

# The Danish childhood vaccination program

SUMMARY IN ENGLISH



2018

## Why do we vaccinate children in Denmark?

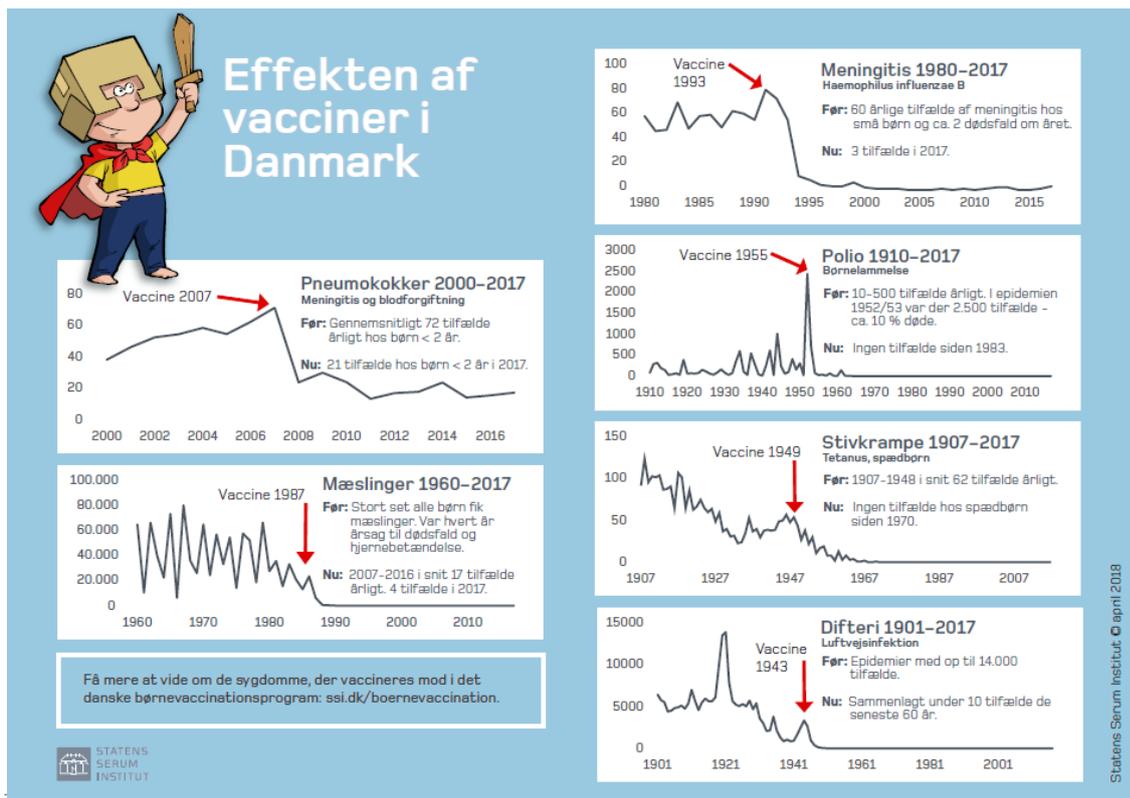
Childhood immunization programs are some of the most effective preventive public health measures available. Most vaccines have a sustained long-term effect, and vaccination can prevent infection in the immunized individual as well as reduce the spread of disease in the general population.

Many of the infectious diseases we cover in our childhood immunization programs would, in an unvaccinated population, occur as large epidemics with intervals of a few years. But such epidemics can be prevented by having a high vaccination coverage in the population. Despite modern treatment, many of the diseases covered by the childhood immunization program may still cause death or permanent injuries to children.

The Danish childhood immunization program has been extremely effective. There has been no transmission of infectious diseases such as diphtheria and polio (infantile paralysis) in Denmark for decades, and for a number of other diseases, we have seen a large reduction of incidence already a year or shortly after the vaccination has been introduced, as was the case with the Hib vaccination. This is, however, not a reason to stop vaccinating. In addition to the continued risk of contracting the diseases in Denmark, there is also a risk that unvaccinated children can be infected abroad and bring the infection home with them, or that unvaccinated visitors or immigrants can bring the infection to Denmark.

Therefore it is important to continue to vaccinate, also against diseases we have not seen in Denmark in recent years. Vaccine preventable diseases will inevitably re-emerge if we stop vaccinating against them unless the disease is completely eliminated.

**Illustration in Danish: The impact of introducing new vaccines into the Danish childhood vaccination program**



## What diseases does the Danish childhood vaccination program cover?

The childhood vaccination program covers the following diseases: diphtheria, tetanus, pertussis (whooping cough), polio (infantile paralysis), meningitis and epiglottitis caused by the bacterium *Haemophilus influenzae* type b (the Hib bacterium), meningitis and other severe diseases caused by the *Streptococcus pneumoniae* bacterium, measles, mumps, rubella (German measles) and cervical cancer (for girls).

The vaccinations are free of charge and voluntary. The vaccinations are typically given by general practitioners.



