 IMD-ACWY cases occurred among <25-year-olds.
- The Health Council of the Netherlands published an advice not to include meningococcal serogroup B vaccination in the NIP. Some of the reasons for this advice were: the low number of cases in the targeted age group; the lack of indirect protection; and high fever in infants being a relatively common side effect of the vaccine.
- An assessment of the completeness of the samples sent to the reference laboratory showed that the laboratory surveillance for IMD has been near-complete for years.
- An outbreak of IMD-B occurred among young adults in England in March 2026. A month later, two smaller independent outbreaks occurred in a primary school and a secondary school. In response, MenB vaccines have been made available for 17–18-year-olds and young adults starting university or other further education up until the end of 2026.

6.7.2 *Tables and figures*

Figure 6.7.1 Incidence of invasive meningococcal disease by serogroup, 1996–2025

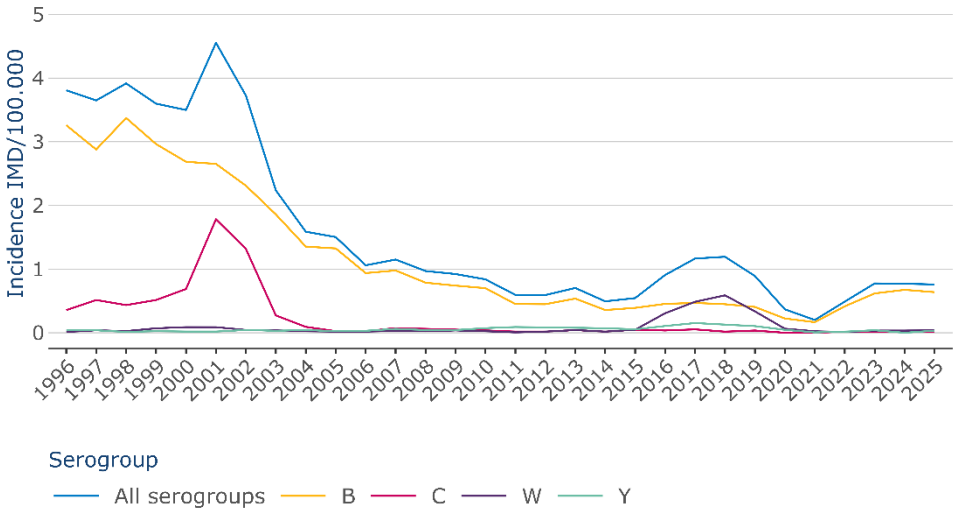
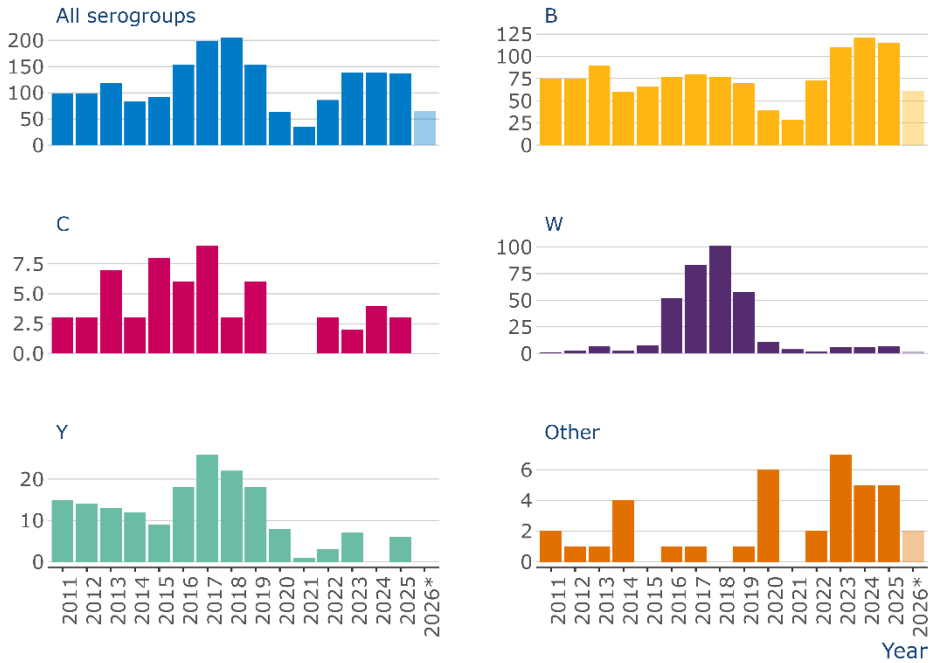


*Figure 6.7.2 Number of cases of invasive meningococcal disease by serogroup, 2011–2026**



*Data for 2026 is based on the first four months of the year only.

Figure 6.7.3 Age-specific incidence of invasive meningococcal disease caused by the vaccine-preventable serogroups A, C, W, or Y combined (IMD-ACWY) by year, 2018–2025

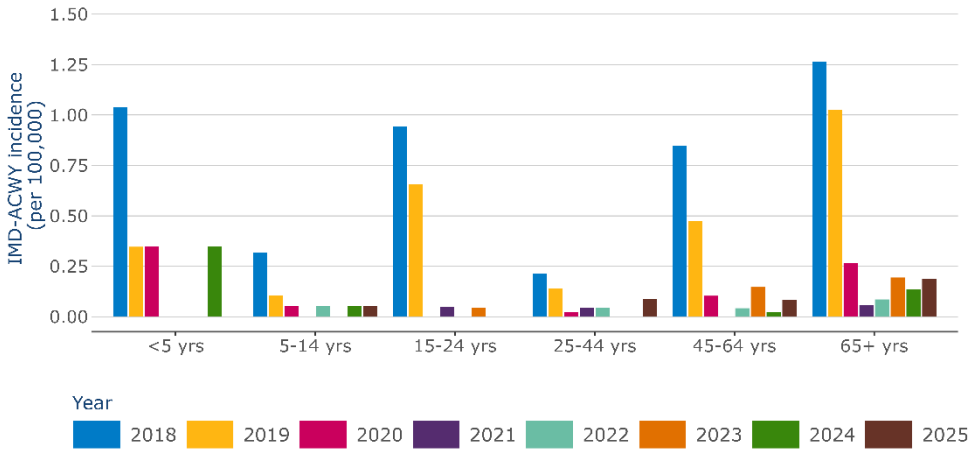


Figure 6.7.4 Age-specific incidence of invasive meningococcal serogroup B disease (IMD-B) by year, 2018–2025

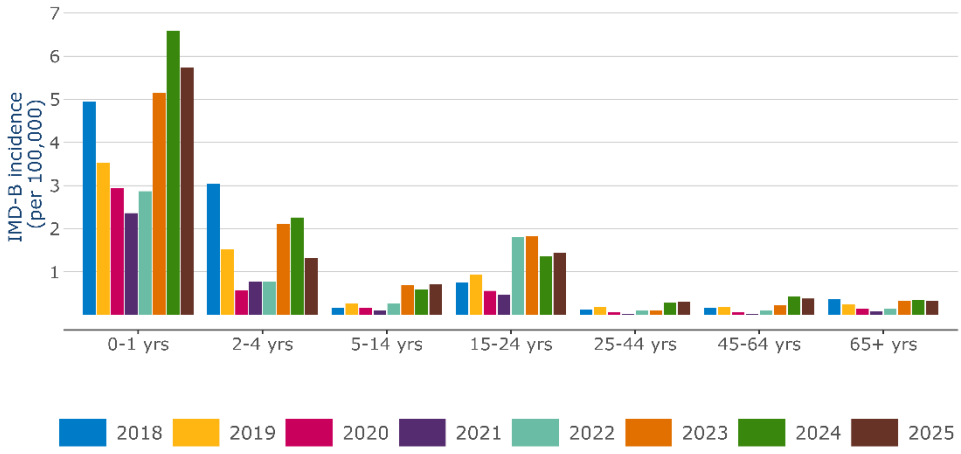
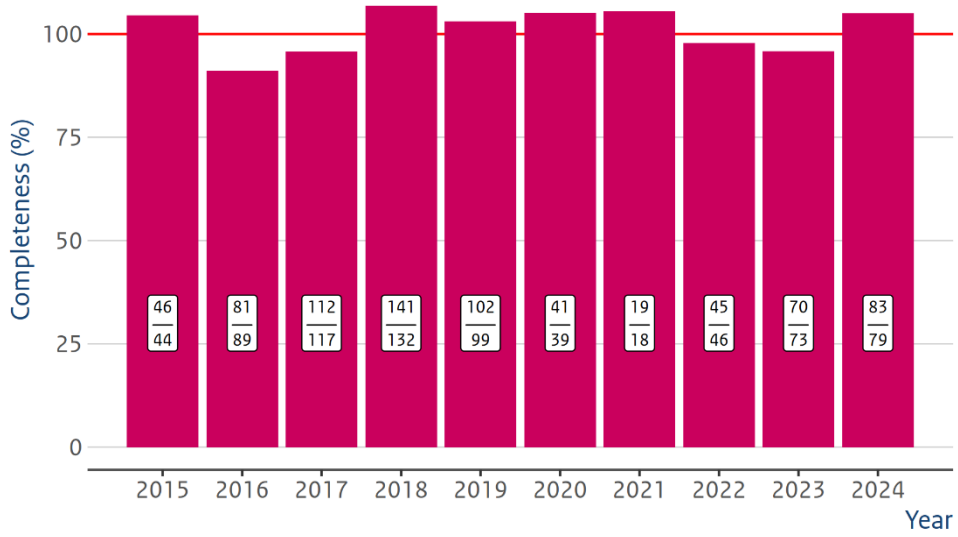


Figure 6.7.5 Completeness of meningococcal isolate submissions to the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM), compared to data from the antibiotic susceptibility surveillance system ISIS-AR, 2015–2024



Please note that all cultured isolates originating from normally sterile sites were considered for this figure. The red horizontal line indicates 100% completeness, a percentage higher than 100% means that more isolates were sent to the NRLBM than were reported in ISIS-AR. The numbers within the bars indicate the number of isolates in NRLBM/number of isolates in ISIS-AR.

6.7.3 Epidemiology

6.7.3.1 Meningococcal disease incidence

Meningococcal vaccination against serogroup C was introduced in the Netherlands in 2002 following a serogroup C outbreak in 2001. The IMD incidence steadily declined in the following years, until an outbreak of serogroup W occurred between 2015 and 2018. After a decrease in the IMD incidence due to both the introduction of the MenACWY vaccine in 2018 and the COVID-19 pandemic during the 2020–2022 period, the incidence rose slightly above pre-pandemic levels in both 2023 and 2024 (Figure 6.7.1). In 2025, the IMD incidence remained constant at 0.76 per 100,000 population (n=137 cases). In the first four months of 2026, 65 IMD cases have been reported, which is similar to the same period in 2025 (n=66) and the pre-COVID-19 years 2015–2019 (median 64 cases).

6.7.3.2 Meningococcal disease caused by serogroups A, C, W, Y

Overall, the incidence of IMD caused by the serogroups ACWY was low in recent years, with an incidence of 0.09 per 100,000 in 2025 (n=16). All IMD-ACWY cases in 2025 occurred in unvaccinated individuals aged 25 years or older, with the exception of one younger unvaccinated case. One adult died as a result of the infection. Between January and April 2026, two MenACWY cases (both IMD-W) were reported, both involving older adults, neither of which were fatal. None of the IMD-ACWY cases in 2025–2026 had known immunosuppressive comorbidities. Since the MenACWY catch-up campaign in 2018–2019 and the introduction of MenACWY into the NIP in 2020, only one vaccine failure has occurred in

a vaccine eligible person up until April 2026, who was an immunocompetent child aged <5-years-old, in 2019.

6.7.3.3 Meningococcal disease caused by serogroup B

Meningococcal serogroup B has been the main serogroup causing IMD in the Netherlands for decades. After a decrease in the IMD-B incidence during the COVID-19 pandemic, the incidence increased again from 2022 onwards and surpassed pre-pandemic levels in both 2023 and 2024. This increase stagnated in 2025, as the IMD-B incidence (0.64 per 100,000, n= 115) was similar to that of 2024. In the first four months of 2026, 61 IMD-B cases were reported, which was similar to the same period in the previous two years (mean n=58, 2024–2025). While the incidence in 2025 remained highest among <2-year-olds with 5.70 per 100,000 (n=19), followed by adolescents (1.45 per 100,000 in 15–24-year-olds; n=32) and 2–4-year-olds (1.33 per 100,000; n=7), IMD-B occurred slightly more often in the older age groups compared to 2024 (Figure 6.7.4). In the first four months of 2026, most cases were reported in children <2-years-old, while during the first four months of 2023–2025 IMD-B most often in adolescents. Since 2015, 42 out of the 848 (5%) IMD-B cases with information available on disease outcome have died. In 2025, four deaths were reported among IMD-B cases (4%; one was younger than five years of age) and two between January and April 2026 (4%; one was aged <5-years). All of the fatal cases in 2025 were infected with a different finetype; none of them had any known immunosuppressive comorbidities.

6.7.3.4 Disease caused by other meningococcal serogroups

During January 2025 and April 2026, seven IMD cases were caused by a non-B and non-ACWY serogroup. One IMD-E, three IMD-X, and three non-groupable IMD cases were reported. Since the first case in 2006, IMD-X has been reported a total of 15 times with around one case every one to two years. A total of 14 IMD-E cases have been reported since 2001, five of which occurred during the last three years. Non-groupable IMD has been reported 15 times since the first case in 2005, with around one case every one to two years.

6.7.4 Pathogen

6.7.4.1 Variability of finetypes

The finetype of the meningococcus causing IMD is used to identify potential clustering [1]. Among the 121 cases with finetype information available in 2025, 72 different finetypes were observed compared to 66 finetypes out of 122 cases in 2024, thus suggesting a similar degree of diversity. In the first four months of 2026, 41 different finetypes among 61 isolates with known finetypes have been observed. Among the 2025 isolates, the most commonly observed finetypes were P1.22,9:F5-12 (n=12; all IMD-B), P1.22,14:F5-5 (n=11; all IMD-B), and P1.7-2,4:F1-5 (n=7; all IMD-B). Other finetypes were observed in one to five cases, without geographical clustering or known epidemiological links. Finetype P1.22,9:F5-12 was also the most common found in the first four months of 2026 with 13 cases, which is more than all of 2025. However, no geographical clustering was observed nor were any epi-links found between the cases. Similar to 2024, the most common finetype among IMD-W isolates in 2025 was P1.5,2:F1-1 (n=5 out of 6). This finetype

caused the IMD-W outbreak in 2018–2019, but annual numbers of this finetype have been very low since 2021.

6.7.5 Current/ongoing research

6.7.5.1 Completeness of isolate submissions

The completeness of meningococcal isolate submissions to the NRLBM was evaluated for the period 2015–2024. The number of isolates submitted to NRLBM was compared to the number of isolates reported in ISIS-AR, the national surveillance system for antimicrobial susceptibility testing (for methods, see Appendix 1). Laboratory surveillance of IMD is long-standing in the Netherlands and has focused on isolates from blood or CSF up until 2022. Thereafter, the NRLBM requests all isolates from normally sterile sites. In addition, the NRLBM requests culture-negative specimens from patients who are strongly suspected of bacterial meningitis for PCR, which were not included in the analysis.
After exclusion due to fusions between labs or differing submission practices within labs, isolates from 85% (n=47) of the labs found in NRLBM and ISIS-AR data could be included. Over the study period, approximately identical numbers were submitted to NRLBM and ISIS-AR. The completeness was 91%–107% for all materials (Figure 6.7.5) and 94%–110% for CSF and blood (not shown separately). This suggests near-complete laboratory surveillance of invasive meningococcal isolates to the NRLBM.

6.7.6 (Inter)national developments

6.7.6.1 Serogroup B

On 27 May 2026, the Health Council of the Netherlands published its advice on MenB vaccination. The Health Council acknowledged that the severity of IMD-B warrants a discussion on vaccination. However, they advised not to introduce MenB vaccination in the NIP at this moment on the following grounds: the relatively low number of cases in the targeted age groups; uncertainty over the number of cases that vaccinations would prevent; the absence of protection against carriage and, hence, the absence of indirect protection; and finally, the fact that the vaccine causes relatively often high fever in young infants that may result in hospitalisation. In the event of either an increase in the incidence or the availability of a new MenB vaccine, the Health Council will reconsider their advice.

In the UK, a large and fast-growing outbreak of IMD-B occurred in March 2026 consisting of 21 confirmed cases, including two deaths, with epidemiological links to Canterbury, Kent [2]. The outbreak strain (P1.12–1,16–183: F1–5: ST-485 (cc41/44)) was covered by the 4CMenB vaccine. An unprecedented large and fast campaign with chemoprophylaxis (uptake of antibiotics over 13,000 people), and targeted vaccination (uptake over 11,000 people) was rolled out [3]. In April and May 2026, two other independent clusters were identified: one in a primary school with four IMD-B cases, and another in a secondary school with three cases. In the case of the secondary school, a large campaign was rolled out which led to an uptake of antibiotics amongst over 1,800 pupils, whilst in the case of the primary school, only close contacts received antibiotics. In response to these outbreaks, MenB vaccines have been made available for 17–18-year-olds and young

adults starting university or other further education up until the end of 2026. In the Netherlands, MenB vaccination is not generally recommended in the event of an IMD-B outbreak, but chemoprophylaxis is. In the Netherlands, the number of MenB vaccines (mainly 4CMenB but also MenB-FHbp) that were dispensed from Dutch public pharmacies increased in the weeks after the IMD-B outbreak in Kent. While generally the number of dispensations of MenB vaccines ranges between 170 and 200 vaccines per month, this increased to 490 in March and 350 in April. The increase was mostly seen among adolescents (12–24 years) and those aged <3-years-old (courtesy of *Foundation for Pharmaceutical Statistics* (SFK). In May 2026, the number returned to its original levels (approximately 200). The data do not include dispenses through municipal health services or by general practitioners via their own pharmacies. As two doses are needed to ensure sufficient vaccine effectiveness, these data cannot be directly translated to the number of vaccinated persons.

The strain coverage of circulating IMD-B strains by the 4CMenB vaccine was analysed in Belgium [4]. Coverage of isolates collected between 2016 and 2022 were analysed using the gMATS and MenDeVAR systems. Around 80% of strains were predicted to be covered by gMATS and 81% by MenDeVAR. There was no reported variation in the coverage either over time or between age groups.

6.7.6.2 All serogroups

A Pfizer-funded study compared Dutch meningococcal carriage and IMD during the period 2012–2014. They looked at sequence type (ST) and factor H-binding protein (fHbp) expression [5]. The focus on fHbp is relevant because different variants of this surface-exposed lipoprotein are included in MenB vaccines. Carriage data came from those aged 17–23 years, while IMD cases of all ages were included. Genogroup B was found to be dominant in carriage (27%) and IMD (75%) isolates; 30% of carrier isolates were non-groupable. Genogroup Y (14% and 13%, respectively) and genogroup W (4% and 5%) were less common. Of the IMD-B isolates, 70% expressed FHbp subfamily-B while 79% of carriage isolates expressed fHbp subfamily-A. The distribution of subfamily fHbp expression was similar between the isolates of all age groups among the IMD-B cases. Note that the 4CMenB vaccine is based on subfamily B, and the MenB-fHbp vaccine is based upon both on subfamily A and B (though carriage is not prevented by any of the two vaccines).

An English study analysed factors associated with the reported increase in the case fatality rate (CFR) of IMD during the COVID-19 pandemic [6]. While the disease incidence decreased during this period, CFR rose from ~10% in 2019 to 12.5% during the 16-month lockdown period. The highest increase in CFR was found in older adults aged 65 or older (from 17.1% to 35%), followed by infants <1-year-old (10.8% to 16%), 15–19-year-olds (8.5% to 12.5%) and 45–64-year-olds (17.1% to 20.0%). In other age groups no fatal cases were reported. Most cases were IMD-B, while some cases involving older adults were IMD-Y. During the lockdown period, 20% of cases were reported within a day of disease onset compared to 40% pre-pandemic. However, the proportion reported within two days of disease onset was similar between the two

periods. Infant cases occurred primarily in healthy children, whereas most older adult patients had comorbidities.

Another study conducted in England assessed inequalities in MenACWY vaccine coverage by socio-economic status [7]. Meningococcal vaccination in England is school-based and has shown declining uptake in recent years. Deprivation was quantified using the index of multiple deprivation and then linked with coverage data. Higher deprivation scores were statistically significantly associated with lower vaccination coverage. This association intensified after the COVID-19 pandemic, thus suggesting increased inequalities with respect to uptake post-pandemic.

6.7.6.3 Vaccine efficacy of 4CMenB against gonococcal infections

Previous observational studies have reported on the vaccine effectiveness of the 4CMenB IMD-B vaccine against *Neisseria gonorrhoeae* (NG) infections [8]. A study conducted in Australia aimed to determine vaccine efficacy and immunogenicity of 4CMenB against gonorrhoea among men who have sex with men in a randomised control trial [9]. The study included 587 participants aged 18–50 years in the primary analysis who were randomised 1:1 to receive two doses of either 4CMenB or placebo. The participants were required to be HIV negative and receive pre-exposure prophylaxis or have a high enough CD4+ T-cell count and have a diagnosis of gonococcal infection or infectious syphilis in the preceding 18-month period. There were no statistically significant reductions in the gonorrhoea incidence between the vaccinated and unvaccinated groups (IRR 1.01, 95% CI: 0.80–1.26). The vaccine efficacy was 5.5% (95% CI: -56.0–42.8) for symptomatic infection. These findings were consistent with a smaller trial conducted in Australia, which was published in the same year [10].

6.7.7 Literature

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*publication with RIVM authors.

6.8 Mumps

6.8.1 Key points

- A total of 150 cases were reported in 2025 in the Netherlands (incidence: 0.83 per 100,000 population). This was lower than in 2024, when 597 cases of mumps were reported (incidence: 3.32 per 100,000).
- Of the reported cases in 2025, 3% required a hospital admission due to mumps. Among the cases, 43% were aged 15 or younger, 71% were unvaccinated, and more than half were resident in the Bible Belt region (54%).
- Since 2025, the second dose of MMR is offered around a child's third birthday rather than at the age of nine. This applies to children born from 1 January 2016 onwards.

6.8.2 *Tables and figures*

Figure 6.8.1. Number of notified mumps cases since 1976

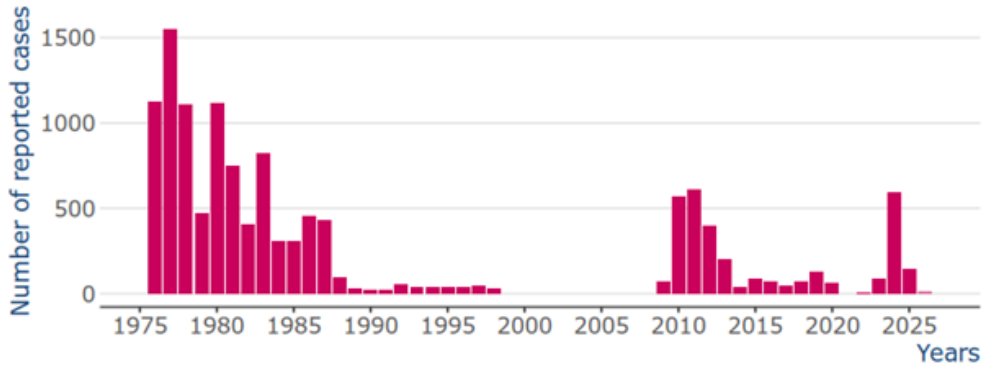


Figure 6.8.2. Age distribution and vaccination status of cases (n= 150) reported in the Netherlands in 2025

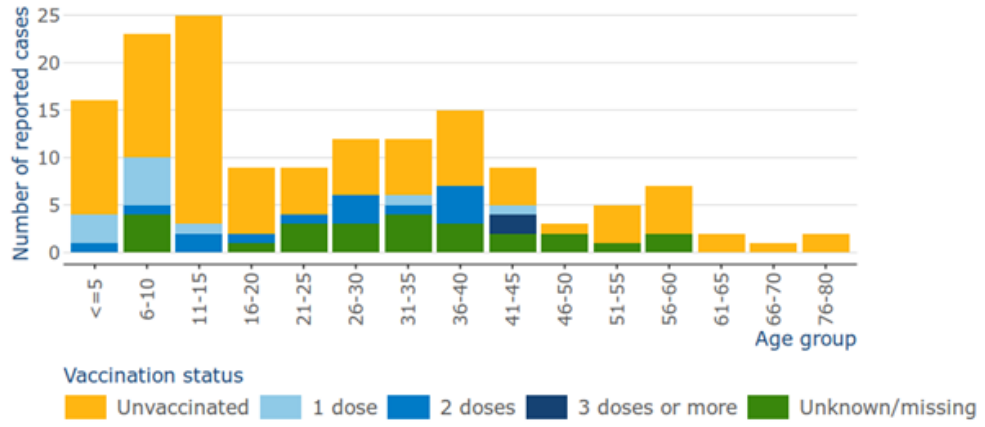


Figure 6.8.3. Reported mumps cases in 2025 by municipality (N=150), the Netherlands



Each point is a case, centred in municipality of residence with random jitter

6.8.3 Epidemiology

In August 2025, the Bible Belt epidemic, which began in the final quarter of 2023, ended. This epidemic occurred in parallel with another in the Randstad, which together comprised 814 reported cases. The height of this epidemic was in June 2024 when over 70 cases were reported in one month. In 2025, 150 cases of mumps (incidence: 0.83 per 100,000) were reported (Figure 6.8.1), which was lower than in 2024 when 597 cases (incidence of 3.32 per 100,000) were reported. Among cases reported in 2025, the mean age was 26 (median: 21), with the ages ranging from 1–78-years-old (Figure 6.8.2). Out of all the cases, 71% were unvaccinated (98 out of 138 with a reported vaccination status). Among the reported cases, 0 patients were aged under 14 months or unvaccinated. Of the patients aged between 14 months and 8-years-old (n=31) who were eligible for one dose of MMR, 87% were unvaccinated. Of the cases aged nine–18-years-old (n=41) who were eligible for two doses of MMR, 72% were unvaccinated. Of the adult cases whose ages ranged from 19–39-years-old (n=49) 86% were unvaccinated, whilst 80% (n=29) of patients aged 40 years and older were unvaccinated.

The following reasons were reported by those who were not vaccinated (n=98): 59 (76%) cited religious grounds (orthodox Protestants), 4 (5%) were critical of vaccinations, 15 (19%) gave no specific reason, and 20 cases were unknown.

For nearly all of the cases (n=138), the most likely country of infection was the Netherlands. This was unknown for five cases, whilst seven cases contracted the infection abroad. For cases in which the data were available (147 out of 150), none died from mumps during this period. Data related to complications were available in 144 of the cases, out of which 14 (10%) reported complications. These reported complications concerned meningitis (n=1), orchitis (n=9), pancreatitis (n=1), and other complications (n=1). Based upon the available data, five out of 146 (3.4%) cases were hospitalised.

In the first three months of 2026, the low transmission of mumps within the second half of 2025 continued, with 15 reported cases from January to March 2026.

The MMR vaccine is given in two doses within the Dutch NIP. From 2025 onwards, the second dose is given at three-years-old rather than nine-years-old. This change was made to optimise the protection against measles (referred to in a report by the Health Council). For mumps, however, it remains to be seen what epidemiological consequences this earlier dose will have, given that waning immunity will now begin at three-years-old rather than nine-years-old.

6.8.4 Pathogen

Between 2009 and 2024, most mumps cases in the Netherlands were caused by infection with genotype G mumps viruses.

In 2025, a genotype was obtained for mumps viruses detected in 57 patients, and in five patients during the first three months of 2025. Mumps virus genotype G virus was detected in 53 patients (93%) in 2025 and three patients (67%) in 2026.

Other mumps virus genotypes detected in 2025 and the first three months of 2026 were genotype C (three cases) and J (three cases). The molecular SH gene variant MuVs/Gelderland.NLD/45.23[G] with one or two nucleotide variations was detected in 48 cases in 2025 and in 0 cases in 2026. The last detection of this variant was collected from a mumps case with onset of disease in August 2025. Thereafter, only genetically distinct genotype G mumps viruses or mumps viruses of other genotypes were detected.

6.8.5 Current/ongoing research

Local wastewater monitoring as a complementary tool in a mumps outbreak investigation in the Netherlands: A proof-of-concept study [1]
A recent outbreak of mumps in 2025 in the Netherlands exhibited a concerningly low number of classical disease notifications, prompting evaluation of the use of local wastewater monitoring. The aim of this study was to identify whether the mumps virus could be detected in wastewater samples during an outbreak of mumps in the Netherlands, using PCR testing on passive sampler material from wastewater. General

practitioners reported 50 suspected patients, of which 24 were confirmed. The passive sampler near the confirmed case detected virus RNA directly postdiagnosis, followed by a negative signal afterwards, whilst samplers at the school and samplers further downstream detected rising concentrations as more cases were reported. Samplers in neighbouring towns showed further spread, including a town with no reported cases. This study demonstrated that mumps virus is detectable in wastewater and suggests that a possible correlation between local wastewater monitoring detecting mumps virus RNA and cases of clinical mumps exists.

6.8.6 (Inter)national developments

The most recent data on mumps from ECDC pertain to 2023 [2]. In 2023, 2,963 cases of mumps were reported to ECDC by 27 EU/EEA Member States with an overall notification rate of 0.7 cases per 100,000 population. This was similar to the rate in 2022, but slightly higher than the notification rate reported in 2021 (0.4) and significantly lower than the notification rates reported during the preceding two years (2020=1.7, 2019=3.4) in the EU/EEA. From the immunisation database of WHO [3], we observed that the number of reported cases decreased from 2023 to 2024, with 387,529 reported cases in 2023 and 245,032 reported cases in 2024, which corresponds to an incidence of 95 and 67 per one million, respectively.

6.8.7 Literature

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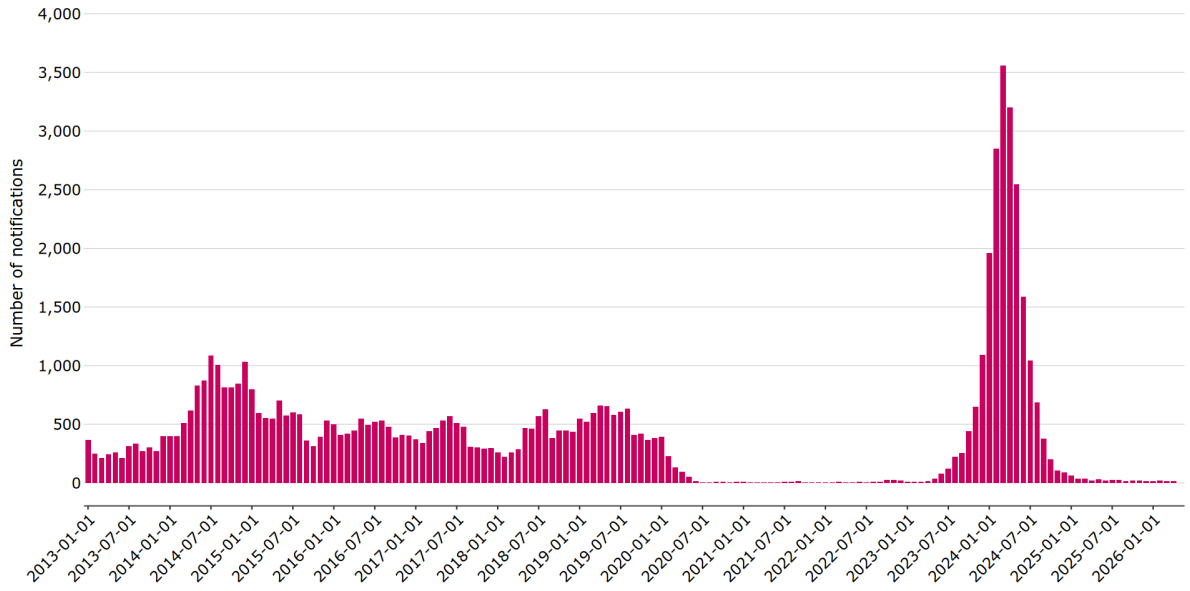
6.9 Pertussis

6.9.1 Key points

- In 2025, a total of 333 pertussis cases were reported, which corresponds to an incidence of 1.8 per 100,000 population.
- These numbers are remarkably low compared to the epidemic in 2024, when 18,213 pertussis cases were reported, with an incidence of 102 per 100,000.
- In 2025, the highest incidence was observed among infants aged 0–5 months (15.7 per 100,000, n=13) and 6–11 months (7.2 per 100,000, n=6).
- According to the notification data, no pertussis deaths were reported in 2025. However, based on preliminary data from CBS, one infant is reported to have died from pertussis in 2025.
- The vaccine effectiveness (VE) estimate of maternal Tdap vaccination against reported pertussis infections among 0–2 month-olds with disease onset between 1 April 2020 and May 2026 was 91% (95% CI: 88 to 93%).
- The VE estimates of the infant vaccination series remained high up until the booster dose administered at four years of age, ranging from 96–99% for cases between 2024 and 2026. Following the booster, VE gradually declined.
- Several European countries have reported macrolide-resistant *B. pertussis* (MRBP) strains. Thus far, none of the Dutch pertussis isolates were MRBP. In 2026, RIVM validated a qPCR-assay to rapidly identify macrolide-resistance within clinical samples.
- From 2025 onwards, vaccination doses for pertussis are provided at the ages of two, three, five, and 12 months and five years rather than at two, three, five, and 11 months and four years.

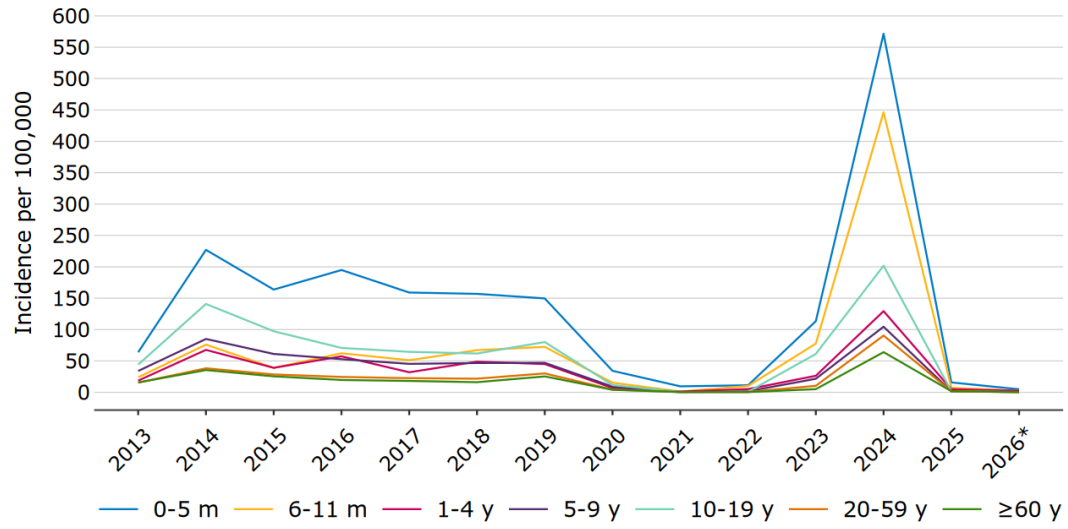
6.9.2 Tables and figures

*Figure 6.9.1 Absolute number of pertussis notifications by month of symptom onset, for 2013–2026**



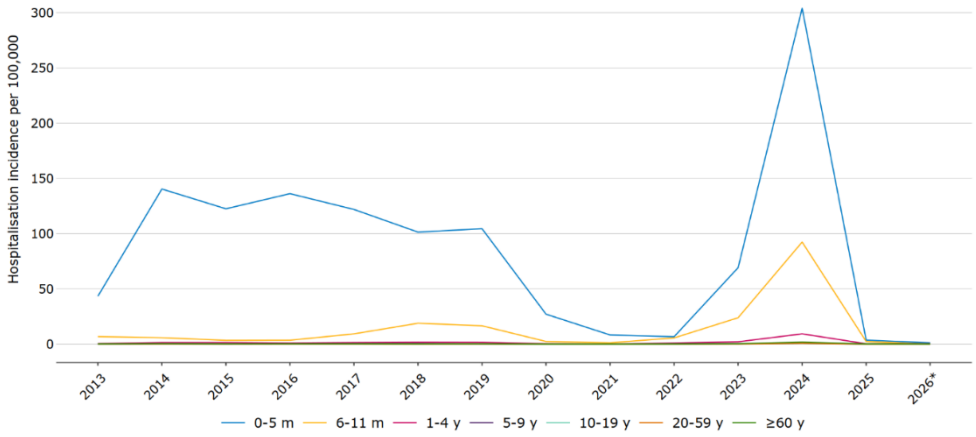
* For 2026, notifications are depicted for the period up to and including May.
Source: national notification system (Osiris)

*Figure 6.9.2 Pertussis notifications per 100,000 population, per age category and by year of symptom onset, for 2013–2026**



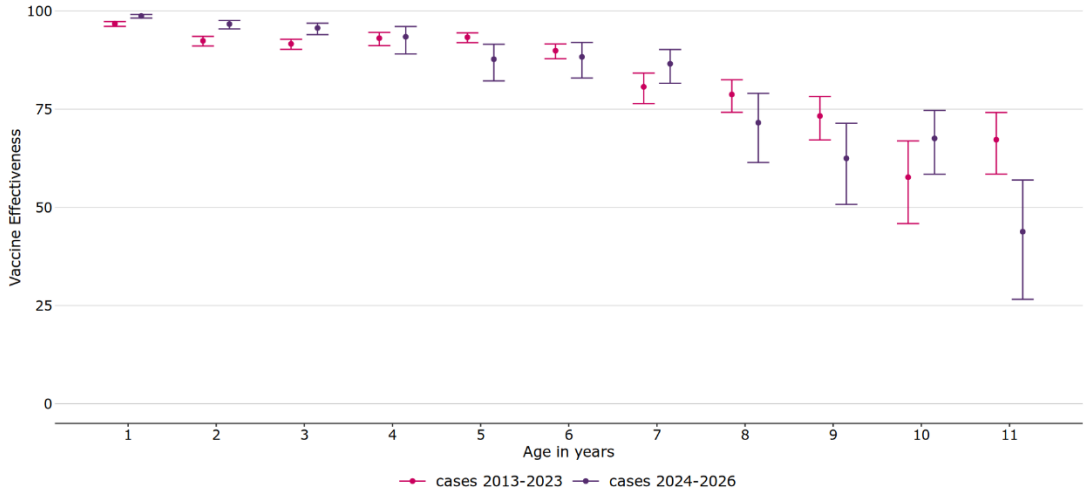
* For 2026, the incidence is depicted for the period up to and including May and not extrapolated to a full calendar year. Source: national notification system (Osiris)

*Figure 6.9.3 Pertussis hospitalisations per 100,000 population, per age category and by year of symptom onset, for 2013–2026**



*For 2026, the incidence is depicted for the period up to and including May and not extrapolated to a full calendar year.
Source: national notification system (Osiris)

Figure 6.9.4 Vaccine effectiveness (VE) of the primary pertussis vaccination series (one-year-olds, two-year-olds, and three-year-olds) and the booster dose (4–11-year-olds) with a mean VE estimate for cases notified between 2013–2023 and in recent years (2024–2026)*



* For 2026, cases up to and including May are included.
For all separate birth cohorts, the registered population coverage of the primary (one-year-olds, two-year-olds, three-year-olds) and booster (4–11-year-olds) vaccination was used, as retrieved from the National vaccination coverage report [1], when available. Otherwise, the coverage of the nearest birth cohort was used. Source: national notification system (Osiris).

