Principles of Vaccination

aZLHE 711,p,c
Kolářová Marie, EPI
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The word “vaccine” comes from the Latin word *vaccinus*, which means “pertaining to cows.” What do cows have to do with vaccines? The first vaccine was based on the relatively mild cowpox virus, which infected cows as well as people. This vaccine protected people against the related, but much more dangerous, smallpox virus.

More than 200 years ago (in 1789), Edward Jenner, a country physician practicing in England, noticed that milkmaids rarely suffered from smallpox.

The milkmaids often did get cowpox, a related but far less serious disease, and those who did never became ill with smallpox.

In an experiment that laid the foundation for modern vaccines, Jenner took a few drops of fluid from a skin sore of a woman who had cowpox and injected the fluid into the arm of a healthy young boy who had never had cowpox or smallpox.

Six weeks later, Jenner injected the boy with fluid from a smallpox sore, but the boy remained free of smallpox.

Dr. Edward Jenner

Dr. Jenner had discovered one of the fundamental principles of immunization.

He had used a relatively harmless foreign substance to evoke an immune response that protected someone from an infectious disease.

His discovery would ease the suffering of people around the world and eventually lead to the elimination of smallpox, a disease that killed a million people, mostly children, each year in Europe.

By the beginning of the 20th century, vaccines were in use for diseases that had nothing to do with cows—rabies, diphtheria, typhoid fever, and plague—but the name stuck.

Remembering an Old Disease

Smallpox

Face lesions on boy with smallpox.

Public Health Images Library (PHIL) ID # 3.
Source: CDC/Cheryl Tyron

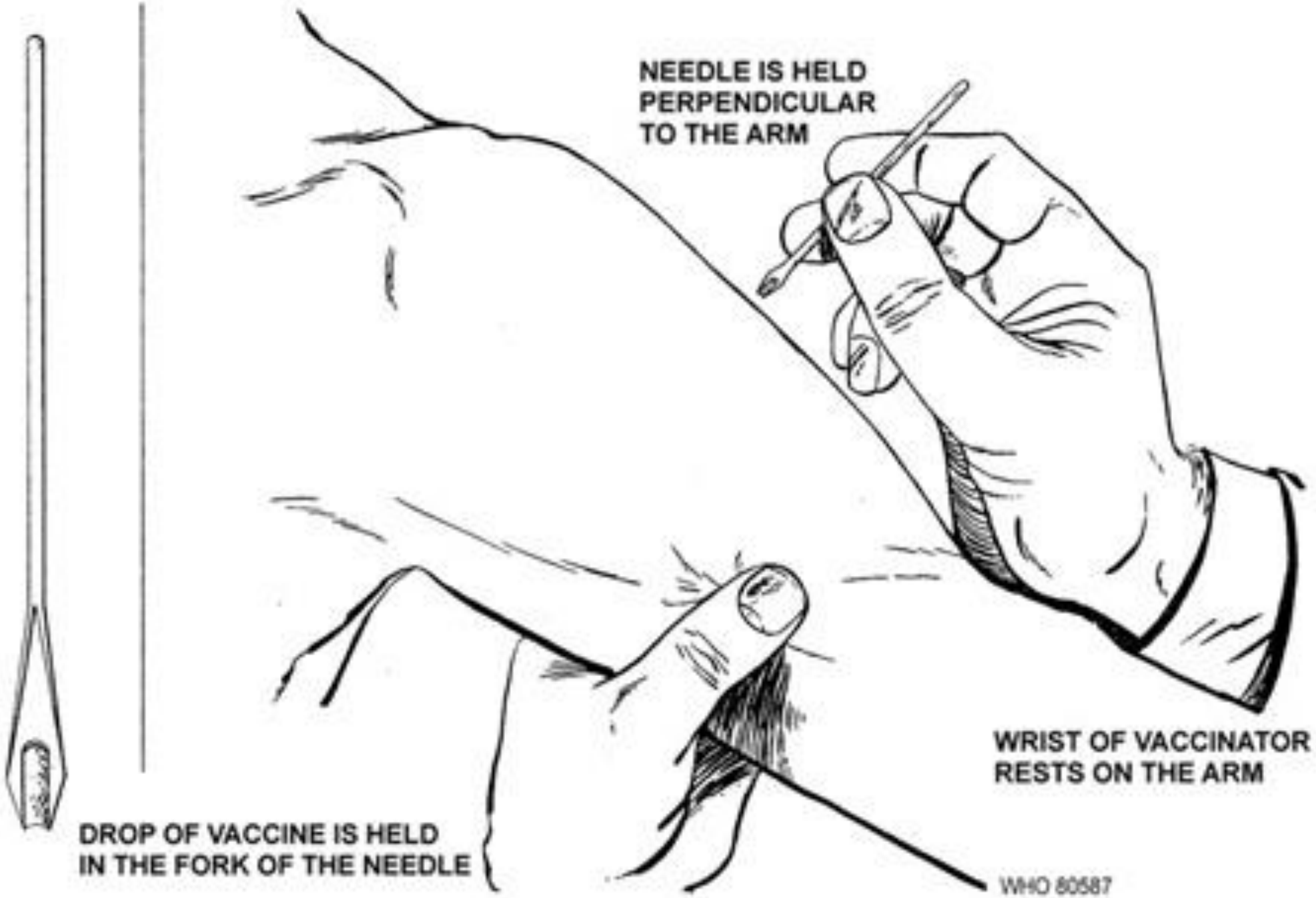
Smallpox recognition card, c.1973, courtesy Dr. Damodar Bhonsule, Panjim, Goa, India.

Smallpox lesions on skin of trunk.
Picture taken in Bangladesh, 1973.

Public Health Images Library (PHIL) ID # 284. Source: CDC/James Hicks

Rural vaccinator in United Provinces, British India, c.1930, private collection of Dr. Sanjoy Bhattacharya

MULTIPUNCTURE VACCINATION BY BIFURCATED NEEDLE



Variola virus, which causes smallpox, was once the scourge of the world.

This virus passes from person to person through the air.

A smallpox infection results in fever, severe aches and pains, scarring sores that cover the body, blindness in many cases, and, often, death. There is no effective treatment.

Although vaccination and outbreak control eliminated smallpox in the United States by 1949, the disease still struck an estimated 50 million people worldwide each year during the 1950s.

In 1967, the World Health Organization (WHO) launched a massive vaccination campaign to rid the world of smallpox —and succeeded.

The last natural case of smallpox occurred in Somalia in 1977.

Ali Maow Maalin, cook twenty-three of the hospitals in the Somali Merce. He contracted when he showed the path of the ambulance chauffeur who drove two sick children to camp insulation.

In 1978 was ill photographer Medical School in Birmingham, England. She was killed by a virus that escaped from a neighboring lab.

Mr. John Wickett, of the World Health Organization, with **the last person** to have contracted – **<u>and survived</u>** – naturally occurring smallpox in Somalia.

(1977), courtesy Mr. John Wickett.

Eradication of smallpox
Czech experts

A key figure in the global eradication program smallpox was prof. MUDr. Karel Raska, MD., who drove in the sixties division

Communicative Diseases of the WHO

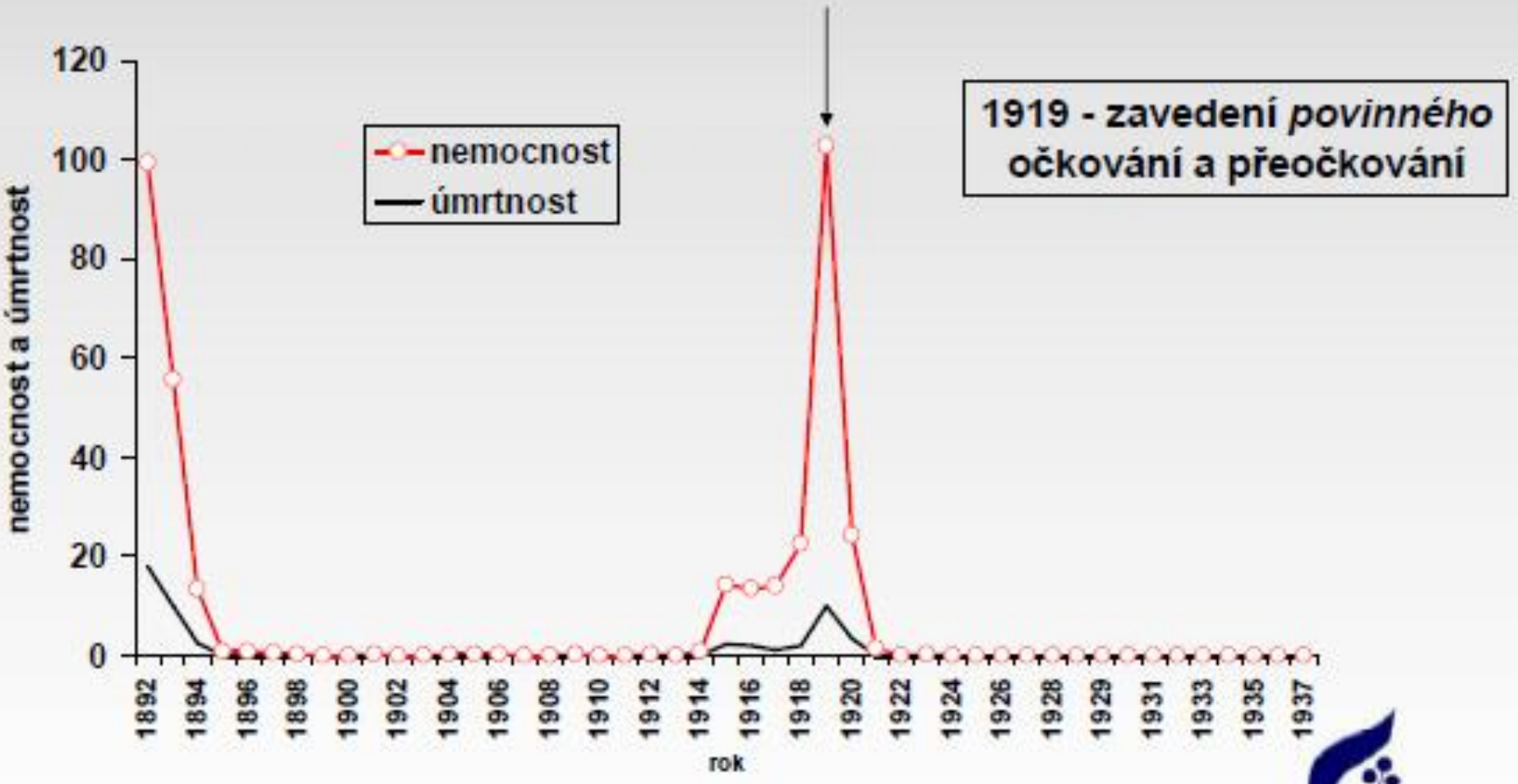
Secretariat in Geneva.

He promoted the establishment of a new, independent units "Eradication of smallpox"and ensure its initial financial and material support, not only in Geneva,
but also in regional offices of WHO.

With its support of the program also attended the 20 Czechoslovak health professionals (14 Czechs and Slovaks 6), mainly epidemiologists.

They participated in both the preparation methodology and procedures, thus working directly in infested areas.

Variola, České země, 1892-1937, nemocnost a úmrtnost na 100 000 obyvatel



Státní zdravotní ústav

SZÚ

Smallpox eradication was
officially announced
at the 33rd General Assembly WHO

8. May 1980.

Tuesday, March 8, 2011; 9:41 AM

Milestones in the eradication of smallpox

1789 Edward Jenner invents a smallpox vaccine.

1966 The World Health Organization (WHO) launches a massive global campaign to eradicate smallpox.

1972 Smallpox vaccinations are discontinued in the United States.

1975 and 1977 The last cases of the two known variants of smallpox occur in the world, in Bangladesh and Somalia.