The Danish Minister for Health lays down the rules governing which diseases should be included in the vaccination program and which population groups should be offered the vaccination. As the supreme health professional authority, the Danish Health Authority has the overall professional responsibility for the childhood vaccination program and recommends to the Minister what vaccines should be included in the program. In cooperation with Statens Serum Institut, the Danish Health Authority manages the ongoing monitoring of the program. Together with the European Medicines Agency (EMA), the Danish Medicines Agency is responsible for authorising the vaccines used and monitoring the safety of vaccines on an ongoing basis.

Child with measles. Website: [www.ssi.dk/Service/Sygdomsleksikon/M/Maeslinger.aspx](http://www.ssi.dk/Service/Sygdomsleksikon/M/Maeslinger.aspx)

## How is the childhood vaccination programme monitored?

The childhood vaccination program is constantly monitored to ensure that it is working as intended.

Statens Serum Institut registers the number of cases reported of the diseases which are vaccinated against in the childhood vaccination program. Statens Serum Institut is also responsible for ensuring the supply of vaccines to the childhood vaccination program and monitors the vaccination coverage in the population. The Danish Medicines Agency monitors potential adverse reactions to the vaccines.

If required, changes are made to the program.

## International recommendations for vaccination coverage

For most vaccines, there is a direct correlation between participation in the childhood vaccination program and the occurrence of the vaccine-preventable diseases.

Measles is the most infectious of the vaccine-preventable childhood diseases, which means that a high coverage in the population is required in order to avoid outbreaks. The World Health Organization's (WHO) objective for measles is coverage of minimum 95%. Therefore, at least 95% of all children should be given both MMR vaccines. This objective has, however, not been achieved for any birth cohort since the vaccine was introduced in the childhood vaccination program in 1987.

As regards polio, WHO assesses that at least 90% of all children should be vaccinated in order to avoid outbreaks. In the Danish childhood vaccination program, this corresponds to 90% of a birth cohort getting the first three DTaP-IPV/Hib vaccinations. This goal has been achieved from the 2009 birth cohort and onwards.

The WHO has not laid down specific targets for coverage of other vaccines in the childhood vaccination program, but a very high coverage is generally regarded as a prerequisite for ensuring effective protection of the population against the vaccine-preventable diseases.

## Vaccination coverage in 2017

The coverage of all vaccinations increased in 2017 compared with 2016. Vaccinations against diphtheria, tetanus, pertussis, polio, Hib infection, *Streptococcus pneumoniae*, measles, mumps and rubella have increased by between two and six percentage points, and the two vaccinations against HPV infection have increased by 12 percentage points.

### Vaccination coverage with the Danish childhood vaccination program 2017

Vaccine	Year of birth	Vaccination coverage
Diphtheria-tetanus-pertussis-polio-HibDiTeKiPol/Hib (three months)	Children born in 2016	96 %*
Diphtheria-tetanus-pertussis-polio-HibDiTeKiPol/Hib (five months)	Children born in 2016	96 %*
Diphtheria-tetanus-pertussis-polio-HibDiTeKiPol/Hib (12 months)	Children born in 2015	95 %*
PCV 13 (3 months)	Children born in 2016	96 %*
PCV 13 (5 months)	Children born in 2016	96 %*

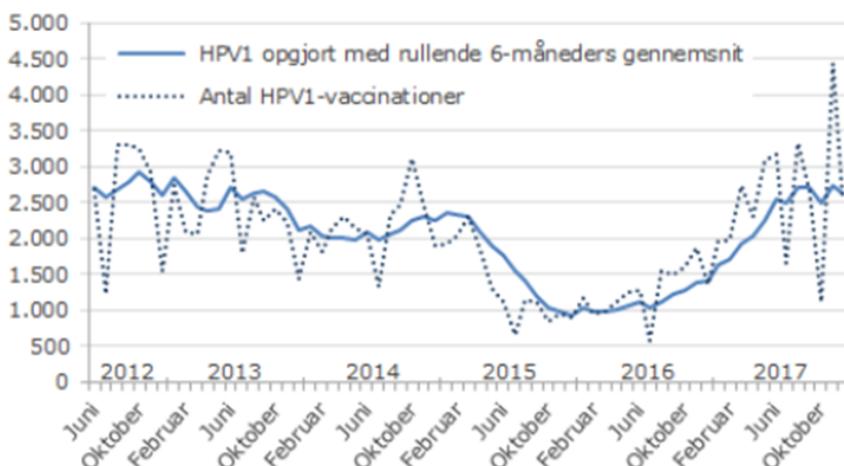
PCV 13 (12 months)	Children born in 2015	94 %*
MMR 1 (15 months)	Children born in 2015	94 %*
MMR 2 (4 years old)	Children born in 2012	88 %
Diphtheria-tetanus-pertussis-polio-Hib - DiTeKiPol revaccination (5 years old)	Children born in 2011	87 %*
HPV 1 (12 years old girls)	Children born in 2004	59 %
HPV (finished) (12 years old girls), i.e. has got at least two vaccinations within the correct intervals.	Children born in 2004	36 %
Data acquired on 5 February 2018	<a href="http://www.ssi.dk/data">www.ssi.dk/data</a>	

**Note\***

A study from 2012<sup>1</sup> shows under reporting when measuring the vaccination coverage in the Danish childhood vaccination program. Therefore, it is estimated that the number of vaccinations given at age three, five, 12, 15 and 60 months can be adjusted upwards by a minimum of three percentage points.