6.9.3 Epidemiology

6.9.3.1 Disease

In 2025, a total of 333 pertussis cases were reported (Figure 6.9.1), which corresponds to an incidence of 1.8 per 100,000 population. These numbers are remarkably low compared to the epidemic in 2024, when 18,213 pertussis cases were reported, with an incidence of 102 per

100,000. In 2025, the highest incidence was observed among infants aged 0–5 months (15.7 per 100,000, n=13) and 6–11 months (7.2 per 100,000, n=6) (Figure 6.9.2). This was also the case in 2024. In 2026, up to and including the month of May, 74 cases, of which six were infants, were reported. It should be noted that the differences in incidence across age groups may, in part, reflect both variation in healthcare-seeking behaviour and whether or not pertussis diagnostics were performed.

The pertussis outbreak in 2024 likely resulted in infection-derived immunity among a (substantial) part of the population [2]. As a consequence, many individuals in the Netherlands were protected against reinfection in 2025 and the first months of 2026. This infection-derived immunity may have contributed to both reduced circulation of *Bordetella pertussis* and the small number of cases during this period.

6.9.3.2 Hospitalisation and mortality

According to notification data (Osiris), a total of 19 individuals were hospitalised either due to or with pertussis in 2025. The majority of these hospitalisations (10 out of 19) involved individuals aged ≥60 years. The highest incidence of hospitalisation was observed among infants aged 0–5 months (3.6 per 100,000, n=3), followed by infants aged 6–11 months (2.4 per 100,000, n=2) (Figure 6.9.3). Furthermore, the proportion of reported pertussis cases requiring hospitalisation was highest among these age groups: 23% (three out of 13) for 0–5-month-olds and 33% (two out of six) for 6–11-month-olds, although the absolute numbers remain very low. For comparison, in 2024, 53% (250/471) of reported cases involving infants aged 0–5 months and 21% (76/367) of those aged 6–11 months were hospitalised.

Since 1964, between zero and three individuals a year were reported to have died from pertussis infections, with the exception of the epidemic in 2024, when ten pertussis deaths were reported by Statistics Netherlands (CBS). According to notification data (Osiris), no pertussis deaths were reported in 2025. However, based on preliminary data from CBS, one infant is reported to have died from pertussis in 2025.

6.9.3.3 Vaccination status and vaccine effectiveness estimates

Maternal vaccination

In 2025 and up until the end of May in 2026, only two cases involving infants aged 0–2 months were reported. Consequently, no separate estimate of maternal Tdap vaccine effectiveness (VE) could be made for these years. The VE estimate described here is therefore based upon 321 infants aged 0–2 months with a known maternal vaccination status and disease onset between April 2020 and May 2026. Of these, 55 infants (17%) were born to mothers who had received a maternal Tdap vaccination. Using the screening method and a vaccination coverage of 70%, the estimated VE is 91% (95% CI: 88–93%). It should be noted that 11 out of the included 55 (20%) infants born to vaccinated mothers were either born prematurely or had an insufficient interval between maternal vaccination and birth, which might have lowered the VE estimate. RIVM does not (yet) have data on prematurity and timeliness of vaccination within the background population (i.e., all women eligible

for maternal Tdap vaccination), and therefore separate VE estimates cannot be calculated.

If it is assumed that cases with unknown maternal vaccination statuses (n=30) were born to mothers who received Tdap vaccination, in order to obtain a more conservative VE estimate, the VE is estimated at 86% (95% CI: 82–90%).

Infant series and booster dose
In 2025 and up to and including May 2026, among reported cases of infants (aged 0–11 months) whose vaccination status was known, 48% (ten out of 21) had received the number of vaccinations recommended for their age according to the vaccination schedule (including maternal vaccination). Among reported cases involving children aged 1–4 years whose vaccination status was known, 51% (24 out of 47) had received the age-appropriate number of vaccinations. For children aged 5–11 years this was 69% (18 out of 26). Compared to 2024 [3], a higher proportion of children under five and a lower proportion of children aged five and over had received the age-appropriate number of vaccinations during 2025–2026. It should be noted, however, that the percentages for 2025–2026 are based upon low absolute numbers of cases, which impedes valid comparison between the years.

Figure 6.9.4 presents VE estimates for the primary pertussis vaccination series (covering one-year-olds, two-year-olds, and three-year-olds) and for the booster dose (covering 4–to 11-year-olds), showing both the mean VE for cases notified between 2013 and 2023 and for more recent years (2024–2026). It should be noted that the latter estimates are primarily based upon cases reported in 2024. Due to the low number of reported pertussis cases in 2025 and up to and including May 2026, it was not possible to produce separate age-stratified VE estimates for these years. Furthermore, no VE estimate could yet be made for the primary pertussis vaccination series among four-year-olds born from 2021 onwards (i.e., children for whom the booster dose is recommended at five years-old).

The VE estimates have remained consistently high up to the booster dose administered at four years of age, ranging from 92–97% for cases aged 1–3 years with disease onset in 2013–2023, and 96–99% for cases in 2024–2026. At seven years of age, approximately three years after the booster dose, VE estimates began to decline gradually, reaching 81% and 87% for cases in 2013–2023 and 2024–2026, respectively. This downward trend continues, with considerably lower VE estimates by 11 years of age: 67% and 44% for cases during 2013–2023 and 2024–2026, respectively.

In order to obtain the most conservative VE estimates, all cases in which the vaccination statuses were unknown were assumed to be fully vaccinated. Based upon this assumption, the VE for the primary series ranged from 91% to 97% for cases aged 1–3 years with disease onset in 2013–2023, and from 92% to 96% for cases in 2024–2026. For the booster dose, VE estimates were 71% and 81% for cases aged seven years, and 46% and 23% for cases aged 11 years, during 2013–2023 and 2024–2026, respectively.

6.9.4 Pathogen

The RIVM is continuously testing *Bordetella*-isolates for pathogen surveillance purposes. Samples are whole genome sequenced, the vaccine targets are monitored, and the isolates are placed within both a European and global perspective. In 2025, however, the RIVM received only four samples for surveillance, which can be explained by the low number of reports. Furthermore, although labs and hospitals are encouraged to send isolates to the RIVM, since *Bordetella* is relatively difficult to culture, there might be hesitance to culture swabs on plates and send them to the RIVM. Therefore, we have successfully developed a method for culture-independent sequencing straight from clinical material. Using RNA-probes, *Bordetella*-DNA is captured and can be isolated from the clinical matrix with magnetic beads. In samples with a relatively high load (*Bordetella* qPCR Cq-threshold below 35 cycles), the genome can be reconstructed with >95% completeness. This method allows us to sequence samples whilst, simultaneously, skipping the time-consuming culturing steps.

Notably, several European countries have reported macrolide-resistant *B. pertussis* strains, including among recent isolates [4]. The most commonly found resistance mechanism is an A2047G mutation within the 23S rRNA gene. Thus far, none of the Dutch pertussis isolates have harboured this 23S rRNA mutation. Since 2026, we have a validated qPCR-assay to rapidly identify macrolide-resistance within clinical samples. With this assay we can quickly monitor macrolide-resistance in the Netherlands.

6.9.5 Current/ongoing research

6.9.5.1 Optimisation of pertussis vaccination in the Netherlands

In accordance with the Health Council's advice to implement changes in the National Immunisation Program (NIP) vaccination schedule [5], the two, three, five, and 11 months and four years of age schedule has been replaced by a two, three, five, and 12 months and five years of age schedule from 2025 onwards.

6.9.5.2 Search for protective immune mechanisms

Cyclical epidemics of pertussis continue to occur despite vaccination, because current vaccines fail to suppress colonisation by, and transmission of, the causative agent *B. pertussis*. Identifying the immunological correlates of protection against *B. pertussis* colonisation could guide the future development of pertussis vaccines. Several studies conducted by the Periscope consortium, in which RIVM participates, set out to fill extant knowledge gaps on immune mechanisms and their correlation with protective status.

In a single-centre, open-label, phase 1, controlled human infection study in Southampton (UK), initiated by the international Periscope consortium, the safety of a *B. pertussis* controlled human infection delivered within an outpatient setting was demonstrated. Moreover, this study showed that higher humoral and CD4+ T-cell responses with specificity to acellular pertussis vaccine antigens are associated with protection against colonisation [6].

Periscope Partners in Finland and the Netherlands evaluated the functional properties of pertussis-specific antibodies, which are important for evaluating long-lasting protection, across age groups. They found that avidity, antigen binding strength, was significantly lower among older adults in comparison to children ($p < 0.01$) and adolescents ($p = 0.03$) one month after booster vaccination. Individuals with relatively low antibody avidity levels could benefit most from booster vaccination to increase these levels, compared to individuals with relatively high levels [7].

B. pertussis humoral and cellular immune markers appear to be both involved in mechanisms of protection against colonisation and disease. A more comprehensive assessment of immunity, including cell-mediated immunity or cytokines after pertussis vaccination, could therefore both reveal a more complete picture of the markers of immunological memory and provide insight into the immune modulating effect of different pertussis vaccines [8].

6.9.5.3 (Maternal) pertussis vaccination studies

Maternal Tdap vaccination shortens the period of time in which an infant is vulnerable to acquiring a pertussis infection. Several studies have been designed and carried out to advance our knowledge on the features of transplacental transfer, especially amongst frail groups.

Maternal Tdap vaccination in women with inflammatory bowel disease (IBD) receiving immunomodulating medication during pregnancy, results in significantly higher Tdap-antibody concentrations in their infants compared to infants of unvaccinated IBD mothers, albeit geometric mean concentration (GMC) was lower for pertactin (PRN) compared to healthy controls. These results support current recommendations to advise maternal Tdap vaccination in pregnant women receiving immunomodulating medication [9].

In a prospective open-label controlled clinical trial it was found that Tdap vaccination during pregnancy resulted in maternal anti-PT antibodies in cord blood that were better in inhibiting epitope specific binding and had a decreased binding strength than infants' PT specific antibodies [10].

6.9.5.4 Pertussis vaccination in lower resource countries

The RIVM-based serology multiplex immune assay (MIA) platform is also used in the Gates Foundation-funded OptIMMS trial. Longitudinal serum samples from 900 children in Nepal and Uganda were used to compare antigen-specific antibodies, including anti-pertussis toxin IgG antibodies as a primary endpoint, across five different vaccination schedules.
The findings indicated that in high-pertussis-burden settings the WHO DTP schedule with three primary doses is the preferred schedule over two-dose schedules, insofar as it elicits the greatest antibody responses within the first three months of life when infants are particularly vulnerable. Although delayed three-dose schedules may be considered within both low-risk contexts and settings with maternal immunisation programmes, early infant protection should guide policy decisions [11].

6.9.6 *(Inter)national developments*

In January 2026, the European Medicines Agency (EMA) authorised the use of VacPertagen® within the EU. VacPertagen® is a standalone pertussis booster vaccine for individuals aged > 11 years, which can also be administered during pregnancy.

6.9.7 *Literature*

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*publication with RIVM authors.

6.10 Pneumococcal disease

6.10.1 Key points

- A total of 1941 invasive pneumococcal disease (IPD) cases were reported during the epidemiological year 2025–2026 (June to May).
- The incidence of IPD was 10.8 per 100,000 population in 2025–2026, which is lower than in 2024–2025 (12.6 per 100,000).
- The incidence in 2025–2026 was lower than 2024–2025 across all age groups. The decrease was largest among <5-year-olds (from 8.6 to 5.2), followed by those aged 65 years and older (from 36.4 to 29.4), 5–49-year-olds (from 3.5 to 3.1) and 50–64-year-olds (from 14.7 to 13.4).
- In the autumn of 2024, PCV15 was introduced within the NIP, thereby replacing PCV10 which had been in use since 2011. While its introduction likely contributed the decrease in IPD incidence, it is too early to determine the full effects of PCV15.
- A background document for the Health Council of the Netherlands on PCV21 vaccination in older adults was published by the RIVM.
- EMA has extended the registration of PCV21 to children aged 2–17 years who received a pneumococcal vaccine through a NIP.

6.10.2 Tables and figures

Table 6.10.1 Number of IPD cases and incidence of IPD in 2024–2025 and 2025–2026 by both age group and normally-sterile sites in which the pneumococcus was detected

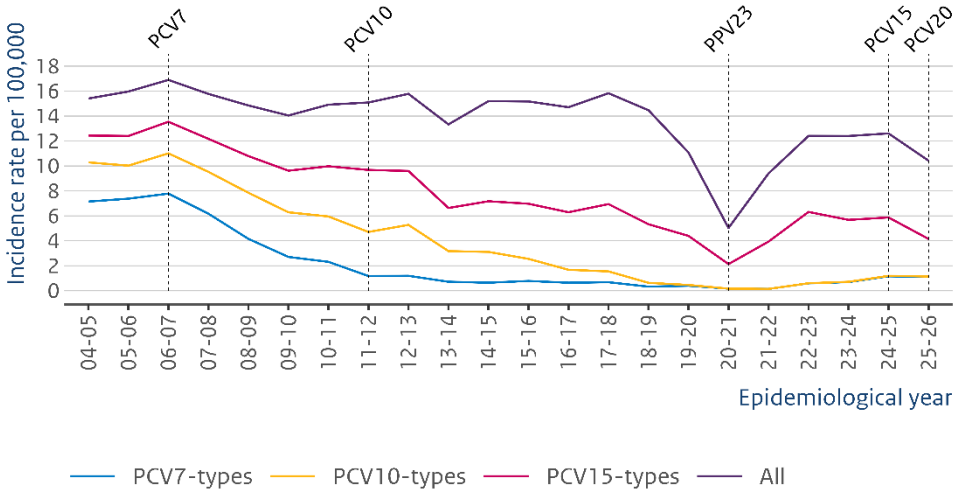
	Number of IPD cases			Incidence (per 100,000)	
	Blood/CSF	**Other sites**	**Total (all IPD)**	**Blood/CSF**	**Total (all IPD)**
2025–2026					
<5 years	39	6	45	4.5	5.2
5–49 years	288	11	299	3.0	3.1
50–64 years	483	10	493	13.1	13.4
65+ years	1077	27	1104	28.7	29.4
Total	1887	54	1941	10.5	10.8
2024–2025					
<5 years	65	9	74	7.6	8.6
5–49 years	337	6	343	3.4	3.5
50–64 years	532	8	540	14.4	14.7
65+ years	1341	26	1367	35.7	36.4
Total	2275	49	2324	12.6	12.9

Table 6.10.2 Serotypes included in the different pneumococcal vaccines that are licensed by the EMA or FDA

	Vaccine						
Serotype	**PCV7**	**PCV10**	**PCV13**	**PCV15**	**PCV20**	**PCV21**	**PPV23**
4	X	X	X	X	X		X
6B	X	X	X	X	X		X
9V	X	X	X	X	X		X
14	X	X	X	X	X		X
18C	X	X	X	X	X		X
19F	X	X	X	X	X		X
23F	X	X	X	X	X		X
1		X	X	X	X		X
5		X	X	X	X		X
7F		X	X	X	X	X	X
3 [1]			/	/	/	/	/
6A [2]		(X)	X	X	X	X	
6C [2]			(X)	(X)	(X)	?	
19A			X	X	X	X	X
22F				X	X	X	X
33F				X	X	X	X
8					X	X	X
10A					X	X	X
11A					X	X	X
12F					X	X	X
15B [3]					X	(X)	X
2							X
9N						X	X
17F						X	X
20(A) [4]						X	X
15A						X	
15C						X	
16F						X	
23A						X	
23B						X	
24F						X	
31						X	
35B						X	

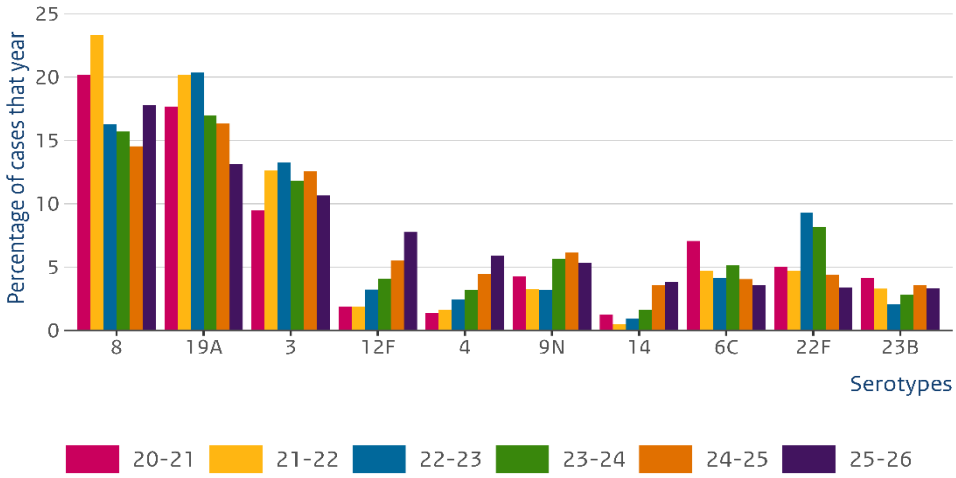
PCV15 is used in the childhood NIP from autumn 2024 onwards and PCV20 is used in the National Programme Pneumococcal Vaccination for adults from autumn 2025 onwards. Please note that PCV7 is no longer on the market, and PCV10 is licensed for children only.
(1) Although PCV13/15/20 and PPV23 include serotype 3 in their license, the vaccine effectiveness is likely to be (very) limited. Therefore, it is not included in the vaccine-specific coverages presented in the text [1, 2].
(2) PCV13, PCV15 and (probably) PCV20 protect against 6C through cross-protection of the 6A antigen. PCV10 protects against 6A through cross-protection of the 6B antigen [1].
(3) For serotype 15C in PCV21, the deOAc15B polysaccharide is used, the molecular structure of which is shared between 15B and 15C. However, PCV21 cross-protection to 15B is only licensed by the FDA for protection against IPD and not pneumonia, while it is referred to as cross-reacting within the licensure by the EMA [3, 4].
(4) In the presented vaccines, an antigen of (genotype) 20A is included, however, in surveillance, subtyping for serotype 20 is not performed.

Figure 6.10.1 IPD Incidence across all ages by vaccine serotype (PCV7 serotypes, PCV10 serotypes, PCV15 serotypes), as well as all-serotype IPD, presented by epidemiological year (e.g., 04–05 = June 2004–May 2005)



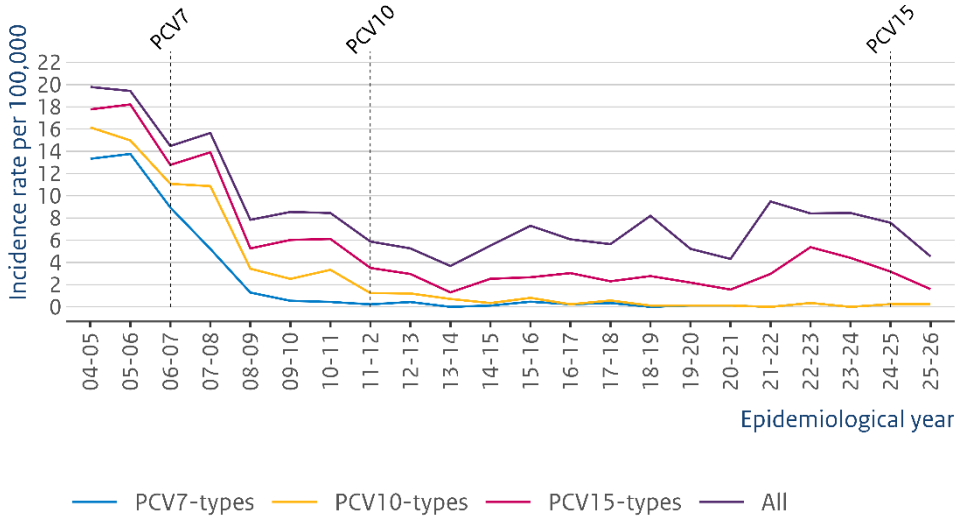
PCV7 was introduced in the childhood NIP in June 2006, PCV10 in May 2011, and PCV15 in September 2024. Up until approximately January 2025, PCV15 was used as a booster only. PPV23 was introduced in a stepwise manner in the National Programme Pneumococcal Vaccination in autumn 2020. In autumn 2025, PPV23 was replaced by PCV20 in the NPPV. From 2004–2005 to 2022–2023, sentinel surveillance data was extrapolated to the Dutch population. National surveillance data have been used from 2022–2023 onwards. Only IPD cases based on pneumococcal detection in blood or CSF samples have been included. Dotted lines indicate the year of vaccine introduction.

Figure 6.10.2 The percentage of IPD cases caused by the ten most common serotypes in 2025–2026, shown for the epidemiological years 2020–2021 to 2025–2026



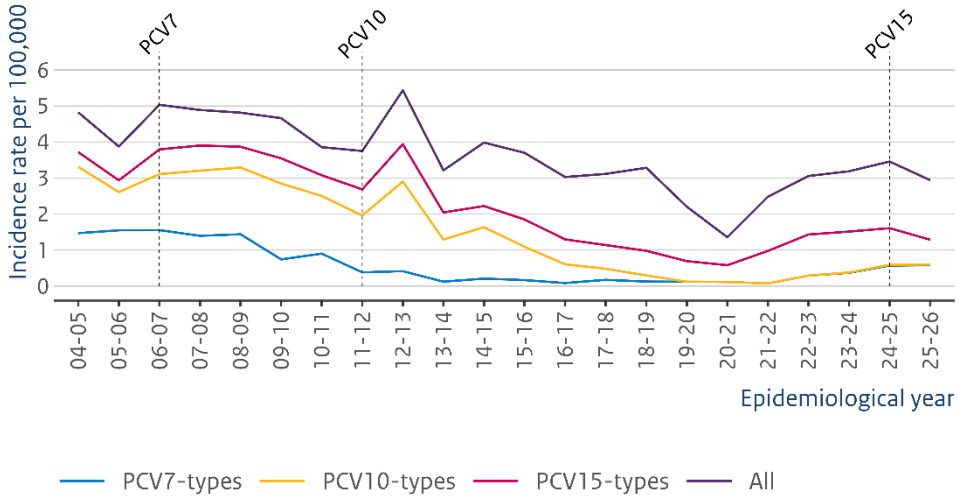
National data have been used and only IPD cases diagnosed from positive blood or CSF culture have been included.

Figure 6.10.3 IPD incidence in children aged <5-years-old by vaccine serotype (PCV7 serotypes, PCV10 serotypes, PCV15 serotypes,), as well as all serotype IPD, presented by epidemiological year (e.g., 04–05 = June 2004–May 2005)



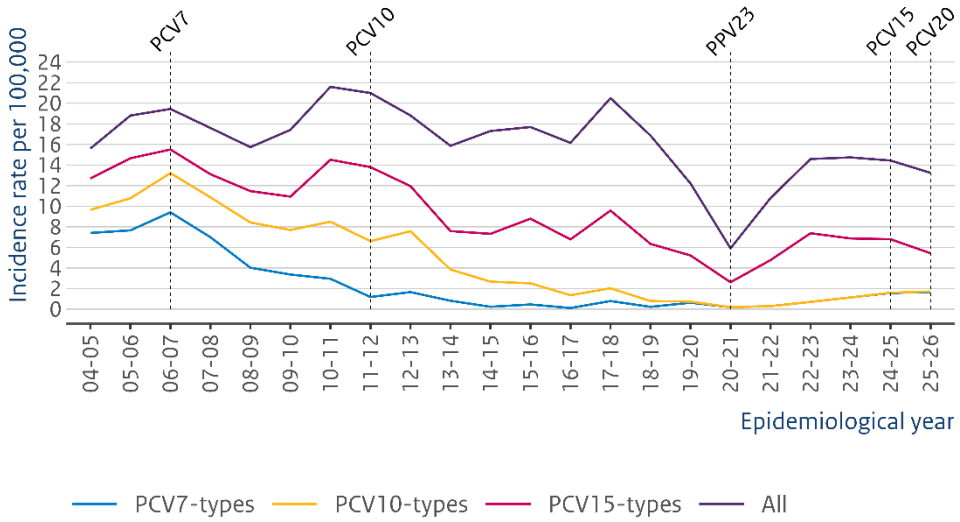
From 2004–2005 to 2007–2008, sentinel surveillance data was used and extrapolated to the Dutch population. From 2008–2009 onwards, data from the national surveillance have been used and only IPD based on pneumococcal detection in the basis of blood or CSF have been included. Dotted lines indicate year of vaccine introduction.

Figure 6.10.4 IPD Incidence in persons aged 5–49 years by vaccine serotype (PCV7 serotypes, PCV10 serotypes, PCV15 serotypes), as well as all serotype IPD, presented by epidemiological year (e.g., 04–05 = June 2004–May 2005)



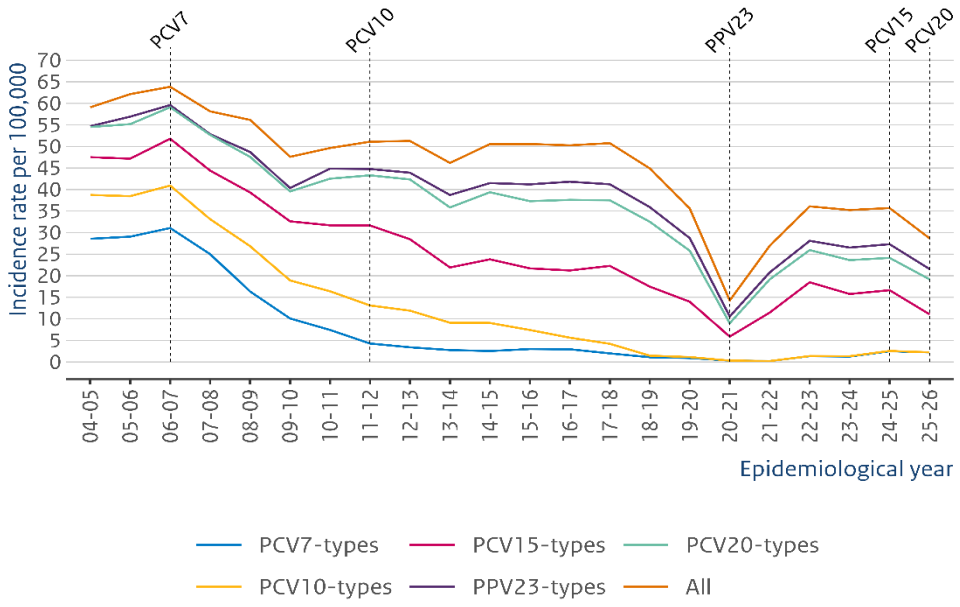
Sentinel surveillance data have been used and extrapolated to the Dutch population up until 2022–2023, after which national data were used. Only IPD cases based on pneumococcal detection in blood or CSF have been included. Dotted lines indicate year of vaccine introduction.

Figure 6.10.5 IPD Incidence in persons aged 50–64 years by vaccine serotype (PCV7 serotypes, PCV10 serotypes, PCV15 serotypes,), as well as all serotype IPD, presented by epidemiological year (e.g., 04–05 = June 2004–May 2005)



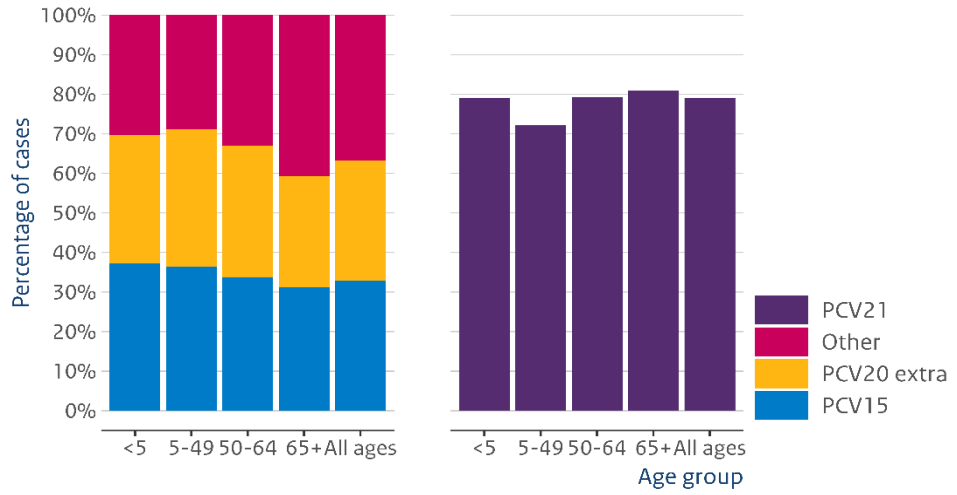
Sentinel surveillance data have been used and extrapolated to the Dutch population up until 2023, after which national data were used. Only IPD cases based on pneumococcal detection in blood or CSF have been included. Dotted lines indicate year of vaccine introduction.

Figure 6.10.6 IPD Incidence in persons aged 65 years and older, by vaccine serotype (PCV7 serotypes, PCV10 serotypes, PCV15 serotypes, PPV23 serotypes), as well as all serotype IPD, presented by epidemiological year (e.g., 04–05 = June 2004–May 2005)



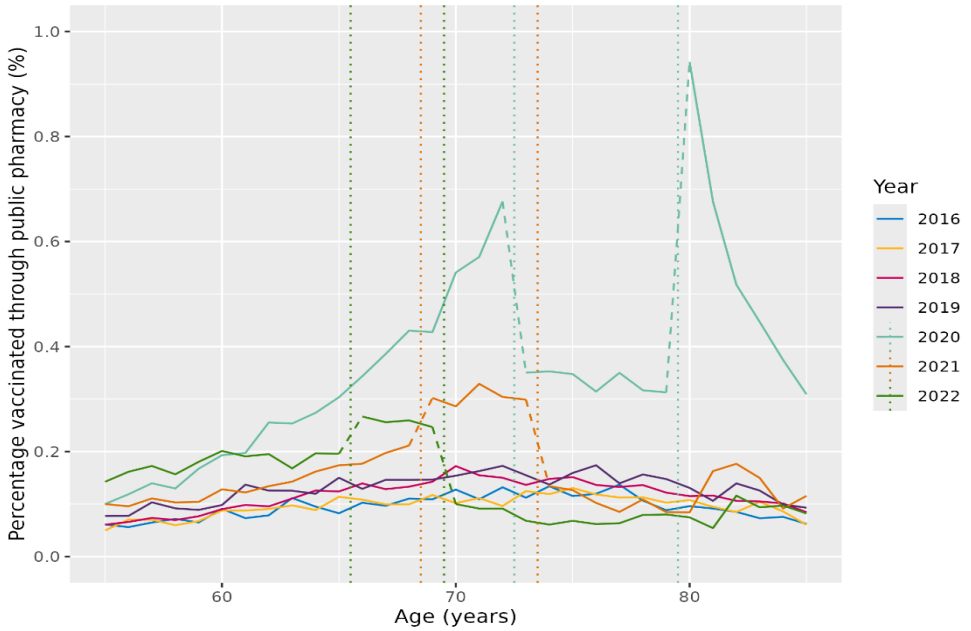
PPV23 was introduced in the autumn of 2020 for those born in 1941-1947, in the autumn of 2021 for those born in 1948-1952, in the autumn of 2022 for those born in 1953-1956, in the autumn of 2023 for those born in 1957-1960, and in the autumn of 2024 for those born in 1961-1964. Sentinel surveillance data have been used and extrapolated to the Dutch population up until 2023, after which national data were used. Only IPD cases based on pneumococcal detection in blood or CSF have been included. Dotted lines indicate year of vaccine introduction.

Figure 6.10.7 Percentage of IPD cases covered by the different vaccines in the different age groups for the epidemiological year 2025–2026.



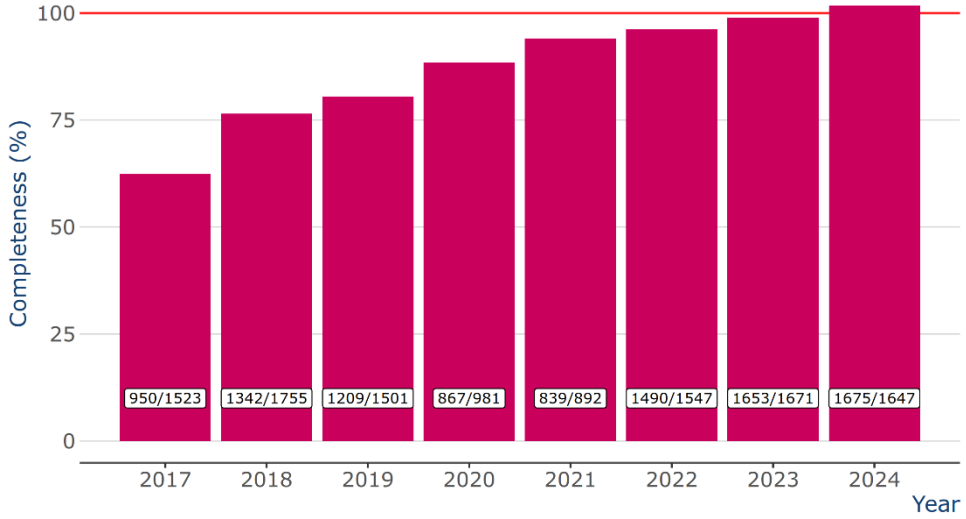
PCV15 coverage includes serotype 6A and serotype 6C, whilst PCV21 coverage includes 6C and 15B. Serotype 3 is excluded from PCV15/20/21 coverage (see Table 6.10.2). National surveillance data of IPD cases diagnosed from any normally sterile site have been used.

Figure 6.10.8 Graphical representation of the pneumococcal vaccine dispenses from public pharmacies (courtesy of Foundation for Pharmaceutical Statistics (SFK))



Vertical dotted lines indicate the eligible age groups for each year with the colour representing the year. Solid lines present the proportion of people who were vaccinated each year, whilst the dashed lines serve to connect the eligible and non-eligible age groups within the same year.

Figure 6.10.9 Completeness of pneumococcus isolate submissions to the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM), compared to data from the antibiotic susceptibility surveillance system ISIS-AR, calendar years 2017–2024



Please note that only isolates cultured from blood or cerebrospinal fluid were considered for this figure. The red horizontal line indicates 100% completeness. Completeness exceeds 100% if more isolates are received by NRLBM than included in ISIS-AR.

6.10.3 Epidemiology

6.10.3.1 Changes to the vaccination programme

In the autumn of 2024, the 15-valent pneumococcal conjugate vaccine (PCV15, see Table 6.10.2 for serotypes covered) replaced the 10-valent PCV10 in the National Immunisation Programme (NIP); PCV15 first replaced the booster dose resulting in combined schedules (two primary doses of PCV10 and a booster dose of PCV15), and from approximately January 2025 replaced all doses. The 23-valent pneumococcal polysaccharide vaccine (PPV23) was used within the National Programme Pneumococcal Vaccination (NPPV) from autumn 2020 to autumn 2024, where it was offered in a stepwise manner to people aged 60–79 years. In autumn 2025, PCV20 replaced PPV23 in the NPPV and is offered when people turn 60-years-old. Furthermore, people who were too old to be eligible for PPV23 in the NPPV (those born in 1940 or earlier) were now offered PCV20. People who were eligible for PPV23 earlier as part of the NPPV are now offered PCV20 five years after they have received PPV23.

6.10.3.2 Overall (Figure 6.10.1)

In 2025–2026, 1941 cases of invasive pneumococcal disease (IPD) were reported (10.8 per 100,000 population). Of these cases, 1887 had a positive blood or cerebrospinal fluid (CSF) sample (10.5 per 100,000), which is a decrease compared to 2024–2025 (n=2275; 12.6 per 100,000, Table 6.10.1). The overall IPD incidence (based on blood/CSF) has remained relatively stable between epi-years 2004–2005 and 2018–2019, with an average incidence of 15.2 per 100,000 (range: 13.3 to 16.9 per 100,000) per epi-year. Following a decrease in incidence during the COVID-19 pandemic, the incidence stabilised below the pre-pandemic average at ~12.4 per 100,000 during 2022–2023 to 2024–

2025. Since 2006, the incidence caused by serotypes included in PCV10 decreased over time following the introduction of PCV7 and PCV10 for children, with a temporary additional decrease observed during the COVID-19 pandemic. The overall incidence of PCV15 serotypes decreased from 5.9 per 100,000 in 2024–2025 to 4.2 per 100,000 in 2025–2026.

The ten most common serotypes in 2025–2026 were 8 (18% of all cases), 19A (13%), 3 (11%), 12F (8%), 4 (6%), 9N (5%), 14 (4%), 6C (4%), 22F (4%), and 23B (3%) (Figure 6.10.3). Compared to 2024–2025, serotypes 19A and 3 were slightly less common while serotype 8 was slightly more common. In 2025–2026, the increase in the percentage of IPD caused was highest for serotypes 12F (+5%), 4 (+4%) and 14 (+3%), while the largest decrease was observed for serotype 19A (from 16% to 13%). Out of the top ten serotypes, 19A, 22F, 4, 14, and 6C are covered by PCV15 (the latter through cross-protection [1, 6], see also Table 6.10.2), whereas serotypes 8 and 12F are covered by PCV20. Notably, serotypes 4 and 14 have been covered by the NIP since PCV7 was introduced in 2006–2007 but have increased over the past five years. For further details see paragraph 6.9.4.3. Overall, 33% of IPD cases were caused by serotypes covered by PCV15 (plus 6A), 63% by PCV20-types (plus 6C, minus serotype 3) and 73% by PCV21-types (Plus 6C and 15B, minus serotype 3) in 2025–2026 (Figure 6.10.7).

6.10.3.3 Children aged <5-years-old (Figure 6.10.3)

In 2025–2026, 39 IPD cases with a positive blood or CSF sample were reported among children aged <5-years-old, resulting in an incidence of 4.5 per 100,000 (Table 6.10.1). Furthermore, in six of the cases involving children aged <5-years-old, pneumococci were detected in normally sterile sites other than blood or CSF (overall IPD incidence 5.2 per 100,000). This was lower than in 2024–2025, when 74 cases (incidence 8.6 per 100,000) were reported, out of which 65 had positive blood or CSF samples.

Following the introduction of PCV7 in 2006 and the subsequent switch to PCV10 in 2011, the IPD incidence in children aged <5-years-old decreased and stabilised from 2015–2016 onwards, averaging 6.8 per 100,000 up to 2019–2020 (Figure 6.10.3). After a decrease during 2020–2021, the incidence increased above pre-pandemic levels (8–9 per 100,000, 2021–2024). In autumn 2024, PCV15 was introduced and the IPD incidence decreased to pre-pandemic levels in 2024–2025 (6.8 per 100,000). This decrease continued in 2025–2026, with 17 reported PCV15-type cases compared to 29 in 2024–2025. PCV10 serotypes remain rare in <5-year-olds with only three cases in 2025–2026. The preliminary effects of PCV15 implementation within infants are described in paragraph 6.9.3.8.