1978 Two people are sickened in a lab accident in England; one dies.

1980 The WHO declares smallpox eradicated.

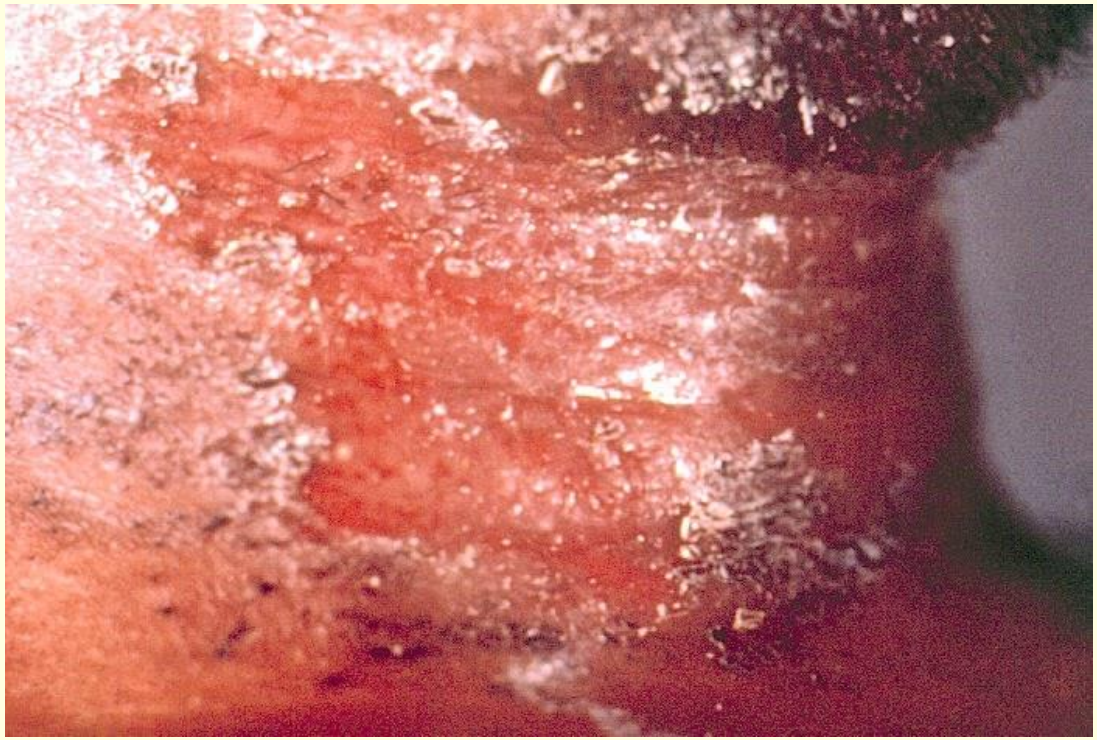
1991 Smallpox virus DNA is mapped.

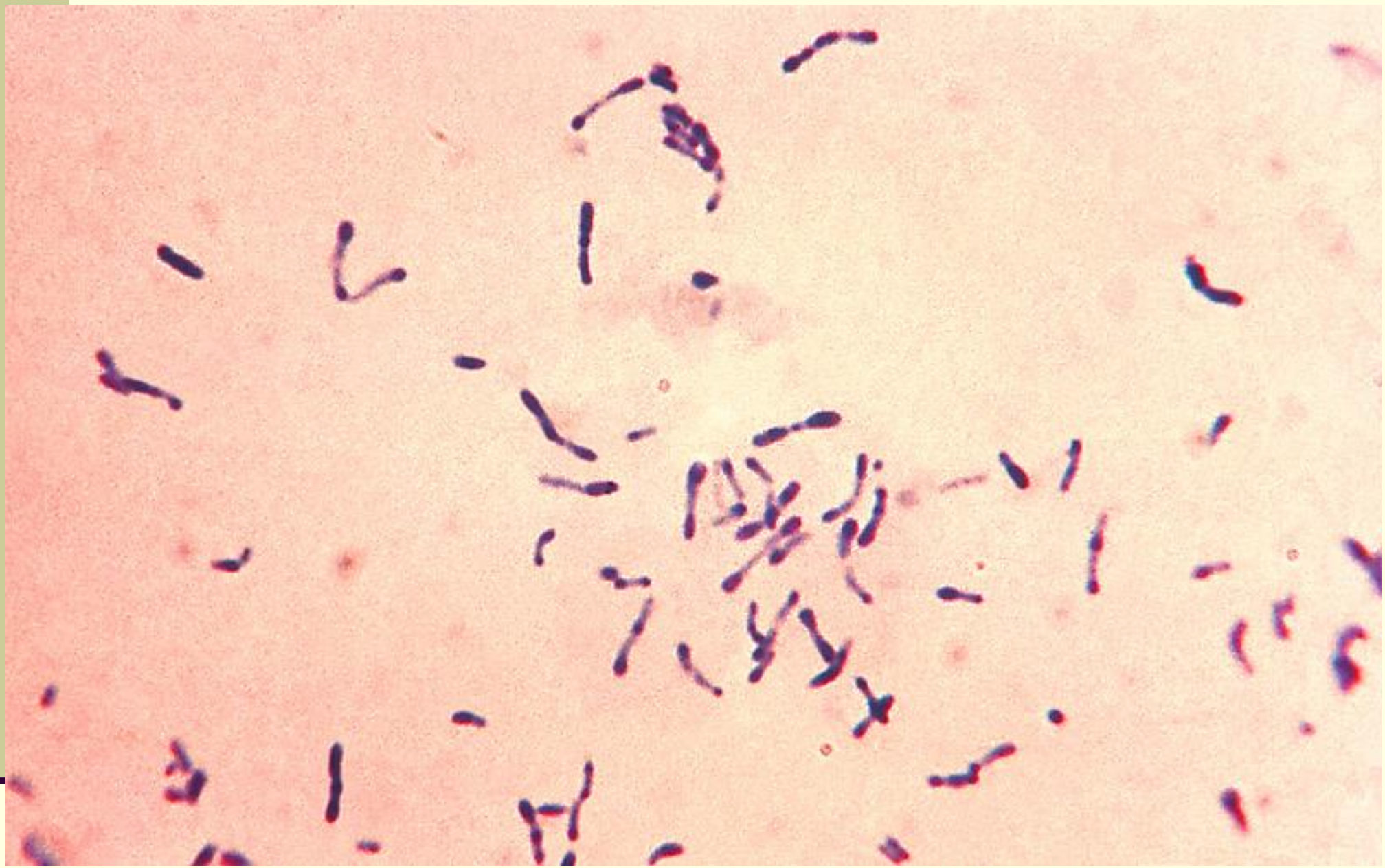
1999 The WHO sets this deadline, by which remaining lab stocks of the virus are to be destroyed. The deadline will be postponed again and again.

2003 Millions of doses of vaccine are produced to hedge against a biological attack.

2011 WHO's decision-making body will meet in May to again vote on whether to kill the remaining live viruses.

Remembering an Old Disease Diphtheria:





PHIL Photo ID#7323

Causes and Transmission

Diphtheria is an infection caused by the toxic *Corynebacterium diphtheriae* bacterium.

Diphtheria is spread (transmitted)

from person to person,

usually through respiratory droplets, like from coughing or sneezing.

Rarely, people can get sick from touching open sores (skin lesions) or clothes that touched open sores of someone sick with diphtheria.

A person also can get diphtheria by coming in contact with an object, like a toy, that has the bacteria that cause diphtheria on it.

Symptoms

When the bacteria get into and attach to the lining of the respiratory system, they produce a poison (toxin) that can cause:

- Weakness
- Sore throat
- Fever
- Swollen glands in the neck (sometimes referred to as „bull neck“)

PHIL Photo ID#5325

The poison destroys healthy tissues in the respiratory system.

Within two to three days, the dead tissue forms a thick, gray coating that can build up in the throat or nose. This thick gray coating is called a "**pseudomembrane**."

It can cover tissues in the nose, tonsils, voice box, and throat, making it very hard to breathe and swallow.

The poison may also get into the blood stream and cause damage to the heart, kidneys, and nerves.

The incubation period of diphtheria is 2–5 days (range: 1–10 days).

After:

- ✓ the provisional clinical diagnosis is made
- ✓ and appropriate cultures are obtained,

persons with suspected diphtheria should be given:

1. - antitoxin and
2. - antibiotics in adequate dosage and
3. - placed in isolation.

Respiratory support and airway maintenance should also be administered as needed.

Diphtheria once was a major cause of illness and death among children.

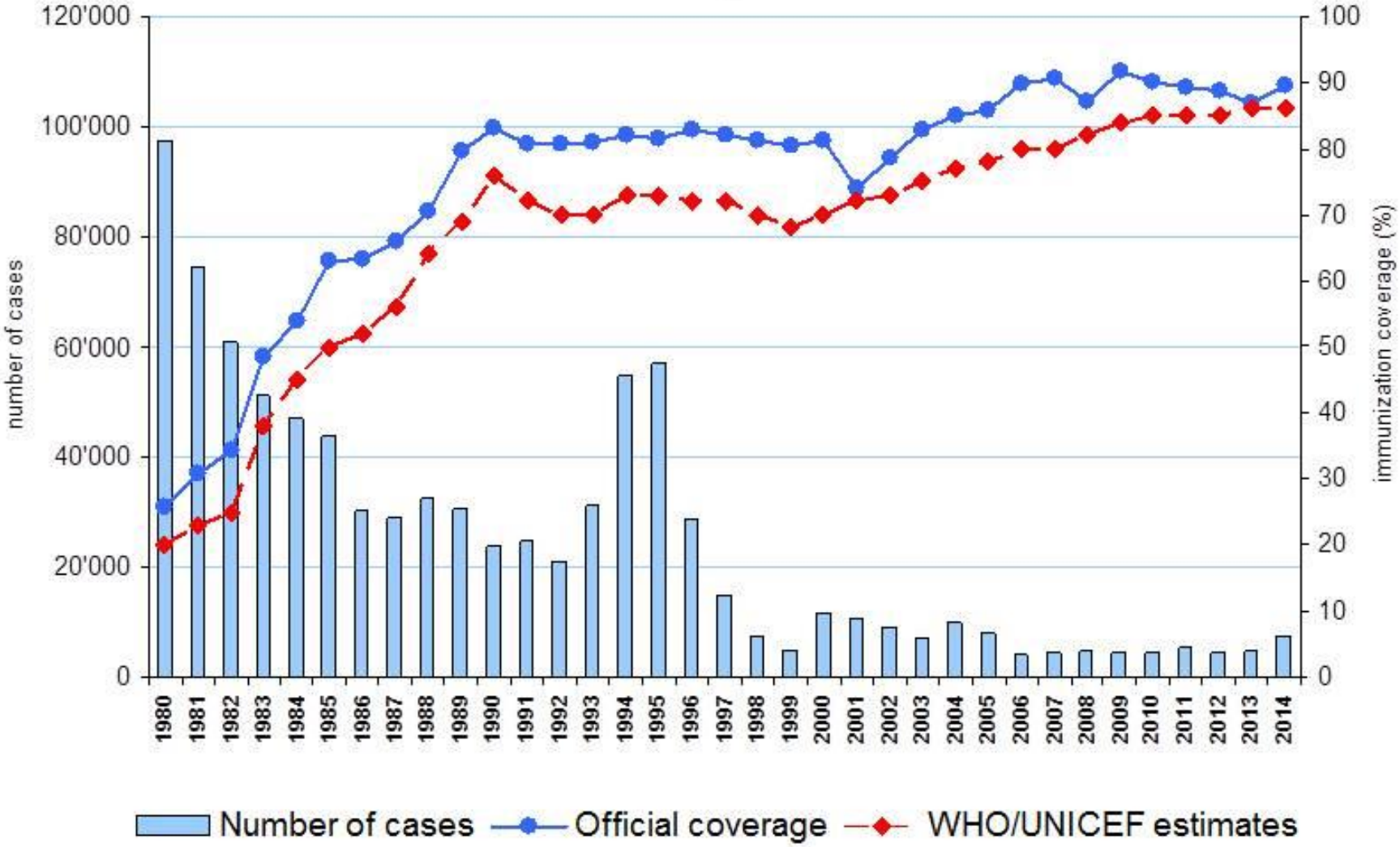
This upper airway infection often results in a grayish, thick membrane that grows in the throat and obstructs breathing. Other symptoms include fever, hoarseness, and coughing.

Most diphtheria deaths resulted not from blocked airways but from the paralyzing **toxin** the bacterium secretes, which can cause the heart or other organs to fail.

For clinical purposes, it is convenient to classify diphtheria into a number of manifestations, depending on the site of disease:

- Respiratory diphtheria
  - Nasal diphtheria
  - Pharyngeal and tonsillar diphtheria
  - Laryngeal diphtheria
- Cutaneous diphtheria

Diphtheria global annual reported cases and DTP3 coverage, 1980-2014



Source: WHO/IVB database, 2015
194 WHO Member States.
Data as of July 2015

Date of slide: 14 July 2015

WHO

In 2014, 7,321 cases of diphtheria were reported worldwide to the World Health Organization, but many more cases likely go unreported.

The case-fatality rate for diphtheria

has changed very little during the last 50 years.

The overall case-fatality rate for diphtheria is 5%–10%,

with higher death rates (up to 20%) among persons younger than 5

and older than 40 years of age.

Before there was treatment for diphtheria, the disease was fatal in up to half of cases.

Some strains are toxin-producing and can cause fatal illness.

In the EU/EEA.

The reported number of cases of diphtheria remains low.

During 2009–2013, 102 cases of diphtheria were reported in the EU/EEA with 55 cases of C. diphtheriae (cca 0.01 per 100 000 population).

There has been an increase in the number of C. diphtheriae cases reported at EU level since 2011.