One of the reasons for the overall increase in coverage is that, in May 2014, Statens Serum Institut started sending reminders to parents whose children have not received the recommended vaccinations in the childhood vaccination program. The increased coverage of HPV vaccination is also due to the extraordinary information campaign Stop HPV – Stop cervical cancer. The campaign was launched by the Danish Health Authority in May 2017 and is conducted in close collaboration with the Danish Cancer Society and the Danish Medical Association, and with the support of a large number of other relevant public authorities, scientific societies and disease prevention organisations.

Numbers of young women who starts HPV-vaccination per month, June 2012 – December 2017



<sup>1</sup> Wojcik, O. P., Simonsen J., Mølbak K. and Valentiner-Branth, P. "Validation of the 5-year tetanus, diphtheria, pertussis and polio booster vaccination in the Danish childhood vaccination database" Vaccine 31.6 (2013): 955-59

For the three vaccines against diphtheria, tetanus, pertussis, polio and the Hib bacterium, there was a significant increase of several percentage points in 2017 compared with the coverage in 2016. Coverage was at least 95% for the three primary vaccinations given at three, five and 12 months. Coverage of vaccination against pneumococcal disease was at the same high level.

Coverage of the vaccine against measles, mumps and rubella (the MMR vaccine) was 2-3 percentage points higher in 2017 than in 2016. The coverage was of 94% for the first MMR vaccination and of 88% for the second MMR vaccination.

The coverage of the HPV vaccine increased for several birth cohorts of girls and young women in 2017. In other words, many young girls have postponed being vaccinated and started their HPV vaccination in 2017. Coverage of the HPV vaccine for girls who attained 13 years of age in 2017 (2004 birth cohort) was 59% for the first HPV vaccination, while 36% completed their vaccination. In addition, the coverage for 14-year-old girls (2003 birth cohort) increased, so that the coverage is now 68% for the first HPV vaccination, and 41% for those who completed their vaccination; these figures were 47% and 24% respectively at the same time in 2016.

The coverage of the various vaccinations in the childhood vaccination program varies between municipalities and regions in Denmark. The coverage of the DTaP-IPV/Hib vaccine varies across municipalities, with the municipality with the lowest coverage being 89% and the municipality with the highest coverage being 100%. The coverage of the MMR vaccination (MMR 2) varies by a total of 28 percentage points across the municipalities in Denmark. The coverage of the HPV vaccination also varies between the municipalities, with the municipality with the lowest coverage of the second HPV vaccination (HPV2) being 54%, while the municipality with the highest coverage was 65% in 2017. The coverage of all municipalities can be seen in Appendix 5 of the report.

## **Measures to increase vaccination coverage in 2017**

The starting point of the Danish Health Authority's recommendations on diseases which are to be prevented by vaccination under the childhood vaccination programme is that children should be protected against the most serious and infectious diseases. To ensure this, it is important to have a constant high programme coverage.

To study Danish municipalities' work in the field of vaccination and the initiatives aimed at increasing the childhood vaccination programme coverage, the Danish Health Authority has contacted 19 municipalities which are significantly above the national average for coverage of either the DTaP-IPV/Hib, MMR or HPV vaccine.

The municipalities almost unanimously stress that the health visitors are especially important in the municipal initiatives and have great focus on the childhood vaccination programme in connection with home visits to new parents. Several municipalities also report that the close relationship with parents provides a good opportunity to engage in

a constructive dialogue if parents are in doubt about child vaccinations or have opted out of vaccination.

## Reports of suspected adverse reactions in 2017

In 2017, the Danish Medicines Agency received a total of 758 reports on vaccines included in the childhood vaccination program. This corresponds to a decrease of 29% compared with the number of reports in 2016. Adverse effects are most commonly reported for the vaccine against diphtheria, tetanus, pertussis, polio and Hib infection (the DTaP-IPV/Hib vaccine) and the vaccine against pneumococcal infection.

In 2017, granulomas were the most frequently reported suspected adverse reaction to vaccines in the childhood vaccination program with a total of 495 reports. A granuloma is an itchy, persistent node formation at the injection site. There is often a large temporal gap between the development of an adverse reaction and the time at which it is reported. For example, there are cases in which a granuloma has been reported 10 years after it has occurred.

A major reason for the large number of reports on granulomas in 2017 is probably the attention that has been paid to granulomas and aluminum salt vaccines in recent years. It is a well-known mechanism that the number of reports increases when there has been much attention to a particular adverse reaction to a vaccine.

Numbers of mild (blue) and serious (orange) cases in reported suspected adverse effects from vaccinations