In 2025–2026, the most common serotype within this age group was serotype 19A (26%, n=11), which is covered by PCV15. Other common serotypes were 12F (12%, n=5) and 10A (9%, n=4), which are not covered by PCV15. Overall, PCV15 serotypes (including 6C, excluding serotype 3) caused 37% of IPD cases among children <5-years-old in 2025–2026 (Figure 6.10.7), which was slightly lower than in 2024–2025

(42%). Of the IPD cases in 2025–2026 with reported clinical presentation (n=41, 91%), three patients died (7%). Among the other patients, 13 (32%) suffered from meningitis with or without sepsis, 13 (32%) had reported sepsis and ten (23%) had pneumonia or empyema.

Of the 635 nationally reported IPD cases in children <5-years-old between June 2016 and May 2026, the mortality status was known for 79% (n=501). Out of these cases, 32 (6.4%) died of the infection. None of the deceased patients were infected with a PCV10 serotype and ten were infected with a PCV15 serotype, though only one was PCV15 eligible at the time of infection. The most common serotypes among deceased children were serotype 19A (22%, n=7), serotype 8 (19%, n=6), serotype 10A and 6C (both 13%, n=4). Of the 32 patients who died, 28 were <2-years-old, five of whom had known comorbidities (three were humoral/cellular immunosuppressed). In 2025–2026, three children <5-years-old died, none of whom were reported to be humoral/cellular immunosuppressed.

6.10.3.4 People aged 5–49 (Figure 6.10.4)

In 2025–2026, 299 IPD cases aged 5–49 years were reported nationally, 288 of which were based on detection of pneumococcus in blood or CSF samples and 11 based on detection in other material. This resulted in an overall incidence of 3.1 per 100,000 population (Table 6.10.1). When looking at trends over a longer time period (in blood or CSF samples), the estimated incidence in 2025–2026 (3.0 per 100,000) was slightly lower than 2024–2025 (3.4 per 100,000) and the pre-pandemic average (3.3 per 100,000, 2015–2019) (Figure 6.10.4). The incidence of IPD caused by PCV15 serotypes decreased slightly from 1.6 per 100,000 in 2024–2025 to 1.3 per 100,000 in 2025–2026, while the PCV10-type incidence remained the same as 2024–2025 at 0.6 per 100,000. The five most common serotypes among people aged 5–49 years in 2025–2026 were serotypes 8 (21%), 4 (12%), 19A (12%), 12F (9%), and 3 (8%). Compared to the previous epi-year, serotype 3 was less common (decreasing from 14% to 8%) while serotype 4 was slightly more common (increasing from 10% to 12%). Out of all cases in this age group, 36% were caused by serotypes covered by PCV15, 71% by PCV20-types and 67% by PCV21-types (Figure 6.10.7).

6.10.3.5 People aged 50–64 (Figure 6.10.5)

In 2025–2026, 493 IPD cases aged 50–64 years were reported nationally, 483 of which were based on pneumococcal detection in blood or CSF samples and 10 based on pneumococcal detection in other material. This resulted in an overall incidence of 13.4 per 100,000 population (Table 6.10.1), which was slightly lower than in 2024–2025 (14.7 per 100,000). When looking at trends over a longer time period (in blood or CSF samples), the estimated incidence for 2025–2026 (13.1 per 100,000) was lower than the pre-pandemic average (mean 17.8 per 100,000) (Figure 6.10.5). The incidence of PCV15-type IPD in this age group decreased from 6.8 per 100,000 in 2024–2025 to 5.4 per 100,000 in 2025–2026, while the PCV10-type incidence remained similar (1.6 and 1.7 per 100,000, respectively). The five most common serotypes were serotypes 8 (19%), 19A (12%), 3 (10%), 12F(9%) and 4 (8%). Compared to the previous epi-year, serotypes 19A and 3 were slightly less common (decreasing from 16% to 12% and 12% to 10%,

respectively), while serotypes 8, 12F and 4 were slightly more common (increasing from 16% to 19%, 7% to 9% and 6% to 8%, respectively). Out of all the cases in this age group, 34% were caused by serotypes covered by PCV15 (with 6C and without 3), 67% by PCV20-types (with 6C and without 3) and 75% (with 6C and 15B, without 3) by PCV21-types (Figure 6.10.7).

6.10.3.6 People aged 65 and older (Figure 6.10.6)

In 2025–2026, 1104 IPD cases in those aged 65 years and older were reported nationally (incidence 29.4 per 100,000 population), 1077 of which were based on pneumococcal detection in blood or CSF samples and 25 on pneumococcal detection in other material (Table 6.10.1). The incidence was lower than in 2024–2025 (1367, incidence 36.4 per 100,000). With the introduction of PPV23 vaccination in the autumn of 2020, the post-pandemic IPD incidence has been lower compared to pre-pandemic (2015–2019). The estimated incidence based on positive blood or CSF samples for 2025–2026 was 28.7 per 100,000, while the pre-pandemic average was 49.1 per 100,000. The PPV23-IPD incidence was lower in 2025–2026 (21.6 per 100,000) compared to both 2024–2025 (27.3 per 100,000) and pre-PPV23 introduction (average of 40.0 per 100,000 between the epi-years 2015–2016 and 2019–2020). In autumn 2025, PPV23 was replaced by PCV20 in the NPPV. The PCV20 type incidence was 19.2 in 2025–2026 compared to 24.1 in 2024–2025. The most common serotypes in 2025–2026 were 8 (17%), 19A (13%), 3 (12%), 12F (7%) and 9N (6%), with all except 9N being covered by PCV20 (though effectiveness against serotype 3 is probably low) [2]. Out of all the IPD in this age group, 31% of the cases were caused by serotypes covered by PCV15 (with 6C and without 3), 59% by PCV20-types (with 6C and without 3), and 74% by PCV21-types (with 6C and 15B, without 3; Figure 6.10.6).

According to the notification data, 75 (8%) out of the 948 IPD cases aged 65 years and over, that were diagnosed in 2025–2026 and had data on the outcome of the infection available, died because of the infection. This was comparable to 2024–2025 (9%). Out of the 1104 diagnosed IPD cases, 861 (78%) had information on comorbidity, of which 617 (72%) had known medical comorbidities. Of the 1104 IPD cases, 1032 were NPPV eligible at disease onset (94.0%). Vaccination status was available for 894 of these eligible cases (87%), of which 422 (47%) were reported to be NPPV vaccinated.

6.10.3.7 Vaccine failure after childhood vaccination

For PCVs in childhood vaccination, vaccine failure is defined as having a vaccine-type IPD diagnosis and having received two or more doses when aged <12 months or, if aged ≥12 months, having received the primary series and a booster dose or at least two doses beyond the age of 12 months and if aged ≥24 months, at least one dose beyond 24 months of age. In all of these cases, the last dose should have been given at least two weeks prior to disease onset. Since the introduction of PCV7, 76 cases of vaccine-type IPD have been reported among vaccine-eligible children, i.e., children born after 1 April 2006 and aged two months and older or born after 1 January 2020 and aged three months and over. Of the 76 eligible children with IPD, 41 were considered to be vaccine failures. Seven of these cases were humoral/cellular immunosuppressed.

The other 35 cases had not yet received two or more doses of the pneumococcal vaccine. Among the vaccine failures, serotype 14 was the most common (n=13, 32%).

Three vaccine failures occurred after the PCV schedule change in 2020 from 2, 4, 11 months to 3, 5, 11 months, in eligible children born after 2020. One case occurred in 2024–2025 in a non-humoral/non-cellular immunosuppressed child vaccinated with PCV10, which was caused by serotype 4. The other two occurred in 2025–2026 in children without comorbidities who were vaccinated with PCV15, both were caused by serotype 19A.

6.10.3.8 The initial effects of childhood vaccination with PCV15 against IPD
In September 2024, PCV10 was replaced by PCV15 in the NIP. First, the PCV15 only replaced the booster, with existing stocks of PCV10 continuing to be used for the primary series, until they were depleted around January 2025 after which PCV15 was given for the entire series. The incidence of IPD serotypes covered by PV15 but not by PCV10 in <2-year-olds was compared between two pre-implementation epi-years (2022–2023 and 2023–2024) and one post implementation epi-year (2025–2026). Because PCV15 was implemented halfway through 2024–2025, it was left out of the comparison.

The overall IPD incidence in <2-year-olds during the pre-implementation period was 33.4 per 100,000. For PCV15-non-PCV10-types, the incidence was 20.8 and 12.3 for non-PCV15-types. In the post-implementation period, the overall IPD incidence was 22.3 per 100,000. The incidence of PCV15-non-PCV10-types was lower at 8.5 while the incidence of non-PCV15-types was more similar at 13.8. Out of the PCV15-non-PCV10-type cases, 22% (n=8) were PCV15 eligible and had a PCV15 serotype. As described in the previous paragraph, there were two PCV15 vaccine failures during the post-implementation period. While it is too early to fully attribute the decrease in PCV15-non-PCV10 IPD cases to the introduction of PCV15, it suggests a positive preliminary effect. These preliminary results have also been shared internationally[5].

6.10.3.9 The preliminary impact of PCV20 in the National Programme Pneumococcal Vaccination (NPPV) among older adults
The preliminary impact of PCV20 in older adults has been described in more detail in the RIVM letter report 'Pneumococcal vaccination in older adults; Updated information for the Health Council of the Netherlands' [6]. In short, the proportion of PCV20-type IPD was determined for those who were offered PCV20 but not PPV23 due to their older age (i.e., those aged 85 in 2025), for the winter period (November 2025–March 2026). This was then compared with the same period and same age group during the epidemiological years 2023–2024 and 2024–2025. After PCV20 implementation, 48% of the IPD cases aged 85 and over were caused by a PCV20 serotype, while this was 59% in the two years prior to its implementation. As a point of comparison, during the same periods, 60% and 58% PCV20-IPD, respectively, was observed amongst 74–78-year-olds, i.e., those who were previously eligible for PPV23 but not yet eligible for PCV20. The fact that the percentage PCV20-IPD remained stable in the non-eligible age-group suggests that the

decrease observed among those aged 85 and older is due to the introduction of PCV20. Furthermore, it suggests that if childhood vaccination with PCV15 has already induced any indirect protection in older adults, the effect of it still seems relatively small.

The impact of PPV23 in the NPPV that began in the autumn of 2020 has been evaluated previously using the Regression Discontinuity design [7, 8]. This is an efficient method to evaluate a programme that follows an age-bound roll-out. However, an important assumption of this method is that those not eligible for the programme are not affected by it. We have used dispensing data from public pharmacies to corroborate these analyses (Figure 6.10.8). The analysis demonstrated that private pneumococcal vaccine dispenses occurred mostly in the first year that the NPPV began, particularly in age groups adjacent to the eligible age group. The highest percentage (0.9%) of private pneumococcal vaccine dispenses amongst the population was in those aged 80 in 2020, that is, during the first year of the NPPV when vaccination was offered to those aged 73–79 years. In both 2020 and 2021, the increase in dispenses in non-eligible age groups mainly involved PPV23, whereas in 2022 the increase was caused by a higher number of PCV13 dispenses. Starting a public vaccination campaign might thus have resulted in increased vaccination of individuals in other age groups than the eligible ones. At the population level, however, private vaccine dispenses were minimal. In 2020, 0.3% of the non-eligible age groups who were aged 55–85 years in 2020 were dispensed a pneumococcal vaccine from a private pharmacy, and 0.1% in 2021 and 2022, compared to 0.1% overall in 2019 *(courtesy of Foundation for Pharmaceutical Statistics (SFK))*. These results are reassuring that the Regression Discontinuity design was an appropriate method for the evaluation of the PPV23 programme. An increase in pneumococcal vaccine dispensations (primarily PPV23) via public pharmacies was also observed in eligible patients, for which we do not have a clear explanation.

6.10.4 Current/ongoing research

6.10.4.1 Completeness of isolate submission

As described for *Haemophilus influenzae* and meningococcus, we also evaluated the completeness of pneumococcal isolate submissions to the NRLBM for the period 2017–2023. We compared the number of isolates submitted to NRLBM with the number of isolates reported in ISIS-AR, the national surveillance system for antimicrobial susceptibility testing (for methods, see Appendix 1). In 2017, pneumococcal laboratory surveillance switched from a sentinel system covering ~25% of the population to national, comprehensive surveillance. In 2023, the surveillance was broadened from pneumococcal isolates identified in blood or CSF to isolates from all normally sterile sites. During the study period, the completeness of isolate-submissions from blood and CSF increased from 58% in 2017 to 98% in 2024 (Figure 6.10.9). Submission of isolates from all normally sterile sites was 95% in 2023 and 2024. Viewed together, this indicates that laboratories quickly adapted to the new surveillance requirements and that the completeness of isolate submissions to NRLBM is very high in recent years.

6.10.4.2 PCV20 as booster after PPV23 primary vaccination

In a subset of the Doetinchem study, the immune response after PCV20 vaccination in the NPPV was determined in individuals aged 78–84 years, who were vaccinated with PPV23 in autumn 2020 [9, 10]. The results are reported in the RIVM letter report 2026-0051 'Pneumococcal vaccination in older adults; Updated information for the Health Council of the Netherlands' [6]. In short, the response to PCV20 after PPV23 showed considerable variation between individuals. One month after PCV20, 61% had antibody concentrations above the threshold for protection (1.3 ug/ml), for 70% of the vaccine serotypes. 31% of the participants showed a booster response, which is defined as having reached the threshold for protection in combination with an observed two--fold or higher increase in antibody titer pre- versus post-PCV20 vaccination for at least 70% of the PCV20 serotypes. PCV20 booster non-responsiveness of older adults was associated with high IgG antibody concentrations pre-vaccination.

6.10.4.3 Genetic diversity of the serotype 4 IPD in the Netherlands, Belgium, and the UK

While serotype 4 is covered by the vaccines that have been used in the NIP, an increase in its incidence in people who are older than those vaccinated in the NIP has been observed in the Netherlands for several years (see Figure 6.10.3 and [11]). A similar increase was observed in, among others, Belgium and the UK. We therefore compared whole genome sequencing (WGS) data of serotype 4 IPD for the period July 2017–June 2024 (n=926) [12]. For the Netherlands, WGS data were available for the years 2019 and 2021–2023. Global Pneumococcal Sequence Clusters (GPSCs) and sequence types (STs) were determined, and a more refined phylogenetic analysis was done for GPSC162. In total, eight distinct GPSCs were found; GPSC162 dominated (89%). GPSC162 includes ST 15063 and 801 and was already observed in England and the Netherlands prior to 2020 but increased in frequency in 2021–2022. Four out of the ten observed clades were only found in the UK (with the exception of one Dutch isolate); the other six shared isolates between countries. Overall, the results indicate that the increase is driven by multiple geographically distinct sub-lineages rather than by one successful clone. Interestingly, Spain has also recently reported an increase in serotype 4 IPD amongst adults, caused by ST 15063 [13].

6.10.5 (Inter)national developments

In addition to the vaccines listed in Chapter 9 of this report, a detailed overview of the new pneumococcal vaccines currently in development can be found in the RIVM letter report 'Pneumococcal vaccination in older adults; Updated information for the Health Council of the Netherlands' [6].

6.10.5.1 Extended registration of PCV21

In April 2026, the EMA extended the registration for PCV21 to also include children aged 2–17 years who have been vaccinated against pneumococcus through a NIP [14]. In Dutch children aged 2–17 years, 76% of IPD in epi-year 2025–2026 was caused by PCV21-non-PCV10 types and 53% was caused by PCV21-non-PCV15 types. As PCV21 covers 11 serotypes that were not present in previous PCVs, vaccination of PCV21 additional to the NIP will provide broader protection against

IPD. This could be especially relevant for children belonging to medical risk groups. A study in France compared the serotype distributions of children under 15-years-old, both with and without underlying medical conditions [15]. They found that serotypes covered by PCV13 less often caused IPD in children with underlying conditions compared to those without (17% vs 26% of all IPD in those groups) while non-PCV20 types were more common (50% vs 41%). The PCV21 serotypes covered 80% and 78% of cases, respectively. The presented differences were primarily found in either immunocompromised children or those with sickle cell disease.

6.10.5.2 PCV20 vaccine effectiveness in older adults

A retrospective cohort study from the US, where PCV20 has been recommended for adults aged 65 years and older since 2021, reported the vaccine effectiveness of PCV20 in Medicare beneficiaries in this age group against all-serotype IPD, pneumonia and lower respiratory tract infections. They compared PCV20 vaccinees to individuals who had not received PCV20, and also did not receive PPV23 within two years, PCV13 within five years, or PCV15 at any time prior to the start of the observation period [16]. The study included cases of IPD, (pneumococcal) pneumonia, and lower respiratory tract infections diagnosed between July 2022 and June 2024. A hazard ratio was estimated with Cox regression, from which a VE was calculated. In order to address potential confounding, inverse probability of treatment weighting (IPTW) was used, thereby statistically balancing the baseline characteristics between the vaccinees and the unvaccinated cohort. From the 16.5 million included individuals, 12.2% received PCV20 and 14606 IPD events were reported during the study period. An overall VE of 25.6% (95%C.I. 17·4 to 33·0) was found against all-serotype IPD. The VE decreased with age: 35.4% (95% C.I. 22.6 to 46.0) in 65–74 year-olds, 24.0% (10.7 to 35.3) in 75–84-year-olds, and 16.6% (-1.4 to 31.4) in those aged 85 and older. The estimated VE against IPD in immunocompromised patients was 25.0% (C.I. 13.0 to 35.3) and 22.6% (C.I. 9.8 to 33.6) in those with chronic medical conditions.

6.10.5.3 Interaction between RSV immunisation and IPD

Early observations point towards impact of RSV prevention on IPD among infants. A French register-based cohort study published in The Lancet Infectious Diseases showed that immunisation with nirsevimab (anti-RSV monoclonal antibodies) was associated with a 36% reduction in the risk of hospitalisation for IPD, six months post-immunisation (OR 0.64, 95% C.I. 0.46–0.82) [17]. Considering the association between RSV and (secondary) pneumococcal infection, it is biologically plausible that RSV prevention would has an impact on pneumococcal disease [18, 19]. A study from England using a regression discontinuity design did not show any effect of RSV vaccination on IPD in older adults [20].

6.10.5.4 Welding as a risk factor in IPD shipyard outbreaks

Through May and early June 2025 an outbreak of pneumococcal disease occurred among shipyard workers in Finland [21]. This was the third shipyard outbreak reported in Finland in recent years, with the previous ones occurring in 2019 and 2023 [22, 23]. The isolates were predominantly serotype 4 and were genomically related to those from the previous outbreaks. Using a case-control design, performing welding

tasks was found to be a risk factor for contracting pneumococcal disease during this outbreak. Exposure to metal fumes and crowding has previously been described as a risk factor for IPD [24]. In a systematic review of six European shipyard outbreaks that occurred between 2015 and 2025, ~45% of cases were exposed to welding fumes through their daily work and ~80% of the shipyard workers shared accommodation [25]. In a few European countries pneumococcal vaccination has been recommended for occupations that are exposed to metal fumes [25]. Most recently, Austria adapted their recommendation to using PCV21 for risk groups to include exposure to metal fumes [26].

6.10.5.5 Evaluation of PCV20 immunisation schedules in infants

A study conducted by Pfizer evaluated the immunogenicity of PCV20 in infants for both a 3+1 and a 2+1 schedule [28]. The results were based on two clinical trials. The 2+1 schedule trial included 951 healthy infants who received either PCV13 or PCV20 in a 2, 3, 11–12 month or a 3, 5, 11–12 month schedule. The 3+1 schedule trial included 1182 healthy infants who received either PCV13 or PCV20 in a 2, 4, 5, 12–15 month schedule. Serotype specific IgG geometric mean titres (GMCs) were analysed to assess immunogenicity. The 2+1 schedule was found to elicit similar booster responses compared to the 3+1 schedule, with higher responses being observed in the 3, 5, 11–12 month schedule. The percentage of participants who met the pre-defined serotype specific GMCs differed per serotype for PCV20, with the highest being serotype 8 at 97.9% and the lowest being serotype 6B at 27.1%. These percentages for PCV13 serotypes were generally lower in the PCV20 group than the PCV13 group.

6.10.6 Literature

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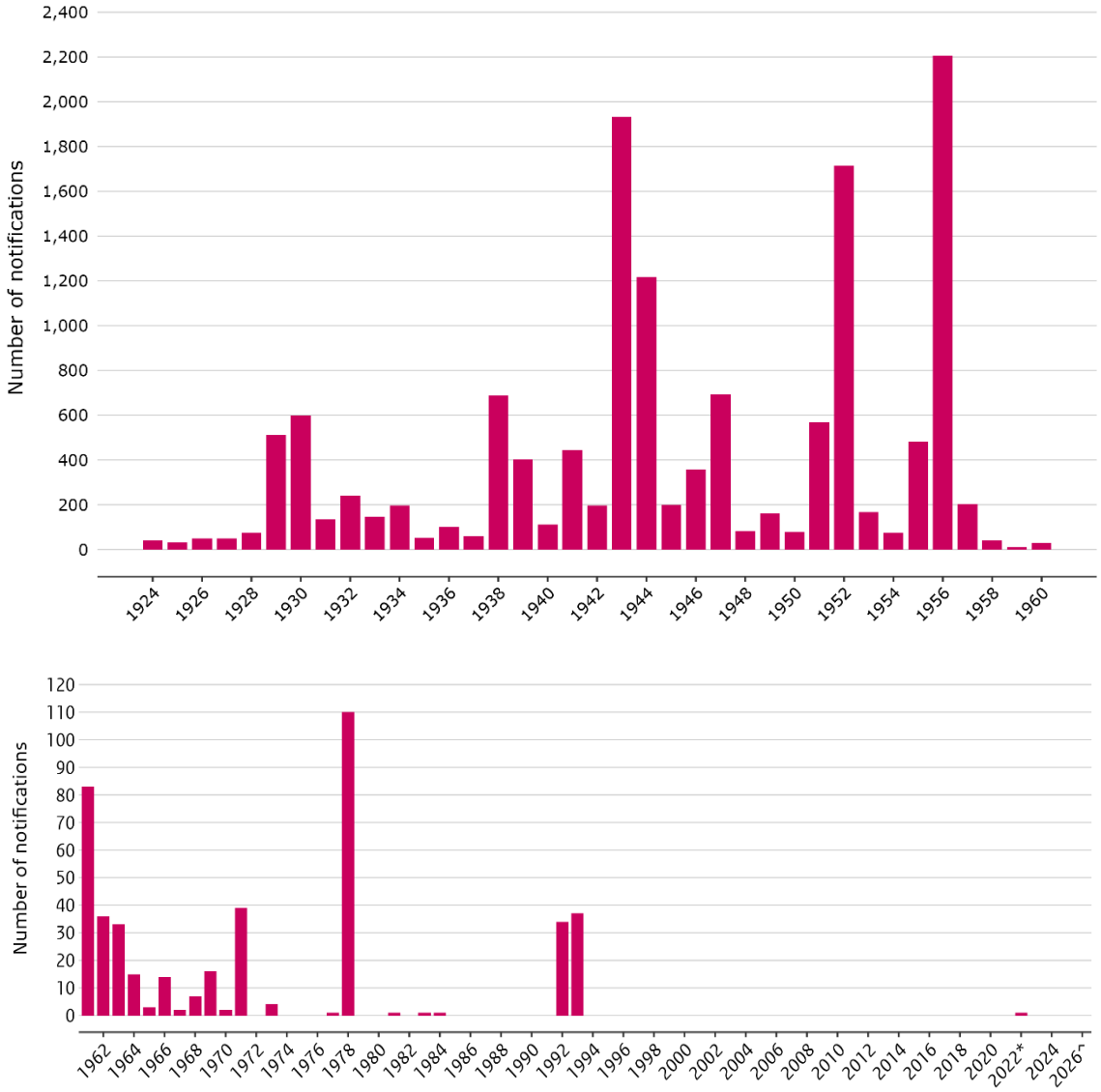
6.11 Poliomyelitis

6.11.1 Key points

- Since 1994, no cases of poliomyelitis have been reported in the Netherlands.
- Enterovirus (EV) surveillance in the Netherlands showed that in 96% of the total stool samples analysed in 2025, poliovirus was shown to be absent. From the remaining 4%, the majority was either not typed or had an invalid test result.
- The percentage of EV-positive stool samples in which poliovirus was excluded by the detection of non-polio EVs increased from 63% in 2024 to 65% in 2025. From the remaining 35% samples in 2025, the majority were not typed and therefore, no non-polio EV could be demonstrated.
- No poliovirus was detected in any sample of the EV-surveillance.
- Afghanistan and Pakistan remained polio-endemic countries in 2025 and 2026 up to and including 20 April.
- As was the case in 2024, cVDPV2 detections in sewage samples were reported by Germany, Poland, and the United Kingdom (UK) in 2025 and in the UK again in March 2026.
- WPV1 was detected by routine environmental surveillance in Germany in October 2025.
- No poliomyelitis cases were reported in these three countries and no cVDPV2 or WPV1 were detected in the Netherlands in 2025 and 2026 up to and including April.
- From 2025 onwards, vaccination doses for polio are provided at the ages of two, three, five, and 12 months and 14 years rather than at two, three, five, and 11 months, four years, and nine years.

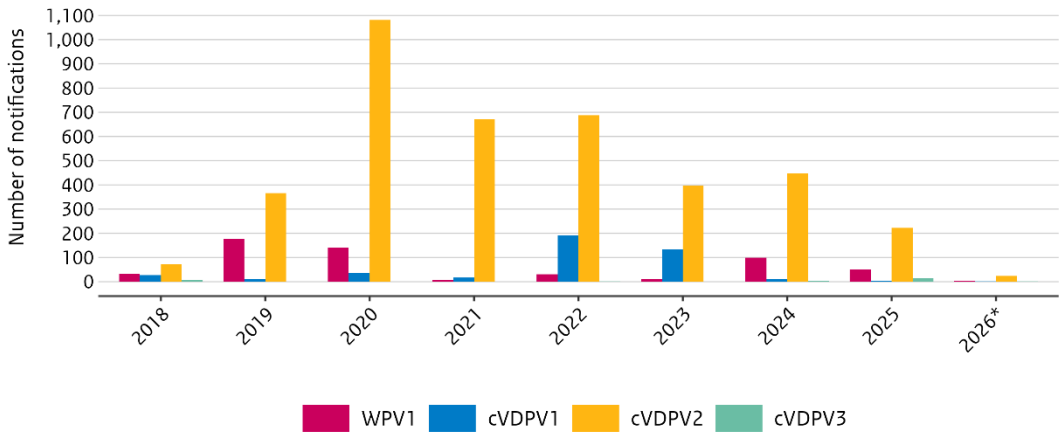
6.11.2 *Tables and figures*

Figure 6.11.1 Notifications of poliomyelitis (acute flaccid paralysis cases and other severe symptoms) in the Netherlands from 1924–1960 (above) and 1961–2026 (below)



* Asymptomatic poliovirus infection
^ Up to and including 20 April

Figure 6.11.2 Total number of global polio cases from 2018 to 2026 as reported to WHO (Vaccine-derived Poliovirus and Wild Poliovirus)



* up to and including 20 April

6.11.3 Epidemiology and pathogen

6.11.3.1 Epidemiology

In 2025 and 2026 up to and including 20 April, no cases of poliomyelitis were reported in the Netherlands.

6.11.3.2 Polio-free status

In 2002, the World Health Organization European Region (WHO EU) was declared wild poliovirus (WPV)-free. Until all six WHO regions have been declared poliovirus-free, establishing and/or maintaining high vaccination coverage and performing high-sensitive surveillance of polio cases is of critical importance. For countries with a strong healthcare system, high levels of sanitation, and a prolonged period of non-endemicity, such as the Netherlands, other surveillance strategies, including enterovirus and environmental surveillance, are also approved. In the Dutch context, specific vulnerabilities for maintaining the polio-free status persist. These include the presence of polio vaccine production facilities with a risk of inadvertent poliovirus shedding and geographically clustered communities with low vaccination coverage for religious reasons in the 'Bible Belt'.

6.11.3.3 Enterovirus surveillance

Nationwide coverage of enterovirus (EV) surveillance was achieved in 2025. Data was received from 30 virological diagnostic laboratories. Nine of these laboratories also tested samples from 12 other laboratories, resulting in data from a total of 42 laboratories across the country. One laboratory did not submit any data. In total, 10,974 stool samples were tested for the presence of EV in order to exclude poliovirus presence. This yielded 796 EV positives, resulting in an EV positivity rate of 7.3% [1]. According to the Global Polio Laboratory Network, an effective EV surveillance system detects between 5% and 25% of enteroviruses within all stool samples tested annually. Exclusion of poliovirus presence on the basis of EV surveillance can be defined at two levels: the percentage of stool samples for which the presence of poliovirus is excluded and the percentage of EV-positive samples for

which the presence of poliovirus is excluded. Poliovirus in EV-positive samples is excluded by the detection of non-polio EVs through sample sequencing. In 96% (10,581/10,974) of the total stool samples analysed in 2025, poliovirus was shown to be absent. From the remaining 4%, the majority were either not typed or had an invalid test result. Poliovirus presence was excluded in 65% (515/796) of EV-positive stools [1]. This percentage is slightly higher than in 2024 (63%) [2]. Of the remaining 35% samples in 2025, the majority were not typed and therefore, no non-polio EV could be demonstrated. However, no poliovirus was detected within any sample. An increase in the number of EV-positive stools for which poliovirus is excluded may be achieved only if poliovirus exclusion in all EV-positive stool samples was mandatory or if laboratories are offered financial compensation for contributing to EV surveillance [1].

6.11.3.4 Environmental surveillance

Environmental surveillance for poliovirus has been in place in the Netherlands since 1997 and, in combination with the system for EV surveillance, has provided clear documentation on the absence of poliovirus circulation in the country over the years. In 2025, all of the 122 analysed sewage samples from residential areas and school sites tested negative for poliovirus. All of the 65 sewage samples at Polio Essential Facility (PEF) premises also tested negative for infectious poliovirus. In response to the detection of circulating Vaccine Derived Polio Virus type 2 (cVDPV2) in wastewater samples in different European countries in 2024 [3], and the recognition of decreased vaccination coverage in larger Dutch cities [4], additional environmental surveillance was carried out in 2024 and January 2025. In January 2025, a total of 19 samples were collected from sewage treatment plants (STPs) in Amsterdam (two sites), The Hague (2), Rotterdam (4), and Utrecht (1). Two of these samples tested positive for poliovirus and were further characterised as recombinants of Sabin-like polioviruses (SLPV) type 3 and type 1. The poliovirus protein 1 (VP1) region contained five mutations and one mutation, respectively, compared to SLPV3. SLPV1 and SLPV3 strains are classified as vaccine-derived polioviruses (VDPVs) when more than nine mutations have accumulated in VP1 [5]. The next sample, collected in March 2025, tested negative for polioviruses, thus indicating that there was no ongoing shedding or transmission in the monitored population.

6.11.4 Current/ongoing research

The National Polio Laboratory (NPL) at RIVM is also a WHO Global Specialized Laboratory (GSL). It participates in several projects run by the WHO Global Polio Laboratory Network (GPLN), including the development of sensitive methods for direct poliovirus detection within clinical samples and the feasibility of Next-Generation Sequencing methods to detect poliovirus sequences in clinical samples, sewage samples, and samples from immunocompromised children. Between November 2024 and July 2025, an increased number of acute flaccid paralysis (AFP) cases were reported in Gaza. Stool samples were analysed at the NPL in Jordan and poliovirus was excluded in all samples (n=61). At the NPL in the Netherlands, samples from 20 unique AFP patients from Gaza were further analysed; enterovirus EV-B75 was detected in four of these patients, whilst in the remaining sixteen cases

no specific causative agent could be identified. In addition, medical microbiologists were asked to send stool samples from recently arrived Gazan medical evacuees aged under 18 years immediately after hospital admission to RIVM in 2025. These were analysed for the presence of polioviruses, in order to avoid potential spread. None of the analysed samples tested positive for poliovirus.

RIVM was involved in a Sero-surveillance study that examined both whether and to what extent type-specific antibodies against various enteroviruses, including poliovirus, can cross-neutralise other recently circulating enteroviruses. It found that poliovirus-specific antibodies did not neutralise any non-polio enteroviruses [6].

In accordance with the Health Council's advice to implement changes within the National Immunisation Programme (NIP) vaccination schedule, vaccination doses for polio are given at the ages of two, three, five, and 12 months and 14 years rather than the ages of two, three, five, and 11 months, four years and nine years from January 2025 onwards.

6.11.5 (Inter)national developments

Endemic countries—Afghanistan and Pakistan—have never stopped the transmission of indigenous wild poliovirus. As was the case in 2024, polio remained endemic in only these two countries in 2025 and 2026 up to and including 20 April. In 2025, the number of cases in both Afghanistan (n=21) and Pakistan (n=31) remained at relatively high levels compared to 2021–2023, but decreased again compared to 2024 (Figure 6.11.2). In the environmental surveillance, lower levels of WPV1 were detected in Afghanistan in 2025 compared to 2024, but slightly higher levels in Pakistan. Moreover, WPV1 was detected by routine environmental surveillance in Germany in October 2025. Whole genome sequencing (WGS) showed that the isolate is related to a sample that was collected by environmental surveillance in Afghanistan in August 2025. This detection underscores the risk of importation of WPV within the EU as long as WPV is not eradicated worldwide. No poliomyelitis cases were reported in Germany in 2025.

As of 20 April 2026, the global number of cVDPV2 cases was 222 in 2025, compared to 448 in 2024 (Figure 6.11.2). However, the number of identified cases in 2025 might still increase, as was the case in 2024, when 297/448 cases were identified in May 2025. Most cVDPV2 cases in 2025 were reported by Nigeria (n=66), Ethiopia (n=40), Chad (n=31), and Yemen (30). As in 2024, cVDPV2 was again detected in sewage samples from Germany, Poland, and the UK in 2025, and in March 2026 in the UK (as of 20 April 2026). In Germany, cVDPV2 continued to be detected up to and including October 2025 (as of 20 April 2026), thus suggesting some degree of local transmission of cVDPV2 besides multiple separate introductions. No poliomyelitis cases were reported in these countries in 2025 and 2026 up to and including 20 April.

6.11.6 Literature

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*publication with RIVM authors

6.12 Respiratory Syncytial Virus

6.12.1 Key points

- In 2025–2026, the peak in respiratory syncytial virus (RSV) laboratory detections was in week 6, which is later than in previous years. Furthermore, the circulation of RSV appeared to be somewhat lower in this season compared to previous seasons.
- In 2025–2026, 87 children <1-year-old were admitted to the pediatric intensive care unit (PICU) with RSV, which was 53–61% lower than in 2022–2023 and 2024–2025 (184 and 222, respectively). This decrease can at least in part be ascribed to the implementation of RSV immunisation in September 2025.
- The effectiveness of RSV immunisation was estimated at 82% (95% CI: 56–93%) against RSV-associated hospitalisations in a preliminary analysis of the Dutch ERIN-study.
- Sequencing of a respiratory sample of 19 children hospitalised for RSV (from the ERIN-study) showed in one RSV-B sample a substitution (K68E) that is known to be associated with decreased sensitivity to nirsevimab. The child associated with this sample was immunised with nirsevimab.
- In the BRICK-2 study, 34% (28/83) of children admitted to the PICU with RSV were ≤14 days old at admission. In the ERIN study, 35% (12/34) of children born during the RSV season and admitted to the hospital with RSV were ≤14 days old at symptom onset. Earlier administration of RSV immunisation could prevent some of these cases.

6.12.2 *Tables and figures*

Figure 6.12.1 Weekly number of RSV detections reported through the weekly virological surveillance, the Netherlands, 2023–2024, 2024–2025 and 2025–2026

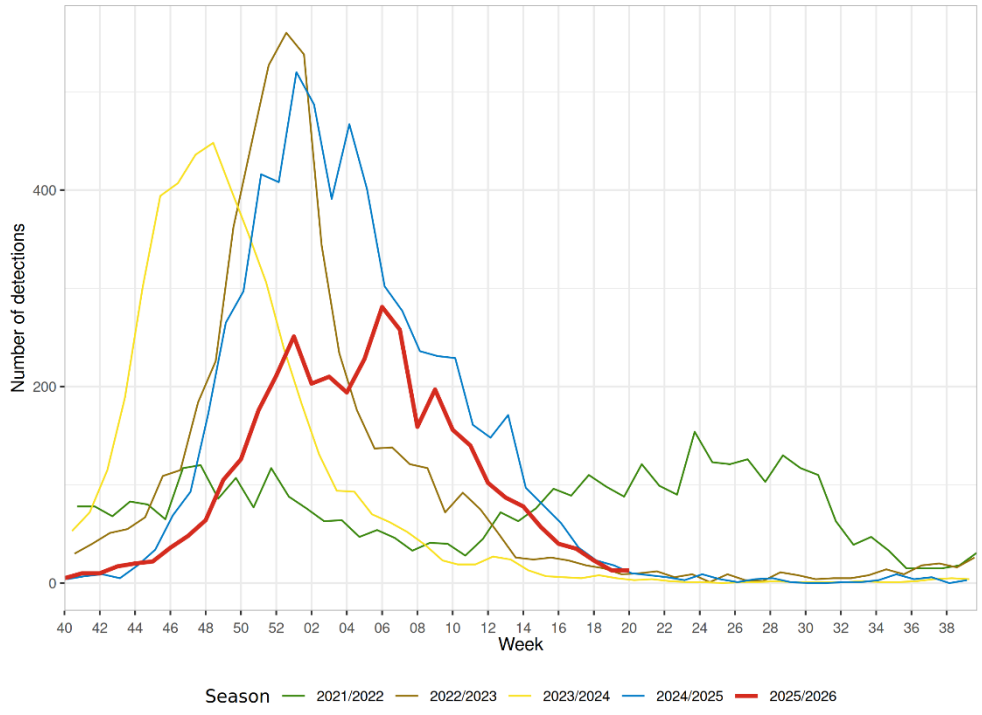
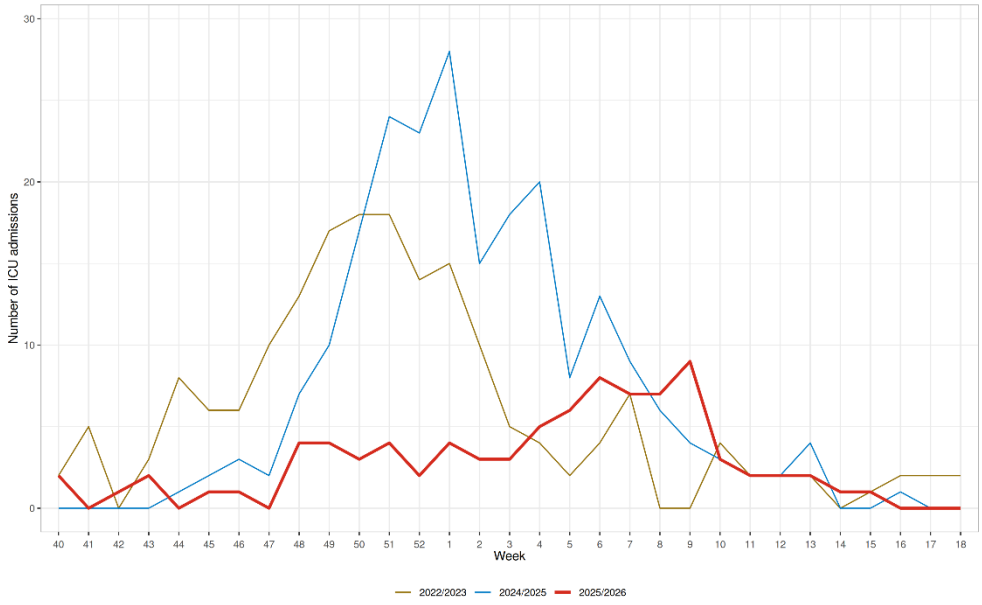
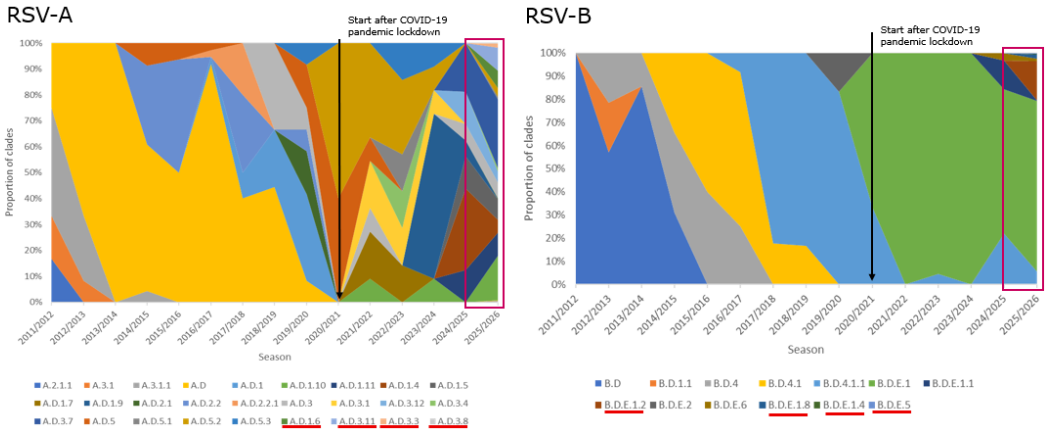


Figure 6.12.2 Number of children <1-year-old admitted to a pediatric intensive care unit with RSV by week of admission, the Netherlands, 2022–2023, 2024–2025 and 2025–2026



Source: data from all Dutch paediatric intensive care units, collected by the UMC Utrecht

Figure 6.12.3 Clade distribution of RSV by epidemiological year, the Netherlands, 2011–2026



The panels show the circulating clades per season for both RSV-A (left panel) and RSV-B (right panel) both prior to and after the non-pharmaceutical interventions implemented during the COVID-19 pandemic (indicated by the black arrow). The most recent season and the most recently emerged clades are indicated by the red rectangle and red lines, respectively.