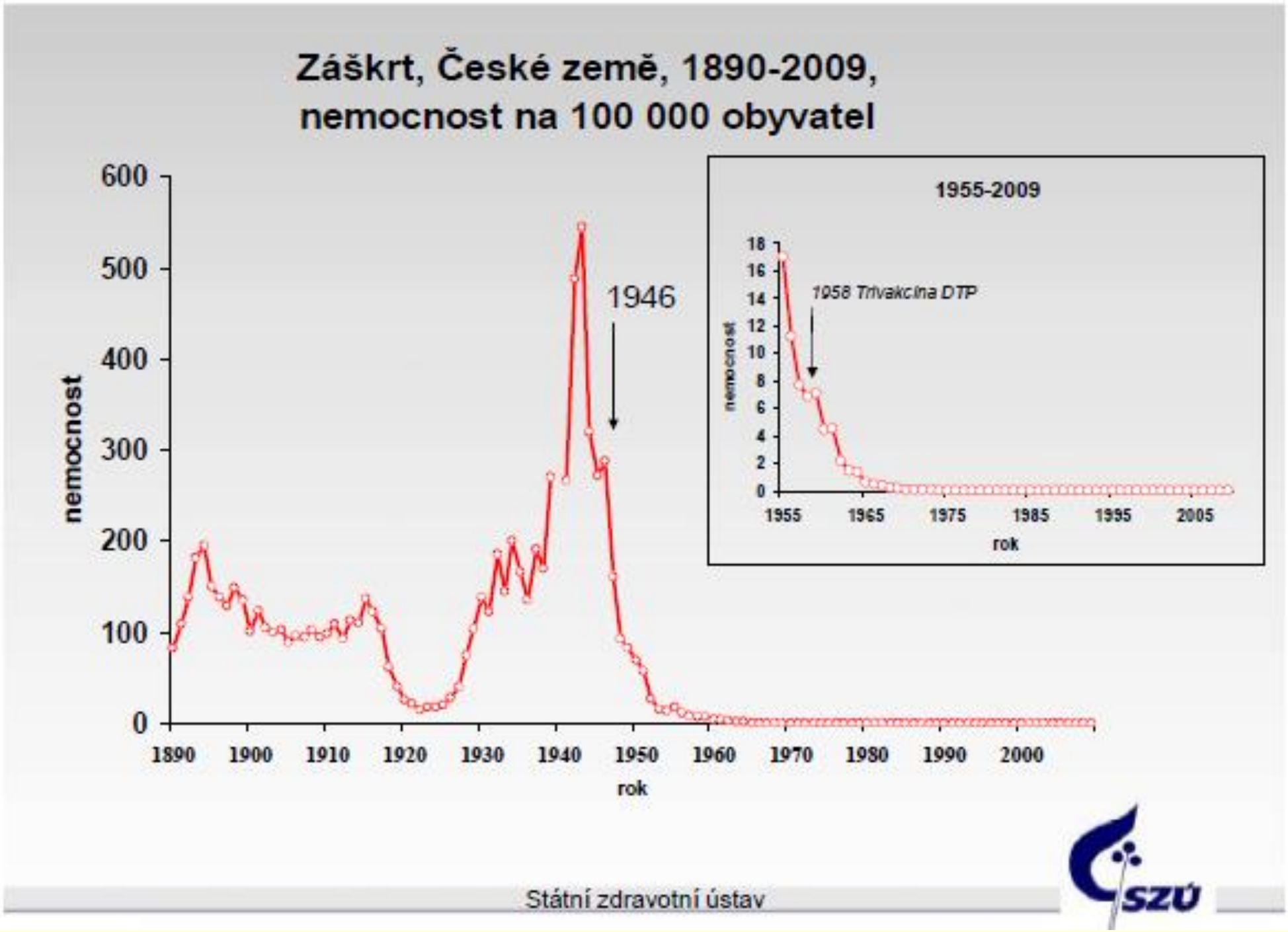
Latvia is the only EU Member State that reports indigenous transmission.

In a recent European study, ten European countries each screened between 968 and 8551 throat swabs from patients with upper respiratory tract infections for C. diphtheriae during 2007–2008.

Six toxigenic strains of C. diphtheriae were identified: two from symptomatic patients in Latvia and four from Lithuania (two cases, two carriers).

Among the toxigenic isolates, the Sankt Petersburg epidemic clone that caused large diphtheria outbreaks in Russia and the NIS* countries in the 1990s was still in circulation .

Carriage rates among household contacts of a laboratory-confirmed case may be as high as 25% .


Záškrt, České země, 1890-2009,
nemocnost na 100 000 obyvatel
nemocnost
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1946
1955-2009
1958 Trivakcina DTP
Státní zdravotní ústav
SZÚ

A case of diphtheria in Spain

15 June 2015

The detection, management and public health response to the first case of diphtheria in Spain in nearly 30 years has highlighted challenges for preparedness against diphtheria in the European Union.

The case is a 6-year-old unvaccinated child. A case of diphtheria in an unvaccinated individual within a highly protected population is not unexpected, because vaccinated people can be asymptomatic carriers of toxigenic C. diphtheriae.

The challenges for diphtheria case management, preparedness and public health response experienced in Spain are shared by many EU Member States. The most urgent critical issue is the shortage of diphtheria antitoxin (DAT) for immediate use when clinicians suspect diphtheria.

DAT must be given as early as possible to be effective, often on the suspicion of diphtheria before a laboratory confirmation.

EU Member States have for a number of years reported difficulties with sourcing and maintaining adequate stockpiles of DAT for emergency use, a problem they share with many countries around the world.

EU Member States have on occasion been forced to arrange emergency deliveries of DAT for patients with diphtheria.

Diphtheria death in Belgium

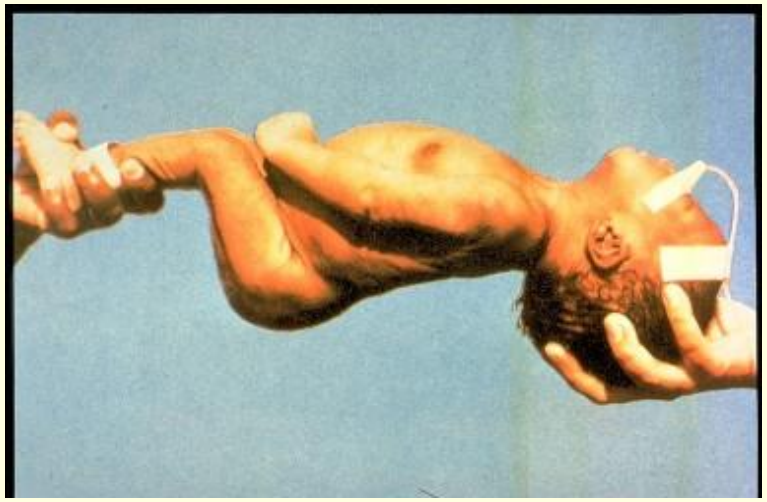
On March 17, 2016, an unvaccinated 3 year old Chechnyens child born in Belgium (girl) died on Diphtheria in Belgium, Antwerp.

The child did not travel anywhere, the parents probably did.
The first symptoms of the disease occurred on March 6,
in the intensive care unit the girl was hospitalized on March 11, 2016, later the child's health deteriorated.
The diagnosis of diphtheria was confirmed on 15 March by the National Reference Center in Belgium and confirmed by the WHO Cooperative Diphtheria Center in the UK.
Since Belgium does not have diphtheria antitoxin, ECDC offered to mediate its securing.
The National Institute for Public Health and the Environment (RIVM) of the Netherlands supplied antitoxin on March 16, 2016.
Despite all efforts and administration of antitoxin the child died on March 17, the cause of death - heart failure (fatal myocarditis) in connection with the progressive course of the disease.

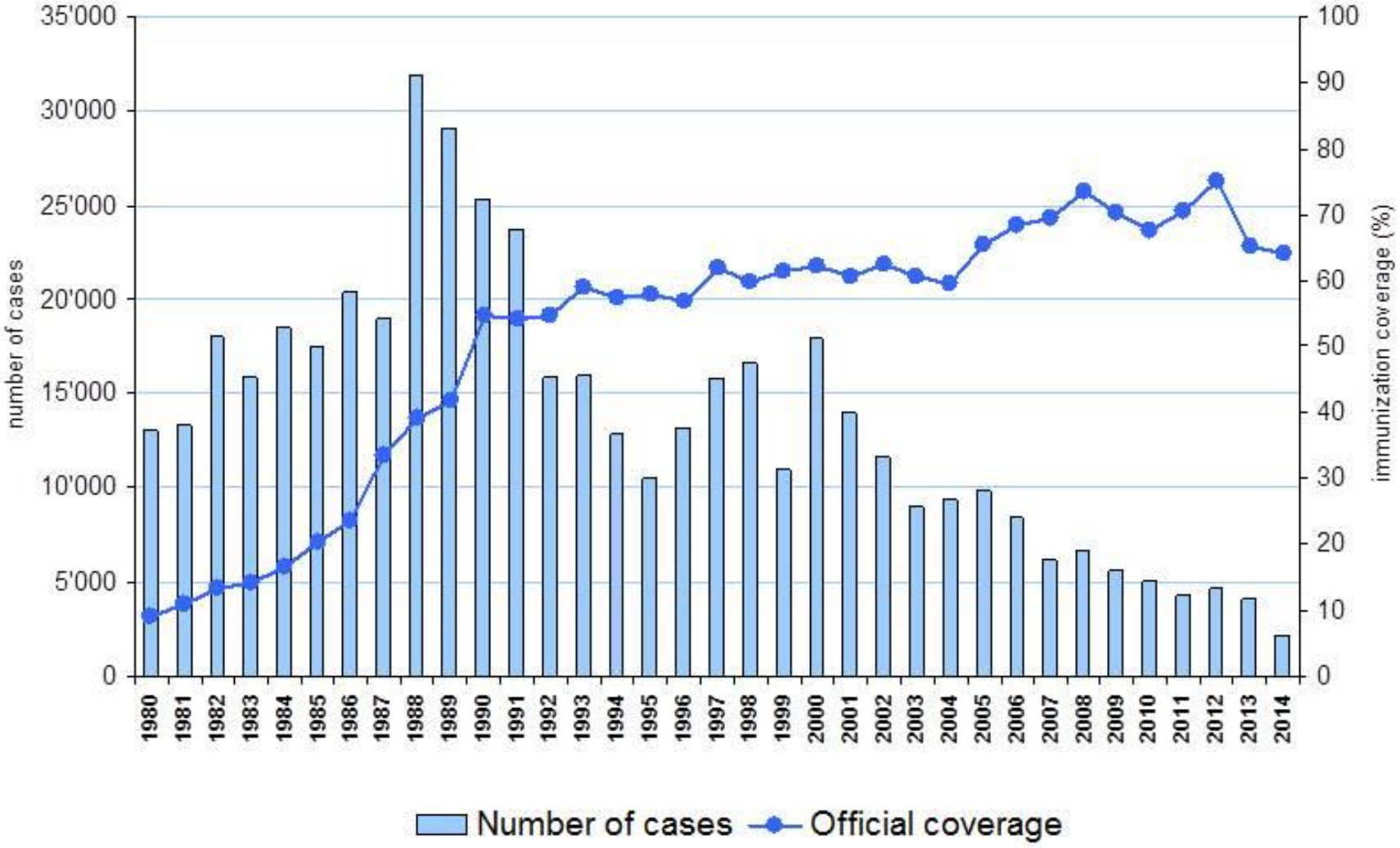
The health authorities of the Flemish Region are now assessing other potential risks such as:
examination of contacts (family, health professionals, nursing staff, nursery school staff),
preventive prophylaxis with antibiotics,
vaccination to introduce possible additional prevention and control measures.

Remembering an Old Disease

Tetanus:



Neonatal tetanus global annual reported cases and TT2plus coverage, 1980-2014



Source: WHO/IVB database, 2015
194 WHO Member States.
Data as of July 2015

Date of slide: 14 July 2015

WHO

TETANUS DISEASE

- Tetanus, commonly called lockjaw, is caused by a bacterium that is mostly present in soil, manure, and in the digestive tracts of humans and animals. Tetanus bacteria enter the body through a wound - sometimes as small as a pinprick or deep scratch but most often through a deep puncture wound or laceration such as those made by rusty nails or dirty knives. Such wounds are difficult to clean adequately and, if tetanus bacteria were present on the nail or knife, the bacteria can remain deep in the wound where they can grow and produce several toxins that attack the body's red and white blood cells and central nervous system. Tetanus bacteria do not grow well in the presence of oxygen, which is why deep puncture wounds are a perfect environment for them to grow in.

TETANUS DISEASE

- The incubation period for symptoms of tetanus to begin can range from one to three weeks. The first symptoms are likely to be headache, irritability, fever, chills, and muscular stiffness of the jaw and neck. As the poison increases and spreads, the body becomes rigid and locked in spasm with head drawn back, legs and feet extended, arms stiff, hands clenched and the jaw unable to open with difficulty in swallowing. The stomach muscles also become rigid and convulsions may occur.