6.12.3 Epidemiology and pathogen

6.12.3.1 Implementation of RSV immunisation

In September 2025, RSV immunisation with the monoclonal antibody nirsevimab was implemented within the NIP in the Netherlands. Children born during the RSV season, i.e., October 2025 to March 2026, were offered immunisation within 14 days after birth. Children born prior to the RSV season, i.e., April to September 2025, were offered immunisation between 8 September and 22 October 2025.

6.12.3.2 RSV circulation

In the respiratory season in 2025–2026, the peak in RSV laboratory detections was in week 6 according to the weekly virological surveillance of RSV (Figure 6.12.1). This was later than in previous years, where the peak was usually around week 1. The percentage of samples testing positive for RSV both among patients visiting their general practitioner (GP) (NIVEL sentinel surveillance) and participants of *Infectieradar* was lower in the 2025–2026 season than in previous seasons. This is likely not related to the implementation of RSV immunisation, because these surveillance sources hardly contain children <1-year-old and RSV immunisation of infants is not expected to exhibit indirect effects within unimmunised populations. Both RSV-A and RSV-B co-circulated throughout the RSV season 2025–2026. For further information on the circulation of RSV in the Netherlands, please refer to the following webpage: Surveillance of respiratory infections - RSV.

6.12.3.3 Impact of RSV immunisation

During the respiratory season 2025–2026, 87 children <1-year-old were admitted to the paediatric intensive care unit (PICU) with RSV (Figure 6.12.2). This was 53% and 61% lower than in 2022–2023 and 2024–2025, in which 184 and 222 children with RSV were admitted, respectively.

In 2025–2026, week 40-15, the incidence of GP consultations for bronchiolitis (ICPC code R78) in children <1-year-old was 4,111 per 100,000 (Nivel Primary Care Database). This was 17–31% lower than in previous seasons in the same period in which 4,951–5,993 per 100,000 consultations were reported (since 2016–2017 excluding the COVID-19 pandemic seasons in 2019–2020 to 2022–2023). A period of eight weeks was used to define a new episode. Please note that bronchiolitis could be caused by other pathogens than RSV. Testing for RSV is generally not recommended at the GP level. This study has been approved according to the governance code of Nivel Primary Care Database, under number NZR-00326.014.

The decreases described above can at least partly be ascribed to the implementation of RSV immunisation. Circulation of RSV also appeared to be somewhat lower in 2025–2026 compared to previous seasons, so part of the decreases could also be ascribed to lower circulation.

6.12.3.4 Genetic diversity

In order to gain insight into genetic diversity, genetic drift and antigenic evolution, which are potentially related to vaccination or immunisation, RSV-positive samples that are voluntarily sent in by microbiology laboratories throughout the country are collected and sequenced in addition to RSV-positive specimens from GP surveillance (Nivel sentinel surveillance) and participatory community surveillance (*infectieradar*). Figure 6.12.3 shows the genetic diversity of RSV-A and RSV-B during the respiratory seasons 2011–2012 up until 2025–2026 in the Netherlands. The genetic diversity of RSV-A clearly increased following the COVID-19 pandemic. RSV-B appears to have been less affected, albeit new clades have emerged within the past two seasons (2024–2025 and 2025–2026). These trends have also been observed by others around the globe but are yet to be fully elucidated. Notably, no substitutions associated with decreased sensitivity to nirsevimab have been observed within the surveillance samples during the first season after its introduction in the Netherlands (season 2025–2026).

6.12.4 Current/ongoing research

6.12.4.1 Effectiveness of RSV immunisation against hospital admission

The ERIN study assesses the effectiveness of RSV immunisation against RSV-associated hospitalisation among children <1-year-old over three respiratory seasons. It is a test-negative case control study in ten Dutch hospitals including children <1-year-old who are hospitalised because of a severe acute respiratory infection (SARI) and are eligible for RSV immunisation (born from April 2025). Immunisation status is compared between children testing positive for RSV (cases) and children testing negative for RSV (controls). In a preliminary analysis, 135 children hospitalised during the 2025–2026 season were included of whom 57 (42%) tested positive and 78 (58%) tested negative for RSV. Out of the RSV-positive cases, 27 (47%) children had received RSV immunisation at least two days prior to symptom onset, compared to 61 (78%) children in the RSV-negative controls. The latter is comparable to the coverage of RSV immunisation in the Netherlands of 77% (see Chapter 2.3). Among children born during the RSV season (n=62), 12 of the 34 RSV-positive cases (35%) had symptom onset within 14 days after birth, of which one was immunised. After adjustment by age at

symptom onset, date of symptom onset and prematurity, the effectiveness of RSV immunisation was estimated at 82% (95% CI: 56–93%). Effectiveness did not differ either by age group at immunisation or by time between symptom onset and immunisation, albeit the estimates were uncertain due to the limited number of children included in the study.

Whole genome sequencing has been carried out in 19 respiratory samples of RSV-positive participants thus far within the ERIN study. From these sequenced samples, 11 were typed as RSV-A and eight as RSV-B. In eight of these 11 RSV-A samples, one, two or three substitutions were observed, with nine different substitutions observed overall. However, none of these substitutions are known to be associated with decreased sensitivity to nirsevimab, nor are they located within the antigenic site targeted by this monoclonal antibody. In seven of the eight RSV-B samples, one or four substitutions were observed, with five different substitutions observed in total. One of these substitutions (K68E) is known to be associated with resistance to nirsevimab within RSV-B strains and has been reported in various previous international studies [1–3], including one studying the real-world emergence of nirsevimab resistance within RSV-B breakthrough infections [2]. The K68E substitution was observed in only one sample, and the child who was associated with this sample was immunised with nirsevimab.

6.12.4.2 Determinants of RSV immunisation uptake

In order to assess Behavioural and Social Drivers (BeSD) influencing RSV immunisation uptake, a questionnaire was administered to 1,139 women who were recruited through a test panel of pregnant women. The questionnaire was developed in accordance with the BeSD model of the WHO. Out of all the respondents, 519 had a child born in April–September 2025 (eligible for catch-up RSV immunisation), 152 had a child born in October–December 2025 (eligible for seasonal RSV immunisation), and 468 pregnant women whose due date was up until March 2026 (eligible for seasonal RSV immunisation). The education level of the participants was higher than among the general Dutch population (69% were of a high education level). Among the 671 women who had a child born in April–December 2025, 89% of their children received an RSV immunisation. Of the 468 pregnant women, 84% intended to have their child receive the RSV immunisation and 8% did not know yet. These numbers are higher than the uptake of 77% among the general population. A large part of the participants (90%) read or heard about RSV and 35% knew a child who had been hospitalised with RSV; the risk perception of RSV was relatively high. In a multivariable model, low education level, religious beliefs, and concerns about both safety and importance were significantly associated with a lower uptake. Social norms were significantly associated with a higher uptake.

6.12.5 (Inter)national developments

6.12.5.1 Monoclonal antibodies

As of April 2026, EMA has approved a new long-acting monoclonal antibody product, clesrovimab (Merck), for the prevention of RSV lower respiratory tract disease in neonates (newborns) and infants up to 12 months of age during their first RSV season. Clesrovimab targets a

different epitope of the prefusion protein than nirsevimab. There is only a one-dose format available for clesrovimab, 105 mg, in contrast to two-dose formats for nirsevimab (50 mg for children weighing less than 5 kg and 100 mg for children weighing 5 kg or more).

The BRICK-2 study, let by WKZ/UMC Utrecht, included all children <1-year-old who have been admitted with RSV to one of the seven PICUs in the Netherlands during the respiratory seasons 2024–2025 and 2025–2026. Preliminary data show that in 2025–2026, 87 children were admitted compared to 222 in 2024–2025. Of the 83 children with known age, 63 (76%) children were <3 months at time of PICU admission and 28 (34%) were ≤14 days. The proportion of children ≤14 days of age was higher than in the previous season (16%).

Several studies have assessed the effectiveness of RSV immunisation against RSV hospitalisation during the 2024–2025 season [4–9]. All were test-negative case-control studies. The estimated effectiveness ranged between 65% and 89%. Five studies assessed effectiveness by time since immunisation and showed some decline in effectiveness. For example, Savulescu *et al.* pooled data from Belgium, Portugal and Spain which included 791 cases and 1,410 controls and reported the estimated effectiveness to be 85% at <30 days after immunisation, 78% at 30–89 days after immunisation and 69% at 90–215 days after immunisation [8].

Nunez *et al.* conducted a case-control study in order to assess the effectiveness of RSV immunisation against RSV hospitalisation between October 2023 and January 2025 in children immunised between September 2023 and March 2024, thereby assessing effectiveness across two seasons [10]. Only healthy term-born infants were included in the study. In total, 423 cases and 1,618 matched controls were included. The effectiveness across the two seasons was 64% (52–72%) among the catch-up group (born prior to the RSV season) and 67% (59–74%) among the primary group (born during the RSV season). Most of the estimated effectiveness was attributable to effectiveness during the first season (78% and 84% for the catch-up and primary group, respectively). In the second season, either low or no effectiveness was observed (-8% and 20% for the catch-up and primary group, respectively).

In France, both nirsevimab and maternal vaccination were available during the 2024–2025 season. The choice between the two options was made by healthcare professionals and parents. Maternal vaccination was recommended at 32 to 36 weeks of gestation from September 2024 to January 2025, and nirsevimab was offered to all newborns in maternity hospitals prior to maternity discharge from September 2024. Jabagi *et al.* compared the effectiveness against RSV-related hospitalisations for both options [11]. The study included children born from September to December 2024, who were discharged from maternity wards from October 2024 and who were immunised either through maternal vaccination or nirsevimab. Infants were excluded if they received both strategies, if their mothers were either vaccinated before 32 weeks or after 36 weeks or if their birth occurred within 14 days of maternal vaccination. Out of the 85,467 infants who met the eligibility criteria,

62,340 (73%) received nirsevimab and 23,136 (27%) received immunisation via maternal vaccination. Infants who received nirsevimab were 1:1 matched to infants whose mother received the vaccination by maternity discharge date, sex, gestational age, and region. Infants were followed from the maternity discharge date up until the outcome event, death or February 2025, whichever occurred first. Outcomes were identified using RSV-specific ICD-10 codes. Infants who received nirsevimab had a 26% lower risk of RSV hospitalisation than infants whose mother received the RSV vaccination (hazard ratio: 0.74 (0.61–0.88)). In the first seven days since inclusion (maternity discharge date), infants who received nirsevimab had a higher risk of RSV hospitalisation (hazard ratio: 2.94 (1.19–7.69). Stratification by the time between maternal vaccination and study inclusion (<5 weeks vs. ≥5 weeks) resulted in similar hazard ratios (0.72 vs. 0.74).

Valtuille *et al.* carried out a similar study in France, which also compared nirsevimab to maternal vaccination [12]. This study included infants whose mother was vaccinated between 28 and 36 weeks of gestation, in contrast to Jabagi *et al*.'s inclusion criteria of 32 to 36 weeks. The outcome was RSV-related hospitalisation at six months of age; children who died during the follow-up prior to RSV-related hospitalisation occurred were excluded. Out of the 164,140 eligible children, 103,062 (63%) received nirsevimab and 61,078 (37%) were born to vaccinated mothers. Infants who received nirsevimab had a 22% lower risk of RSV hospitalisation compared to infants whose mother received RSV vaccination (odds ratio: 0.78 (0.70–0.86)). When the interval between maternal vaccination and birth was shorter than eight weeks, nirsevimab was found to be more effective than maternal vaccination (odds ratio 2–4 weeks: 0.45; 4–8 weeks: 0.80), whereas there was no difference observed in effectiveness if the interval was eight weeks or more (odds ratio: 1.01). There was no difference between nirsevimab and maternal vaccination for hospitalisations prior to one month of age (odds ratio: 0.99).

A study from France assessed the effectiveness of nirsevimab against invasive pneumococcal disease (IPD) during the first season of implementation of nirsevimab (2023–2024) when maternal vaccination was not yet available [13]. The study included children born between February 2023 and January 2024 who were therefore eligible to receive RSV immunisation between September 2023 and January 2024. Children who received RSV immunisation were matched to non-immunised children by month of birth and were followed for hospitalisation for IPD over the next six-month period. A total of 527,971 children were included of whom 22.6% received RSV immunisation, and among whom 112 IPD cases occurred. RSV immunisation reduced the risk of IPD by 36% (odds ratio: 0.64; 95% CI: 0.46–0.82). An additional analysis with time-dependent adjustment for pneumococcal vaccination yielded similar results (odds ratio: 0.62). The effect of RSV immunisation on IPD could be expected because RSV is suspected to facilitate the transition of pneumococcal carriage to disease.

6.12.5.2 Maternal vaccination

Two studies from the UK investigated the effect of maternal RSV vaccination on the prevention of RSV-related hospital admission among

infants <90 days old [14] or <5 months old [15] using a population-based case-control design or test-negative case-control design, respectively.

McLachlan *et al.* included 354 infants who had an RSV-related hospital admission for lower respiratory tract infection born between August 2024 and March 2025 [14]. These cases were matched to 3,511 controls from a source population comprising all live births in Scotland with no previous RSV-positive test or RSV-related hospital admission. Maternal RSV vaccination received >14 days prior to delivery was reported in 12% of the cases and 43% of the controls, resulting in an effectiveness estimate of 82% (95% CI: 75–87) adjusted for sex, birthweight, maternal ethnicity, maternal age, and smoking status, parity, and deprivation index. The adjusted effectiveness among preterm infants (<37 weeks of gestation) was 90% (95% CI: 55–98).

Williams *et al.* included 537 infants with acute lower respiratory infections hospitalised in one of 30 hospital sites between October 2024 and January 2025, of which 391 and 146 were RSV-positive and RSV-negative, respectively [15]. Maternal RSV vaccination was reported in 19% of the cases and 41% of the controls, resulting in an effectiveness estimate of 58% (95% CI: 28–75) adjusted for site, calendar month of hospital admission, sex, age, and prematurity. Including only mothers who were vaccinated >14 days prior to delivery resulted in an effectiveness estimate of 72% (48–85).

A study from the US investigated the effect of maternal RSV vaccination on the prevention of medically attended RSV-associated acute respiratory infections (ARI) and RSV-associated hospitalisation [7]. They included 446 infants <6 months of age of which there were 139 RSV-positive cases and 307 RSV-negative controls. Maternal RSV vaccination received >14 days prior to delivery was reported in 19% of the cases and 35% of the controls, resulting in an effectiveness of 64% (95% CI: 37–79) against medically attended RSV-associated ARI and 70% (95% CI: 37–86) against RSV-associated hospitalisation, adjusted for site, age, enrollment month, high-risk medical condition, infant race and ethnicity.

6.12.5.3 Older adults

In Denmark, a pragmatic open-label randomised trial was conducted among adults 60 or older comparing the RSVpreF vaccine to no vaccine during the 2024–2025 respiratory season [16]. Baseline and outcome data were collected using national registers. The primary outcome, RSV-related hospitalisation, occurred in three of the 65,642 participants within the RSV vaccination group and in 18 of the 65,634 participants within the control group (vaccine effectiveness (VE): 83% (43–97)).

A test-negative case control study from the UK included ~11,000 adults aged 74–79 who were hospitalised and tested for RSV during the 2024–2025 season [17]. Out of the 826 RSV-positive cases, 100 (12%) were vaccinated and 3,797 of 10,641 RSV-negative controls (36%) were vaccinated, resulting in a VE of 75% (69–80).

A test-negative case control study from the US assessed VE over two seasons (2023–24 and 2024–25) in adults aged 60 and older [18]. The VE against RSV-related hospitalisation and emergency department visits was 81% (68–89) in the first season after vaccination and 76% (48–89) in the second season, whilst VE among immunocompromised adults decreased more rapidly: from 74% in the first season to 54% in the second season.

6.12.6 Literature

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6.13 Rotavirus

6.13.1 Key points

- In 2025, 807 rotavirus laboratory detections were reported, which is lower than both the average of 977 in 2016–2019 (range 679–1129) and in 2024 (n = 921).
- In 2025, the rate of GP consultations for gastroenteritis (GE) in children under the age of five was 5,961 per 100,000, which represents a decline compared to both 8,876 in 2018–2019 and 6,613 in 2024.
- The estimated number of rotavirus-attributable hospitalisations involving children aged under 5-years-old in 2025 was 2,059, which is a 13% decrease compared to 2024 (2,350). Similar to 2022–2024, rotavirus genotype G3P8 was the most prevalent in 2025 (67%).
- Following the introduction of universal rotavirus vaccination in 2024, there has been a modest decline in rotavirus disease burden. The impact of vaccination, including its effectiveness, is currently being researched.

6.13.2 Tables and figures

*Figure 6.13.1 Weekly number of reported laboratory rotavirus detections in the virological laboratory surveillance in the Netherlands, 2015–2026**

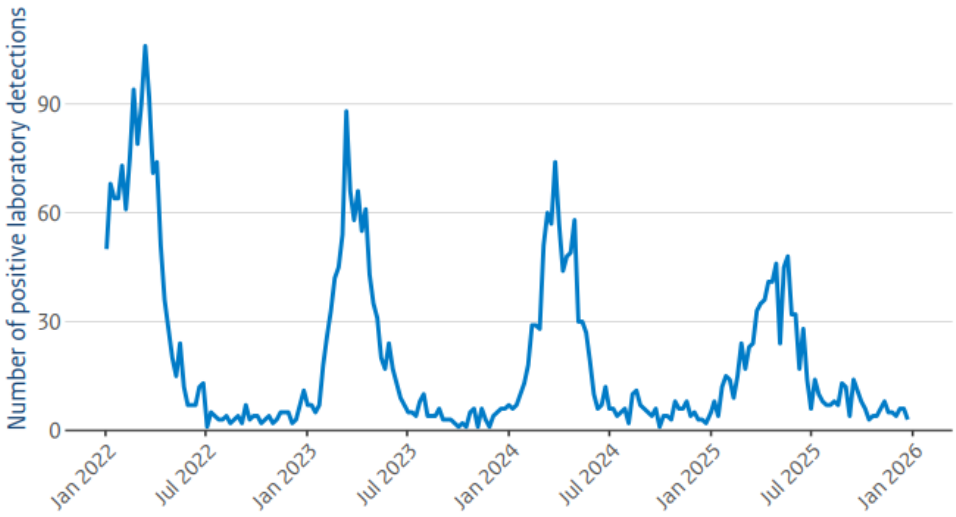


Figure 6.13.2 Number of general practice all-cause gastroenteritis consultations involving children aged <5-years-old per week in the Netherlands, 2018–2025

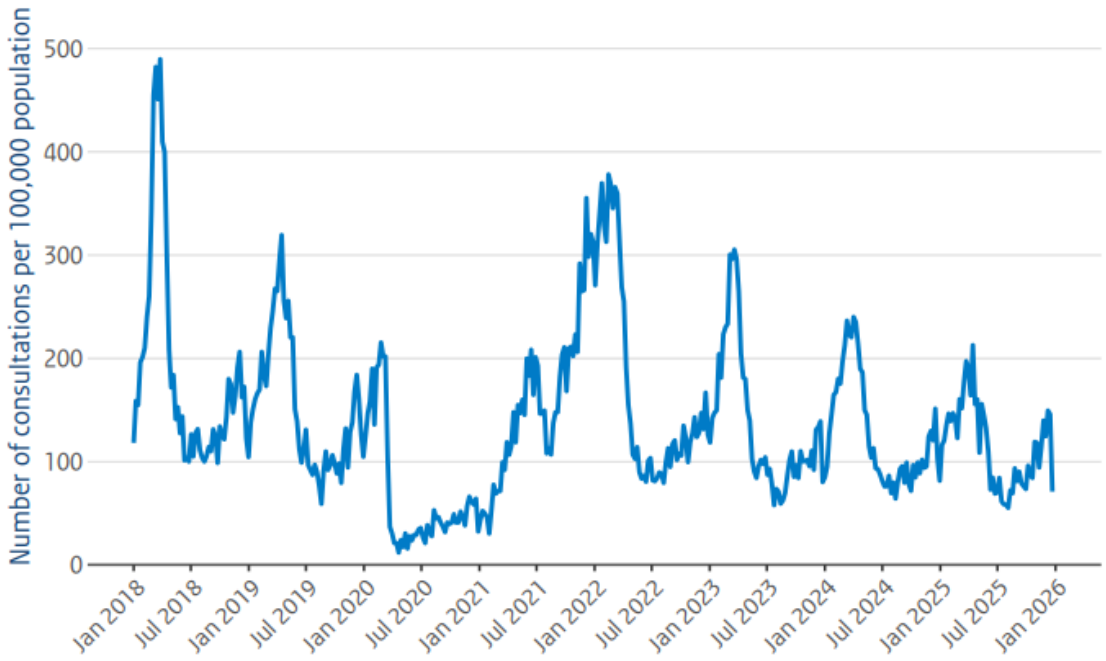


Figure 6.13.3 Three-week moving averages of the number of hospitalisations for (rotavirus) gastro-enteritis involving children aged <5-years-old in the Netherlands, 2015–2025

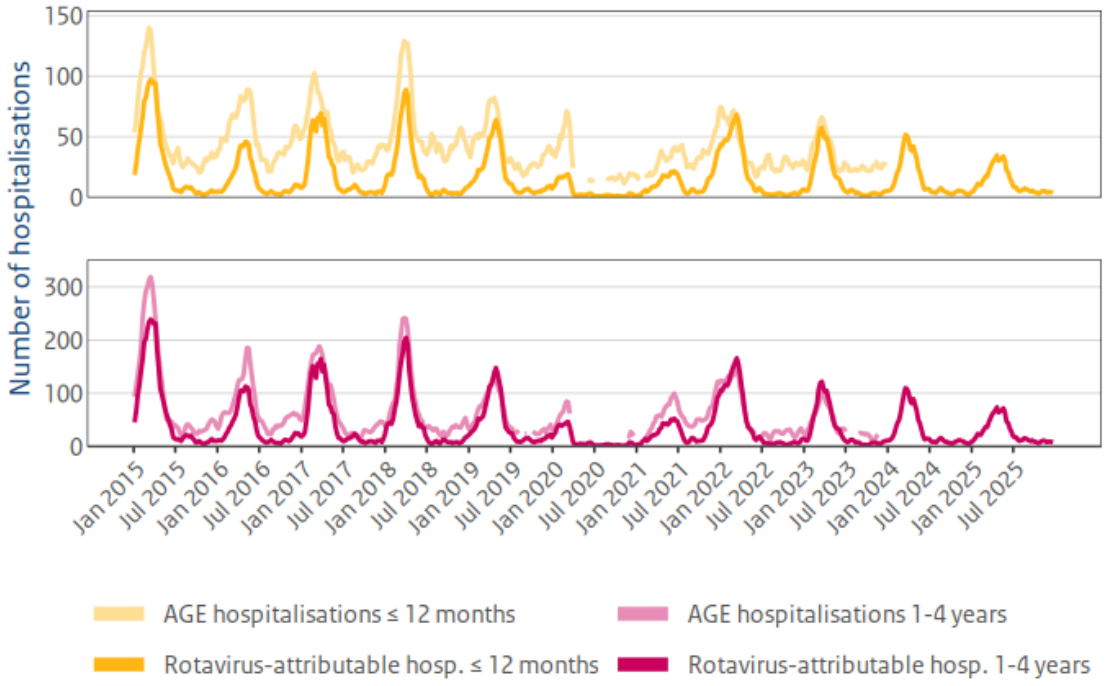


Table 6.13.1 Number of reported laboratory rotavirus detections and number of hospitalisations for (rotavirus) gastro-enteritis involving children aged <5-years-old in the Netherlands, 2015–2025

	Laboratory detections	AGE hospitalisations <5-years-old	Rotavirus-attributable hospitalisations <5- years-old
2015	1323	8150	5228
2016	679	6351	2529
2017	1047	6251	3653
2018	1129	6842	3647
2019	1053	4858	3202
2020	350	2144	669
2021	872	4550	2481
2022	1391	4745	3957
2023	959	3574	2447
2024	921	-	2350
2025	807	-	2059

Table 6.13.2 Number of rotavirus samples typed per year and identified genotypes in the Netherlands, 2021–2025

Type	2021		2022		2023		2024		2025		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
G12P8	2	3	5	6	1	2	1	2	0	0	9	3
G1P8	13	17	7	8	8	15	8*	15	8**	19	44	14
G2P4	11	15	2	2	2	4	1	2	2	5	18	6
G3P8	19	25	65	74	37	69	41	77	28	67	190	61
G4P8	0	0	0	0	0	0	0	0	0	0	0	0
G9P8	29	39	8	9	5	9	0	0	0	0	42	13
G9P4	1	1	0	0	0	0	1	2	0	0	2	1
Other	0	0	1	1	1	2	1	2	4	10	7	2
Total	**75**	**100**	**88**	**100**	**54**	**100**	**53**	**100**	**42**	**100**	**312**	**100**

* One isolate of G1P8 was typed as the vaccine strain. Another isolate could not be typed using sequence analysis but was positive in the vaccine-specific PCR.
** Seven isolates of G1P8 were typed as the vaccine-strain.

6.13.3 Epidemiology

Rotavirus infections are not notifiable in the Netherlands. Therefore, we used the weekly virology laboratory surveillance, the Nivel Primary Care Database, and the estimated number of rotavirus hospitalisations to describe the epidemiology of rotavirus.

Rotavirus in the Netherlands generally exhibits a consistent seasonal pattern, with peak activity around March and April. During the COVID-19 pandemic in 2020–2021, rotavirus circulation markedly reduced. This was proceeded by an atypical resurgence in 2022, characterised by an earlier-than-usual and pronounced peak, likely driven by an accumulation of susceptible young children. In 2024, universal rotavirus vaccination was added to the NIP. A two-dose schedule is being used with Rotarix®. All babies born on or after 1 January 2024 are offered vaccination at 6–9 weeks and again at three months. The vaccine is administered via drops in the mouth from a small tube. Rotarix® is a monovalent live-attenuated vaccine that contains a human G1P8 strain. It provides heterotypic protection (cross-protection) against a variety of circulating strains, including the most prevalent ones G1P8, G2P4, G3P8, G4P8 and G9P8. [1] The vaccination coverage among the birth cohort in 2024 was reported at 72.8%. This is described in further detail in Chapter 2 of this report (Table 2.2.1). The impact of vaccination, including its effectiveness, is currently being researched and results are expected in 2027.

6.13.3.1 Laboratory detections

In 2025, a total of 807 rotavirus laboratory detections were reported, which is lower than the average of 1,091 seen in the pre-vaccination years 2018–2019 and 2023 (n=959) (Figure 6.13.1), and 2024 (n=921). Furthermore, the seasonal peak was observed in May, which is later than the typical seasonal peak in March/April. This likely reflects the impact of the universal rotavirus vaccination programme introduced in 2024. Preliminary data for 2026 show a total of 378 reported

rotavirus laboratory detections in the first 20 weeks, which is lower than the 471 detections recorded during the same period in 2025. This continued decline may reflect the growing impact of the universal rotavirus vaccination programme.

6.13.3.2 Consultations in primary care

Nivel Primary Care Database provides data on general practitioner (GP) consultations for all-cause gastroenteritis in children under 5-years-old. [2] Gastroenteritis is defined as a diagnosis of presumed gastrointestinal infection (ICPC code D73). Weekly rates reflect the number of children who consulted their GP for gastroenteritis at least once in a given week. In 2025, 5,961 all-cause gastroenteritis consultations were reported per 100,000 children <5-years-old (on average 115 per 100,000 per week). This represents a decline compared to the average in 2018–2019 (8,876 per 100,000 children) and 2024 (6,613 per 100,000 children). Consultations in 2025 followed the usual seasonal pattern (Figure 6.13.2).

6.13.3.3 Hospitalisations

Hospitalisations for rotavirus were estimated based on International Classification of Diseases and Related Health Problems (ICD)-10 codes A0, A09, K52, and K529 registered in the Dutch Hospital Data (DHD), reflecting cases of acute gastro-enteritis (AGE). These registrations, however, are not specific to AGE caused by rotavirus. Therefore, we estimated the number of cases attributable to rotavirus by using a Poisson regression analysis, or a negative binomial regression in the case of overdispersion, with hospital admissions for the aforementioned ICD-10 codes per age category as the outcome variable, and the number of rotavirus laboratory detections from the weekly virology laboratory surveillance as the predictor. Resulting age group-specific coefficients and year-specific coefficients were used to estimate the number of rotavirus hospitalisations by multiplying the coefficients by the number of reported rotavirus laboratory detections. All estimations were based on DHD data registered in 2014–2023. For 2024 and 2025, the most recent available coefficient of 2023 was used.

Figure 6.13.3 shows the weekly number of hospitalisations for AGE and the estimated number of rotavirus attributable hospitalisations. The estimated number of rotavirus-attributable hospitalisations for children under five in 2025 was 2,059, which is around 40% lower compared to the average in 2018–2019 (3,425) and 16% and 13% lower compared to 2023 (2,447) and 2024 (2,350), respectively (Table 6.13.1). In both years, around 30% of hospitalisations among children under 5-years-old occurred in children aged 12 months and under.

6.13.4 Rotavirus genotypes

IDS/RIVM receives faecal samples throughout the year from the Working Group Clinical Virology laboratories for rotavirus genotyping. The results for each calendar year are presented in Table 6.13.2. In 2025, G3P8 was the most prevalent genotype (28 isolates, 67%), which is in line with 2024 (77%), 2023 (69%) and 2022 (74%). The prevalence of this genotype was higher than in 2020 and 2021 (2020=14%; 2021=25%), when G9P8 was most prevalent.

6.13.5 *Current/ongoing research*

In February 2025, the ROVI study was initiated to assess the vaccine effectiveness (VE) of rotavirus vaccination against severe, laboratory-confirmed rotavirus GE in children under the age of two in the Netherlands, evaluating the actual implementation of rotavirus vaccination in the NIP from 2024 onwards. The ROVI study uses a test-negative design and currently involves the recruitment of participants from eleven hospitals across the Netherlands. Patients are eligible for the study if they were born after 1 January 2024 (when rotavirus vaccination was introduced in the Netherlands) and are present at the emergency department or are hospitalised for AGE. Faecal samples from the participants are analysed at the RIVM laboratory for a panel of viruses commonly associated with AGE, including rotavirus, parechovirus, sapovirus, adenovirus, norovirus, astrovirus, and enterovirus. The vaccination statuses of the participants are obtained through a questionnaire and the vaccination register, Praeventis. VE is estimated by comparing the vaccination statuses of children testing positive for rotavirus and children testing negative for rotavirus. Two seasons of the study have already been completed: the first from January to June 2025, and the second from December 2025 to June 2026. Thus far, a total of 109 children have been enrolled in the study, of whom 44 tested positive for rotavirus. Recruitment is planned to continue in a third season in order to further increase the sample size, thereby allowing for a more robust and valid analysis of VE.

6.13.6 *(Inter)national developments*

A meta-analysis and systematic review estimated that there were 2.2. billion diarrheal diseases that led to 880,000 deaths globally in 2021, which were attributable to 14 diarrhea-causing pathogens. [3] Whilst bacterial and protozoal agents account for most morbidity, rotavirus remains the leading cause of diarrheal mortality, resulting in approximately 238,600 cases and 214,700 deaths. [3]

A 2025 review of the European EuroRotaNet surveillance network sought to evaluate the contribution of the network to monitoring rotavirus strain epidemiology and vaccine impact across Europe. EuroRotaNet was established to collect and analyse rotavirus genotype data from participating countries in order to monitor circulating strains, detect emerging variants, and assess temporal and geographical trends in rotavirus epidemiology. After the introduction of Rotarix vaccination across several EuroRotaNet countries, the previously dominant G1P[8] genotype declined in relative prevalence across multiple national datasets, whilst G2P[4] strains temporarily increased in proportion to the years following the vaccine introduction. These changes were neither uniform nor sustained across all countries, thus suggesting that rotavirus genotype patterns are influenced by both vaccine introduction and natural temporal variation. Moreover, data from EuroRotaNet show that equine-like G3P[8] and G12P[8] has become increasingly common in European countries. A change in the circulating genotypes of rotavirus after vaccination is important because the vaccine offers less protection against some genotypes. If these less-protected genotypes become more common, then the overall effectiveness of the vaccine may decrease. The network enables the detection of broader regional and international trends in rotavirus genotype distribution. This paper

highlights the importance of continuous, coordinated rotavirus surveillance via networks like EuroRotaNet. [4]

The MNSSTER-V project examined oral rotavirus VE among malnourished children under the age of 5-years-old across 19 countries with medium to high child mortality, in order to understand whether undernutrition affects vaccine performance. Overall, VE was highest in children without severe stunting (59%; 95% CI: 49–67), lower in those with moderate-to-severe stunting (42%; 95% CI: 19–58) and further reduced in children with severe stunting (31%; 95% CI: −14 to 58). Potential explanations for the overall lower VE in developing countries compared to developed countries, as well as the faster waning of immunity, include higher rotavirus transmission rates, differences in gut microbiota and mucosal immune factors, stronger inhibitory effects of maternal antibodies in serum or breast milk, higher levels of malnutrition and micronutrient deficiencies, interference from concurrent enteric viral or helminth infections, microbial overload of mucosal surfaces, a greater burden of comorbidities, and co-administration with oral polio vaccine [5]. However, the exact effect of these factors on VE remains inconclusive. Despite reduced effectiveness with increasing severity of chronic malnutrition (i.e., stunting), vaccination still provided meaningful reductions in severe rotavirus gastroenteritis, thus lending support to its continued use within high-burden settings. Ongoing efforts to both prevent and manage malnutrition could further decrease the overall burden of rotavirus-related morbidity and mortality. [6]

6.13.7 Literature

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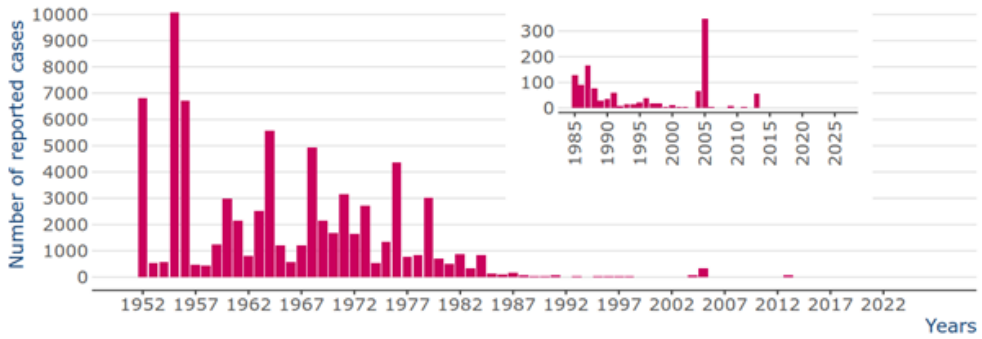
6.14 Rubella

6.14.1 Key points

- No rubella cases were reported in 2025.
- Since 2015, no new cases of rubella have been reported in the Netherlands.
- In 2024, one case of congenital rubella syndrome was reported.
- If rubella were to be introduced into the Bible Belt, there is a risk of an outbreak that could include women of childbearing age, potentially resulting in cases of congenital rubella syndrome (CRS).
- Since 2025, the second dose of MMR is offered around a child's third birthday rather than at 9-years-old. This applies to children born from 1 January 2016 onwards.

6.14.2 *Tables and figures*

Figure 6.14.1 Number of notified rubella cases since 1952



6.14.3 *Epidemiology*

Since 2015, no new cases of rubella have been reported in the Netherlands (Figure 6.14.1). In 2024, however, one case of congenital rubella syndrome (CRS) was reported, concerning a full-term neonate with CRS who was born to an asylum seeker.

6.14.4 *Current/ongoing research*

6.14.4.1 Evaluation of measles and rubella population-wide immunity in the Netherlands

A nation-wide sero-survey was conducted in 2016–2017 (age 0–89 years). Using a multiplex-based immunoassay, the presence of rubella-virus specific antibodies was assessed. The sero-prevalence of rubella virus-specific IgG was 95.0% (CI: 94.3–96.0) within the Dutch population. Within the low vaccination coverage areas (the Bible Belt), we also assessed sero-positivity, which was observed to be around 70% between two and nine years of age. There was a considerable difference observed between orthodox Protestant individuals (OPIs) and non-OPIs, namely a lower sero-positivity of 54% in OPIs aged between 17 months and 17-years-old compared to 84% in non-OPIs. Older age groups (18 years and older) were similar in terms of sero-positivity between OPIs and non-OPIs (both 97%). This lack of immunity in individuals younger than 17 in 2016–2017 means that a large group of socially clustered individuals born after 2001 are not protected against rubella. This creates a risk of a rubella outbreak if it were to be introduced, which would include women of child-bearing ages, and thus result in a greater risk of emerging CRS cases.

6.14.5 *(Inter)national developments*

From 1 February 2025 to 31 January 2026, 30 EU/EEA Member States reported a total of 86 cases of rubella, 11 (1.0%) of which were laboratory confirmed [1]. During this twelve-month period, 21 countries (Croatia, Bulgaria, the Czech Republic, Denmark, Estonia, Ireland, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Portugal, Romania, Slovenia, Slovakia, Norway, Iceland and Liechtenstein) reported no cases. The highest number of cases were reported by Poland (69), Germany (seven), Italy (three), Spain (two) and France (two). Data from Poland should be interpreted with caution, insofar as only three out of the 69 cases (4.35%) were laboratory confirmed.

By the end of 2023, 19 lower-income and middle-income countries had still not introduced RCV. In 2019, an estimated 24,000 CRS cases occurred in those countries, which accounted for 75% of the estimated 32,000 cases worldwide [2]. Previously, WHO recommended adding rubella within the NIP only in the event that measles coverage was above 80%. This was based upon the idea that at percentages below this threshold, rubella would not be eliminated but merely reduced, which, in turn, could potentially lead to an increase in the average age of infection and possibly more CRS cases. However, this recommendation has since been revised based upon modelling studies, which show that the overall CRS burden also decreases at a vaccination coverage of 60%. In September 2024, the WHO Strategic Advisory Group of Experts (SAGE) on Immunisation considered these estimates and recommended removing both the ≥80% coverage threshold and universal RCV introduction. The decision by SAGE to recommend universal RCV introduction within the remaining countries provides an opportunity through which to both reduce the global incidence of CRS, which is a preventable and potentially fatal condition, and eliminate the barriers to vaccine introduction stemming from the current 80% MCV coverage threshold. RCV introduction within these 19 countries during 2025–2030 aims to rapidly accelerate progress towards rubella and CRS elimination worldwide.

A total of 20,445 cases of rubella were reported to WHO in 2025 [3], which represented a decrease compared to 2024 when Member States reported 23,882 cases. The largest share of these cases came from WHO AFRO which reported 12,941 cases (63%) in 2025. It is important to note, here, that out of 197 Member States, only 145 reported to WHO.

6.14.6 Literature

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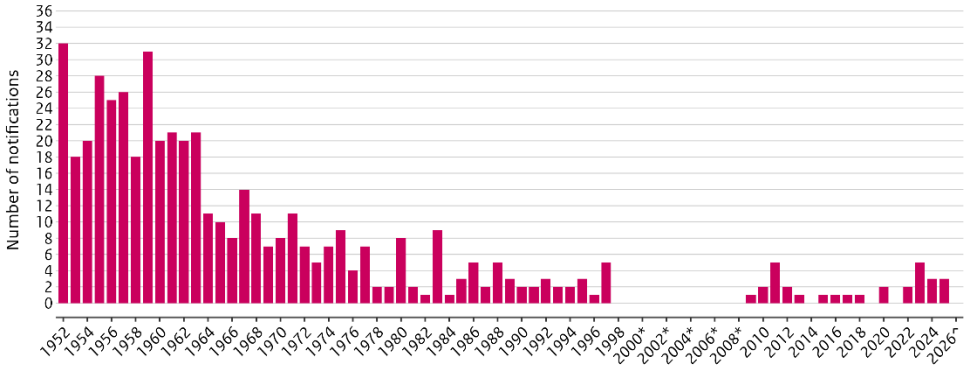
6.15 Tetanus

6.15.1 Key points

- Three tetanus patients, aged 60–85 years, were reported in the Netherlands in 2025 (0.02 per 100,000 population).
- The patients were either born prior to the introduction of childhood tetanus vaccinations or their vaccination statuses were unknown.
- One of the patients died as a result of the tetanus infection.
- During the period 2009–2025, between zero and five tetanus patients were reported annually.
- As of December 2025, 51 out of the 59 countries in which maternal and neonatal tetanus (MNT) was identified as a public health concern in 2000, have subsequently eliminated MNT.
- From 2025 onwards, vaccination doses for tetanus are given at the ages of two, three, five, and 12 months, five years, and 14 years rather than at two, three, five, and 11 months, four years, and nine years.

6.15.2 *Tables and figures*

Figure 6.15.1 Reported cases of tetanus in the Netherlands by year, 1952–2026



Patients are classified by year in order of data availability: date of symptom onset, date of diagnosis, date of notification. Source: Osiris.
* Between 1999 and 2008, tetanus was not mandatory to report.
^ For 2026, notifications for the period up to 20 April were included.

6.15.3 *Epidemiology*

Three tetanus patients, aged 60–85 years, were reported in 2025, and no patients in 2026 up to and including 20 April. The patients were either born prior to the introduction of childhood tetanus vaccinations in 1953 or their vaccination statuses were unknown. One of the patients died as a result of the tetanus infection; it is unknown whether this patient had underlying comorbidities. As in previous years, PEP-guidelines were not always met or fully met when a patient consulted a physician with a wound prior to the onset of symptoms of tetanus disease.

6.15.4 *Pathogen*

The diagnosis of tetanus is ordinarily based upon clinical recognition; laboratory diagnosis is less common. *Clostridium tetani* is rarely isolated from suspected patients. In 2025, one isolate was received at RIVM for the tetanospasmin gene polymerase chain reaction (PCR), which was positive. In 2026, up to and including the month of April, no isolates were received. Serological diagnosis is not possible, insofar as infection does not result in a detectable antibody response; the presence of a protective antibody level within a blood sample taken prior to immunoglobulins being given, makes a tetanus diagnosis unlikely.

6.15.5 *(Inter)national developments*

As of December 2025, 51 out of the 59 countries in which MNT was identified as a public health concern in 2000, have been validated as having achieved MNT elimination (MNTE). The last two countries to achieve MNTE-status were Sudan and South Sudan. The eight countries that have yet to achieve MNTE include Afghanistan, Angola, Central African Republic, Nigeria, Pakistan, Papua New Guinea, Somalia and Yemen.

7 Immunisation programme in the Caribbean part of the Kingdom of the Netherlands



7.1 Key points

- In general, vaccination coverage of the NIP for infants, toddlers, schoolchildren, and adolescents both within the Caribbean Netherlands and the local national immunisation programmes of the Caribbean countries within the Kingdom of the Netherlands is high. However, due to differences in target groups and vaccination schedules, data on vaccination coverage are not always easy to compare.
- Overall, the vaccination coverage for COVID-19 vaccination among people aged 60 and older was low, <10% on the three islands for which data were available.
- In 2026, several changes were made to the vaccination schedules of all islands compared to 2025. These changes differed across each of the islands. Among other changes, RSV immunisation was added to the schedule of Bonaire, Saba, and Sint Eustatius.

7.2 Tables and figures

Table 7.2.1 Immunisation schedule for Aruba in 2026

Age or school year	Vaccination 1	Vaccination 2
1 month	HBV 1	
2 months	DTaP-IPV-Hib 1	Pneu 1
3 months	HBV 2	
4 months	DTaP-IPV-Hib 2	Pneu 2
6 months	DTaP-IPV-Hib 3	
9 months	HBV 3	
12 months	MMR 1	Pneu 3
15 months	DTaP-IPV-Hib 4	MMR 2
4 years	DTaP-IPV 1	
10 years	DTaP-IPV 2	
11 years	HPV*	

* for girls only.
Abbreviations: HBV: hepatitis B; D: diphtheria; T: tetanus; aP: pertussis; IPV: polio; Hib: Haemophilus influenza type b; Pneu: pneumococci; MMR: mumps, measles, rubella; HPV: Human papillomavirus.

Table 7.2.2 Immunisation schedule for Bonaire in 2026

Age or school year	Vaccination 1	Vaccination 2	Vaccination 3
0–2 weeks (or 0–7 months)*	RSV		
6–9 weeks	Rota	DTaP-IPV-Hib-HBV**	
3 months	Rota	DTaP-IPV-Hib-HBV	Pneu 1
5 months	DTaP-IPV-Hib-HBV	Pneu 2	
12 months	DTaP-IPV-Hib-HBV	Pneu 3	
14 months	MMR-V 1	MenACWY 1	
18 months	MMR-V 2		
5 years	DTaP		
9 years	HPV 1		
9.5 years	HPV 2		
14 years	DT-IPV	MenACWY 2	

* Introduced within the NIP from June 2026 onwards.
** Only if the mother has not been vaccinated against pertussis during pregnancy (maternal pertussis vaccination), and in special situations.
Abbreviations: RSV: respiratory syncytial virus; Rota: rotavirus; D: diphtheria; T: tetanus; aP: pertussis; IPV: polio; Hib: *Haemophilus influenzae* type b; HBV: hepatitis B; Pneu: pneumococci; MMR: mumps, measles, rubella; V: varicella zoster; MenACWY: meningococcal disease type ACWY; HPV: Human papillomavirus.

Table 7.2.3 Immunisation schedule for Curaçao in 2026

Age or school year	Vaccination 1	Vaccination 2	Vaccination 3
2 months	DTwP-Hib-HBV 1	Polio 1 (IPV)	
3.5 months	DTwP-IPV-Hib-HBV 2	Pneu 1 (13-valent)	
5.5 months	DTwP-Hib-HBV 3	Polio 3 (bOPV)	Pneu 2 (13-valent)
>12 months	MMR 1	Pneu 3 (13-valent)	
15 months	DTwP-Hib-HBV 4	Polio 4 (bOPV)	MMR 2
4 years	DT 1 (paediatric)	Polio 5 (bOPV)	
9 years	DT 2 (adult)	HPV 1 (4-valent)	
9.5–10 years	HPV 2 (4-valent)		

Abbreviations: D: diphtheria; T: tetanus; wP: whole cell pertussis; Hib: *Haemophilus influenzae* type b; HBV: hepatitis B; IPV: inactivated polio vaccine; bOPV: bivalent oral polio vaccine; Pneu: pneumococci; MMR: mumps, measles, rubella; HPV: Human papillomavirus.

Table 7.2.4 Immunisation schedule for Saba in 2026

Age or school year	Vaccination 1	Vaccination 2	Vaccination 3
0–2 weeks (or 0–7 months)*	RSV		
6–9 weeks	Rota	DTaP-IPV-Hib-HBV**	
3 months	DTaP-IPV-Hib-HBV	Pneu 1	Rota
5 months	DTaP-IPV-Hib-HBV	Pneu 2	
12 months	DTaP-IPV-Hib-HBV	Pneu 3	
14 months	MMR-V 1	MenACWY 1	
3 years	MMR-V 2		
5 years	DTaP		
10 years	HPV 1		
10.5 years	HPV 2		
14 years	DT-IPV	MenACWY 2	

* Introduced within the NIP from June 2026 onwards.
** Only if the mother has not been vaccinated against pertussis during pregnancy (maternal pertussis vaccination), and in special situations.
Abbreviations: RSV: respiratory syncytial virus; Rota: rotavirus; D: diphtheria; T: tetanus; aP: pertussis; IPV: polio; Hib: *Haemophilus influenzae* type b; HBV: hepatitis B; Pneu: pneumococci; MMR: mumps, measles, rubella; V: varicella zoster; MenACWY: meningococcal disease type ACWY; HPV: Human papillomavirus.

Table 7.2.5 Immunisation schedule for Sint Eustatius in 2026

Age or school year	Vaccination 1	Vaccination 2	Vaccination 3
0–2 weeks (or 0–7 months)*	RSV		
6–9 weeks**	Rota	DTaP-IPV-Hib-HBV***	
3 months	DTaP-IPV-Hib-HBV	Pneu 1	Rota
5 months	DTaP-IPV-Hib-HBV	Pneu 2	
12 months	DTaP-IPV-Hib-HBV	Pneu 3	
14 months	MMR-V 1	MenACWY 1	
18 months	MMR-V 2		
5 years	DTaP		
10 years	HPV 1		
10.5 years	HPV 2		
14 years	DT-IPV	MenACWY 2	

* Introduced within the NIP from February 2026 onwards.
** Introduced within the NIP from Q4 2026 onwards.
*** Only if the mother has not been vaccinated against pertussis during pregnancy (maternal pertussis vaccination), and in special situations.
Abbreviations: RSV: respiratory syncytial virus; Rota: rotavirus; D: diphtheria; T: tetanus; aP: pertussis; IPV: polio; Hib: *Haemophilus influenzae* type b; HBV: hepatitis B; Pneu: pneumococci; MMR: mumps, measles, rubella; V: varicella zoster; MenACWY: meningococcal disease type ACWY; HPV: Human papillomavirus.

7.2.6 Immunisation schedule for Sint Maarten in 2026

Age or school year	Vaccination 1	Vaccination 2
2 months	DTaP-IPV-Hib 1	HBV 1
3 months	DTaP-IPV-Hib 2	HBV 2
4 months	DTaP-IPV-Hib 3	Pneu 1
6 months	HBV 3	Pneu 2
12 months	DTaP-IPV-Hib 4	MMR 1
15 months	MMR 2	Pneu 3
4 years	DT-IPV	
9 years	DT-IPV	HPV1*
9.5 years	HPV 2*	

* For girls only.
Abbreviations: D: diphtheria; T: tetanus; aP: pertussis; IPV: polio; Hib: *Haemophilus influenzae* type b; HBV: hepatitis B; Pneu: pneumococci; MMR: mumps, measles, rubella; HPV: Human papillomavirus.

Table 7.2.7 (continues on the next page) Vaccination coverage[a,b] in the Netherlands Caribbean region

Infants (aged 2-years-old)

	Aruba	Bonaire	Curaçao	Saba[i]	Sint Eustatius	Sint Maarten
Number in cohort 2023	902	252	*	20	32	*
Number DTa(P)-IPV-Hib(-HBV)	[c] 830	227	*	20	21	*
% DTa(P)-IPV-Hib(-HBV)	92.0%	90.1%	*	100%	65.6%	*
Number HBV	[c] 855	n.a.	n.a.	n.a.	n.a.	*
% HBV	94.8%	n.a.	n.a.	n.a.	n.a.	*
Number Polio	n.a.	n.a.	*	n.a.	n.a.	n.a.
% Polio	n.a.	n.a.	*	n.a.	n.a.	n.a.
Number Pneu	[c] 835	227	*	20	21	*
% Pneu	92.6%	90.1%	*	100%	65.6%	*
Number MMR(V)1	[c] 849	228	*	20	21	*
% MMR(VZV)1	94.1%	90.5%	*	100%	65.6%	*
Number MMR(V)2	[c] 811	197	*	n.a.	n.a.	n.a.
% MMR(V)2	89.9%	78.2%	*	n.a.	n.a.	n.a.
Number MenACWY	n.a.	228	n.a.	20	20	n.a.
% MenACWY	n.a.	90.5%	n.a.	100%	62.5%	n.a.

Toddlers (aged 5-years-old)

	Aruba	Bonaire	Curaçao	Saba	Sint Eustatius	Sint Maarten
Number in cohort 2020	*1,127*	*307*	*	*14*	*54*	*
Number DT(aP)(IPV)	[c] 911	188	*	14	21	*
% DT(aP)(IPV)	80.8%	61.2%	*	100%	38.9%	*
Number MMR(V)2	[c] 902	n.a.	n.a.	14	22	*
% MMR(V)2	80.0%	n.a.	n.a.	100%	40.7%	*

Schoolchildren (aged 10-years-old)

	Aruba	Bonaire	Curaçao	Saba	Sint Eustatius	Sint Maarten
Number in cohort 2015	[d] *1,450*	*n.a.*	*	*23*	*35*	*
Number DT(aP)(IPV)	1,243	n.a.	*	23	19	*
% DT(aP)(IPV)	85.7%	[g] n.a.	*	100%	54.3%	*
Number MMR2	1,371	n.a.	n.a.	23	n.a.	n.a.
% MMR2	[e] 94.6%	n.a.	n.a.	100%	n.a.	n.a.

Adolescent girls (aged 10-years-old)

	Aruba	Bonaire	Curaçao	Saba	Sint Eustatius	Sint Maarten
Number in cohort 2015	[f] 682	*131*	*n.a.*	*<10*	*21*	*
Number HPV	494	33	n.a.	<10	13	*
% HPV	72.4%	[h] 25.2%	n.a.	77.8%	61.9%	*

Adolescent boys (aged 10-years-old)

	Aruba	Bonaire	Curaçao	Saba	Sint Eustatius	Sint Maarten
Number in cohort 2015	*n.a.*	*133*	*n.a.*	*14*	*13*	*
Number HPV	n.a.	17	n.a.	14	3	*
% HPV	n.a. [h]	12.8%	n.a.	100%	23.1%	*

Adolescents (aged 15-years-old)

	Aruba	Bonaire	Curaçao	Saba	Sint Eustatius	Sint Maarten
Number in cohort 2010	*n.a.*	*n.a.*	*n.a.*	*20*	*50*	*n.a.*
Number MenACWY	n.a.	n.a.	n.a.	18	2	n.a.
% MenACWY	n.a.	n.a.	n.a.	90.0%	4.0%	n.a.

* Not reported in time/due to circumstances reporting was not possible.
a The registration systems within the Netherlands Caribbean region (with the exception of Aruba) are not linked to the national population register. As a result, immigration and emigration cannot be monitored as precisely as in the European Netherlands. The figures in this table provide the closest possible approximation.
b Vaccination status at 2-years-old: DTaP-IPV/MMR/MenACWY = basic immunity, Hib/HBV/PCV = completed; at the age of 5 years: DT(aP)- IPV = revaccinated, MMR = completed; at the age of 10 years: DTaP/MMR/HPV = full participation; at 15-years-old: MenACWY = full participation.
c On Aruba, this concerns all children born in 2023 and 2020, respectively, who received the correct number of vaccinations for their age prior to or on 31 December 2025. For children born from 2023 onwards, the age at which they receive the second MMR dose has been brought forward from 4-years-old to 15 months.
d On Aruba, the DT(aP)-IPV is provided in year seven of regular education, irrespective of age, and at 10-years-old within special education. These figures relate to the school year 2023–2024 rather than to cohort 2014, at age 10.
e On Aruba, from cohort 2008 onwards, MMR2 vaccination has been brought forward, which means that the percentage of children vaccinated for MMR2 is higher than that of DTaP at this age.
f On Aruba, HPV vaccination is provided to girls in year eight, irrespective of age. These figures relate to school year 2024–2025, rather than to cohort 2014, at age 10.
g On Bonaire, the DT-IPV at 9-years-old has been moved to 14-years-old as of 1 January 2025.
h On Bonaire, uptake for HPV dose 1 is much higher than for HPV dose 2 (HPV-1 girls 63/131 = 48.1% and HPV-1 boys 48/133 = 36.1%). This is because the first dose is given at school and the second dose is given by appointment at the child health clinic, which some do not attend.
i For Saba, the immunisation rate against RSV for the 2025/2026 season is 68.8%. The vaccination rate against rotavirus is 86.7% (2024 cohort).
Source (in Dutch): Vaccinatiegraad Rijksvaccinatieprogramma Nederland. Verslagjaar 2026.

Table 7.2.8 COVID-19 vaccination coverage in the Netherlands Caribbean region[1]

Island	Number and percentage 60+
Aruba	*
Bonaire	8.2%
Curaçao	*
Saba	8.4%
Sint Eustatius	<5%
Sint Maarten	*

* Not reported in time/due to circumstances reporting was not possible.
[1] Data sources: OLB-PG (Bonaire), Public Entity Saba (Saba), Public Entity Sint Eustatius (Sint Eustatius).

7.3 Immunisation schedules

The immunisation schedules for the islands in the Caribbean part of the Kingdom of the Netherlands are presented in Tables 7.2.1–7.2.6. Both recent and upcoming changes to immunisation schedules on the islands can be seen below.

7.3.1 Recent and upcoming changes to the immunisation schedules

From 2026, some changes to the NIP schedule have been implemented. On Bonaire and Saba, RSV immunisation for newborns was implemented within the NIP from June 2026 onwards. On Sint Eustatius, RSV immunisation was implemented within the NIP from February 2026 onwards. On Curaçao, a new vaccine was used DTwP-IPV (wHexa) rather than DTwP and a separate poliovirus vaccine (IPV) for children aged three and a half months. In 2027, this vaccine will also be given to children aged two months, five and a half months, and 15 months.

7.3.1.1 New recommendations and decisions

On 8 April 2026, the Health Council advised not to include dengue vaccination within the NIPs of the Caribbean part of the Kingdom of the Netherlands. The benefits of vaccination may not outweigh the potential risks, insofar as the vaccine effectiveness against serotypes 3 and 4 is uncertain and vaccination may increase the risk of severe dengue in previously uninfected individuals. The Health Council advised to carefully monitor both the proportion of children and adults with past dengue infection and the number of dengue cases, hospitalisations and deaths. New data on the epidemiology of dengue, vaccine effectiveness against serotypes 3 and 4 and/or the risk of severe dengue after vaccination, or the availability of a new dengue vaccine could lead to the Health Council revising their recommendation.

7.4 Vaccination coverage

7.4.1 Childhood vaccinations

In general, vaccination coverage of both the NIP within the Caribbean Netherlands (Bonaire, Sint Eustatius and Saba) and the local national immunisation programmes of the Caribbean countries within the Kingdom of the Netherlands (Aruba, Curaçao, and Sint Maarten) is high (Table 7.2.7). However, due to differences in target groups and vaccination schedules, it is not always straightforward to compare vaccination coverage. The method used for determining vaccination coverage often results in coverage for schoolchildren being underestimated, insofar as vaccinations are ordinarily offered per school year irrespective of a child's year of birth. As a result, the age limits of five, ten, and 15 are not always met. Due to circumstances, it was not possible to provide data on Curaçao and Sint Maarten in time.

7.4.2 COVID-19

The same risk groups are eligible for vaccination in the Netherlands Caribbean region as those in the European Netherlands. The COVID-19 vaccination coverage among people aged 60 and older is low in the Netherlands Caribbean region (of the three islands for which data were available; the highest vaccination coverage was 8.4% in Saba) compared to the European Netherlands (vaccination coverage was 41.7%) (Table 7.2.8).

7.5 Epidemiology of diseases included within the NIP

Surveillance data in the Caribbean part of the Kingdom of the Netherlands have been available from 2017 onwards for Bonaire and Saba, and from 2021 onwards for Sint Maarten.
In 2025, two adult cases of pertussis were reported to the public health service centre in Bonaire. One case was hospitalised, but neither case was fatal. On Saba, there were no cases of notifiable diseases within the NIP. It was not possible to provide data on cases related to diseases included within the NIP for Aruba, Curaçao, Sint Eustatius and Sint Maarten in 2025.

8 Potential NIP target diseases



8.1 Varicella zoster virus infection

8.1.1 Key points

- The incidence of varicella recorded by general practitioners (GPs) in 2025 was 230 per 100,000 population, which is comparable to the incidences prior to 2020 (pre-pandemic). This may indicate a stabilisation after strong fluctuations in 2020–2024.
- The highest incidence of varicella was recorded among infants under the age of one.
- The incidence of herpes zoster (HZ) episodes recorded by GPs in 2025 was unprecedentedly high at 790 per 100,000 population, compared to 610 per 100,000 in 2024.
- The increase in the incidence of HZ was visible across all age groups 60 and older.

8.1.2 Tables and figures

Figure 8.1.1 Estimated incidence of episodes of varicella (ICPC code A72) and herpes zoster (ICPC code S70) per 100,000 population in 2025 versus mean 2015–2024 by age group, Nivel Primary Care Database [1]

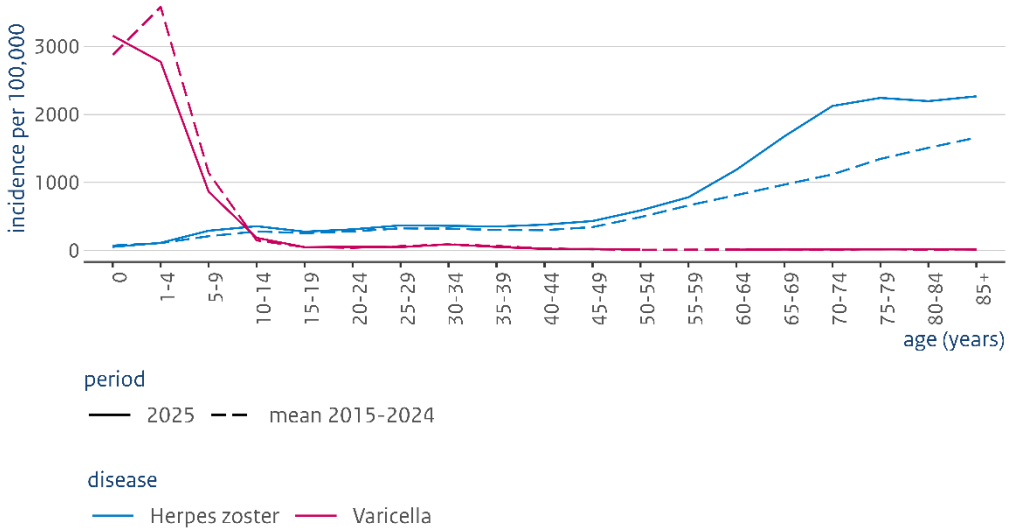


Figure 8.1.2 Estimated incidence of episodes of varicella (ICPC code A72) in children aged 0, 1–4, and 5–9-years-old per 100,000 population in 2015–2025, Nivel Primary Care Database [1]

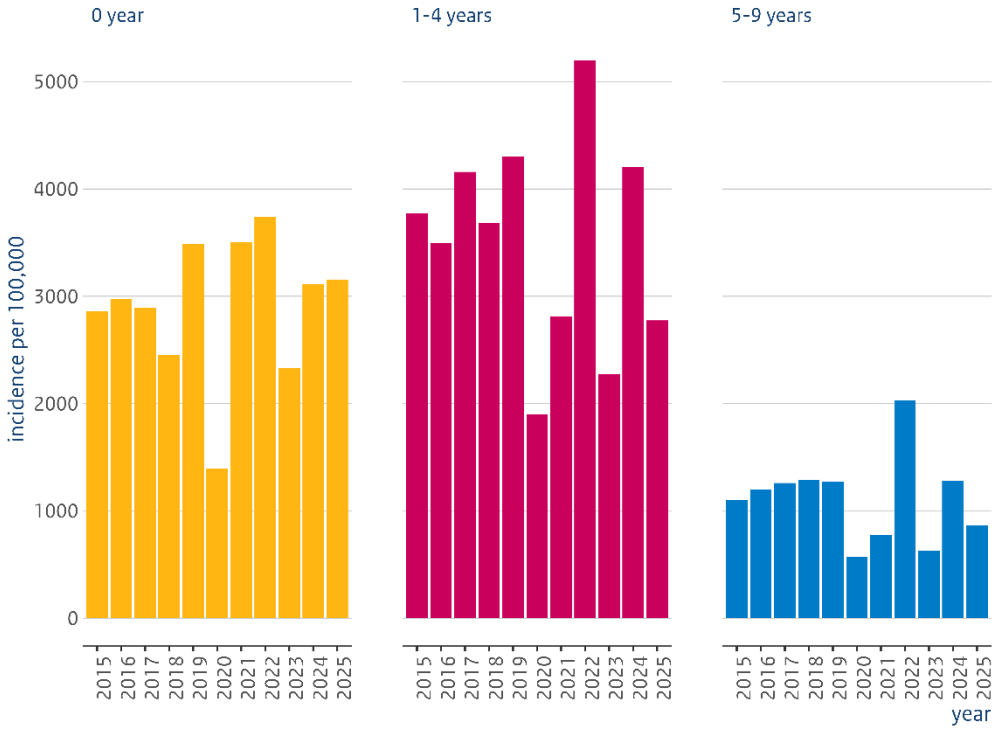


Table 8.1.1 Estimated incidence of episodes of varicella (ICPC code A72) and herpes zoster (ICPC code S70) per 100,000 population in 2015–2025, Nivel Primary Care Database (rounded up to the nearest 10)[1]

	Varicella	Herpes zoster
2015	250	530
2016	240	530
2017	280	530
2018	260	540
2019	300	550
2020	130	530
2021	190	540
2022	400	520
2023	170	560
2024	300	610
2025	230	790

8.1.3 Epidemiology

Varicella Zoster Virus (VZV) infections (varicella and herpes zoster) are not notifiable in the Netherlands. Therefore, we used the Nivel Primary Care Database, the Statistics Netherlands (CBS) open data and Dutch Hospital Data (DHD) to describe the epidemiology of VZV infections (see Appendix 1) [1, 2].

8.1.3.1 Varicella

In 2025, general practitioners (GPs) recorded around 41,000 varicella episodes (230 episodes per 100,000 population, Nivel Primary Care Database under number NZR-00326.007), which was lower than in 2024 (300 per 100,000). The incidence was highest among infants <1-year-old (Figure 8.1.1). The incidence per age group among children in 2025 was similar to that seen pre-pandemic, after strong fluctuations in the incidence 2020–2024 (Figure 8.1.2). The number of hospitalisations for varicella in 2024 was similar to pre-pandemic years, and in 2025 only one varicella death was reported (Appendix 2).

8.1.3.2 Herpes zoster

In 2025, GPs recorded around 143,000 herpes zoster (HZ) episodes, with an incidence of 790 per 100,000 population. This is substantially higher than the 2024 incidence of 610 per 100,000, and, in fact, is the highest incidence in the past decade (Table 8.1.1). Figure 8.1.1 shows that the 2025 incidence was much higher than previous years for the age groups 60 and older. This increase was reported by Nivel in early 2025 and brought to the attention of the media. The cause of this increase is unknown, although it coincided with media attention around introduction of vaccination against HZ and possible protective effects of HZ vaccination against dementia (see paragraph 8.1.4.2). It was therefore speculated that perhaps patients who visited their GP with questions about HZ vaccination were inadvertently coded as HZ episodes [3]. However, the incidence of GP visits for HZ has remained at this high level throughout 2025 and the first half of 2026. Also, the number of deaths reported to be HZ related was higher in 2025 than in previous years (n= 63 in 2025, compared to 27-44 in 2015-2024).

When hospitalisation data become available for 2025 and 2026, these could shed further light on the extent of the increase in HZ disease burden. The number of hospitalisations for HZ was higher in 2023 and 2024 than in 2015–2022 (600 and 570 versus 455–525, see Appendix 2).

8.1.4 (Inter)national developments

8.1.4.1 Varicella vaccine effectiveness

A systematic review and meta-analysis was published by Bolormaa et al. in 2025 on varicella vaccine effectiveness (VE)[4]. Single-dose pooled VE was 79% (95%CI 77-82%), and two-dose VE was 95% (95%CI 92-96%). VE against moderate to severe disease was >90% for both one and two doses. VE declined over time since vaccination, but was more durable after two doses.

8.1.4.2 Herpes zoster vaccination and dementia

Since 2021, an increasing number of scientific articles on the association between HZ vaccines and dementia have reported lower dementia risks for vaccinated people compared to unvaccinated people. Such an effect would add an additional protective effect against dementia to the already well-established effect against HZ of the vaccine, which would be of major public health importance as dementia is projected to cause the largest burden of any disease in the Netherlands by 2050. To date, conclusive evidence about a potential mechanism is lacking, although several hypotheses have been put forward. Such exploratory mechanisms link HZ vaccination to a lower risk of dementia through reducing clinical and subclinical reactivations of VZV or via pathogen-independent immune mechanisms [5].

In 2025, a team at the RIVM-CIb-EPI along with external collaborators began working on a systematic review and meta-analysis that sought to assess the presence of an association between HZ vaccines and the risk of dementia, which includes a quality assessment process, a meta-analysis and a narrative synthesis. The review draws upon scientific studies on the association deposited in PubMed, Embase and Cochrane Library up until March 2026 using search terms that included the words herpes zoster, shingles, permutations of vaccine, inoculation, immunisation, dementia, and Alzheimer, cognitive decline, Zostavax, and Shingrix.

All studies that employed a study design that quantitatively collected and analysed data in order to report on a measure of association, such as relative risks, odds ratios, hazard ratios (HRs) or other measures of association, like Restricted Mean Time Lost ratios, were considered for inclusion. Studies were evaluated by two independent researchers against their eligibility to be included in the review and meta-analysis using the JBI Critical Appraisal Tool for systematic reviews. The review is registered in Prospero and is ongoing. To be included, the following criteria were used:

- Observational studies, such as cohort studies, studies with a quasi-experimental design, and case-control studies
- Studies with an HZ-vaccinated or HZ-eligible cohort and an HZ-non-vaccinated or HZ-ineligible cohort; for case-control studies

cases must be patients with dementia, whilst controls must be individuals without dementia
- Types of dementia were clearly defined and diagnosed based upon valid diagnostic criteria and exposure to HZ vaccines was determined based upon valid recording systems

Thus far, a total of 388 papers have been identified, of which 23 were screened and 14 were included in the systematic review. Most of the papers that were excluded were removed based on title and abstract screening. Of the 14 included papers [6–19], seven were analysed as part of the meta-analysis [6, 7, 9–11, 13, 17] and seven were summarised in the narrative synthesis [8, 12, 14–16, 18, 19]. Due to the long time periods required to establish an effect on dementia incidence, most of the studies (9 out of 14) assessed the effect of the live-attenuated vaccine Zostavax, which has now been replaced by the recombinant subunit vaccine Shingrix. Three studies considered the effect of Shingrix, whilst two studies assessed the effect of both vaccines. The random effects meta-analysis found a pooled HR of 0.69, with a 95% confidence interval (CI) ranging from 0.62 to 0.76, which means that, after weighting the HRs of all studies included and accounting for their heterogeneity, the pooled HR suggested that people receiving an HZ (Zostavax or Shingrix) vaccine are 31% (95% CI: 24–38%) less likely to develop a form of dementia in the years following the HZ vaccination.

A number of scientific papers that reported on the association between HZ vaccinations and the occurrence of dementia but did not fit into the meta-analysis were also identified. Four out of eight studies made use of a regression discontinuity design (RDD) to assess the relationship between HZ vaccination, either through eligibility or receiving the vaccine, and the occurrence of dementia, generating a high level of evidence. All four studies studied Zostavax and found a protective effect on the development of dementia, with dementia risk reduction estimates of up to 30% in those who had been vaccinated. However, as also reported in some of the studies included in the meta-analysis, the effect appeared to be stronger in women than in men, which cannot yet be explained.

The quality of the studies was generally high, with large databases underpinning both the cohort studies and those with a regression discontinuity design. However, residual confounding due to healthy vaccinee bias cannot be excluded. In this respect, the RDD studies are more robust. Further research should investigate the immunological mechanism through which HZ vaccines provide protection against dementia and examine why this effect appears to be stronger in women than in men. A large randomised controlled trial is being conducted by GSK among persons aged 76 or older in Finland, which studies the effect of HZ vaccination on incident dementia diagnoses. The first results are expected in 2030 at the earliest. Furthermore, a GSK-funded nationwide randomised study in Denmark among adults aged 65 and older will assess major cardiovascular events and incident dementia until 2029, by utilising nationwide registry data.

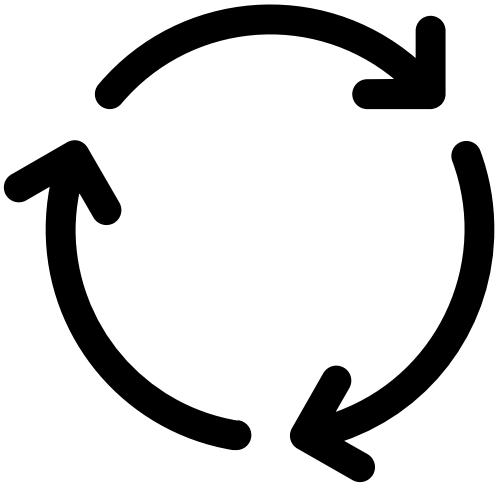
8.1.5 Literature

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*publication with RIVM authors.

9 Vaccines in development for other potential future NIP target diseases



9.1 Keypoints

- Market authorisation for Lyme vaccine is expected this year
- Several pneumococcal conjugate vaccines covering other or even more serotypes (PCV21, than the currently available PCV15, PCV20 and PCV21, PCV25 and PCV31) are being tested in phase 3 studies.

9.2 Chapter overview

We present an update of information on vaccines for infectious diseases that are relevant for the Netherlands and have reached the final phase of clinical testing. Only vaccines that have reached phase-3 clinical development, vaccine efficacy and safety analyses, and are thus close to market authorisation have been included (see the tables below). Due to this restriction, information on vaccines in development for the following pathogens have not been added Bacteria: Chlamydia, Gonorrhoeae, Helicobacter pylori, Moraxella catarrhalis, Staphylococcus Aureus, Streptococcus group A. Viruses: MERS-CoV, Parainfluenza type I, West Nile virus, and Zika.

There are two exceptions of vaccines in development that are worth mentioning, that are not in phase 3 yet but are expected to be available within 1-2 years. The first one is a vaccine against the currently circulating Bundibugyo Ebola virus strain and the second is a RSV/human metapneumo virus combination vaccine. The Coalition of Epidemic Preparedness Innovations (CEPI) supports rapid development of an Ebola vaccine against the Bundibugyo strain by several vaccine manufacturers. Among them are a vaccine based on the rVSV vaccine platform (International AIDS vaccine Initiative (IAVI's)), a vaccine based on the ChAdOx1 platform (University of Oxford and Serum Institute of India) phase 1 trial started July 2026, and a mRNA vaccine developed by Moderna. Efficacy of Merck's licensed Ervebo vaccine against this specific strain is being tested in a small scale animal study. Sabine vaccine institute is now testing a cAd3 Sudan Ebola vaccine in a phase 2 trial, development of previously mentioned cAd3-EBO Zaire ebola vaccine has been discontinued.
Several companies are developing an RSV/human meta pneumovirus (RSV/hMPV) combination vaccine but none of them has started a phase 3 trial yet. Sanofi (mRNA) and AstraZeneca (IVX-A12, virus-like particle (VLP)) have completed their phase 2 trials.

Information included in the table below is based on vaccine development pipeline/portfolio websites from vaccine manufacturers, the clinicaltrials.gov website, a database of clinical research studies including information on their results, and the WHO website. AstraZeneca, Bavarian Nordic and MSD were the only vaccine manufacturers that provided an update on their vaccine development pipeline upon our request, on which the update in the table below is based (June 2026).