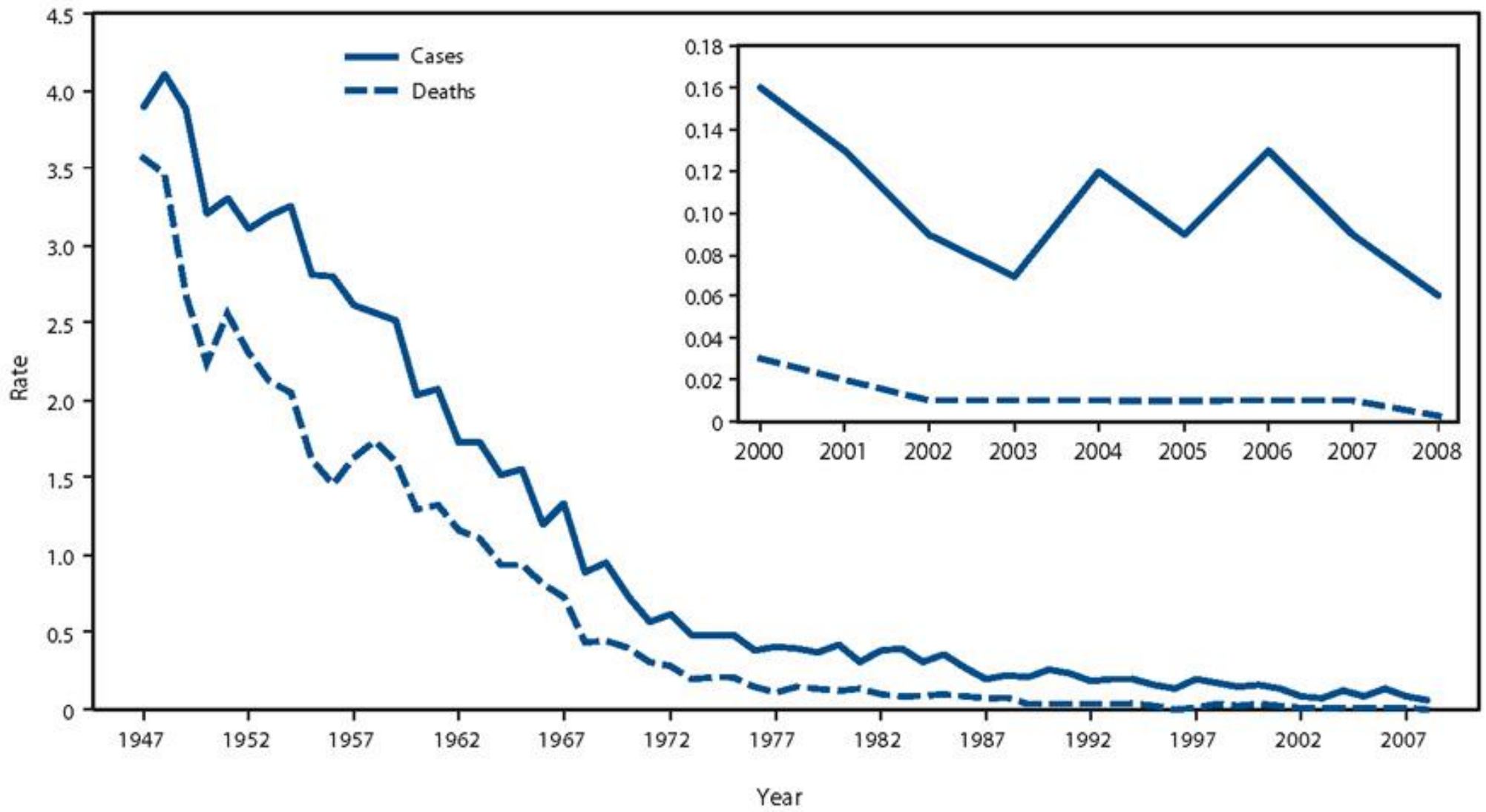
TETANUS DISEASE

- In 1948 there were 601 cases of tetanus reported in the U.S., the highest number of cases reported in one year. In 2002 there were 25 cases of tetanus and 3 deaths reported in the U.S. Tetanus is a much more serious problem in underdeveloped countries, especially among newborn babies born in unsanitary conditions whose umbilical cords can become infected with tetanus.

TETANUS DISEASE

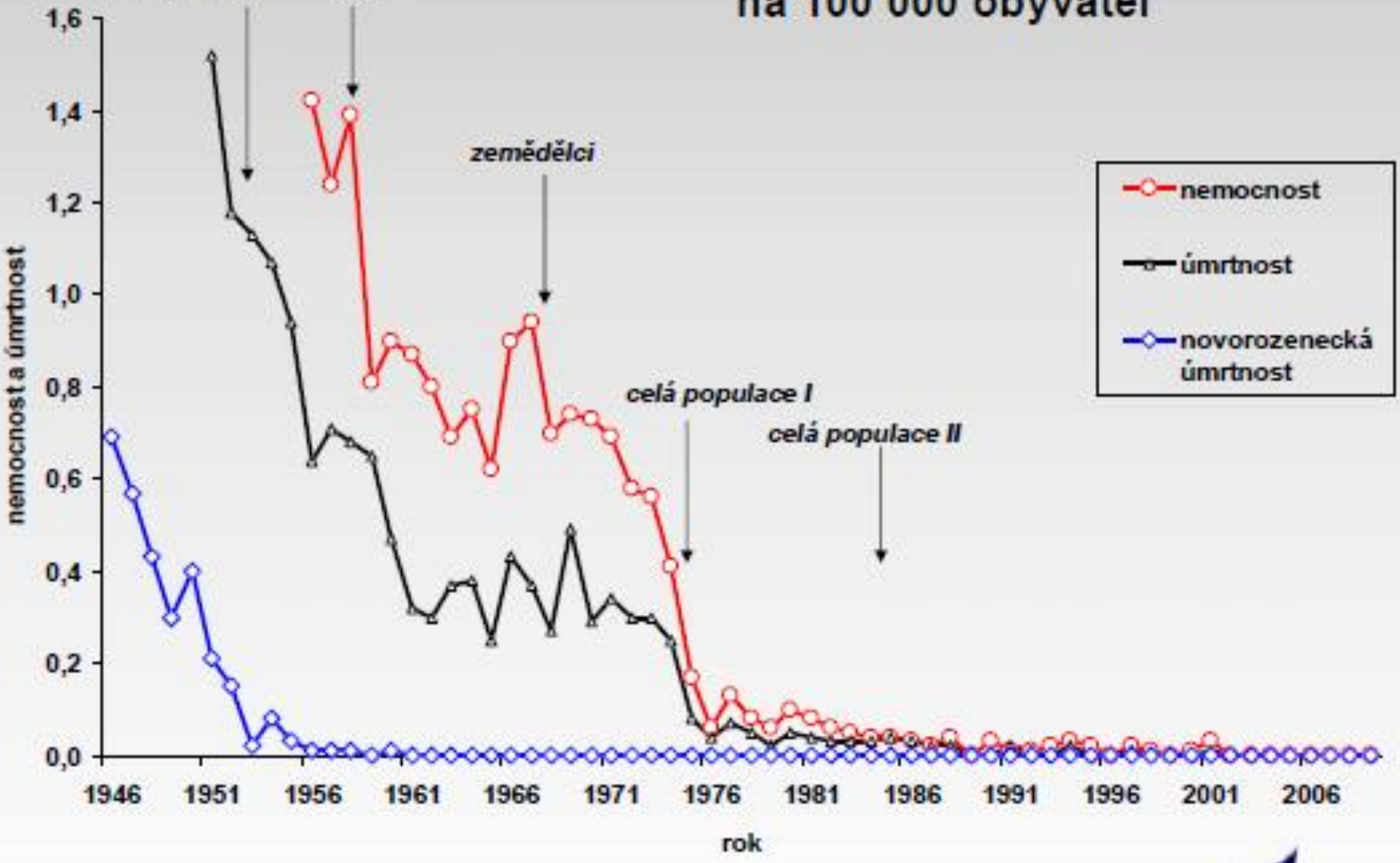
- **TETANUS VACCINE:** The most common reactions reported to occur following DT vaccine include swelling and pain at the injection site; sleepiness; irritability; vomiting; loss of appetite; persistent crying; and fever.
- Paleness, cold skin, collapse, rash, and joint pain have also been reported.
- In 1994 the Institute of Medicine concluded that there is compelling scientific evidence to conclude that tetanus, DT and Td vaccines can cause Guillain-Barre syndrome including death; brachial neuritis; and death from anaphylaxis (shock).

Tetanus—United States, 1947-2008



* Per 1 million population.

Tetanus, ČR, 1946-2009, nemocnost a úmrtnost na 100 000 obyvatel

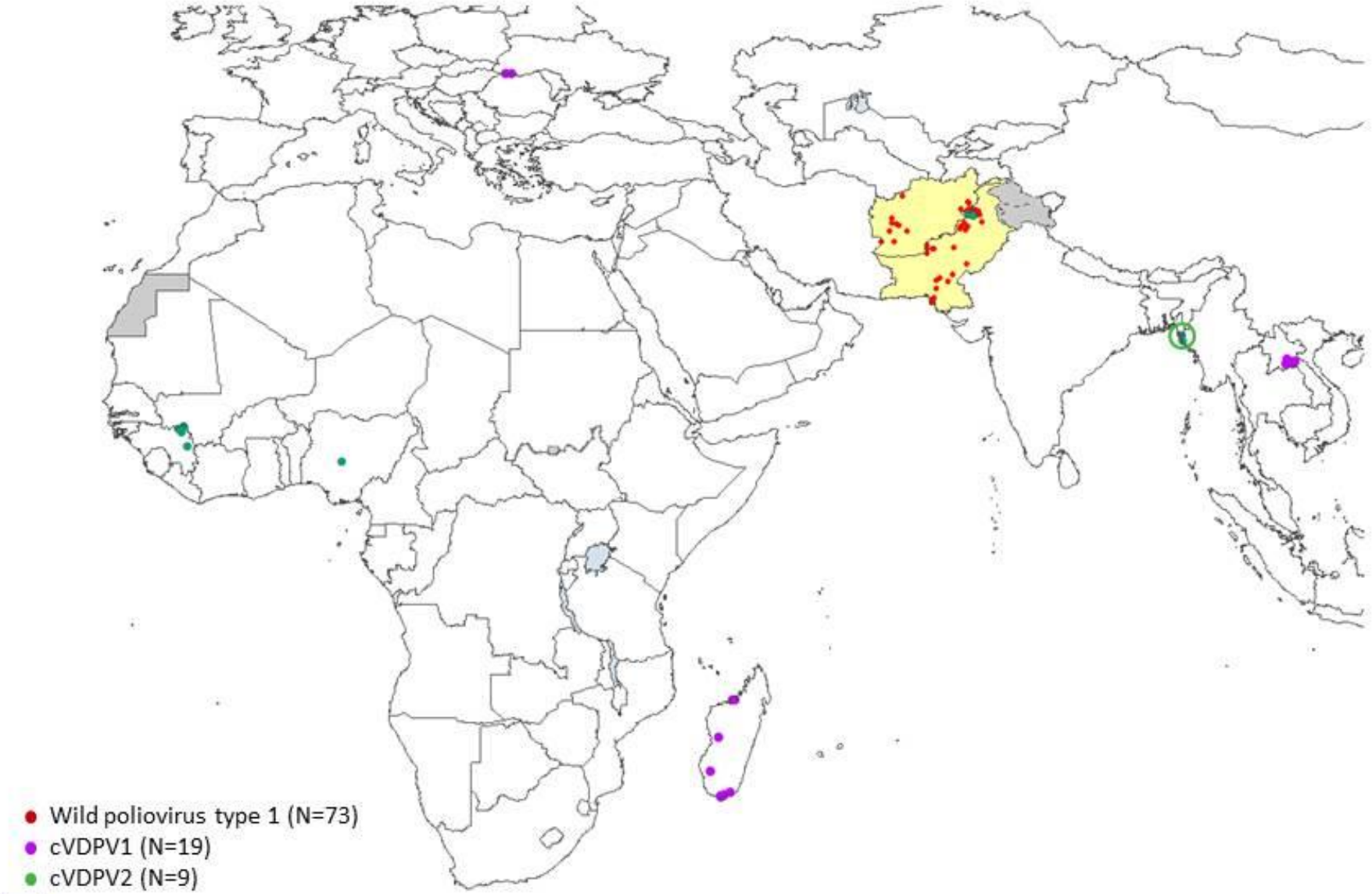


Remembering an Old Disease

Poliomyelitis:

The highly infectious poliovirus, the cause of polio, once crippled 13,000 to 20,000 people every year in the United States. In 1 out of 200 cases, this virus attacks the spinal cord, paralyzing limbs or leaving victims unable to breathe on their own. In 1954, the year before the first polio vaccine was introduced, doctors reported more than 18,000 cases of paralyzing polio in the United States. Just 3 years later, vaccination brought that figure down to about 2,500. Today, the disease has been eliminated from the Western Hemisphere, and public health officials hope to soon eradicate it from the globe. In 2001, only 537 cases of polio were reported worldwide, according to WHO.

Wild Poliovirus & cVDPV Cases[1], 2015
01 January – 31 December



[1]Excludes viruses detected from environmental surveillance.

Data in WHO HQ as of 02 February 2016

Poliomyelitis

Morbid changes occur
mainly in the gray matter of the spinal cord.

The infectious agent:
There are three types of polioviruses
-1, 2 and 3.

Virus excretion: 1 week from the nasopharynx,
6 weeks of stool.

80% of cases are asymptomatic.

- Polio Viruses, which are endemic or epidemic areas
- spreading in a population,we are known as **wild polioviruses**.

- Among them were for the purpose of preparing
live vaccines repeated passaging the virus in cell cultures
resulting strain called **vaccinal.**

Polio eradication

In 1988, the forty-first World Health Assembly adopted a resolution for the worldwide eradication of polio, the Global Polio Eradication Initiative (GPEI). Since then, the number of cases has fallen by over 99% from an estimated 350 000 to 416 reported cases in 2013.

In 2014, only three countries in the world remained polio-endemic: Nigeria, Pakistan and Afghanistan.

In 2015 to date, two countries have together reported 37 cases: Pakistan (29 cases) and Afghanistan (eight cases), all due to wild poliovirus type 1.

The last natural circulation of WPV2 was in India in 1999 and the last WPV3 case was detected in Nigeria in November 2012.

- Since then, WPV1 has been the only circulating wild type virus.

The last case of endemic paralytic polio in the WHO European Region (i.e. with the source of the infection originating in the Region) was reported in Turkey in November 1998,

and the Region was declared polio-free in June 2002.

The most recent outbreaks linked to importations into the WHO European Region occurred in 2010 in Tajikistan and in 2013–2014 in Israel where WPV1 was circulating in the environment without causing clinical cases .

The most recent polio outbreaks in what today constitutes EU/EEA were in the Netherlands in 1992, in a religious community opposed to vaccination,

and in 2001, when three polio cases were reported among Roma children in Bulgaria .

On 5 May 2014, WHO declared the international spread of wild poliovirus in 2014 a Public Health Emergency of International Concern (PHEIC) following the confirmed circulation of wild poliovirus in several countries and the documented exportation of wild poliovirus to other countries.

The Polio Eradication and Endgame Strategic Plan 2013–2018 sets out the actions required for a polio-free world by 2018 and beyond.

Outbreak of circulating vaccine-derived poliovirus type 1 (cVDPV1) in Ukraine

2 September 2015

Two cases of paralytic poliomyelitis caused by circulating vaccine-derived poliovirus type 1 (cVDPV1) were confirmed in Ukraine on 28 August 2015.

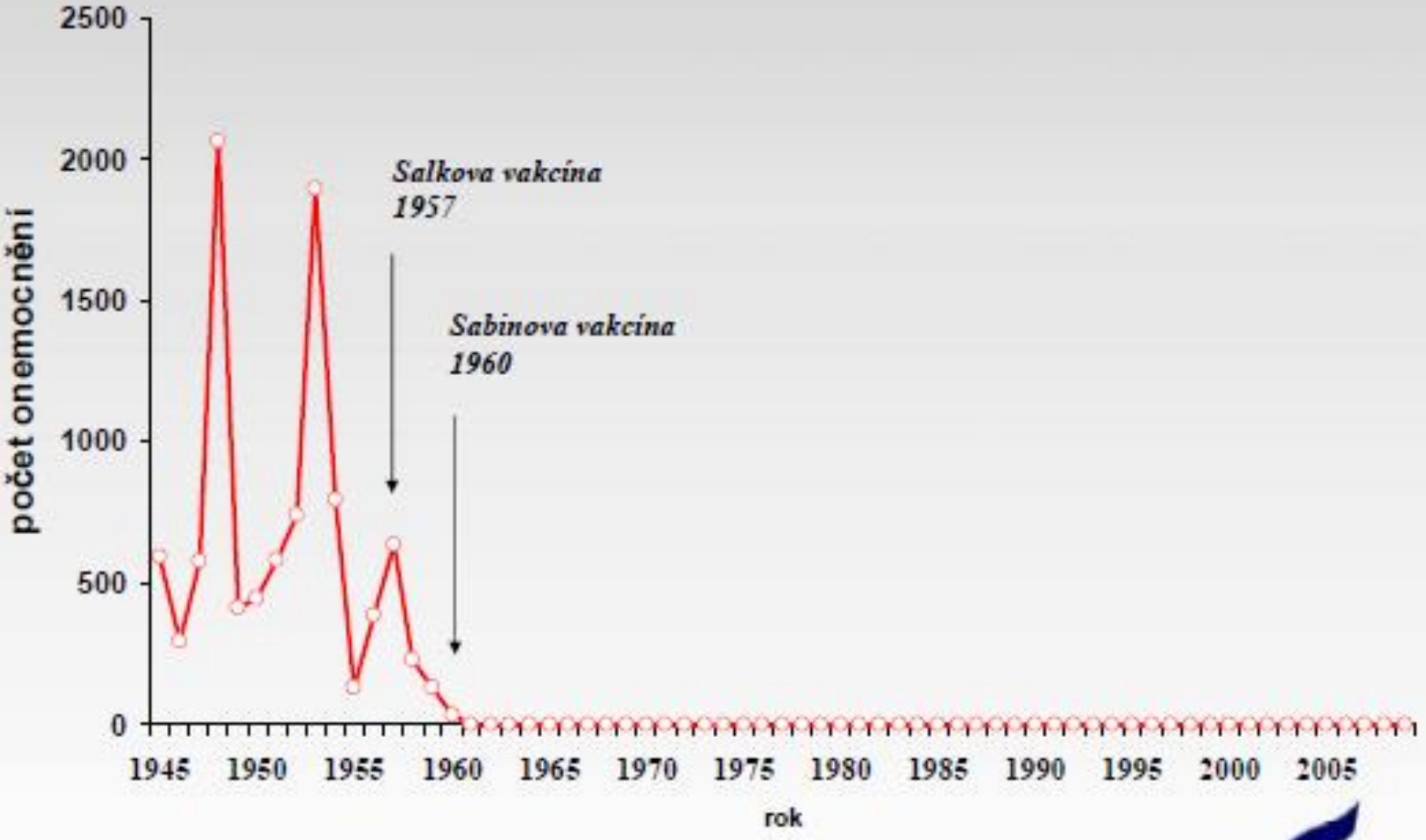
The cases, a 4-year-old child and a 10-month-old infant, had onset of paralysis on 30 June and 7 July respectively and the positive stool samples were collected from 5–10 July 2015.

The genetic similarity between the isolates indicates active transmission of cVDPV1.

Both children are from the Zakarpatskaya oblast [region], in south-western Ukraine, bordering Romania, Hungary, Slovakia and Poland.

Ukraine has been at high risk of vaccine-preventable diseases outbreaks for several years due to persistent low routine vaccination coverage.

Polio (A80), Česká republika, hlášená onemocnění 1945-2009



Pertussis

Pertussis is an acute bacterial infection of the respiratory tract, caused by the bacterium *Bordetella pertussis*. The disease is characterised by a severe cough, which can last two months or even longer.

Humans are the only reservoir. Infected adults usually have only mild symptoms, but can shed bacteria for weeks. Following infection (by inhalation of droplets), susceptible individuals develop symptoms after an incubation period of about 10 days. The typical paroxysmal cough is usually seen in young children. Babies less than six months old may not cough, but they manifest dyspnea and paroxysmal asphyxia and are the most likely to die of the disease unless they receive suitable treatment.

Affected children are also exposed to complications such as pneumonia, atelectasia, weight loss, hernia, seizures, encephalopathy (probably due to hypoxia). Antibiotics may reduce the duration of the disease, especially if administered in its early stages.

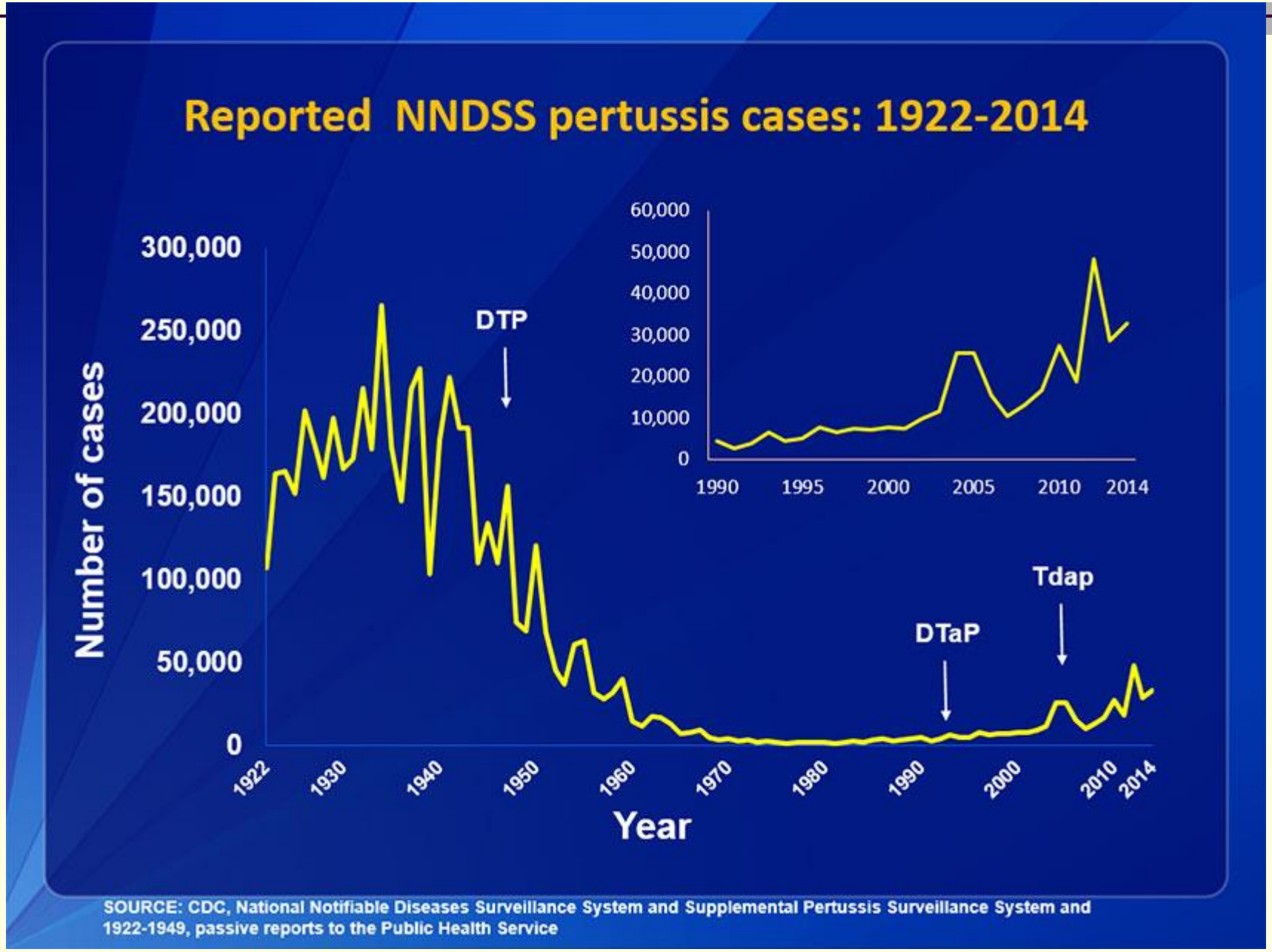
Bordetella pertussis

Sekvenací oblastí genomu *ptxP*, *ptxA*, *prnA* a *fim3* u kmenů *B. pertussis* izolovaných v ČR v období 1967–2010 byly potvrzeny změny alelických variant těchto oblastí.