9.3 Bacteria

	Vaccine type	Target group	Status
Clostridium difficile	Bivalent toxoid subunit vaccine PF-07831694 (Pfizer)	Older adults (>=65 yrs) and at-risk populations	Phase 3, study completion expected 2029
Escherichia coli	Conjugate vaccine 9-valent ExPEC9V (Johnsen & Johnsen, Sanofi)	Age 60 years and over	Phase 3, discontinued due to being insufficiently efficacious in preventing IED
Group B streptococcus	Multivalent polysaccharide conjugate vaccine (GBS6, Pfizer)	Maternal Prevention invasive infection	Phase 3 Results expected 2029 EMA PRIME* status
	Protein vaccine containing two fusion proteins (AlpN-GBS, Minervax)	Maternal, older adults	Phase 3 scheduled to start 2026 EMA PRIME* status
Lyme (*Borellia*)	Multivalent recombinant protein subunit vaccine (PF-07307405/VLA-15, Valneva/Pfizer)	Age 5 years and over	Phase 3 results (VE 73.2%) day 28, EMA submission for evaluation for market authorisation expected 2026
N. Meningitidis	MenQuadfi conjugated vaccine A, C, W, Y (Sanofi)	Age 6 weeks and over	Positive opinion EMA June 2026. Extension of indication for individuals age 12 month and older
Pneumococcus	Single dose pneumococcal polysaccharide conjugate vaccine PCV-21 (Capvaxive, Merck/MSD)	Children at risk aged 2–18 years (NCT06177912)	Positive opinion EMA March 2026. Extension indication for 18+ yrs
	PCV21 (Sanofi)	Infants, toddlers Young children and adolescents (2-7 yrs) with Sickle Cell Disease	Phase 3 results anticipated 2027
	25-valent PCV (Pfizer)	Age 6 weeks and over (3+1 schedule)	Phase 3, infants versus PCV20

	Vaccine type	Target group	Status
	31-valent PCV (VAX-31, Vaxcyte)	adults	Phase 3, OPUS1 vs PCV20 and Capvaxive in adults, results expected Q4 2026. OPUS2; co-admin influenza vaccine OPUS3; previously PCV vaccinated adults
Shigella	Outer membrane based with S. sonnei and S. flexneri 1b, 2a and 3a O Antigens (altSonflex1-2-3, Bharat Biotech and GSK)	infants	Entering Phase 3
Tuberculosis	M72/ASO1 adjuvanted recombinant subunit fusion protein (GSK licensed to Gates MRI, GSKs adjuvant)	Adolescents and adults (15-44 yrs)	Phase 3, study completion anticipated 2028
	MTBVAC live attenuated (Biofabri)	Infants	Phase 3 (Africa)
	Live attenuated (VPM1002, Serum Institute India)	Infants/neonates, adolescents and adults	Phase 3, prevent progression into active disease but does not prevent latent infection or the most infectious form of TB

9.4 Viruses

	Type vaccine	Target group	Status
Chikungunya	Live-attenuated IXCHIQ/VLA-1553 (Valneva)	Age 1-12 years	Phase 3 to be initiated after gathering additional real-world experience in adolescent population EU market authorisation for age 12 years and older. FDA temporarily suspended registration based on

	Type vaccine	Target group	Status
			4 SAEs, Valneva withdrew BLA voluntarily
	Adjuvanted Virus-like particles (VLPs) recombinant protein vaccine (Vimkunya, Bavarian Nordic)	Age 2 to <12 years	Phase 3, results anticipated 2028 EU market authorisation for age 12 years and older
***Cytomegalovirus* (CMV)**	mRNA (mRNA-1647) vaccine (Moderna)	Age 16–40 years	Phase 3 discontinued; did not meet primary efficacy endpoint of preventing CMV infection in seronegative female participants of childbearing age (16-40 years) Oct. 2025
Dengue	Single dose live attenuated tetravalent vaccine V181 (Merck)	Healthy Participants aged 2 to 17 years, regardless of prior dengue exposure	Phase 3 recruiting (NCT07013487)
Ebola (see text above table)	cAd3-EBO Z vaccine (Sabine vaccine institute)		Phase 3, development discontinued
Pandemic influenza vaccine	mRNA-based H5 pandemic influenza vaccine, mRNA-1018 (Moderna, CEPI)	Age 18 years and older	Phase 3 started April 2026
Norovirus	Trivalent mRNA encoding VLP-forming capsid proteins (mRNA-1403, Moderna)	Age18 years and over	Phase 3, trial has been on hold from Feb-May 2025 following a GBS case, difficult to find cases.
	Bivalent VLP vaccine (TAK-214, Takeda)	High risk populations	Phase 3

	Type vaccine	Target group	Status
Respiratory syncytial virus (RSV)	Clesrovimab (Enflonsia); Monoclonal antibodies against RSV-F protein; targets site IV (Merck)	Second RSV season for children with increased risk for severe RSV disease	Study results (NCT04938830) Clesrovimab (MK-1654-007) | submitted to EMA EU market authorisation for neonates and infants during first RSV season in April 2026
	Recombinant protein adjuvanted vaccine (GSK)	Age 18–49 years at increased risk	Extension of EU market authorisation for individuals of 60+yrs and 50-59 yrs at increased risk to 18 years and older
	mRNA (mRNA-1345) (Moderna)	Age 18–59 years high-risk 60+ EMA-approved)	Extension of EU market Authorisation from 60 yrs and older (2025) to 18 years and older
	Live-attenuated intranasal vaccine (SP0125, Sanofi)	Children 6 months to < 22 months of age	Phase 3, stopped Oct 2025 since unlikely to reach suitable efficacy according to independent data monitoring committee
Rabies	VRVg rabies, inactivated, purified, serum free viral vaccine (Sanofi)	All age groups	EMA evaluation registration, market authorisation anticipated H2 2026
SARS-CoV-2	mRNA (mRNA-1283) (mNexspike, Moderna)	Age 12 years and over	EU market authorisation February 2026
	Self-amplifying (sa) mRNA Kostaive	Age 18 years and over	EMA approval Feb. 2025

	Type vaccine	Target group	Status
	(zapomeran) (CSL Seqirus)		
SARS-Cov-2/flu	mRNA vaccine mRNA-1083 (mCombriax Moderna)	Age 50 years and older	EU market authorisation February 2026
	COVID-19-Influenza Combination (CIC) NVX-CoV2373 (SARS-CoV-2 recombinant Wuhan spike protein vaccine (rS)) and quadrivalent influenza hemagglutinin with a Matrix-M® saponin-based adjuvant (Nova vax)	Age 65 years and over	Phase 3, results initial cohort (n=2000), looking for partner
	mRNA (Pfizer)	Adults and risk groups	Phase 2/3, did not meet primary objective for influenza B strain (lower geometric mean titers and seroconversion versus influenza vaccine alone
Vaccinia virus	Live attenuated vaccine (Imvanex, Bavarian Nordic)	children 2-12 yrs of age	Phase 3 study for extention of current market authorisaton for age >12yrs
Yellow fever	Vero yellow fever (Sanofi)	Age 9 months and over	Phase 3 started, expected EMA submission for evaluation for market authorisation 2027

* The European Medicines Agency's (EMA) Priority Medicines (PRIME) scheme offers early regulatory support to accelerate the development of innovative medicines addressing unmet medical needs

List of abbreviations

4CMenB	multicomponent meningococcal B vaccine
2vHPV	bivalent human papillomavirus vaccine
4vHPV	quadrivalent human papillomavirus vaccine
95%CI	95% confidence interval
9vHPV	nonavalent human papillomavirus vaccine
AEFI	adverse event following immunisation
AE	adverse events
AFP	acute flaccid paralysis
AGE	acute gastroenteritis
AGW	anogenital warts
ARI	acute respiratory infection
BeSD	Behavioral and Social Drivers
bOPV	bivalent oral polio vaccine
CBS	Statistics Netherlands; Centraal Bureau voor de Statistiek
CDC	Centre for disease control
C	Corynebacterium
CD4	cluster of differentiation 4
CFR	case fatality rate
CI	confidence interval
CIb	Centrum Infectieziektebestrijding (Centre for Infectious Disease Control)
CIMS	COVID-vaccination Information and Monitoring System
CIN	cervical intraepithelial neoplasia
CMV	Cytomegalo virus
COVID-19	coronavirus disease 2019
Cq	quantification cycle
CRM	cross-reactive material conjugate
CRPS	complex regional pain syndrome
CRS	congenital rubella syndrome
CSF	cerebrospinal fluid
cVDPV1	circulating vaccine derived polio virus type 1
cVDPV2	circulating vaccine derived polio virus type 2
cVDPV3	circulating vaccine derived polio virus type 3
DALY	disability-adjusted life years
DHD	Dutch Hospital Data
DNA	deoxyribonucleic acid
DT	diphtheria toxoid
DTP	combination of diphtheria, tetanus and pertussis vaccines
DTaP	combination of diphtheria, tetanus and acellular pertussis vaccines
DTaP-IPV	combination of diphtheria, tetanus, acellular pertussis and inactivated polio vaccines

DT-IPV	combination of diphtheria, tetanus and inactivated polio vaccines
DTP1	first dose of a combination of diphtheria, tetanus and pertussis vaccine
DTP3	third dose of a combination of diphtheria, tetanus and pertussis vaccine
DTaP-IPV-HBV-Hib	combination of diphtheria, tetanus, pertussis, inactivated polio, hepatitis B virus and *Haemophilus influenzae* type b vaccines
ECDC	European Centre for Disease Control and Prevention
EEA	European Economic Area
EIA2030	European Immunisation Agenda 2030
ELISA	enzyme-linked immunosorbent assay
EMA	European Medicines Agency
Epi-year	Epidemiological year (July-June)
EU	European Union
EV	enterovirus
FDA	Food and Drug Administration
FHA	filamentous haemagglutinin
FHbp	factor H-binding protein
GAVI	Global Alliance for Vaccines and Immunization
GBD	global burden of disease
GBS	Guillain-Barré syndrome
GDPR	general data protection regulation
GE	gastroenteritis
GGD	municipal health services; gemeentelijke gezondheidsdiensten
gMATS	genomic meningococcal antigen typing system
GMC	geometric mean concentration
GP	general practitioner
GPLN	(WHO) Global Polio Laboratory Network
GPSC	Global Pneumococcal Sequence Cluster
GSL	(WHO) Global Specialized Laboratory
HAV	hepatitis A virus
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HepA	hepatitis A
HepAB vaccine	Hepatitis A Inactivated and Hepatitis B (Recombinant) vaccine
HepB	hepatitis B
HHE	Hypotonic-hyporesponsive episode
Hi	*Haemophilus influenzae*
Hia	*Haemophilus influenzae* type a
Hib	*Haemophilus influenzae* type b
Hie	*Haemophilus influenzae* type e
Hif	*Haemophilus influenzae* type f
HIV	human immunodeficiency virus
HPV	human papillomavirus
HPVc	HPV vaccine, completed series
HR	hazard ratio

hrHPV	high-risk human papillomavirus
HWS	The Netherlands Ministry of Health, Welfare and Sport
HZ	herpes zoster
IA2030	Immunisation Agenda 2030
IBD	Inflammatory Bowel Disease
ICD	International Classification of Diseases
ICPC	International Classification of Primary Care
ICU	intensive care unit
IDS	Centre for Infectious Disease Research, Diagnostics and Screening
IDU	injecting drug use
IgA	immunoglobulin A
IgG	immunoglobulin G
IKNL	Netherlands Comprehensive Cancer Organisation; Integraal Kankercentrum Nederland
IMD	invasive meningococcal disease
IPD	invasive pneumococcal disease
IPP	invasive pneumococcal pneumonia
IPV	inactivated polio vaccine
IRR	incidence rate ratio
IU	International units
JGZ	youth health care; jeugdgezondheidszorg
LBZ	national register hospital care
LINH	Netherlands Information Network of General Practice; Landelijk informatienetwerk huisartsenzorg
LMR	national medical register
LZV	Live attenuated herpes zoster vaccines
MBC	memory B-cell
MCV	measles-containing vaccine
MCV1	first dose of a measles-containing vaccine
MCV2	second dose of a measles-containing vaccine
MenABCWY	pentavalent meningococcal conjugate vaccine
MenACWY	quadrivalent meningococcal conjugate vaccine
MeV	Measles virus
MHS	Municipal Health Services
MIA	Multiplex Immuno Assay
MMR	combination of measles, mumps and rubella vaccines
MMRV	combination of measles, mumps, rubella and varicella vaccines
MNT	Maternal and Neonatal Tetanus
MNTE	Maternal and Neonatal Tetanus Elimination
MRBP	macrolide-resistant B. pertussis
MSM	men who have sex with men
NA	Not Available
NICE	Dutch National Intensive Care Evaluation; Nationale Intensive Care Evaluatie
NIP	National Immunisation Programme

Nivel	Netherlands Institute for Health Services Research; Nederlands Instituut voor Onderzoek van de Gezondheidszorg
Nivel-PCD	Nivel Primary Care Database
NKR	Netherlands Cancer Registry
NL	Netherlands
NPG	Nationaal Programma Grieppreventie (National Influenza Prevention Programme)
NPL	National Polio Laboratory
NPPV	Nationaal Programma Pneumokokkenvaccinatie Volwassenen (adult pneumococcal vaccination program)
NRLBM	Netherlands Reference Laboratory for Bacterial Meningitis
NTHi	nontypeable *Haemophilus influenzae*
nWGS	near complete whole genome sequencing
NWKV	Dutch Working Group for Clinical Virology; Nederlandse Werkgroep voor Klinische Virologie
OPIs	orthodox Protestant individuals
OPV	oral polio vaccine
OR	odds ratio
OSIRIS	Dutch information system for infectious disease surveillance; Online systeem voor infectieziekten registratie binnen ISIS
PCR	polymerase chain reaction
PCV	pneumococcal conjugate vaccine
PCV3	third dose of a pneumococcal conjugate vaccine
PCV7	heptavalent pneumococcal conjugate vaccine
PCV10	10-valent pneumococcal conjugate vaccine
PCV12	12-valent pneumococcal conjugate vaccine
PCV13	13-valent pneumococcal conjugate vaccine
PCV15	15-valent pneumococcal conjugate vaccine
PCV20	20-valent pneumococcal conjugate vaccine
PCV21	21-valent pneumococcal conjugate vaccine
PCV24	24-valent pneumococcal conjugate vaccine
PCV31	31-valent pneumococcal conjugate vaccine
PEF	Polio Essential Facility
PEP	post-exposure prophylaxis
PICO	PIENTER Corona study
PICU	paediatric intensive care unit
Pneu	pneumococcal disease
POTS	postural orthostatic tachycardia
PPV	pneumococcal polysaccharide vaccine
PPV23	23-valent pneumococcal polysaccharide vaccine
PR	prevalence ratio
PrEP	pre-exposure prophylaxis
PRN	pertactin
PRNT	plaque reduction neutralization test
PSUR	Periodic Safety Update Reports
PT	pertussis toxin
PV	poliovirus

QALY	quality-adjusted life year
qPCR	real-time polymerase chain reaction
RCC	Regional Certification Commission
RCT	randomized controlled trial
RCV	rubella-containing-vaccine
RDD	regression discontinuity design
RIVM	Netherlands National Institute for Public Health and the Environment
RNA	ribonucleic acid
RR	relative risk
RSV	respiratory syncytial virus
RV	rotavirus
RVC	Regional Verification Commission
RZV	recombinant zoster vaccine (Shingrix®)
SAGE	Strategic Advisory Group of Experts on Immunization
SARI	Severe acute respiratory infection
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SEP	Socioeconomic Position
SFK	Foundation for Pharmaceutical Statistics
SIDS	sudden infant death syndrome
SLPV	Sabin-like poliovirus
SLPV1	Sabin-like poliovirus type 1
SLPV3	Sabin-like polioviruses type 3
SocioVax	social science research on vaccination; sociaalwetenschappelijk onderzoek naar vaccineren
ST	sequence type
STI	sexually transmitted infection
STP	sewage treatment plants
Tdap	tetanus, diphtheria and pertussis vaccine
THP	tailoring health programmes
TNFi	tumor necrosis factor inhibitors
UK	United Kingdom
UNICEF	United Nations International Children’s Emergency Fund
USA	United States of America
VASCO	Vaccination Study on the Coronavirus
VDPV	vaccine-derived poliovirus
VE	vaccine effectiveness
VLPs	virus-like particles
VP1	polio virus protein 1
VPDs	vaccine preventable diseases
VZV	varicella zoster virus
WGS	whole-genome sequencing
WHO	World Health Organisation
WHO EU	WHO European Region
WHO THP	World Health Organisation Tailoring Health Programmes

WPV	wild poliovirus
WPV1	type 1 wild poliovirus
YHC	youth healthcare

Appendix 1 Methods for monitoring and evaluation of the national immunisation programme

A1.1 Disease surveillance

The National Immunisation Programme (NIP) is monitored and evaluated by the RIVM by analysing data on vaccine coverage, disease and virological surveillance and sero-epidemiology related to the target diseases. Here we describe the various data sources used for disease surveillance (including mortality and morbidity) and the various methods used to estimate vaccine impact, vaccine effectiveness, burden of disease, and cost-effectiveness.

A1.1.1 Data sources

A1.1.1.1 Notification data

Mandatory disease notifications are an important source of surveillance data for the diseases included in the NIP. Mandatory notification of certain infectious diseases was introduced in the Netherlands in 1865. Since then, several changes in the notification procedures have been implemented. Not all diseases targeted by the NIP have been notifiable throughout the entire period (Table A1.1) [1]. In December 2008, a new law (Wet Publieke Gezondheid) was passed, which requires notification of all NIP-targeted diseases except human papillomavirus (HPV). Rotavirus vaccination was added to the NIP in 2024 and immunisation against respiratory syncytial virus (RSV) was added in 2025; but both are not (yet) notifiable in the Netherlands.

There are four notifiable disease categories. Diseases in category A have to be reported by telephone immediately following a suspected case. Diseases in categories B1, B2, and C must be reported within 24 hours or 1 working day following laboratory confirmation. However, under-reporting and reporting delays are issues with regard to several diseases [2]. In each of the first three categories (A, B1, and B2), various intervention measures can be enforced by law to prevent spreading of the disease.

Physicians and clinical laboratories are required to notify cases to the Municipal Health Centres (GGDs). The GGD in question reports cases to RIVM through the online Osiris platform. In addition to patient characteristics (e.g. year of birth, sex, postal code), epidemiological (e.g. related cases, risk factors) and clinical data (e.g. hospital admission, death, vaccination status) is collected through the notifications.

Table A.1.1 Periods and category of statutory notification for vaccine-preventable diseases (VPDs) included in the current National Immunisation Programme (NIP).

Disease	Category	Periods of notification by legislation
Diphtheria	B1	From 1872 onwards
Pertussis	B2	From 1975 onwards
Tetanus	C	1950-1999, from December 2008 onwards
Poliomyelitis	A	From 1923 onwards
Invasive *Haemophilus influenzae* type b	C	From December 2008 onwards
Hepatitis B disease	B2	From 1950 onwards
Invasive pneumococcal disease	C	From December 2008 onwards for children born in or after 2006, from March 2021 onwards for persons aged 60 years and older
Mumps	C	1975-1999, from December 2008 onwards
Measles	B2	1872-1899, from 1975 onwards
Rubella	B2	From 1950 onwards
Invasive meningococcal disease	C	From 1905 onwards
COVID-19	A	From 28 January 2020–June 2023

A1.1.1.2 Register-based data

A1.1.1.2.1 Death statistics

Statistics Netherlands (CBS) registers mortality data from death certificates on a statutory basis. The registration specifies whether a natural death, a non-natural death, or a stillborn child is concerned. In the event of a natural death, the physician is required to report the illness or disease that has led to death (primary cause), any complication directly related to the primary cause that has led to death (secondary cause), as well as additional diseases and specifics present at the moment of dying that have contributed to death (further secondary causes). CBS codes causes of death according to the International Classification of Diseases (ICD). This classification is adjusted every ten years or so, which has to be taken into account when identifying mortality trends. Since the statistical year 2013, CBS has used the IRIS programme to automatically code the causes of death [3]. One of the advantages of this procedure is that it increases the international comparability of data. The change in coding did, however, cause considerable (once-only) shifts in the statistics.

A1.1.1.2.2 Hospital admissions

Until 2010, hospital data was managed by the Prismant research institute in the National Medical Register (LMR). Since 2011, Dutch Hospital Data (DHD) has managed the LMR. Since 2013, the National

Register Hospital Care (LBZ), managed by DHD, has received the discharge diagnoses of all patients admitted to hospital. Outpatient diagnoses are not registered. Diseases, including all NIP-targeted diseases, are coded as the main or subsidiary diagnosis according to the ICD-10 coding system. Until mid-2005, coverage of this registration system amounted to about 99%. Since then, coverage has fluctuated due to changes in funding. The data presented in this report only relates to the main diagnoses of clinical admissions. From 2015 onwards, hospitalisation data has been retrieved from Statistics Netherlands. This data is corrected for non-participating hospitals, which may have resulted in a trend break from previous years. Admissions for NIP diseases are counted per year, age group, and sex, and de-duplicated to include one admission per person, year, and disease. Due to privacy regulations, data is rounded to the nearest five. Therefore, one should take into account that 0 cases is not always actually 0 but may also mean 1 or 2 cases. Data for 2025 is not yet available at the time of writing this report.

Between 2020 and 2023, the NICE COVID-19 database was used to monitor COVID-19 hospitalisations. Linkage of the NICE COVID-19 database to the CIMS vaccination register allowed for vaccine effectiveness estimates against COVID-19 hospitalisation.

A1.1.1.2.3 Primary care data

Nivel Primary Care Database (Nivel-PCD) uses routinely recorded data from primary healthcare providers to monitor health and the utilisation of health services in a representative sample of the Dutch population. The database includes data from routine electronic medical records of general practitioners (GPs) [4, 5]. Symptoms and diagnoses of consulting patients are recorded using the International Classification of Primary Care (ICPC-1). The use of electronic health records for research purposes is allowed under certain conditions. When these conditions are fulfilled, neither obtaining informed consent from patients nor approval by a medical ethics committee is obligatory for this type of observational studies, which contain no directly identifiable data (art. 24 General Data Protection Regulation (GDPR) implementation Act jo art. 9.2 sub j GDPR). Annual incidence estimates of the total number of new episodes appearing in general practices in the Netherlands are generated by extrapolating the reporting rates in these practices to the total number of Dutch residents, as obtained from Statistics Netherlands (CBS). The incidences of varicella and herpes zoster have been calculated on the basis of this data. The current Dutch RSV surveillance programme is based among others on Nivel-PCD GP surveillance of patients with acute respiratory infections (ARI), including bronchiolitis. Nose swabs and throat swabs are collected from a subset of patients with ARI and sent to RIVM for virological laboratory diagnostics on influenza virus, RSV, rhinovirus, and enterovirus. Diagnostics have been extended to SARS-CoV-2 from February 2020, parainfluenza virus types 1-4, human metapneumovirus, human seasonal coronaviruses from January 2021, and adenovirus from October 2023.

A1.1.1.3 Laboratory data

Laboratory diagnostics are important in monitoring infectious diseases and the effectiveness of vaccination; approximately 75% of all infectious

diseases can only be diagnosed definitively by laboratory tests [6]. Furthermore, typing and sequencing can give more valuable information.

However, limited information on patients is registered and, in many cases, laboratory confirmation is not sought for self-limiting vaccine-preventable diseases. Two laboratory surveillance systems used for NIP disease surveillance are the Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM) and the virological laboratories, which are part of the Dutch Working Group for Clinical Virology.

A1.1.1.3.1 Netherlands Reference Laboratory for Bacterial Meningitis (NRLBM)

The NRLBM is a collaboration between the RIVM and the Amsterdam University Medical Centre (Amsterdam UMC). On a voluntary basis, microbiological laboratories throughout the Netherlands send isolates and samples from normally sterile sites (e.g. blood and cerebrospinal fluid (CSF)) of patients with invasive diseases caused by meningococci, pneumococci, and *Haemophilus influenzae* to the NRLBM for further typing. For invasive meningococcal disease and invasive *H. influenzae* disease, there has been nationwide coverage of laboratory surveillance for a long time, at least since the introduction of vaccination for these diseases. Whereas isolate selection was first restricted to samples from CSF or blood, since 2023, laboratories have been requested to send in material from all normally sterile sites, not only from blood or CSF.

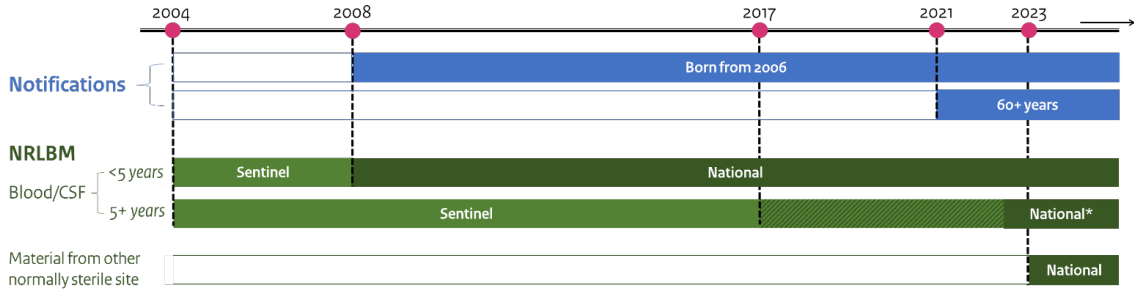
For invasive pneumococcal disease, nine sentinel clinical laboratories distributed throughout the country have sent in isolates and samples from blood or CSF positive for *Streptococcus pneumoniae* since 2004, (Figure A1.1). Up to 2020, these nine sentinel laboratories covered approximately 25% of the Dutch population; since 2020, coverage increased to 28%. For children aged under 5 years, all clinical laboratories have sent in isolates and samples from blood or CSF positive for *S. pneumoniae* since 2008, resulting in national coverage for this age group. Since 2017, all laboratories have been requested to submit isolates and samples from blood or CSF positive for *S. pneumoniae* without restrictions to the patient's age, resulting in national surveillance for all age groups. From the epidemiological year 2022–2023 onwards, national data rather than sentinel data has also been used for analyses on surveillance data for age groups >=5 years. Because of the changes in IPD surveillance over time, only IPD diagnoses based on positive blood or CSF samples are included in the analyses of long-term trends. All pneumococcal isolates are serotyped, and CSF-samples are tested using PCR for confirmation of the pneumococcal infection.

For meningococci, isolates are serogrouped and further characterised by DNA sequencing based on PorA and FetA finetype. Finetype is used in surveillance to determine whether potential clusters are occurring, since isolates within an outbreak will generally have an identical finetype. Additionally, whole genome sequencing was performed in batches for IMD serogroup B isolates at least up to and including June 2024.

Haemophilus influenzae isolates are serotyped. Additionally, the biotype is determined for non-typeable *Haemophilus influenzae* isolates.

Data from the NRLBM is linked to notification data for IPD, IMD, and invasive Hib disease. For non-b *Haemophilus influenzae* infections, only limited case information is available.

Figure A1.1 Overview of surveillance of invasive pneumococcal disease over time.



National data for persons aged 5 years and over has been used in analyses of surveillance data from 2022–2023.
*Since 2017 all laboratories in the Netherlands have been asked to send in samples for all age groups, but only since the epidemiological year 2022–2023 has national data been used in surveillance.

In 2025-2026, the RIVM evaluated the completeness of isolate submission from the medical microbiological laboratories to the NRLBM for the invasive bacteria pneumococcus, meningococcus, *Haemophilus influenzae* and *Streptococcus pyogenes*. Therefore, records of submitted isolates in the years 2015-2024 were extracted from the databases of the NRLBM and of ISIS-AR, the national surveillance system for antimicrobial susceptibility testing. For each database, isolates were deduplicated if these were isolated from the same patient within 30 days of each other. Only isolates matching the NRLBM submission criteria were kept for analysis. Isolate counts were aggregated by organism, year, patient age group, source material and submitting laboratory. Completeness was calculated by dividing the number of NRLBM isolates by the number of ISIS-AR isolates for a particular organism and year, since we expected that isolates from invasive infections would always be tested for antimicrobial susceptibility. Completeness was determined for CSF and blood only, as well as for isolated from all normally sterile sites, as the request for isolate submission had been broadened to isolated from all normally sterile sites in 2023. See the disease-specific chapters for results.

A1.1.1.3.2 Virological laboratories

Every week, virological laboratories that are members of the Dutch Working Group for Clinical Virology send positive results of virological diagnostics to RIVM. Approximately 22 laboratories submit information on a regular basis. Aggregated results are shown on the RIVM website. For more information, also on other sources for RSV surveillance, please see the background and method document on the respiratory surveillance of 2024-2025.

It is important to bear in mind that the presence of a virus does not automatically imply the presence of disease. As from 1 December 2014, information on the total number of tests performed can be reported for each week or each year.

A1.1.1.4 Dedicated studies

In addition to the data sources described above, dedicated disease surveillance studies are performed to collect data on hospitalisation or mortality. Further details about dedicated studies can be found in the disease-specific chapters.

A1.1.1.5 Validity of the different data sources

Data from registers on mortality and hospitalisation is not always reliable. For example, cases of post-poliomyelitis syndrome are sometimes classified as acute poliomyelitis, even though they occurred many years ago. Furthermore, cases of acute flaccid paralysis (AFP) due to causes other than poliovirus infection are sometimes inadvertently registered as cases of acute poliomyelitis [7]. Thus, for poliomyelitis, notifications are a more reliable source of surveillance data.

Moreover, for invasive *H. influenzae* disease, invasive pneumococcal disease, and, to a lesser extent, invasive meningococcal disease, data on mortality and hospital admissions based on registration databases is unreliable. This is because they are syndromic diseases (meningitis, sepsis, and pneumonia) and the causative pathogen is not always correctly specified when these diseases are coded. Notification data in combination with laboratory data from the NRLBM is more reliable for these diseases.

A specific ICD-10 code is available (A08.0) for Rotavirus (RV) disease. However, this code is hardly ever used in the Netherlands, as more general ICD categories are felt to suffice. Moreover, gastroenteritis hospitalisations are often not tested in general for all causative pathogens, in particular if very young children are concerned. For this reason, the number of gastroenteritis hospitalisations attributable to RV is estimated indirectly according to a method proposed by Harris et al. [8]. Using this method, the proportion of hospitalisations for gastroenteritis attributable to RV can be estimated by comparing the weekly RV laboratory detections (surveillance virological laboratories) with the number of hospitalisations for specific gastroenteritis ICD-10 codes (A0,-A09, K52, K529) using Poisson regression analysis, or negative binomial regression in case of overdispersion. In this analysis, weekly hospital admissions for the selected ICD-10 codes per age category are used as the outcome variable, with the number of rotavirus laboratory detections from weekly virological surveillance as the predictor. The resulting coefficients from the regression model are used to estimate the number of rotavirus-attributed hospitalisations by multiplying them by the number of reported rotavirus laboratory detections. For this report, coefficients were estimated by imposing the model onto hospitalisation data and weekly laboratory detections from a five-year window, spanning two years prior to and two years after the year of interest. The COVID-19 pandemic years (2020–2022) are modelled separately with their own coefficients due to atypical patterns in hospitalisations and laboratory detections. For the most recent years, the coefficient was based on data from 2018, 2019, and 2023. This coefficient was used to estimate the RV-attributed hospital admissions for the most recent year (for which data is not yet available) by multiplying it by the RV-positive laboratory detections of that year.

From 2012 onwards, incidence rates from Nivel-PCD have been calculated using an adjusted procedure: changes were made to the definitions of disease episodes and to calculations of incidence, which caused an increased incidence for many diseases. Episode duration is defined as the time between the first and last consultation registered with the same code, plus an additional period in which patients are considered not to be susceptible (eight weeks for acute morbidities/complaints). Incidence rates are calculated using a more specific selection of patient years, resulting in a more reliable denominator [9, 10]. Because of these changes, we decided to report previously published incidence rates until 2011 on the basis of the old method [11] and incidence rates from 2012 onwards on the basis of the new method [9]. Due to the new estimation method, the data from 2012 (based on 219 practices) and onwards is not comparable to the data from previous years.

A1.1.2 Methods for disease surveillance

A1.1.2.1 Burden of disease

The disability-adjusted life year (DALY) is a composite health measure that was developed to compare the impact of diseases. The idea behind this approach is that the impact of a particular disease can be split between the number of years of life lost (i.e. premature mortality) and the number of years lived at less than full health (i.e. morbidity). The result is a single measurement unit that quantifies the years of healthy life lost due to a certain disease or infection. The full methodology used to estimate the disease burden of infectious diseases in the Netherlands, expressed in DALYs, is described in the State of Infectious Diseases in the Netherlands, 2013 [12].

A1.1.2.2 Impact of implementation of vaccination

The impact of vaccination (programmes) can be estimated by comparing disease burden following the implementation of vaccination to disease burden prior to the implementation. This can be realised quite simply by a before/after comparison of incidence. However, results can be confounded, e.g. by underlying trends. A more complex alternative is applying time series analysis, in which, for example, time trends before the implementation of vaccination, seasonality, and vaccination coverage can be taken into account. The vaccination status of individuals is not needed to estimate the impact of a vaccination programme; the vaccination coverage of the population suffices. In addition to the effectiveness of the vaccination itself, vaccination coverage, and the level of herd protection determine the impact of a vaccination programme.

A1.1.2.3 Vaccine effectiveness

To estimate vaccine effectiveness, at least data on the vaccination status of the cases and of the population is necessary.

Following the implementation of a vaccination in the NIP, vaccine effectiveness (VE) can be routinely estimated using the 'screening method' [13] with the following equation:

VE (%) = 1- [PCV / (1-PCV) * (1-PPV/PPV)], in which;

PCV = proportion of cases vaccinated;
PPV = proportion of population vaccinated;
1-PCV = proportion of cases that is either not vaccinated, partially vaccinated, or had an unknown vaccination status;
1 – PPV = proportion of population that is either not vaccinated, partially vaccinated, or had an unknown vaccination status, and;
VE = vaccine effectiveness.
It is worth noting, however, that this method is very sensitive to changes in the proportion of population and cases vaccinated. Therefore, the fact that the vaccine coverage of the population can be monitored less precisely due to the informed consent procedure affects the reliability of the VE estimates.

In addition, several study designs, including case-control and cohort studies, can be used to assess VE following implementation [14]. A specific type of case-control design used to estimate VE is the indirect cohort design or Broome method [15]. This design can be used for a vaccine that protects against specific types of a pathogen, for example, 10-valent pneumococcal conjugate vaccine, which protects against 10 pneumococcal serotypes. Cases in which the disease is caused by a vaccine type are the 'cases', and cases in which the disease is caused by a type not included in the vaccine serve as 'controls'. Vaccination status is then compared across the 'cases' (vaccine-type cases) and the 'controls' (non-vaccine-type cases). The advantage of this design is that it adjusts for ascertainment bias between cases and controls, as both cases and controls are actually ill. One assumption in this design is that vaccinated people are at the same risk of non-vaccine-type infection as unvaccinated people. This means that VE is underestimated in the case of cross-protection by the vaccine against non-vaccine-type disease. Conversely, if a replacement disease occurs only in vaccinated people, VE is overestimated.

Multiple statistical approaches are available to evaluate VE against persistent HPV infections through the use of cohort studies. These approaches differ with respect to their underlying assumptions [16]. On the basis of the available literature, absence of violations of the underlying assumptions, and the use of data throughout the follow-up, we suggest the Prentice Williams Peterson Total-Time (PWP-TT) approach as being the most valid method to evaluate vaccine effectiveness against HPV infections in cohort studies conducted among young women. The PWP-TT is a survival analysis method for recurrent events, taking into account the total time at risk. It assumes event-specific hazards, allowing the hazard to be different for each subsequent event [17]. We estimated VE as one minus the hazard ratio times 100%. If VE is estimated against a combined endpoint of multiple HPV types, being infected with one of these types at that time point is used as the outcome instead of the total number of infections.

A1.1.2.4 Pertussis vaccination coverage

Up to and including publication year 2018, standardised vaccination coverage estimates of 96% and 92% were used for the PPV to calculate vaccine effectiveness of the primary vaccination series and the booster vaccination, respectively. From publication year 2019 onwards, in response to the changes in vaccination coverage, the vaccination

coverage as reported in the national vaccination coverage report has been used for each birth cohort. This results in a different PPV for each birth cohort and more accurate VE calculation. However, the fact that the vaccine coverage of the population and the vaccination status of the cases can be monitored less precisely due to the informed consent procedure, affects the reliability of the VE estimates from more recent years.

A 1.1.2.5 Epidemiological years invasive pneumococcal disease

The monthly number of IPD cases follow a seasonal pattern, with a peak during the influenza season in the winter months. Using calendar years may lead to large variability in annual numbers depending on the timing of the influenza peak (most cases before or after January 1th); therefore, epidemiological years or epi-years are used in IPD surveillance. These epi-years run from June of the first calendar year to May of the second calendar year, e.g. June 2023 – May 2024 (written as epi-year 2023–2024).

A1.2 Molecular surveillance of the pathogen

Monitoring strain variations due to differences in phenotype and/or genotype is an important part of information gathering on the emergence of (sub)types that may either be more virulent or less effectively controlled by vaccination. It is also a useful tool for increasing insights into transmission dynamics.

A1.3 Immunosurveillance

Monitoring the seroprevalence of NIP-targeted diseases is a way to gather age-specific and sex-specific information on immunity to these diseases, acquired either through natural infection or vaccination. To achieve this, a random selection of people from the general population of the Netherlands is periodically asked to donate a blood sample and complete a questionnaire (PIENTER survey). This survey was conducted in 1995–1996 (N_{blood}=10,128) [18], 2006–2007 (N_{blood}=7904) [19], and 2016–2017 (N_{blood}=5745)[20]. The next PIENTER study sampling started in the autumn of 2026. People living in regions with low vaccine coverage and non-Western migrants are oversampled in order to gain greater insights into differences in immunity among specific groups.

The PIENTER Corona (PICO) study, a derivative of the PIENTER study, is a Dutch nationwide prospective population-based cohort study that was set up during the early stages of the COVID-19 pandemic [21-23]. Its primary aim was to assess levels of antibodies to SARS-CoV-2 in consecutive blood samples of over 10,000 unique participants across all ages and regions representative of the Dutch population. In total, thirteen study rounds were performed up until the end of 2024.

A1.4 Vaccination coverage

Vaccination coverage data can be used to gain insight into the NIP's effectiveness. Furthermore, this information can help identify groups with low vaccine coverage who are at increased risk of contracting one of the NIP-targeted diseases. In the Netherlands, all vaccinations administered within the framework of the NIP are registered in a central electronic (web-based) database at the individual level (Præventis) [24].

COVID-19 vaccinations are registered in CIMS, which is used to estimate COVID-19 vaccination coverage.

As from 1 January 2022, informed consent is required to send vaccination data containing personal data with RIVM. As a result, RIVM can no longer determine vaccination coverage exactly. Anonymous vaccinations cannot be included in vaccination coverage calculations, as year of birth, sex, place of residence, and vaccination dose are unknown. Therefore, the registered vaccination coverage is lower than the actual vaccination coverage. In addition, the DTaP-IPV-HBV-Hib figures for newborns born from August 2020 until December 2021 (reporting years 2023–2024) are negatively affected if the DTaP-IPV vaccine schedule indication is missing and the assessment of the vaccination status is too strict as a result.

The CIMS dataset only contains vaccinations of people who gave consent for registration in CIMS. Therefore, the registered vaccination coverage is lower than the actual vaccination coverage. During the autumn round of 2025, 95% of people who were vaccinated by the Municipal Health Services gave consent for registration in CIMS. For people vaccinated by other organisations, this percentage is unknown.

The CIMS database is linked to the Personal Records Database (BRP). The numerator is updated daily and the denominator data is updated monthly, to account for vaccinated individuals who have passed away or emigrated.

A1.5 Surveillance of adverse events following vaccination

Until 2011, RIVM used passive safety surveillance through an enhanced spontaneous reporting system. An aggregate analysis of all reported adverse events following immunisation (AEFIs) was published annually. The last report, for 2010, also contains a detailed description of the methodology used and a review of trends and important findings over the previous fifteen years [25].

On 1 January 2011, this enhanced spontaneous AEFI reporting system was taken over by the Netherlands Pharmacovigilance Centre (Lareb). Detailed information is available at www.lareb.nl. In view of this transition, comparisons between the period before 2011 and the period from 2011 onwards should be made with caution. Furthermore, in 2011, Lareb started a campaign among parents of vaccinated children to promote the reporting of AEFIs. Until 2017, Lareb combined all injection site reactions as a single adverse event. Between 2017 and 2022, all injection site reactions were listed separately, but starting from 2023, these reactions have been combined again. Because changes to the NIP occur regularly, the effect of these changes is often not reflected in the total number of adverse events reported annually by Lareb.
In addition, the RIVM Centre for Infectious Disease Control (CIb) conducts systematic studies to monitor the vaccine coverage and vaccine effectiveness of the NIP, such as questionnaire surveys and linkage studies between different databases. When appropriate, adverse events will be included in these studies.