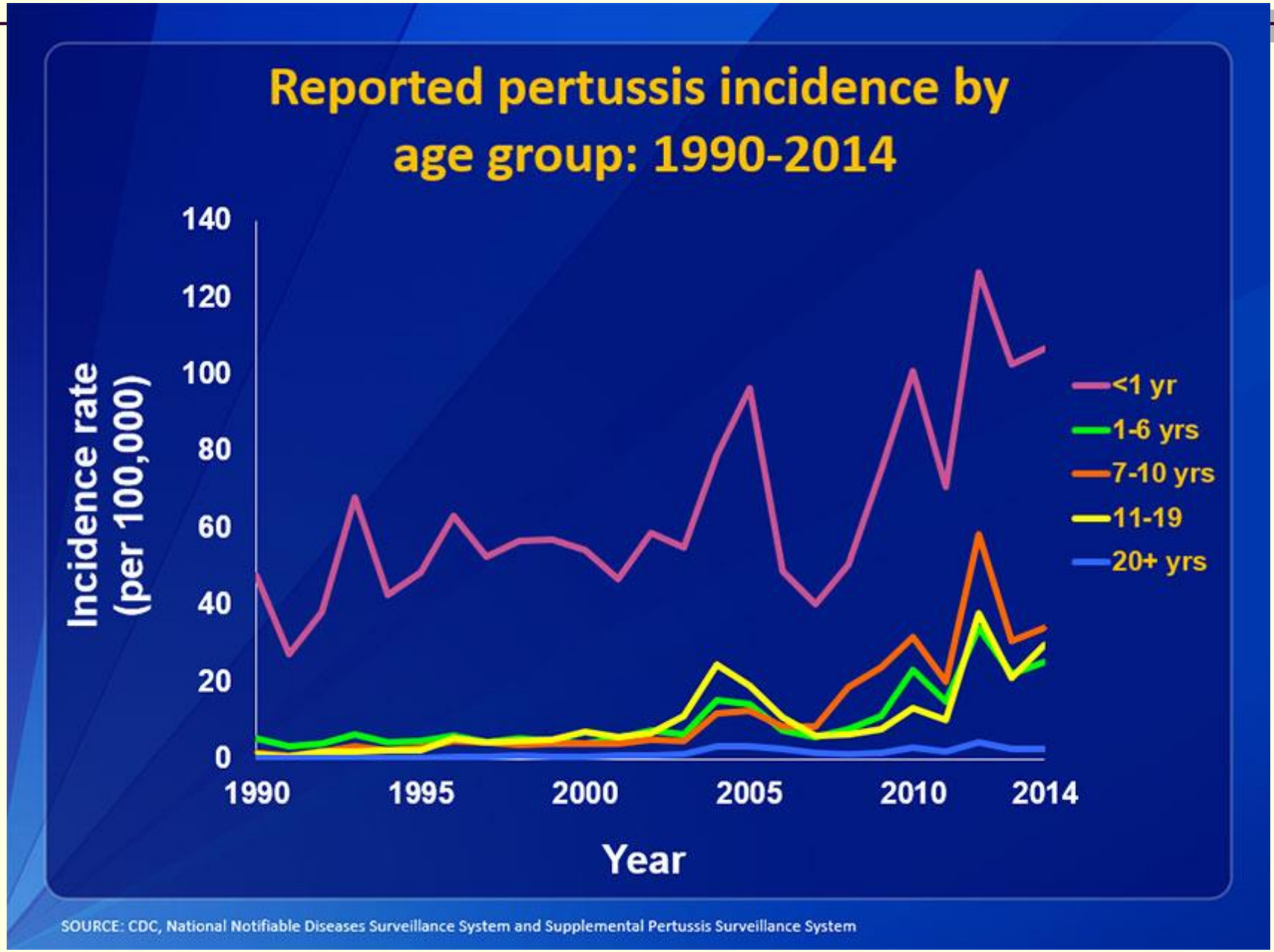
Výskyt kmenů nesoucích nové alelické varianty narůstá po roce 1995 na úkor kmenů nesoucích varianty původní.

Výsledky studie lze interpretovat jako částečný genetický únik patogenních kmenů *B. pertussis* mimo účinnost pertusových vakcín.

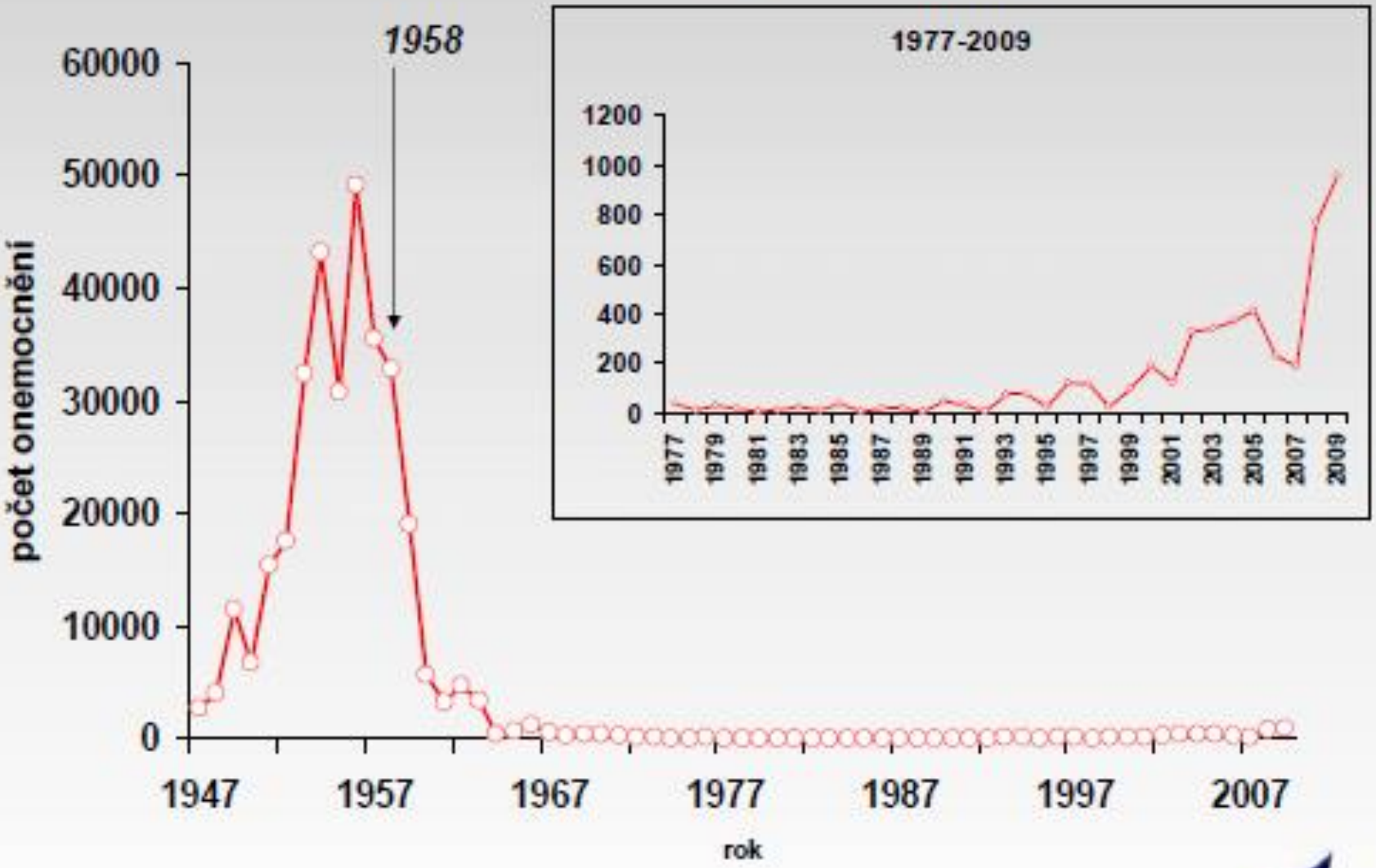
This graph illustrates the number of pertussis cases reported to CDC from 1922 to 2014. Following the introduction of pertussis vaccines in the 1940s when case counts frequently exceeded 100,000 cases per year, reports declined dramatically to fewer than 10,000 by 1965. During the 1980s pertussis reports began increasing gradually, and by 2014 more than 32,000 cases were reported nationwide.



This graph shows reported pertussis incidence (per 100,000 persons) by age group in the United States from 1990–2014. Infants aged <1 year, who are at greatest risk for serious disease and death, continue to have the highest reported rate of pertussis. School-aged children 7 to 10 years continue to contribute a significant proportion of reported pertussis cases.



Dávivý kašel - pertuse (A37.0), Česká republika, 1947-2009



- **Recommendation for vaccination against pertussis for of women in pregnancy.**

Measles

During the 12-month period from July 2014 to June 2015, a total of 4 224 cases was reported by 30 EU/EEA countries. Twenty-three countries reported consistently throughout this period.

- Germany accounted for 58.2% of the cases reported during this period.

In 10 of the countries reporting consistently, the measles notification rate was less than one case per million population, including six countries which reported zero cases during the 12-month period.

The diagnosis of measles was confirmed by positive laboratory results (serology, virus detection or isolation) in 63.4% of all cases.

Of all cases, 89.2% had a known vaccination status and of these, 83.8% were unvaccinated.

In the target group for routine childhood MMR vaccination (1–4-year-old children), 76.9% of the cases were unvaccinated.

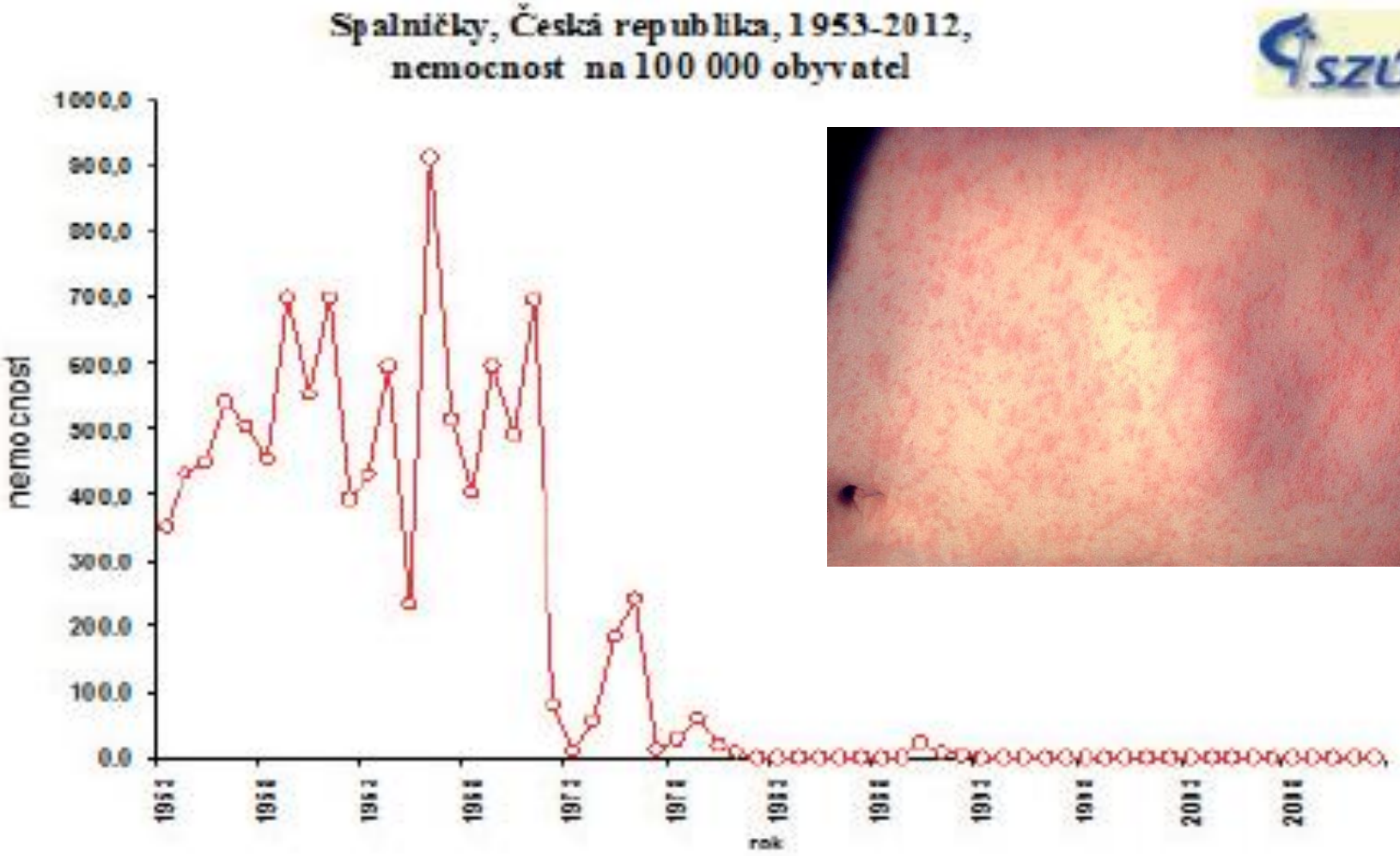
One measles-related death was reported during the period July 2014–June 2015, and eight cases were complicated by acute measles encephalitis.

Since the previous report, outbreaks of measles have been detected in several countries in the WHO European Region: Austria, Belarus, Lithuania, Denmark, Norway, the United Kingdom, France, Sweden and Belgium.

Outside of Europe, measles outbreaks are reported from the Democratic Republic of Congo, Guinea, Sudan, South Sudan, Brazil, Australia, Mali, Algeria, Chile, Peru, Cameroon, Taiwan, Iraq and Malaysia.

Graf č. 5 Zvládnutí spalniček očkováním

Dokud bylo očkování nepovinné, patřily spalničky mezi nejčastější příčiny smrti u dětí do 5 let. Jednalo se hlavně o navazující zápaly plic, průdušnice, mozku nebo srdečního svalu.Jedna dávka očkovací látky se ukázala jako nedostatečná, proto bylo zavedeno očkování druhou dávkou.