A1.6 Cost-effectiveness

The decision to include a certain vaccination option in the NIP is based on several factors, including vaccine safety and efficacy, avertable disease burden, acceptability, and cost-effectiveness of vaccination. Cost-effectiveness is defined as the additional cost per additional unit of health benefit produced, compared to an alternative, such as the vaccine already in use or no vaccination. In other words, economic evaluation of a vaccination programme provides information on whether the health gain associated with a new vaccine is worth the cost as compared with other options for investing in health improvements or prevention. Most commonly, cost-effectiveness is expressed in cost per quality-adjusted life year (QALY), which is a measure of disease burden comprising both the quality and quantity of life. If provided in a transparent and standardised manner, evidence of cost-effectiveness can contribute to policy recommendations for vaccinations included in the NIP.

A1.7 Methods on the Dutch Caribbean islands

Monitoring methods on the Dutch Caribbean CAS and BES islands (Curaçao, Aruba, St. Maarten; and Bonaire, St. Eustatius and Saba, respectively) differ from the European Netherlands as well as between islands. All islands have their own register for notifications of diseases included in the NIP. This data is shared with RIVM upon request.

For the surveillance of vaccinations administered within the NIP, as well as COVID-19 vaccinations and population size, the islands share data with RIVM on an annual basis. It is imperative to note that in the CAS and BES islands, in contrast to continental Netherlands, local vaccination data registration systems are not linked to local population registers. As a result, immigration and emigration cannot be monitored precisely. The method used for determining vaccination coverage often results in an underestimation where school-aged children are concerned, as vaccinations are usually offered per school year regardless of a child's year of birth. In that case, the age limits of five, ten, and fifteen years, as maintained for the European Netherlands, are not always met.

A1.8 Literature

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Appendix 2 Morbidity and mortality figures

Diseases included in the current NIP

Diphtheria (ICD-10: A36)															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hospitalisations ^ (source: Prismant/DHD/CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notifications (source: Osiris)															
2015	0	0	0	0	0	0	0	0	4	0	1	0	5	0	5

Diphtheria (ICD-10: A36)															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2016	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
2017	0	0	0	0	0	0	0	0	0	1	2	1	2	2	4
2018	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
2019	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
2020	0	0	0	0	0	0	0	0	0	2	1	0	1	2	3
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	5	1	0	0	2	0	7	1	8
2023	0	0	0	0	0	0	9	0	5	0	0	0	14	0	14
2024	0	0	0	0	0	0	0	0	1	0	1	1	2	1	3
2025	0	0	0	0	0	0	0	0	0	0	3	4	3	4	7
Laboratory diagnoses (source: IDS, RIVM)**															
2015	0	0	0	0	0	0	0	0	5	1	3	2	8	3	11
2016	0	0	0	0	0	0	0	1	3	1	6	5	9	7	16
2017	0	0	0	0	0	0	0	0	4	3	4	1	8	4	12
2018	0	0	0	0	0	0	0	0	5	1	5	2	10	3	13
2019	1	0	0	0	0	1	0	1	3	2	6	1	10	5	15
2020	0	0	0	0	0	0	0	0	1	2	6	1	7	3	10
2021	0	0	0	0	0	0	1	0	5+	1	3	0	9+	1	10+
2022	0	0	0	0	0	0	10×	2	0	3	3	0	13×	5	20#×
2023	0	0	0	0	1	0	6	0	6	1	3	1	17$	2	20$<
2024	0	0	0	0	0	0	0	0	8	3	9	6	17	9	27<
2025	0	0	0	0	0	0	3	0	9	3	24×	6	36×	9	45×

* Preliminary figures.
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.
** Number of diphtheria isolates.
+ Two isolates came from the same patient, but were collected at different times and from different sample types.
× Twice, two isolates came from the same patient, were collected during the same week, and came from different sample types.
Two isolates came from the same patient (gender unknown), were collected during the same week, and came from different sample types.
$ For one isolate age was unknown.
< For one isolate sex was unknown.

Haemophilus influenzae ICD-10: G000, J14, J201, A413, A492 and B963															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Notifications (serotype b; source: Osiris)															
2015	3	0	1	3	0	0	0	0	4	0	2	0	10	3	17
2016	7	0	6	6	0	0	1	0	2	2	6	6	22	14	36
2017	1	3	2	6	2	2	0	1	4	2	5	9	14	23	37
2018	6	1	4	7	1	1	0	0	0	2	3	8	14	19	33
2019	6	3	4	3	0	0	1	1	1	4	6	10	18	21	39
2020	9	4	8	8	3	1	0	0	4	6	12	13	36	32	68
2021	5	5	12	4	1	1	1	0	1	5	17	15	37	30	67
2022	5	5	10	11	1	1	0	0	2	2	12	11	30	30	60
2023	5	5	10	8	0	0	0	0	5	3	11	9	31	25	56
2024	6	2	4	3	0	1	0	0	2	5	13	19	25	30	55
2025	8	0	6	4	1	2	0	2	4	6	12	24	31	38	69
Laboratory diagnoses (serotype b; source: NRLBM)															
2015	3	0	4	7	1	0	0	0	5	0	10	6	23	13	36
2016	8	0	6	7	0	1	1	0	2	2	9	7	26	17	43
2017	1	3	2	7	2	2	0	1	5	2	10	13	20	28	49
2018	7	1	4	6	1	0	0	0	2	4	4	12	18	24	42
2019	6	3	4	3	0	0	1	1	1	4	5	10	17	21	38
2020	8	4	8	8	3	1	0	0	4	6	12	13	35	32	67
2021	5	5	12	4	1	1	1	0	2	6	17	16	38	32	70
2022	5	5	10	12	1	1	0	0	2	2	12	8	30	28	58
2023	5	5	10	8	0	0	0	0	5	3	12	9	32	25	57
2024	6	2	4	3	0	1	0	0	2	6	12	19	24	31	55
2025	8	1	6	4	1	2	0	3	5	7	13	23	33	40	73
Laboratory diagnoses (all serotypes; source: NRLBM)															
2015	11	6	6	9	3	1	1	0	15	13	64	65	102	97	199
2016	14	4	7	8	1	1	1	0	8	12	49	75	80	100	184
2017	6	6	7	12	4	2	2	2	11	23	63	90	93	136	233
2018	14	5	8	6	3	0	4	3	8	24	76	79	113	118	235
2019	11	5	8	7	0	0	2	2	10	27	75	75	106	116	223

Haemophilus influenzae ICD-10: G000, J14, J201, A413, A492 and B963															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	13	6	13	9	4	1	1	3	5	18	63	60	99	97	198
2021	7	11	14	6	2	4	3	1	5	18	50	49	81	89	171
2022	12	8	19	16	5	2	1	1	15	29	103	110	155	167	325
2023	14	10	13	11	3	2	7	3	13	22	117	100	167	149	317
2024	8	4	9	8	3	1	3	1	20	34	112	123	155	171	327
2025	15	5	11	7	1	2	1	3	13	36	100	105	141	158	301

Hepatitis B *Age (years)*															
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (B16: Acute; source: CBS)															
2015	0	0	0	0	0	0	0	0	0	1	2	0	2	1	3
2016	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2021	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
2022	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
2023	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 *	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hospitalisations (source: Prismant/DHD/CBS)															
2015	0	0	0	0	0	0	0	0	10	5	15	5	25	15	40
2016	0	0	0	0	0	0	0	0	10	15	20	0	30	15	45
2017	0	0	0	0	0	0	0	0	10	10	15	5	25	15	35
2018	0	0	0	0	0	0	0	0	10	5	10	10	20	15	35
2019	0	0	0	0	0	0	0	0	5	5	10	5	10	10	25
2020	0	0	0	0	0	0	0	0	10	5	10	5	20	10	30
2021	0	0	0	0	0	0	0	0	15	5	10	5	25	10	35
2022	0	0	0	0	0	0	0	0	10	5	10	5	20	10	25
2023	0	0	0	0	0	0	0	0	15	5	15	0	25	5	35
2024	0	0	0	0	0	0	10	0	0	0	10	5	20	5	25
Notifications (Acute; source: Osiris)															
2015	0	0	0	0	0	0	0	1	52	14	33	10	85	25	110
2016	0	0	0	0	0	0	2	3	40	16	46	7	88	26	114
2017	0	0	0	0	0	0	1	2	47	15	43	7	91	24	115
2018	0	0	0	0	0	0	0	2	52	13	32	6	84	21	105
2019	0	0	0	0	0	0	0	2	40	20	37	6	77	28	105

Hepatitis B *Age (years)*															
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	1	0	46	17	28	4	75	21	96
2021	0	0	0	0	0	0	2	3	38	4	24	3	64	10	74
2022	0	0	0	0	0	0	0	0	40	11	32	4	72	15	87
2023	0	0	0	0	0	0	0	0	41	15	35	3	76	18	94
2024	0	0	0	0	0	0	0	1	43	13	33	5	76	19	95
2025	0	0	0	0	0	0	1	0	38	12	39	10	78	22	100
Notifications (chronic; source: OSIRIS)															
2015	0	0	1	0	0	1	14	17	433	327	152	71	600	416	1017
2016	1	0	0	0	0	0	25	12	396	298	184	90	606	400	1006
2017	0	0	0	1	0	1	20	18	439	357	171	97	630	474	1105
2018	0	0	0	0	0	0	21	19	427	325	157	87	605	431	1036
2019	0	0	1	3	3	1	20	11	447	310	192	90	663	415	1079
2020	0	0	0	0	0	0	8	7	280	228	146	53	434	288	724
2021	0	0	0	0	1	1	10	8	305	212	134	75	450	296	747
2022	0	0	0	1	0	1	10	4	378	217	170	70	558	293	851
2023	0	0	1	3	1	0	10	7	343	257	153	73	508	340	848
2024	0	0	0	2	0	1	7	8	327	246	143	95	477	352	831
2025	0	0	0	0	0	2	19	4	304	194	165	83	488	283	771

Human papillomavirus ICD-10: C53															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (cervical cancer; source: CBS)															
2015	-	0	-	0	-	0	-	0	-	49	-	158	-	207	207
2016	-	0	-	0	-	0	-	0	-	50	-	179	-	229	229
2017	-	0	-	0	-	0	-	0	-	44	-	162	-	206	206
2018	-	0	-	0	-	0	-	0	-	50	-	167	-	217	217
2019	-	0	-	0	-	0	-	0	-	45	-	171	-	216	216
2020	-	0	-	0	-	0	-	0	-	52	-	178	-	230	230
2021	-	0	-	0	-	0	-	0	-	48	-	165	-	213	213
2022	-	0	-	0	-	0	-	0	-	53	-	170	-	223	223
2023	-	0	-	0	-	0	-	0	-	36	-	159	-	195	195
2024	-	0	-	0	-	0	-	0	-	39	-	177	-	216	216
2025*	-	0	-	0	-	0	-	0	-	44	-	152	-	196	196
Registrations (cervical cancer; source NKR)															
2015	-	0	-	0	-	0	-	0	-	388	-	321	-	709	709
2016	-	0	-	0	-	0	-	0	-	447	-	358	-	805	805
2017	-	0	-	0	-	0	-	1	-	437	-	337	-	775	775
2018	-	0	-	0	-	0	-	0	-	470	-	376	-	846	846
2019	-	0	-	0	-	1	-	0	-	514	-	395	-	910	910
2020	-	0	-	0	-	0	-	0	-	453	-	352	-	805	805
2021	-	0	-	0	-	0	-	0	-	563	-	386	-	949	949
2022	-	0	-	0	-	0	-	0	-	546	-	408	-	954	954
2023	-	0	-	0	-	0	-	0	-	465	-	381	-	846	846
2024*	-	0	-	0	-	0	-	1	-	494	-	470	-	965	965
2025*	-	0	-	0	-	0	-	1	-	424	-	440	-	865	865

*Preliminary figures.

Human papillomavirus ICD-10: C51															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (vulva cancer; source: CBS)^															
2015	-	0	-	0	-	0	-	0	-	8	-	50+	-	103	103
2016	-	0	-	0	-	0	-	0	-	0	-	95	-	99	99
2017	-	0	-	0	-	0	-	0	-	2	-	99	-	114	114
2018	-	0	-	0	-	0	-	0	-	4	-	112	-	141	141
2019	-	0	-	0	-	0	-	0	-	3	-	137	-	167	167
2020	-	0	-	0	-	0	-	0	-	3	-	164	-	150	150
2021	-	0	-	0	-	0	-	0	-	4	-	147	-	144	144
2022	-	0	-	0	-	0	-	0	-	5	-	140	-	144	144
2023	-	0	-	0	-	0	-	0	-	2	-	139	-	135	135
2024	-	0	-	0	-	0	-	0	-	3	-	125	-	128	128
2025*	-	0	-	0	-	0	-	0	-	2	-	156	-	158	158
Registrations (vulva cancer; source NKR)^															
2015	-	0	-	0	-	0	-	0	-	43	-	336	-	379	379
2016	-	0	-	0	-	0	-	0	-	37	-	380	-	417	417
2017	-	0	-	0	-	0	-	0	-	38	-	372	-	410	410
2018	-	0	-	0	-	0	-	0	-	43	-	385	-	428	428
2019	-	0	-	0	-	0	-	0	-	49	-	407	-	456	456
2020	-	0	-	0	-	0	-	0	-	42	-	388	-	430	430
2021	-	0	-	0	-	0	-	1	-	35	-	412	-	448	448
2022	-	0	-	0	-	0	-	0	-	30	-	435	-	465	465
2023	-	0	-	0	-	0	-	0	-	39	-	420	-	459	459
2024*	-	0	-	0	-	0	-	0	-	36	-	441	-	477	477
2025*	-	0	-	0	-	0	-	0	-	33	-	423	-	456	456

^While HPV can contribute to the formation of this type of cancer, it is not solely responsible for all registrations or deaths presented here.
*Preliminary figures.

Human papillomavirus ICD-10: C60															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (penis cancer; source: CBS)^															
2015	0	-	0	-	0	-	0	-	2	-	33	-	35	-	35
2016	0	-	0	-	0	-	0	-	1	-	33	-	34	-	34
2017	0	-	0	-	0	-	0	-	4	-	30	-	34	-	34
2018	0	-	0	-	0	-	0	-	2	-	32	-	34	-	34
2019	0	-	0	-	0	-	0	-	1	-	45	-	46	-	46
2020	0	-	0	-	0	-	0	-	1	-	50	-	51	-	51
2021	0	-	0	-	0	-	0	-	0	-	37	-	37	-	37
2022	0	-	0	-	0	-	0	-	2	-	37	-	39	-	39
2023	0	-	0	-	0	-	0	-	1	-	33	-	34	-	34
2024	0	-	0	-	0	-	0	-	1	-	47	-	48	-	48
2025*	0	-	0	-	0	-	0	-	0	-	36	-	36	-	36
Registrations (penis cancer; source NKR)^															
2015	0	-	0	-	0	-	0	-	11	-	141	-	152	-	152
2016	0	-	0	-	0	-	0	-	9	-	158	-	167	-	167
2017	0	-	0	-	0	-	0	-	13	-	153	-	166	-	166
2018	0	-	0	-	0	-	0	-	12	-	175	-	187	-	187
2019	0	-	0	-	0	-	0	-	11	-	192	-	203	-	203
2020	0	-	0	-	0	-	0	-	13	-	174	-	187	-	187
2021	0	-	0	-	0	-	0	-	5	-	177	-	182	-	182
2022	0	-	0	-	0	-	0	-	9	-	201	-	210	-	210
2023	0	-	0	-	0	-	0	-	5	-	202	-	207	-	207
2024*	0	-	0	-	0	-	0	-	5	-	198	-	203	-	203
2025*	0	-	0	-	0	-	0	-	5		198		203		203

^While HPV can contribute to the formation of this type of cancer, it is not solely responsible for all registrations or deaths presented here.
*Preliminary figures.

Human papillomavirus ICD-10: C10															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (oropharynx cancer; source: CBS)^															
2015	0	0	0	0	0	0	0	0	2	0	61	32	63	32	95
2016	0	0	0	0	0	0	0	0	3	1	66	31	69	32	101
2017	0	0	0	0	0	0	0	0	4	0	64	32	68	32	100
2018	0	0	0	0	0	0	0	0	1	1	67	34	68	35	103
2019	0	0	0	0	0	0	0	0	2	1	74	40	76	41	117
2020	0	0	0	0	0	0	0	0	2	1	81	33	83	34	117
2021	0	0	0	0	0	0	0	0	1	0	75	47	76	47	123
2022	0	0	0	0	0	0	0	0	3	1	114	35	117	36	153
2023	0	0	0	0	0	0	0	0	1	1	79	42	80	43	123
2024	0	0	0	0	0	0	0	0	2	2	92	42	94	44	138
2025*	0	0	0	0	0	0	0	0	1	0	95	38	96	38	134
Registrations (oropharynx cancer; source NKR)^															
2015	0	0	0	0	0	0	2	0	55	14	607	237	664	251	915
2016	0	0	0	0	0	0	1	0	47	18	660	269	708	287	995
2017	0	0	0	0	0	0	1	1	45	21	637	251	683	273	956
2018	0	0	0	0	0	0	1	3	39	14	663	273	703	290	993
2019	0	0	0	0	0	0	2	0	40	25	690	243	732	268	1000
2020	0	0	0	0	0	0	1	1	27	21	689	273	717	295	1012
2021	0	0	0	0	0	0	2	0	40	17	699	271	741	288	1029
2022	0	0	0	0	0	0	3	0	53	15	721	277	777	292	1069
2023	0	0	0	0	0	0	0	0	45	13	754	297	799	310	1109
2024*	0	0	0	0	0	0	0	0	38	20	692	273	730	293	1023
2025*	0	0	0	0	0	0	1	0	47	15	702	275	750	290	1040

^While HPV can contribute to the formation of this type of cancer, it is not solely responsible for all registrations or deaths presented here.
*Preliminary figures.

Human papillomavirus ICD-10: C21															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (anus cancer; source: CBS)^															
2015	0	0	0	0	0	0	0	0	3	0	16	15	19	15	34
2016	0	0	0	0	0	0	0	0	3	1	30	19	33	20	53
2017	0	0	0	0	0	0	0	0	1	1	30	27	31	28	59
2018	0	0	0	0	0	0	0	0	4	0	34	20	38	20	58
2019	0	0	0	0	0	0	0	0	1	2	31	30	32	32	64
2020	0	0	0	0	0	0	0	0	1	2	20	33	21	35	56
2021	0	0	0	0	0	0	0	0	2	4	29	30	31	34	65
2022	0	0	0	0	0	0	0	0	3	4	27	36	30	40	70
2023	0	0	0	0	0	0	0	0	2	0	41	31	43	31	74
2024	0	0	0	0	0	0	0	0	4	1	29	38	33	39	72
2025*	0	0	0	0	0	0	0	0	0	3	38	49	38	52	90
Registrations (anus cancer; source NKR)^															
2015	0	0	0	0	0	0	0	0	16	18	105	112	121	130	251
2016	0	0	0	0	0	0	0	0	18	15	106	121	124	136	260
2017	0	0	0	0	0	0	0	0	13	13	111	120	124	133	257
2018	0	0	0	0	0	0	0	0	14	16	134	147	148	163	311
2019	0	0	0	0	0	0	0	0	13	12	119	140	132	152	284
2020	0	0	0	0	0	0	0	0	11	16	107	158	118	174	292
2021	0	0	0	0	0	0	0	0	14	20	144	170	158	190	348
2022	0	0	0	0	0	0	0	0	13	16	120	180	133	196	329
2023	0	0	0	0	0	0	0	0	17	19	156	160	173	179	352
2024*	0	0	0	0	0	0	0	0	13	22	141	190	154	212	366
2025*	0	0	0	0	0	0	0	0	12	22	142	179	154	201	355

^While HPV can contribute to the formation of this type of cancer, it is not solely responsible for all registrations or deaths presented here.
*Preliminary figures.

Measles ICD-10: B05															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
2025*	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
Notifications (source: Osiris)															
2015	0	0	0	0	0	0	0	0	5	1	1	0	6	1	7
2016	0	0	0	0	0	2	0	0	2	2	0	0	2	4	6
2017	0	0	1	0	0	1	1	1	5	7	1	0	8	9	17
2018	2	1	1	3	0	0	1	1	6	8	0	1	10	14	24
2019	3	0	6	8	11	8	4	6	22	13	0	1	46	36	82
2020	0	0	0	1	0	0	0	0	1	0	0	0	1	1	2
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	1	1	3	0	0	0	0	1	0	0	4	2	6
2023	0	0	1	1	0	0	0	0	2	3	0	0	3	4	7
2024	7	5	31	38	33	29	9	13	11	22	4	3	95	110	205
2025	19	11	73	63	96	94	48	37	30	47	8	13	274	264	539
Hospitalisations^ (source: Prismant/DHD)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	5	0	0	0	5	0	5
2018	0	0	0	0	0	0	0	0	5	0	0	0	5	5	10
2019	0	0	0	0	0	0	0	0	5	0	0	0	10	5	10

Measles ICD-10: B05															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
2024	0	5	5	5	0	0	5	0	5	0	0	0	10	15	25

^Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Meningococcal disease ICD-10: A39, M010															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	1	0	0	0	0	1	0	0	2	1	3	4
2016	0	0	1	1	0	0	0	1	0	0	1	2	2	4	6
2017	1	0	1	1	0	0	1	0	1	1	0	2	4	4	8
2018	0	0	2	0	0	0	1	3	2	0	1	4	6	7	13
2019	0	1	0	1	0	0	0	1	1	0	0	4	1	7	8
2020	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	1	0	0	0	0	0	0	0	0	2	1	2	3
2023	0	0	0	1	0	0	0	0	0	0	1	1	1	2	3
2024	1	0	1	0	0	0	0	0	1	0	4	0	7	0	7
2025*	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
Notifications (source: Osiris)															
2015	7	6	5	6	4	1	9	5	8	5	13	19	46	42	88
2016	4	8	8	8	3	4	11	15	16	13	14	42	56	90	146
2017	6	10	10	9	1	2	13	26	23	13	29	53	82	113	195
2018	9	6	15	11	1	2	16	19	13	12	34	61	89	111	199
2019	2	3	12	5	3	2	12	13	18	15	23	43	71	82	151
2020	6	0	5	5	2	2	5	3	10	2	10	14	38	26	64
2021	3	3	2	4	0	0	7	5	2	1	1	5	15	18	33
2022	4	1	7	2	0	2	20	14	14	5	5	7	50	32	81
2023	3	7	13	5	4	1	19	19	8	20	9	24	61	83	134
2024	9	8	11	8	5	3	16	8	11	19	22	17	77	65	137
2025	5	6	9	5	6	3	13	11	14	22	16	20	67	74	130
Laboratory diagnoses (all serogroups; source: NRLBM)															
2015	7	6	5	6	4	1	9	5	9	5	13	21	47	44	92
2016	5	8	8	8	3	4	11	15	16	13	16	47	59	95	154
2017	7	10	10	9	1	2	13	26	23	14	29	55	83	116	199
2018	9	6	16	11	1	2	16	19	13	13	35	64	90	115	205
2019	3	3	12	5	3	2	12	13	18	15	24	44	72	82	154

Meningococcal disease ICD-10: A39, M010															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	6	0	5	5	3	1	5	3	10	2	11	13	40	24	64
2021	3	3	2	4	0	0	7	5	3	1	1	6	16	19	35
2022	4	1	7	2	0	2	20	15	12	6	6	8	49	34	83
2023	3	7	14	5	4	1	20	19	6	20	10	24	57	76	133
2024	9	9	11	8	5	3	16	8	11	19	21	17	73	64	137
2025	5	6	10	5	6	3	15	11	15	22	18	21	69	68	137
Laboratory diagnoses (serogroup C; source: NRLBM)															
2015	2	0	0	0	0	0	0	0	2	1	2	1	6	2	8
2016	0	0	0	0	0	0	0	1	2	0	0	3	2	4	6
2017	0	1	0	0	0	0	1	0	1	0	3	3	5	4	9
2018	0	0	0	0	0	0	0	0	0	1	0	2	0	3	3
2019	0	0	0	0	0	0	0	0	1	0	2	3	3	3	6
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	1	0	0	0	0	1	1	1	2	3
2023	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
2024	0	0	0	0	0	0	1	0	0	0	2	1	3	1	4
2025	0	0	0	0	0	1	0	0	1	0	1	0	2	1	3
Laboratory diagnoses (serogroup W; source: NRLBM)															
2015	0	1	0	0	0	0	0	0	1	0	0	5	1	6	8
2016	0	0	1	2	0	1	4	5	5	3	6	25	16	36	52
2017	1	3	3	1	0	0	5	10	13	6	11	30	33	50	83
2018	4	1	0	3	1	1	4	11	6	6	18	46	33	68	101
2019	1	0	1	1	1	0	4	2	7	6	9	26	23	35	58
2020	1	0	1	0	1	0	0	0	1	0	2	5	6	5	11
2021	0	0	0	0	0	0	0	0	1	1	0	2	1	3	4
2022	0	0	0	0	0	0	0	0	1	0	0	1	1	1	2
2023	0	0	0	0	0	0	0	1	0	0	2	3	2	4	6
2024	1	0	1	1	0	0	0	0	0	0	2	1	4	2	6
2025	0	0	0	0	0	0	0	0	2	0	3	2	5	2	7

Meningococcal disease ICD-10: A39, M010															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Laboratory diagnoses (serogroup B; source: NRLBM)															
2015	5	5	5	6	4	1	9	5	4	4	8	10	35	31	66
2016	5	8	7	6	3	3	7	6	6	10	6	10	34	43	77
2017	6	6	7	8	1	2	6	15	9	7	5	8	34	46	80
2018	5	4	16	8	0	1	7	7	7	4	13	5	48	29	77
2019	2	3	11	4	2	1	6	11	7	6	8	9	36	34	70
2020	4	0	4	5	2	1	4	3	6	2	5	3	25	14	39
2021	3	3	2	4	0	0	7	4	2	0	1	3	15	14	29
2022	4	1	7	2	0	1	19	14	10	6	5	4	45	28	73
2023	3	7	14	5	4	1	16	17	6	18	4	15	47	63	110
2024	8	9	10	7	5	2	14	8	10	18	16	14	63	58	121
2025	5	6	10	5	6	2	13	11	10	21	10	16	54	61	115
Hospitalisations^ (source: Prismant/DHD/CBS)															
2015	10	5	5	5	5	5	10	5	5	5	5	15	35	40	75
2016	5	10	5	10	5	5	10	10	15	15	10	25	45	70	115
2017	10	5	15	10	0	0	15	25	15	10	20	30	70	85	155
2018	10	5	15	10	0	0	15	15	10	5	20	40	75	80	155
2019	5	0	10	5	5	5	10	10	15	10	15	25	50	55	105
2020	5	0	5	5	5	0	5	5	10	5	5	5	30	20	50
2021	5	5	0	5	0	0	5	5	0	0	0	5	15	15	30
2022	5	0	5	0	0	0	20	15	15	5	5	5	45	30	80
2023	5	5	10	5	5	0	15	15	5	15	10	20	50	60	115
2024	5	10	10	10	15	5	10	20	5	0	10	10	55	60	115

*Preliminary figures.
^Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Mumps ICD-10: B26															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025*	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Notifications (source: Osiris)															
2015	0	0	0	0	0	2	14	9	32	26	0	4	46	41	87
2016	0	0	3	2	5	2	14	6	15	19	4	1	41	30	71
2017	0	0	3	1	0	0	6	2	23	9	1	1	33	13	46
2018	0	0	0	1	1	3	2	3	31	22	4	6	38	35	73
2019	0	0	3	1	1	2	17	5	60	35	4	3	85	46	131
2020	0	0	1	2	0	0	9	4	26	18	2	2	38	26	64
2021	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2022	0	1	2	0	0	0	0	0	3	4	1	0	6	5	11
2023	0	1	6	12	18	12	7	5	11	18	1	2	43	50	93
2024	1	0	29	18	85	50	87	77	92	136	11	11	305	292	597
2025	0	0	8	7	12	10	23	13	24	36	9	8	76	74	150
Hospitalisations^ (source: Prismant/DHD)															
2015	0	0	0	0	0	0	0	0	0	5	0	5	5	10	15
2016	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5
2017	0	0	0	0	0	0	0	0	5	0	0	5	5	5	10
2018	0	0	0	0	0	0	0	0	0	0	0	5	5	5	10
2019	0	0	0	0	0	0	0	0	5	0	0	0	5	5	10

Mumps ICD-10: B26															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
2024	0	0	0	0	5	0	0	10	5	0	5	0	15	10	25

*Preliminary figures.
^Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Pertussis ICD-10: A37															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
2016	0	1	0	0	0	0	0	0	0	0	1	0	1	1	2
2017	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2
2018	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
2019	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
2020	1	0	0	0	0	0	0	0	0	0	1	0	2	0	2
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	1	0	0	0	0	0	0	0	0	0	1	0	2	2
2024	2	2	0	0	0	0	0	0	0	0	4	2	6	4	10
2025*	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Notifications (source: Osiris)															
2015	86	91	122	156	257	311	918	1036	744	1315	633	893	2760	3802	6566+
2016	121	97	194	211	217	274	652	771	674	1131	513	704	2371	3188	5562$
2017	82	99	104	119	173	248	620	679	567	1054	516	664	2062	2863	4926>
2018	97	93	174	167	179	254	559	685	558	967	461	669	2028	2835	4865<
2019	85	102	141	173	193	238	714	892	802	1352	721	971	2656	3728	6388+
2020	21	21	21	26	29	52	102	129	106	189	127	145	406	562	970<
2021	4	5	2	6	2	1	4	4	7	16	14	14	33	46	79
2022	9	10	13	22	10	4	9	7	11	21	12	14	64	78	142
2023	74	86	86	98	97	97	582	630	288	463	187	254	1314	1628	2944<
2024	427	410	421	483	445	493	1785	2182	2419	4034	2265	2821	7762	10423	18213#
2025	9	10	17	16	5	8	16	17	37	69	72	57	156	177	333
Hospitalisations^ (source: Prismant/DHD)															
2015	55	70	0	5	0	0	5	5	0	0	0	10	65	90	160
2016	75	55	5	10	0	0	5	0	5	0	5	5	90	75	165
2017	60	70	5	10	0	0	5	5	0	0	0	10	65	95	160
2018	55	55	0	10	0	0	5	0	0	0	0	5	60	75	135
2019	45	55	0	10	0	0	0	0	0	0	10	10	55	80	135

Pertussis ICD-10: A37															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	15	15	0	0	0	0	0	0	0	0	5	0	25	15	40
2021	10	5	0	0	0	0	0	0	0	0	0	0	10	5	15
2022	5	10	0	0	0	0	0	0	0	0	0	0	5	10	20
2023	25	35	0	5	0	0	0	0	0	0	5	5	35	45	85
2024	195	200	35	65	5	5	5	15	0	5	40	25	285	315	600

* Preliminary figures.
+ For 4 notifications gender was unknown.
$ For 3 notifications gender was unknown.
> For 1 notification gender was unknown.
< For 2 notifications gender was unknown.
For 28 notifications gender was unknown.
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Pneumococcal disease ICD-10: J13															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Notifications IPD* (source: Osiris)															
2015	15	11	10	7	0	0	-	-	-	-	-	-	25	18	43
2016	12	12	10	9	0	1	-	-	-	-	-	-	22	22	44
2017	15	9	8	7	6	0	0	0	-	-	-	-	29	16	45
2018	21	14	11	9	5	6	2	0	-	-	-	-	39	29	68
2019	14	15	18	6	6	4	1	1	-	-	-	-	39	26	65
2020	6	8	9	6	7	7	1	0	-	-	-	-	23	21	44
2021	21	11	21	16	7	3	2	3	-	-	311	268	362	301	663
2022	14	16	28	20	12	6	7	8	-	-	710	648	771	698	1469
2023	33	18	14	11	18	8	7	5	-	-	775	687	847	729	1576
2024	19	15	19	18	11	3	8	8	-	-	751	719	808	763	1571
2025	17	18	16	6	10	6	21	7	-	-	785	753	849	790	1639
Laboratory diagnoses IPD (nationwide; source: NRLBM)															
2015	21	23	14	8									35	31	66
2016	17	13	13	7									30	20	50
2017	18	15	12	12	14	2	8	3					52	32	84
2018	25	17	16	11	11	7	4	6					56	41	97
2019	17	16	23	8	5	5	8	4					53	33	86
2020	7	8	9	7	7	7	3	0					26	22	48
2021	24	16	20	17	7	2	8	4	81	72	471	403	611	514	1130
2022	13	15	28	19	12	6	12	8	123	79	883	807	1071	934	2014
2023	34	18	14	8	18	6	12	6	153	104	948	827	1179	969	2151
2024	22	17	21	18	11	5	13	20	146	118	926	849	1139	1027	2168
2025	18	19	16	10	8	6	20	7	177	121	973	892	1212	1055	2270
Mortality pneumococcal pneumonia (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	1	13	15	13	16	29
2016	0	0	0	0	0	0	0	0	0	0	15	12	15	12	27
2017	0	0	0	0	0	0	0	0	0	0	7	8	7	8	15
2018	0	0	0	0	0	0	0	0	1	0	13	12	14	12	26
2019	0	0	0	0	0	0	0	0	0	0	9	7	9	7	16

Pneumococcal disease ICD-10: J13															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	0	0	1	1	9	12	10	13	23
2021	0	0	0	0	0	0	0	0	0	1	6	8	6	9	15
2022	0	0	0	0	0	0	0	0	0	0	14	11	14	11	25
2023	0	0	0	0	0	0	0	0	1	1	24	13	25	14	39
2024	0	0	0	0	0	0	0	0	0	0	15	14	15	14	29
2025*	0	0	0	0	0	0	0	0	0	1	23	12	23	13	36
Hospitalisations^ pneumococcal pneumonia (source: Prismant/DHD)															
2015	0	0	10	5	5	5	15	5	140	140	1025	1015	1195	1175	2370
2016	0	0	5	0	0	5	10	10	160	190	1005	1000	1180	1205	2385
2017	0	5	5	0	5	0	10	5	150	95	1070	975	1240	1080	2320
2018	5	0	5	5	0	0	5	5	150	130	1225	1120	1395	1265	2665
2019	5	0	5	10	5	0	10	5	125	105	1075	985	1220	1105	2325
2020	5	0	0	0	0	0	0	0	80	65	605	550	690	615	1305
2021	0	0	5	0	0	0	5	0	85	75	590	500	685	580	1265
2022	0	0	10	10	5	0	5	10	135	105	860	810	1015	940	1955
2023	0	0	5	5	5	0	10	10	150	115	940	835	1115	965	2080
2024	0	5	5	10	10	10	150	140	5	5	1035	970	1200	1135	2335

*Notifiable for children born from 2006 onwards, and from April 2021 also for people aged 60 and over.
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Poliomyelitis ICD-10: A80															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (acute; source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notifications (source: Osiris)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	1**	0	0	0	1**	0	1**
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hospitalisations^ (source: Prismant/DHD)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Poliomyelitis ICD-10: A80															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Preliminary figures.
** Asymptomatic polio-infection
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Rubella (acquired) ICD-10: B06															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notifications (source: Osiris)															
2015	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hospitalisations^ (source: Prismant/DHD)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rubella (acquired) ICD-10: B06															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Preliminary figures.
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Tetanus ICD-10: A33-35															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2025*	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Notifications (source: Osiris)															
2015	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
2016	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
2017	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
2018	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	1	0	0	0	0	1	1	1	2
2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
2023	0	0	0	0	0	0	0	0	1	1	0	3	1	4	5
2024	0	0	0	0	1	0	0	0	0	0	0	2	1	2	3
2025	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3

Rotavirus ICD-10: A0, A09, K52, K529							
	Age (years)						
Year	0	1-4	5-9	10-19	20-49	50+	Total
Hospitalisations* (source: Prismant/DHD)							
2015	1492	3743	197	58	0	1189	6679
2016	728	1828	90	27	-14	652	3311
2017	1074	2645	122	23	5	931	4800
2018	1097	2556	120	22	-68	793	4520
2019^	964	2318	129	36	19	900	4366
2020†	248	645	28	-3	29	42	989
2021†	619	1607	69	-7	71	105	2464
2022†	988	2564	110	-12	114	167	3931
2023x	777	1753	73	27	50	721	3401
2024x	747	1683	70	26	48	692	3266
2025x	654	1475	61	22	42	607	2861

* Estimated rotavirus-attributable hospitalisations are based on laboratory detections and hospital data from 2 years before and 2 years after the concerning year (if available).
^ The estimates for 2019 were based on 2017-2019, to exclude the exceptional COVID-19 pandemic years.
† The estimates for 2020-2022 were based on data for 2020 only.
x The estimates for 2023 and 2024 were based on data for 2023 only

Potential NIP target diseases

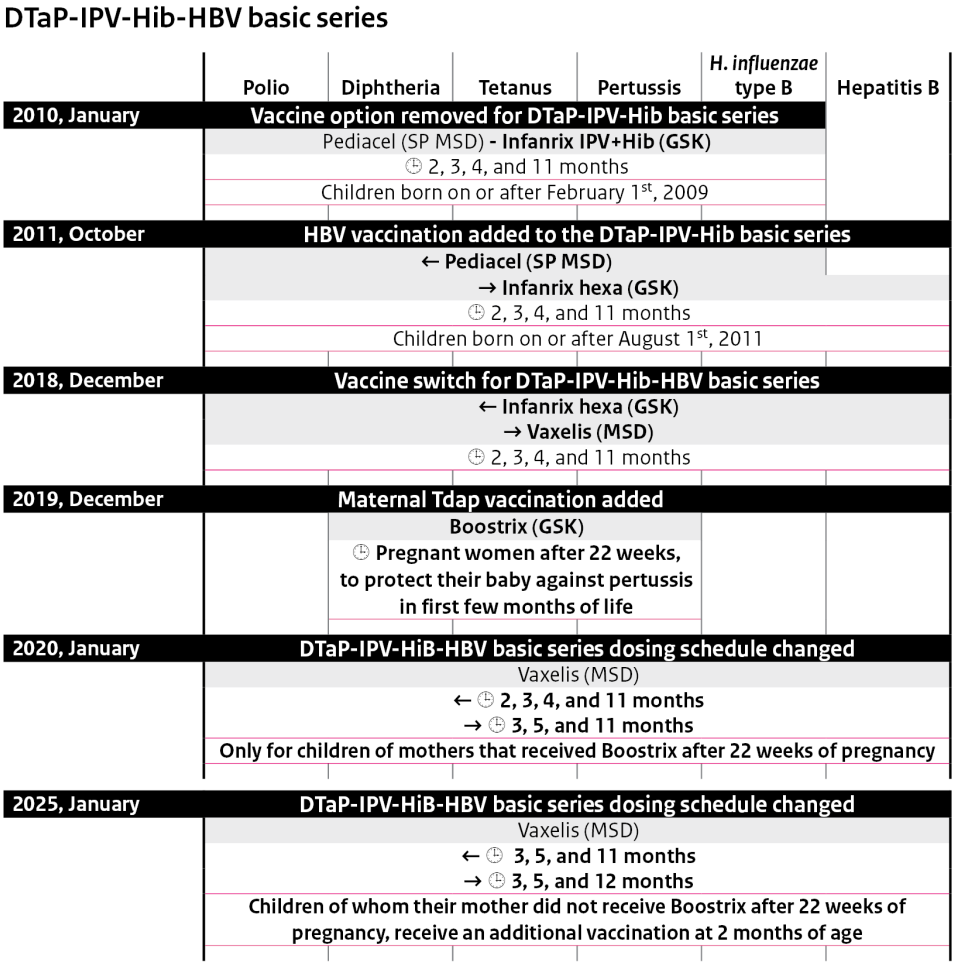
Varicella (chickenpox) ICD-10: B01															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
2016	0	0	0	0	0	0	0	0	0	0	3	1	3	1	4
2017	0	1	0	1	0	0	0	0	0	0	0	1	0	3	3
2018	0	0	0	0	0	1	0	0	0	0	1	0	1	1	2
2019	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
2020	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2
2021	0	0	0	0	0	0	0	0	0	0	1	3	1	3	4
2022	0	1	1	2	0	1	0	0	1	0	1	3	3	7	10
2023	0	0	0	0	0	0	0	0	0	0	1	4	1	4	5
2024	0	0	1	0	0	0	0	0	0	0	3	1	4	1	5
2025*	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Hospitalisations^ (source: Prismant/DHD)															
2015	25	20	55	50	5	10	5	5	25	15	40	30	160	120	280
2016	30	20	60	55	15	10	5	10	25	20	40	30	175	145	320
2017	40	30	70	40	10	15	5	5	30	20	30	25	190	135	325
2018	25	20	40	40	10	10	10	5	35	20	35	30	155	120	280
2019	30	25	55	45	10	5	5	5	35	15	35	50	170	150	320
2020	10	10	20	15	5	5	5	0	15	10	30	30	85	65	150
2021	10	5	20	20	5	10	5	5	15	15	40	40	95	90	185
2022	35	25	105	100	35	20	5	5	35	20	45	30	260	195	455
2023	15	10	25	25	5	5	10	5	20	20	45	40	120	105	225
2024	20	20	70	40	10	10	35	20	10	10	40	35	180	140	320