Zdroj: SZÚ

Zdraví 2020 – Národní strategie ochrany a podpory zdraví a prevence nemocí

Spalničky, nemocnost a úmrtnost, ČR, 1953-2009 nemocnost a 1946-2009 úmrtnost na 100 000 obyvatel

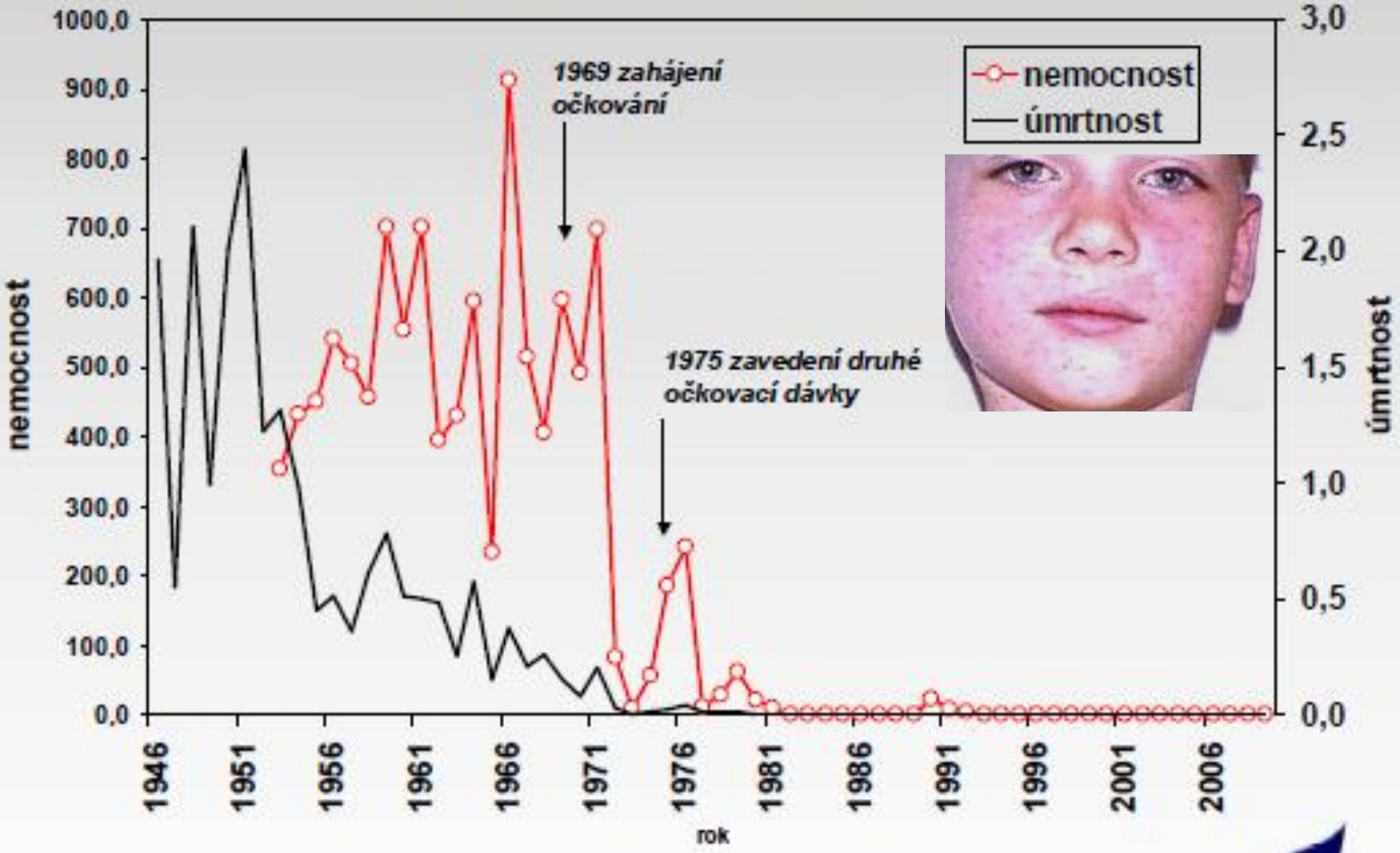
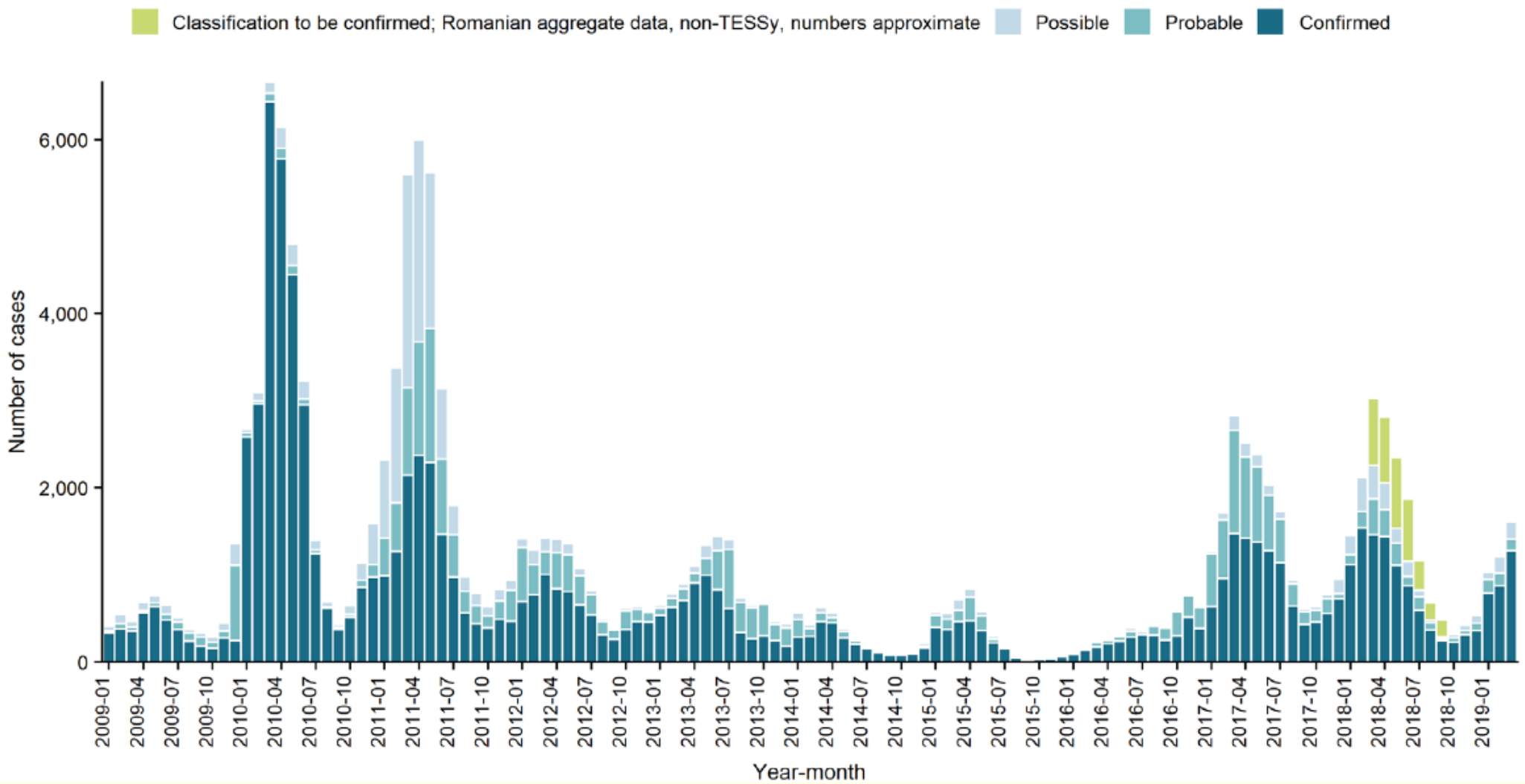


Figure 1. Number of measles cases by month and case classification, 1 January 2009 to 31 March 2019, EU/EEA countries (n = 144 954)



Rubella

• Twenty-eight EU/EEA countries reported a total of 2 808 rubella cases during the period July 2014 to June 2015.

• In 18 of the countries reporting consistently, the rubella notification rate was less than one case per million population, including 11 countries reporting zero cases during the 12-month period.

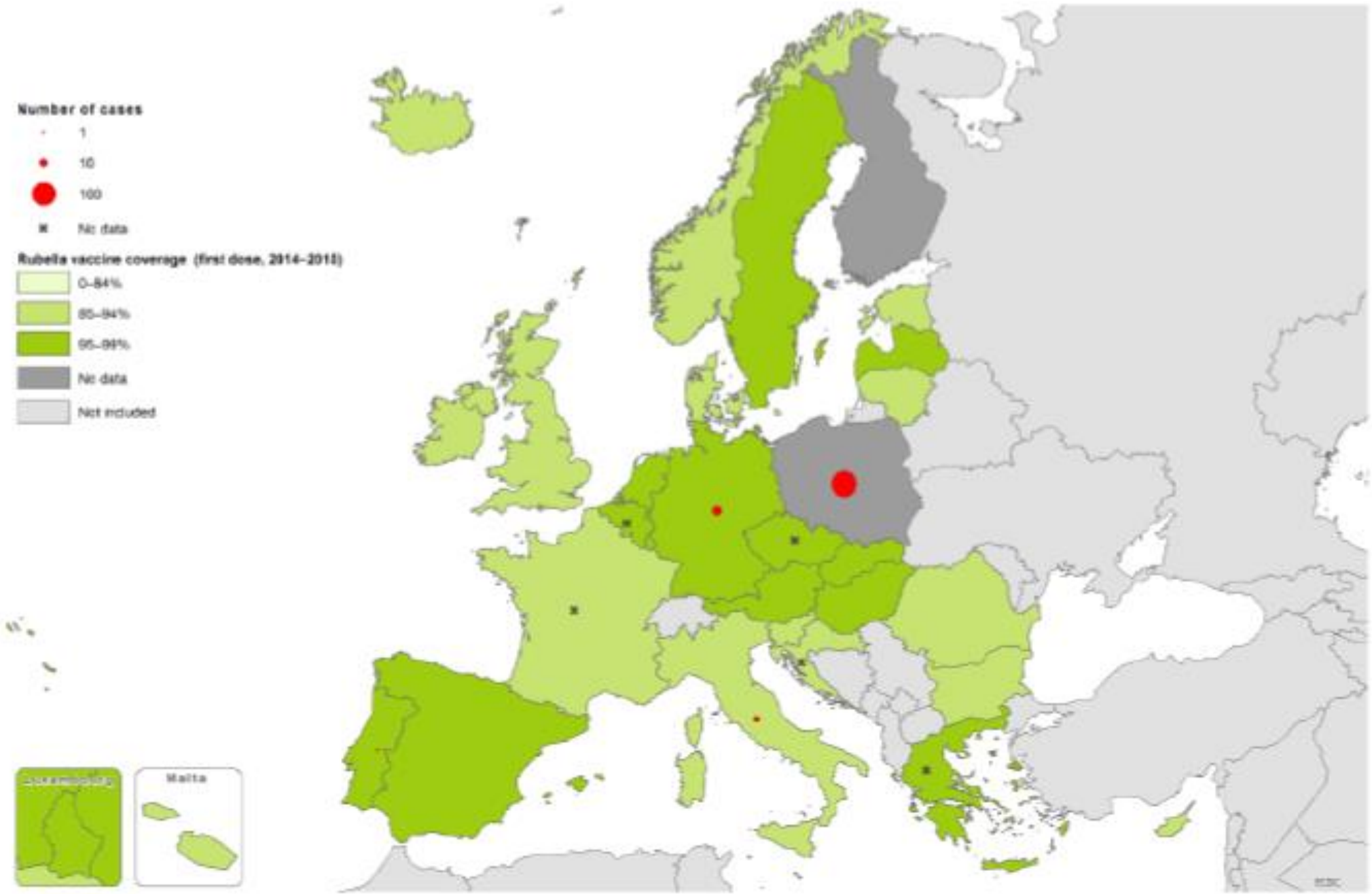
• Poland accounted for 93.9% of all reported rubella cases in the 12-month period.

The highest number of cases was observed in 5–9- and 1–4-year-olds. 28.5% of the cases were unvaccinated.

However, this figure needs to be interpreted with caution as only 37 cases were confirmed through laboratory testing.