^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Herpes zoster (shingles) ICD-10: B02															
	Age (years)														
	0		1-4		5-9		10-19		20-49		50+		Total		
Year	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Mortality (source: CBS)															
2015	0	0	0	0	0	0	0	0	0	0	10	23	10	23	33
2016	0	0	0	0	0	0	0	0	0	0	9	18	9	18	27
2017	0	0	1	0	0	0	0	0	0	0	6	26	7	26	33
2018	0	0	0	0	0	0	0	0	0	0	12	24	12	24	36
2019	0	0	0	0	0	0	0	0	0	0	11	21	11	21	32
2020	0	0	0	0	0	0	0	0	0	0	15	28	15	28	43
2021	0	0	0	0	0	0	0	0	0	0	11	26	11	26	37
2022	0	0	0	0	0	0	0	0	0	0	16	22	16	22	38
2023	0	0	0	0	0	0	0	0	0	0	9	32	9	32	41
2024	0	0	0	0	0	0	0	0	0	0	10	34	10	34	44
2025*	0	0	0	0	0	0	0	0	0	0	19	44	19	44	63
Hospitalisations^ (source: Prismant/DHD)															
2015	0	0	5	5	10	0	5	5	20	35	165	225	210	270	480
2016	0	0	5	5	5	5	5	5	20	20	155	240	190	270	460
2017	0	0	5	5	5	0	5	10	20	20	155	220	195	260	455
2018	0	0	5	5	0	5	5	0	35	35	180	240	220	285	510
2019	0	0	5	5	5	0	5	5	30	35	195	250	235	290	525
2020	0	0	5	5	0	5	5	5	35	30	170	240	215	285	500
2021	0	0	0	0	0	0	10	5	25	30	190	255	225	290	510
2022	5	5	5	5	5	0	5	5	25	30	185	205	225	245	470
2023	0	0	10	5	5	0	10	10	45	30	245	240	310	290	600
2024	0	0	5	5	5	5	20	30	0	5	225	270	255	315	570

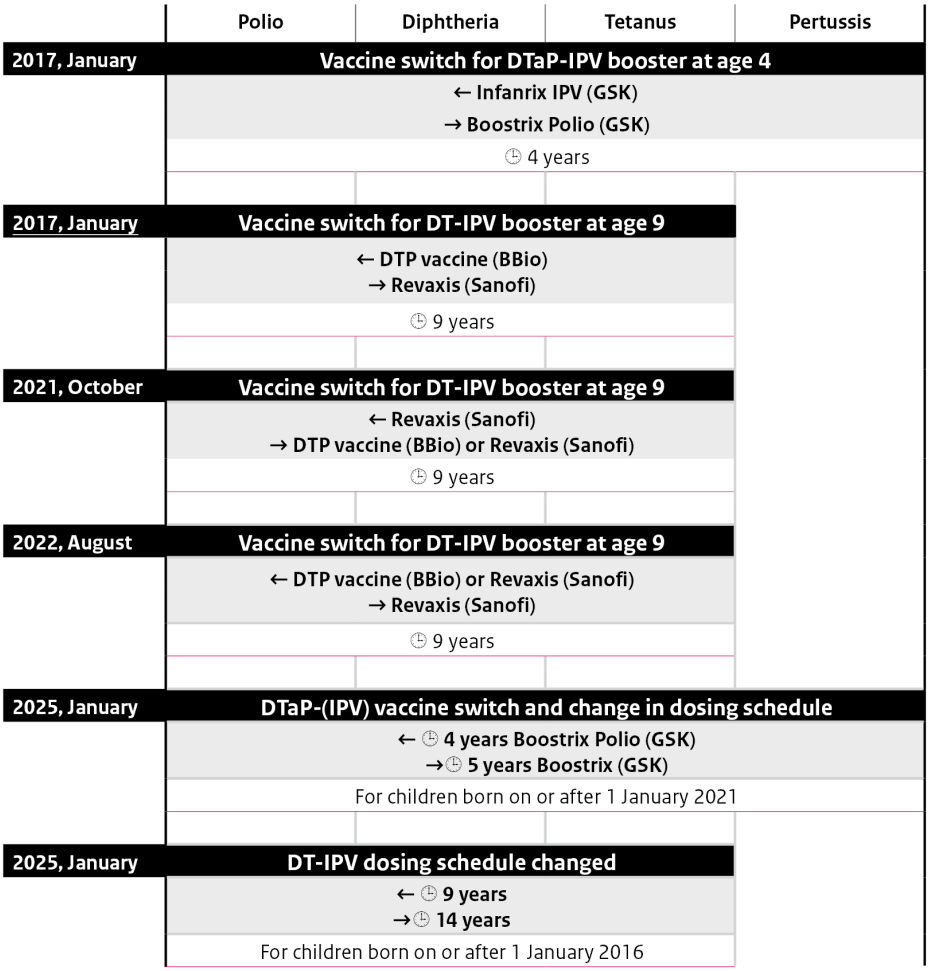
^ Data corrected for non-participating hospitals and rounded off to closest five. Therefore, 0 cases can also be a few cases.

Appendix 3 Overview of vaccine changes in the NIP from 2010



Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

Tdap-IPV booster vaccinations



Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

Influenza vaccination

2023, October	Maternal influenza vaccination added
	Influvac tetra (Mylan)
	🕒 Pregnant people after 22 weeks, between the 15th of October and the 1st of March, with and without a medical indication to protect their baby against influenza in the first few months of life.
2025, October	**Maternal influenza vaccine switch**
	← Influvac tetra (Mylan) **→ Influvac (Mylan)**
	🕒 Pregnant people after 22 weeks, between the 15th of October and the 1st of March, with and without a medical indication to protect their baby against influenza in the first few months of life.

Rotavirus vaccination

2024, January	Rotavirus vaccination added
	Rotarix (GSK)
	🕒 2 vaccines at 6-9 weeks and 3 months of age
	For children born on or after January 1st, 2024

RSV immunisation

2025, September	RSV immunisation added
	Beyfortus (Sanofi)
	🕒 Children born between April and September will receive RSV the immunisation in September and October. Children born between October and March will receive the RSV immunisation within 14 days after birth.
	Children born on or after April 1st 2025

Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

Pneumococcal vaccination

2011, May	Vaccine switch
	← **Prevnar (Wyeth)**
	→ **Synflorix (GSK)**
	🕒 2, 3, 4, and 11 months
	Children born on or after March 1st, 2011
2013, December	**Vaccine switch + change in dosing schedule**
	Synflorix (GSK)
	← 🕒 **2, 3, 4, 11 months**
	→ 🕒 **2, 4, 11 months**
	Children born on or after October 2013
2020, January	**Change in dosing schedule**
	Synflorix (GSK)
	← 🕒 **2, 4, 11 months**
	→ 🕒 **3, 5, 11 months**
2024, September	**Vaccine switch**
	← **Synflorix (GSK)**
	→ **Vaxneuvance (MSD)**
	From 1 september 2024 onwards, children received their third vaccination with Vaxneuvance. After that, the other vaccination moments gradually switched to Vaxneuvance as well. From 1 May 2025, children received this vaccine for all their pneumococcal vaccinations.

MMR vaccination

2025, January	Change in dosing schedule
	MMR-VaxPro (SP MSD)
	← 🕒 **14 months, 9 years**
	→ 🕒 **14 months, 3 years**
	Children born on or after 1 January 2016. Children born between 1 January 2016 to 2021 will receive the second MMR vaccination between the ages of 5 and 9 years. Children born in or after 2022 receive the second MMR vaccination at the age of 3 years.

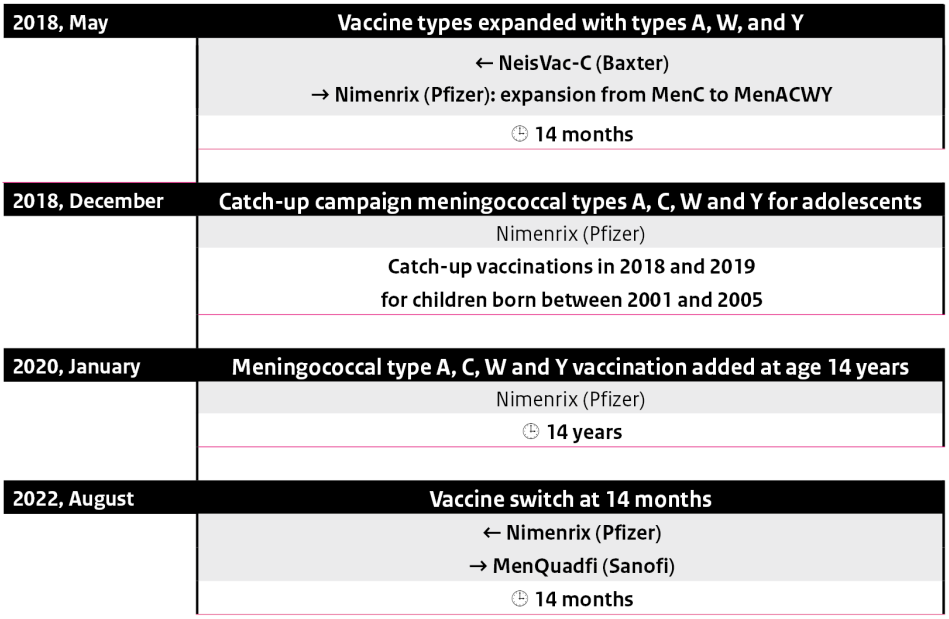
Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

HPV vaccination

2010, January	**HPV vaccination added at age 13**
	Cervarix (GSK)
	🕒 **13 years, girls only**
	Children born on or after January 1st, 1997, 3 doses at 0, 1, and 6 months Catch-up campaign for children born between January 1st, 1993, to December 31st, 1996
2014, January	**Change in dosing schedule**
	Cervarix (GSK)
	🕒 13 years, girls only
	← 3 doses, intervals of 1 and 5 months **→ 2 doses, interval 6 months**
	Children born on or after January 1st, 2001
2022, January	**Boys are also offered HPV vaccination + age of vaccination lowered to age 10**
	Cervarix (GSK)
	🕒 **Boys *and* girls, at age 10**
	Children born on or after January 1st, 2012 Catch-up campaign in 2022 and 2023 for children born between January 1st, 2004, to December 31st, 2011
2022, September	**Change in dosing schedule**
	Cervarix (GSK)
	🕒 Boys *and* girls, aged 15 and over
	← 3 doses, intervals of 1 and 5 months **→ 2 doses, interval 6 months**
2023, February	**Catch up campaign HPV 18+**
	Cervarix (GSK)
	🕒 Boys and girls born between January 1st 1996 to December 31st 2003 2 doses, interval 6 months

Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

Meningococcal vaccination



Source: https://rijksvaccinatieprogramma.nl/wat-is-het-rijksvaccinatieprogramma and the NIP report of last year: https://www.rivm.nl/publicaties/national-immunisation-programme-in-netherlands-surveillance-and-developments-in-2024

Appendix 4 Composition of vaccines/immunoglobulins used in the NIP

Vaccine	Composition
M-M-R VaxPro / MSD EU/1/06/337 Mumps, measles and rubella vaccine 0.5 ml	Measles virus[1] (Enders' Edmonston)[2], ≥1000 $TCID_{50}$[3] Mumps virus[1] (Jeryl Lynn, Level B)[2], ≥12,500 $TCID_{50}$[3] Rubella virus[4] (Wistar RA 27/3)[2], ≥1000 $TCID_{50}$[3] [1] produced in chick embryo cells [2] live attenuated [3] 50% tissue culture of infectious doses [4] produced in WI-38 human diploid lung fibroblasts
Boostrix / GSK RVG 35121 Diphtheria, tetanus and pertussis (acellular component) vaccine (adsorbed, reduced antigen) 0.5 ml	Diphtheria toxoid[1], ≥2 IU Tetanus toxoid[1], ≥20 IU *Bordetella pertussis* antigens: Pertussis toxoid (PT)[1], 8 µg Filamentous haemagglutinin (FHA)[1], 8 µg Pertactin (PRN)[1], 2.5 µg [1] adsorbed to aluminiumhydroxide ($Al(OH)_3$), hydrated, 0.3 mg Al^{3+} and aluminiumphosphate ($AlPO_4$), 0.2 mg Al^{3+}
Vaxelis / MCM Vaccine B.V. EU/1/15/1079 Diphtheria, tetanus, pertussis (acellular component), hepatitis B (rDNA), inactivated poliomyelitis and Haemophilus type b vaccine (adsorbed) 0.5 ml	Diphtheria toxoid[1], ≥20 IU[2] Tetanus toxoid[1], ≥40 IU[2] *Bordetella pertussis* antigens[1]: Pertussis toxoid, 20 µg Filamentous haemagglutinin, 20 µg Fimbriae type 2 and 3, 5 µg Pertactin, 3 µg Hepatitis B surface antigen[3,4], 10 µg Inactivated poliovirus[5]: Inactivated type 1 poliovirus, 29 DE Inactivated type 2 poliovirus, 7 DE Inactivated type 3 poliovirus, 26 DE *Haemophilus influenzae* type b polysaccharide (Polyribosylribitol Phosphate), 3 µg Conjugated to meningococcal protein[3], 50 µg [1] adsorbed on aluminiumphosphate, 0.17 mg Al^{3+} [2] or equivalent activity determined by an immunogenicity evaluation [3] adsorbed on amorphous aluminium hydroxyphosphate sulfate, 0.15 mg Al^{3+}

Vaccine	Composition
	[4] produced in yeast (Saccharomyces cerevisiae) cells by recombinant DNA technology [5] produced in Vero cells
REVAXiS / Sanofi RVG24534 Diphtheria, tetanus and inactivated poliomyelitis vaccine (absorbed; limited quantity of antigen(s)) 0.5 ml	Purified diphtheria toxoid[1], ≥2 IU Purified tetanus toxoid[1], ≥20 IU Inactivated poliovirus type 1[2], 29 DU Inactivated poliovirus type 2[2], 7 DU Inactivated poliovirus type 3[2], 26 DU [1] adsorbed to aluminium hydroxide, 0.35 mg (as aluminium) [2] produced in Vero cells
Engerix-B Junior / GSK RVG24290 Hepatitis B vaccine (recombinant, adsorbed) 0.5 ml	Hepatitis B-virus surface antigen recombinant (S protein)[1,2], 10 µg [1] adsorbed to aluminium hydroxide, hydrated, 0,25 mg Al3+ [2] produced on yeast cells (Saccharomyces cerevisiae) with recombinant DNA technology
Engerix-B / GSK RVG17316 Hepatitis B vaccine (recombinant, adsorbed) 1 ml	Hepatitis B-virus surface antigen[1,2], 20 µg [1] adsorbed on aluminium hydroxide, hydrated, 0.5 mg Al3+ [2] produced on yeast cells (Saccharomyces cerevisiae) with recombinant DNA technology
Cervarix / GSK EU/1/07/419 Human papillomavirus vaccine (2-valent, recombinant, adsorbed) 0.5 ml	Human papillomavirus type 16 L1 protein[1,2,3], 20 µg Human papillomavirus type 18 L1 protein[1,2,3], 20 µg [1] adjuvanted by AS04 containing 3-O-desacyl-4'-monophosphoryl lipid A (MPL)[3], 50 µg [2] absorbed on aluminium hydroxide, hydrated (Al(OH)3), 0.5 mg Al^{3+} in total [3] L1 protein in the form of non-infectious virus-like particles (VLPs) produced by recombinant DNA technology using a Baculovirus expression system, which uses Hi-5 Rix4446 cells derived from *Trichoplusia ni*
Nimenrix / Pfizer EU/1/12/767 Conjugated meningococcal group A, C, W-135 and Y vaccine 0.5 ml	*Neisseria meningitidis*-group A polysaccharide[1], 5 µg *Neisseria meningitidis*-group C polysaccharide[1], 5 µg *Neisseria meningitidis*-group W-135 polysaccharide[1], 5 µg *Neisseria meningitidis*-group Y polysaccharide[1], 5 µg [1] conjugated to tetanus toxoid carrier protein, 44 µg

Vaccine	Composition
MenQuadfi / Sanofi EU/1/20/1483 Conjugated meningococcal group A, C, W and Y vaccine 0.5 ml	*Neisseria meningitidis*-group A polysaccharide[1], 10 µg *Neisseria meningitidis*-group C polysaccharide[1], 10 µg *Neisseria meningitidis*-group Y polysaccharide[1], 10 µg *Neisseria meningitidis*-group W polysaccharide[1], 10 µg [1] conjugated to tetanus toxoid carrier protein, 55 µg
Rotarix / GSK EU/1/05/330 Rotavirus vaccine 1.5 ml	Human rotavirus RIX4414 strain (live, attenuated)[1] ≥ $10^{6.0}$ Cell Culture Infective Dose $(CCID)_{50}$ [1] produced in Vero cells
Beyfortus / Sanofi EU/1/22/1689 Human monoclonal antibody against respiratory syncytial virus (RSV) (recombinant) 0.5 ml 1.0 ml	Nirsevimab 100mg per ml[1] [1] produced in CHO cells
Influvac / Mylan RVG22289 Inactivated influenza vaccine (3-valent) 0.5 ml	A/subtype H1N1, 15 µg HA[1] A/subtype H3N2, 15 µg HA[1] B-line, 15 µg HA[1] [1] produced in embryonated chicken eggs

Vaccine	Composition
Vaxneuvance / MSD EU/1/21/1591 Pneumococcal polysaccharide conjugate vaccine (15-valent, absorbed)	Pneumococcal polysaccharide serotype 1[1,2], 2 µg Pneumococcal polysaccharide serotype 3[1,2], 2 µg Pneumococcal polysaccharide serotype 4[1,2], 2 µg Pneumococcal polysaccharide serotype 5[1,2], 2 µg Pneumococcal polysaccharide serotype 6A[1,2], 2 µg Pneumococcal polysaccharide serotype 7F[1,2], 2 µg Pneumococcal polysaccharide serotype 9V[1,2], 2 µg Pneumococcal polysaccharide serotype 14[1,2], 2 µg Pneumococcal polysaccharide serotype 18C[1,2], 2 µg Pneumococcal polysaccharide serotype 19A[1,2], 2 µg Pneumococcal polysaccharide serotype 19F[1,2], 2 µg Pneumococcal polysaccharide serotype 22F[1,2], 2 µg Pneumococcal polysaccharide serotype 23F[1,2], 2 µg Pneumococcal polysaccharide serotype 33F[1,2], 2 µg Pneumococcal polysaccharide serotype 6B[1,2], 4 µg [1,2] [1] adsorbed on aluminum phosphate [2] conjugated to Cross-Reactive Material (CRM)

More extensive product information can be found at: www.cbg-meb.nl and https://www.ema.europa.eu/en/medicines

Characteristics of the COVID-19 vaccines used in the 2025 autumn round in the Netherlands (15 September 2025 – 5 December 2025).

Vaccine	Type	Offered to ages (years)	Dose
Comirnaty® Pfizer/BioNTech LP.8.1	mRNA	0.5–4	3 µg (0.2 ml)
Comirnaty® Pfizer/BioNTech LP.8.1	mRNA	5–11	10 µg (0.3 ml)
Comirnaty® Pfizer/BioNTech LP.8.1	mRNA	12+	30 µg (0.3 ml)
HIPRA® Bimervax LP.8.1	Protein	12+	40 µg (0.3 ml)

Appendix 5 Overview of recent RIVM publications (01/07/2025 to 30/06/2026)

Vaccination coverage

van Lier EA, Holwerda MR, Westra M, Giebers H, Hament J-M, van der Maas NAT, et al. Vaccinatiegraad Rijksvaccinatieprogramma Nederland. Verslagjaar 2026 [Vaccination coverage National Immunisation Programme in the Netherlands. Reporting year 2026]. National Institute for Public Health and the Environment, 2026 30–06–2026. Report No.: 2026-0001.

Acceptance of vaccination

Knijff M, van Lier A, de Vries M, Hament J-M, Holwerda M, Drijfhout I, et al. No improvement in parental vaccine hesitancy in the Netherlands in 2023 versus 2022. BMC Public Health. 2026;26(1):1632.

Kroese F, van Dijk M, Boer M, Stok M. Results of the SocioVax monitor 2024: insights from social science on willingness to vaccinate in the context of the National Immunisation Programme. 2025.

Kroese F, Wuyts R, Roordink E, van Hameren S, Holland A, al-Rubaie N, et al. SocioVax literature review: Determinants of vaccination uptake in children. 2025. Report No.: RIVM knowledge brief KN-2025-0105.

Kroese F, Wuyts R, Roordink E, van Hameren S, Holland A, al-Rubaie N, et al. SocioVax literature review: interventions that could promote vaccination uptake in children. 2025. Report No.: RIVM knowledge brief KN-2025-0106.

Kroese F, Wuyts R, Roordink E, van Hameren S, Holland A, al-Rubaie N, et al. SocioVax literatuuronderzoek: determinanten van vaccinatiedeelname bij kinderen. Rijksinstituut voor Volksgezondheid en Milieu RIVM, 2025 19–09–2025.

Kroese F, Wuyts R, Roordink E, van Hameren S, Holland A, al-Rubaie N, et al. SocioVax literatuuronderzoek; interventies die vaccinatiedeelname onder kinderen kunnen bevorderen. Rijksinstituut voor Volksgezondheid en Milieu RIVM, 2025.

Linden Lvd, Vromans R, Kunneman F, Vries Md, Lambooij M, Sanders J, et al. Online news commenting as a means for social listening? A case study of the AstraZeneca vaccine suspension using thematic analysis. Journal of Media and Communication Studies. 2025;17(3):72–87.

Roozenbeek T, van den Berg C, Lambooij MS, van der Linden S, Maertens R, Ferreira JA, et al. Trust in institutions and misinformation susceptibility both independently explain vaccine skepticism. Scientific Reports. 2025;15(1):37655.

van Dijk M, Boer M, Stok M, Kroese F. Resultaten van de Sociovax monitor 2025: inzicht in vaccinatietwijfel. 2026 2026–06–30. Report No.: RIVM kennisnotitie KN-2026-0017.

Wennekes MD, De Haan F, Eilers R, Caputo A, Nicoli F, Nagy D, et al. Perceptions on vaccines, vaccine communication and information needs of healthcare professionals involved in older adult vaccination: A cross-country interview study. PLOS Global Public Health. 2025;5(9):e0004928.

Current NIP

Diphteria

Bijukchhe SM, Marchevsky NG, Kibengo F, Sharma AK, Basi R, Cantrell L, et al. Optimising DTwP-containing vaccine infant immunisation schedules in Uganda and Nepal (OptImms): two open-label, non-inferiority, randomised controlled trials. The Lancet Infectious Diseases. 2026;26(7):726–38.

Mburu CN, Ojal J, Selim R, Ombati R, Akech D, Karia B, et al. Seroprevalence of antibodies against diphtheria, tetanus, and pertussis over a 12-year period in children in Kilifi, Kenya (2009-2021). International Journal of Infectious Diseases. 2026;164:108396.

Pijpers J, van Roon A, Schipper M, Stok M, van den Hof S, van Gaalen R, et al. The decrease in childhood vaccination coverage and its sociodemographic determinants, the Netherlands, birth cohorts 2008 to 2020. Eurosurveillance. 2025;30(39):2500251.

Pijpers J, van Roon A, van den Hof S, van Gaalen R, de Melker H, Hahné S. Large differences in MMR and DTaP-IPV vaccination coverage among primary schools by denomination, the Netherlands, 2024. Vaccine. 2026;72:128137.

Haemophilus influenzae

Bertran M, de Gier B, Garcia Vilaplana T, van Sorge NM, de Melker HE, Steens A. Product- and schedule-specific vaccine effectiveness against invasive *Haemophilus influenzae* serotype b (Hib) disease, The Netherlands, 2005 to 2023. Eurosurveillance. 2026;31(19):2500699.

Hepatitis B

Brouwers EEHG, ter Waarbeek HLG, Somers C, Dukers-Muijrers NHTM, den Heijer CDJ, Hoebe CJPA. Non-hospital occupational blood exposure accidents: A nine-year retrospective analysis of post-exposure HIV, hepatitis B and C risk management in the Netherlands. Epidemiology and Infection. 2026;154:e58.

Canabarro APF, Duffell E, Hansson D, Dudareva S, Seyler T, Niehus R, et al. Use of the Workbook Method to estimate the prevalence of chronic hepatitis B infections in the European Union and European Economic Area, 2022. Eurosurveillance. 2026;31(14):2500322.

Generaal E, Bachour Y, Klijzing S, Cornelissen A, Toering R, Hoornenborg E, et al. Integrating hepatitis B virus, hepatitis C virus and human immunodeficiency virus screening for migrants from endemic countries into travel-related and sexual health care in Amsterdam, the Netherlands. Frontiers in Public Health. [Original Research]. 2025;Volume 13 - 2025.

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Zaaijer HL, Smeets LC, Petrignani M, Voordouw BCG, Benschop KSM, Leonhard SE, et al. Acute hepatitis B infection escaping vaccination: A case report. Medicine. 2026;105(22):e48735.

Human papillomavirus (HPV) infection

Duijster J, de Melker H, de Boer P, Brouwer J, Hoeve-Bakker B, van der Kooij D, et al. Human papillomavirus (HPV) vaccination. Background information for the Dutch Health Council. Rijksinstituut voor Volksgezondheid en Milieu, 2025. Report No.: RIVM rapport 2024-0217.

Middeldorp M, Donken R, Nirmal A, Smith B, Citlali Marquez A, Bettinger JA, et al. Quadrivalent HPV Vaccine Evaluation Study with Addition of the Nonavalent Vaccine (QUEST-ADVANCE): protocol of an observational cohort study. BMJ Open. 2025;15(9):e100560.

Middeldorp M, Duijster JW, Hoeve-Bakker BJA, Berkhof J, de Melker HE. The Long-Term Effect of 2 and 3 Doses of Bivalent HPV Vaccination Against HPV Infections: A Comparison Between 2 Observational Cohort Studies. The Journal of Infectious Diseases. 2026;234(2):e302–e10.

van Veelen S, Alberts C, Hoornenborg E, Bruisten SM, Vermeij K, van der Klis F, et al. Human papillomavirus (HPV) vaccine effectiveness against anal HPV-16 and HPV-18 infections among young men who have sex with men visiting the sexual health center of Amsterdam (HPV4M): study protocol of an observational study. BMJ Open. 2025;15(8):e101634.

Measles

Buzasi K, van Wijhe M, Wallinga J, Janssens A. The changing mortality burden of measles, pertussis, and diarrheal disease in Amsterdam, 1856-1920. International Journal of Infectious Diseases. 2026;167:108508.

Janssen MJM, de Witte MA, Daenen LGM, Verduyn Lunell F, van Baarle D, Kuball J, et al. Preserved measles immunity after allogeneic hematopoietic stem cell transplantation in a cohort of mainly αβ T-cell-depleted graft recipients. Bone Marrow Transplantation. 2026;61(1):92–4.

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Saha S, van Binnendijk R, Ussher J, ten Hulscher H, Millier M, McIntyre P. Limitations of serological screening for measles immunity in young health care workers in New Zealand. Vaccine. 2025;68:127931.

Meningococcal disease

Bertran M, van de Kassteele J, Visser LJ, Knol MJ, de Melker HE, van Sorge NM, et al. Invasive meningococcal B disease: Spatiotemporal cluster identification using finetype data, the Netherlands, 2005-2023. Epidemiol Infect. 2026;154:e51.

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Mumps

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Pertussis

Anabe D, Ilonen J, Barkoff A-M, Teräsjärvi JT, Mertsola J, van Gageldonk P, et al. Association of HLA class II haplotypes with antibody concentrations after diphtheria-tetanus acellular pertussis booster vaccination in four age groups of Finnish participants. Vaccine. 2026;85:128697.

Bijukchhe SM, Marchevsky NG, Kibengo F, Sharma AK, Basi R, Cantrell L, et al. Optimising DTwP-containing vaccine infant immunisation schedules in Uganda and Nepal (OptImms): two open-label, non-inferiority, randomised controlled trials. The Lancet Infectious Diseases. 2026;26(7):726–38.

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Smet J, Smits K, Dirix V, Vermeulen F, De Schutter I, Buisman AM, et al. Multiparametric analysis of vaccine-induced B and T cell responses for optimal evaluation of memory immune responses to Bordetella pertussis in children. Vaccine. 2026;81:128552.

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Pneumococcal disease

Arranz-Herrero J, Baranda J, Rius-Rocabert S, Moreno-Vadillo M, Gonzalez-Ruiz I, Miranda-Bedate A, et al. Divergent macrophage responses to Influenza A virus and Streptococcus pneumoniae: co-infection drives bacterial dominance whereas superinfection favors viral priming. Frontiers in Immunology. [Original Research]. 2026;Volume 17 - 2026.

Niessen FA, Steens A, Knol MJ, Groenwold RHH, Bonten MJM, van Sorge NM, et al. Impact and vaccine effectiveness of the 23-valent pneumococcal polysaccharide vaccine in adults aged 65 years or older in the Netherlands. Clinical Microbiology and Infection. 2026;32(3):440–5.

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Poliomyelitis

de Schrijver S, Vanhulle E, Ingenbleek A, Alexakis L, Johannesen CK, Broberg EK, et al. Epidemiological and Clinical Insights into Enterovirus Circulation in Europe, 2018–2023: A Multicenter Retrospective Surveillance Study. The Journal of Infectious Diseases. 2025;232(1):e104–e15.
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Rubella

Pijpers J, van Roon A, Schipper M, Stok M, van den Hof S, van Gaalen R, et al. The decrease in childhood vaccination coverage and its sociodemographic determinants, the Netherlands, birth cohorts 2008 to 2020. Eurosurveillance. 2025;30(39):2500251.
Pijpers J, van Roon A, van den Hof S, van Gaalen R, de Melker H, Hahné S. Large differences in MMR and DTaP-IPV vaccination coverage among primary schools by denomination, the Netherlands, 2024. Vaccine. 2026;72:128137.

Tetanus

Bijukchhe SM, Marchevsky NG, Kibengo F, Sharma AK, Basi R, Cantrell L, et al. Optimising DTwP-containing vaccine infant immunisation schedules in Uganda and Nepal (OptImms): two open-label, non-inferiority, randomised controlled trials. The Lancet Infectious Diseases. 2026;26(7):726–38.
Mburu CN, Ojal J, Selim R, Ombati R, Akech D, Karia B, et al. Seroprevalence of antibodies against diphtheria, tetanus, and pertussis over a 12-year period in children in Kilifi, Kenya (2009-2021). International Journal of Infectious Diseases. 2026;164:108396.
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Covid-19

Arias-Hidalgo C, Juanes-Velasco P, Iglesia-Sánchez A, Nuño-Soriano A, Lecrevisse Q, Herrero R, et al. Humoral Response Profile in SARS-CoV-2 Infection: Differences across Virus Strains and Influenza. Journal of Proteome Research. 2025;24(9):4347–61.

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Appendix 6 Overview of relevant websites

General information for NIP professionals

NIP website for professionals:
http://www.rivm.nl/Onderwerpen/R/Rijksvaccinatieprogramma/Professionals

Preventieprogramma's en Opschaling voor de Publieke Gezondheid (PPG, Prevention Programmes and Public Health Upscaling):
https://www.rivm.nl/over-het-rivm/organisatie#kenniscentra

Meldingsplicht infectieziekten
(Mandatory notification of infectious diseases in the Netherlands):
http://www.rivm.nl/Onderwerpen/M/Meldingsplicht_infectieziekten

Cervical cancer screening programme:
https://www.rivm.nl/Onderwerpen/B/Bevolkingsonderzoek_baarmoederhalskanker_voor_professionals

European Surveillance Atlas of Infectious Diseases:
https://www.ecdc.europa.eu/en/surveillance-atlas-infectious-diseases

Sociaalwetenschappelijk onderzoek naar vaccineren (SocioVax):
https://www.rivm.nl/gedragsonderzoek/sociovax

General information for the public

National Immunization Program:
https://rijksvaccinatieprogramma.nl/

Available vaccines that are not (yet) part of a public vaccination programme:
www.rivm.nl/vaccinaties

Volksgezondheidenzorg.info:
https://www.volksgezondheidenzorg.info/

Cervical cancer screening programme:
https://www.rivm.nl/Onderwerpen/B/Bevolkingsonderzoek_baarmoederhalskanker

Vaccines Today:
https://www.vaccinestoday.eu/about-us/who-we-are/

Other NIP-related RIVM reports

Vaccination coverage National Immunisation Programme in the Netherlands. Reporting year 2026:
https://www.rivm.nl/publicaties/vaccinatiegraad-rijksvaccinatieprogramma-nederland-verslagjaar-2026

Adverse events in the Netherlands Vaccination Programme, reports in 2010 and review 1994–2010:
http://www.rivm.nl/bibliotheek/rapporten/205051004.pdf

Adverse events in the Netherlands Vaccination Programme. Report 2025:
https://www.lareb.nl/news/meldingen-van-bijwerkingen-rijksvaccinatieprogramma-2025/

Product information

NIP vaccine product information and package leaflets:
https://rijksvaccinatieprogramma.nl/professionals/productinformatie-vaccinaties

National organisations

General
Ministry of Health, Welfare and Sport:
http://www.rijksoverheid.nl/onderwerpen/vaccinaties

Gezondheidsraad (Health Council of the Netherlands):
http://www.gezondheidsraad.nl/

GGD GHOR
https://ggdghor.nl/

Vaccine safety
Netherlands Pharmacovigilance Centre Lareb:
http://www.lareb.nl/

College ter Beoordeling van Geneesmiddelen (CBG, Netherlands Medicines Evaluation Board):
https://www.cbg-meb.nl/

Data sources
Statistics Netherlands (CBS):
http://www.cbs.nl/

Dutch Hospital Data (DHD):
https://www.dhd.nl/

Nederlands instituut voor onderzoek van de gezondheidszorg (NIVEL, Netherlands Institute for Health Services Research):
http://www.nivel.nl/

Nederlands Referentielaboratorium voor Bacteriële Meningitis (NRLBM, Netherlands Reference Laboratory for Bacterial Meningitis):
https://www.amc.nl/web/specialismen/medische-microbiologie-infectiepreventie-1/medische-microbiologie-infectiepreventie-1/nederlands-referentie-laboratorium-voor-bacteriele-meningitis-nrlbm.htm

Integrated Primary Care Information (IPCI):
http://www.ipci.nl/

The Netherlands Cancer Registry (NKR):
http://www.cijfersoverkanker.nl/

Nederlandse Werkgroep Klinische Virologie
(NWKV, Netherlands Working Group Clinical Virology):
https://www.nvmm.nl/commissie-werkgroep/nederlandse-werkgroep-klinische-virologie/

International organisations

World Health Organization (WHO):
http://www.who.int/en/

World Health Organization (WHO) Europe:
https://www.who.int/europe/home?v=welcome

European Centre for Disease Prevention and Control (ECDC):
http://ecdc.europa.eu/en/

ClinicalTrials.gov:
https://clinicaltrials.gov/

Advisory Committees
Joint Committee on Vaccination and Immunisation (JCVI):
https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation

National Immunization Technical Advisory Groups (NITAGs):
http://www.nitag-resource.org/

Safety of vaccines
European Medicines Agency (EMA):
https://www.ema.europa.eu/en/homepage

U.S. Food and Drug Administration (FDA):
http://www.fda.gov/

Vaccine schedules in EU/EEA countries
European Centre for Disease Prevention and Control (ECDC):
https://www.ecdc.europa.eu/en/publications-data/ecdc-vaccine-scheduler

World Health Organization (WHO):
https://immunizationdata.who.int/

International networks
EUVAC-Net:
https://www.ecdc.europa.eu/en/vaccine-preventable-diseases

HAVNET:
http://www.rivm.nl/en/Topics/H/HAVNET

National Respiratory and Enteric Virus Surveillance System (NREVSS):
https://www.cdc.gov/surveillance/nrevss/

WHO Global Polio Laboratory Network (GPLN):
https://www.who.int/europe/initiatives/polio-laboratory-network

European Respiratory Virus Surveillance Summary (ERVISS)
erviss.org

Invasive Respiratory Infections Surveillance (IRIS):
Invasive Respiratory Infections Surveillance (IRIS) | PubMLST

VITAL:
VITAL | IHI Innovative Health Initiative (europa.eu)

Communication platforms

EpiPulse – the European surveillance portal for infectious diseases:
https://www.ecdc.europa.eu/en/publications-data/epipulse-european-surveillance-portal-infectious-diseases

Vaccination of risk groups

Covid-19 vaccination
RIVM website on Covid-19 vaccination:
https://www.rivm.nl/corona/coronaprik

Influenza vaccination
RIVM website on Influenza vaccination:
http://www.rivm.nl/Onderwerpen/G/Griep/Griepprik

Stichting Nationaal Programma Grieppreventie
(SNPG, Foundation for the National Influenza Prevention Programme):
http://www.snpg.nl/

Scientific Institute for Quality of Healthcare:
http://www.iqhealthcare.nl/nl/

Annual Report on Surveillance of Influenza and Other Respiratory Infections in the Netherlands:
https://www.rivm.nl/luchtweginfecties/samenvatting-seizoen-2025-2026

Tuberculosis
KNCV Tuberculosis foundation:
https://www.kncvtbc.org/

National Tuberculosis Control Plan 2021-2025:
https://www.rivm.nl/bibliotheek/rapporten/2021-0215.pdf

Traveller vaccinations
Landelijk Coördinatiecentrum Reizigersadvisering
(National Coordination Centre for Information for Travellers):
https://lcr.nl/landing

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