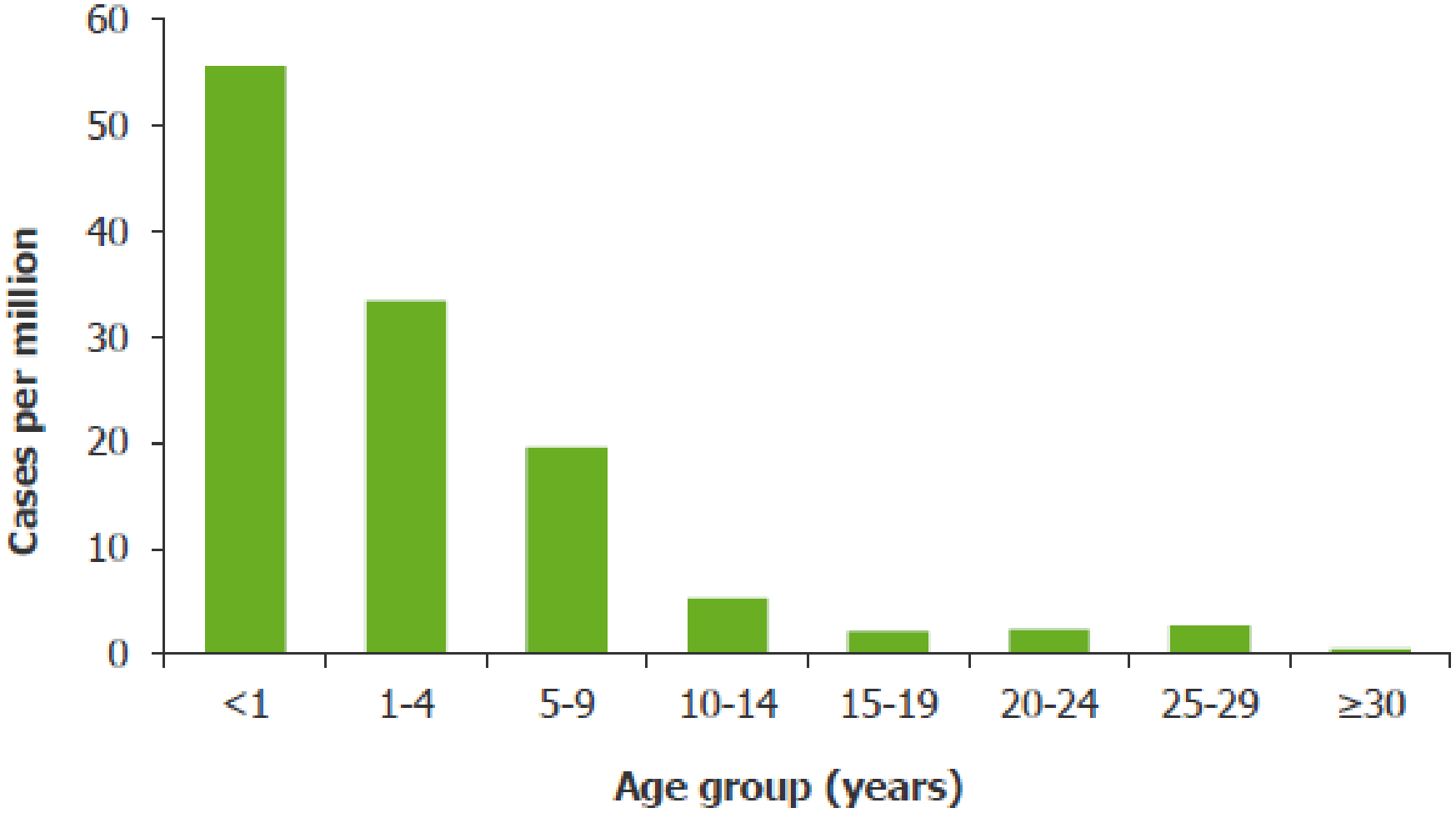
• No outbreaks of rubella have been detected by epidemic intelligence since the last report.

Figure 6. Number of rubella cases by country, June 2016 (n=144), and rubella vaccine coverage (first dose, 2014–2015, WHO*), EU/EEA countries



** Coverage figures (%) are official national figures reported via the annual WHO/UNICEF Joint Reporting Form. See notes at the end of this report for further explanations.*

Figure 8. Rubella notification rate (cases per million) by age group, 1 July 2015 – 30 June 2016, EU/EEA countries (n=1 708 cases with known age)



Zarděnky, Česká republika, 1961-2009, nemocnost na 100 000 obyvatel

MUMPS

Mumps is an acute illness caused by the mumps virus. It is characterised by fever and swelling of one or more salivary glands (mumps is the only cause of epidemic infectious parotitis).

Humans are the only reservoirs of the virus, which is transmitted from person to person via droplets and/or saliva. Following infection, the incubation period lasts on average 16–18 days. Salivary glands apart, other organs may be involved and symptoms might include infection in the testicles (in post-pubertal males), prostate gland, thyroid gland, and pancreas. Brain involvement is frequent, but mostly without symptoms. Brain infection is believed to occur in only one in 10 000 cases, but it often leads to death.

Mumps is preventable by a vaccine, which is most often administered in association with anti-rubella and anti-measles vaccines (MMR).

MUMPS - NORWAY: INCREASED INCIDENCE

Date: Fri 6 Nov 2015

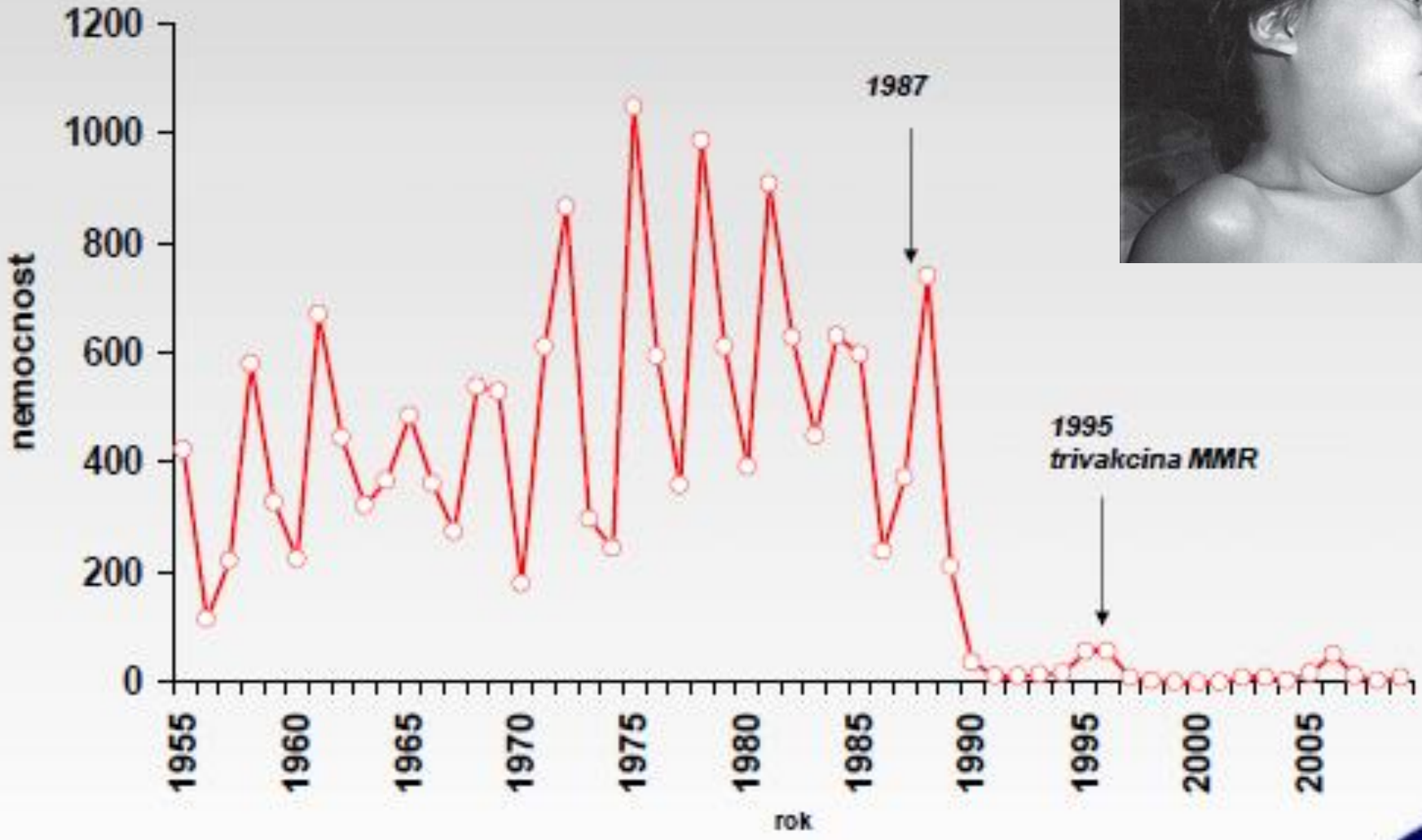
Around 80 cases of the mumps (called kusma in Norwegian) have been recorded in Norway recently, mostly among college students. The outbreak began in Trondheim, but residents of Oslo, Bergen and elsewhere along the west coast have also fallen ill.

Doctors in Trondheim alerted state officials at the Institute for Public Health (Folkehelseinstituttet) late last week. By then, cases were spreading beyond Trondheim. All students suffering symptoms that can be confused with flu were urged to undergo testing. Dr Karin Ronning of the health institute said the outbreak is believed to have been brought in by foreign students.

"Since 1969, all children in Norway have been offered vaccination against measles via the Childhood Immunisation Programme. The measles vaccine is given in the form of 2 doses of MMR vaccine at 15 months and at 11 years (Grade 6). If there is an increased risk of infection, the vaccine may be given as early as 9 months, but a booster dose at

- 15 months of age is recommended.„

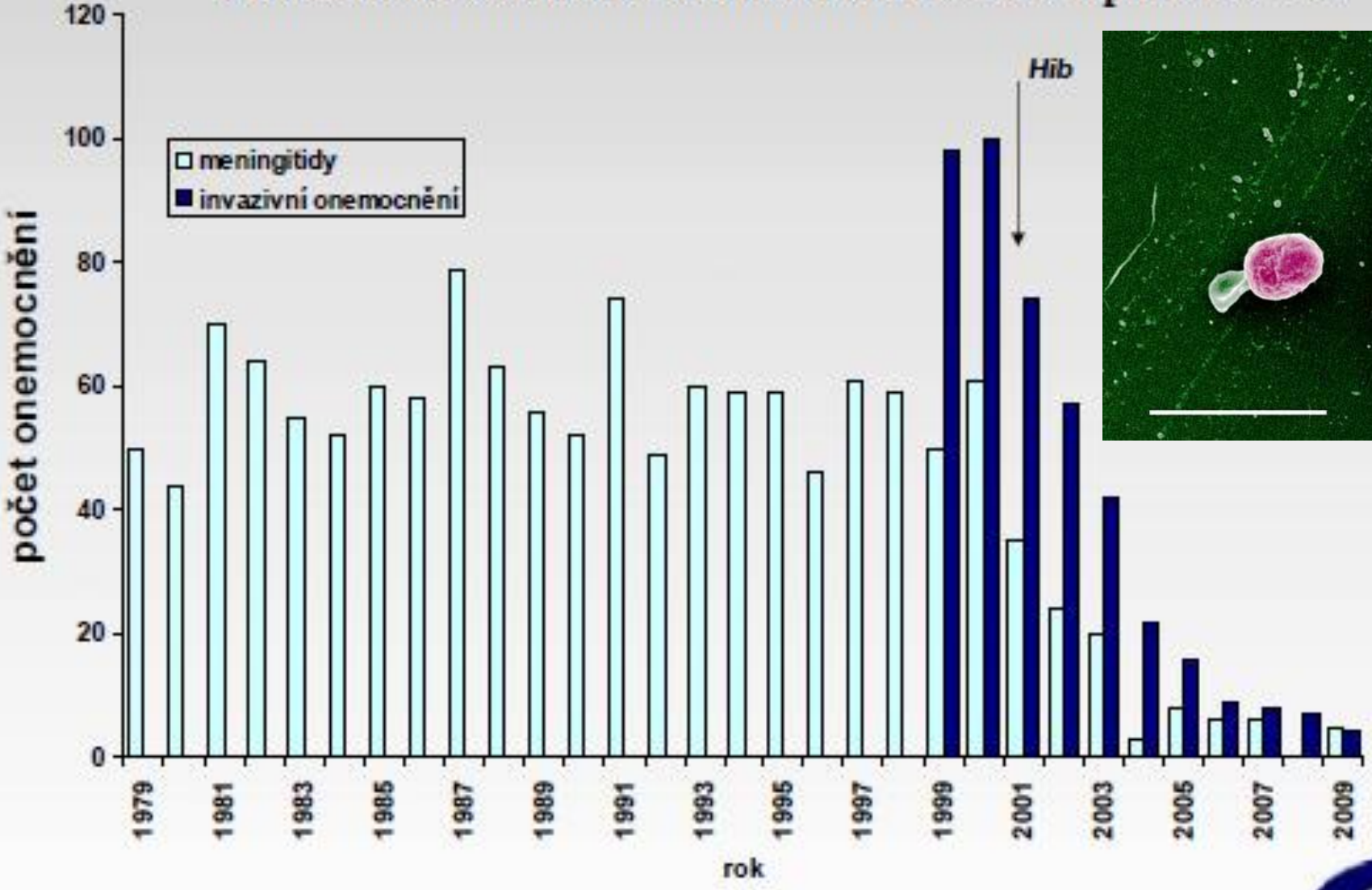
Příušnice, ČR, 1955-2009, nemocnost na 100 000 obyvatel



***Haemophilus influenzae* type b (Hib).**

Other familiar diseases that vaccines protect against include chickenpox, hepatitis A and B, and ***Haemophilus influenzae* type b (Hib)**. Hib causes meningitis, an inflammation of the fluid-filled membranes that surround the brain and spinal cord. Meningitis can be fatal, or it can cause severe disabilities such as deafness or mental retardation. This disease has nearly disappeared among babies and children in the United States since the Hib vaccine became widely used in 1989.

Hemofilové bakteriální meningitidy (do roku 1998) a invazivní hemofilová onemocnění B96.3 v Epidatu v ČR



Invasive Haemophilus influenzae disease

Invasive Haemophilus influenzae disease has become rare; the notification rate in Europe was 0.49 per

100 000 population, with a slightly ascending trend which may be attributed to improved surveillance in most countries.

 Country-specific rates were highest in northern Europe and in the United Kingdom;

age-specific rates were highest in children under one year and adults aged 65 years or over.

 The national immunisation schedules of all EU/EEA countries include the Hib vaccine, which has led to a

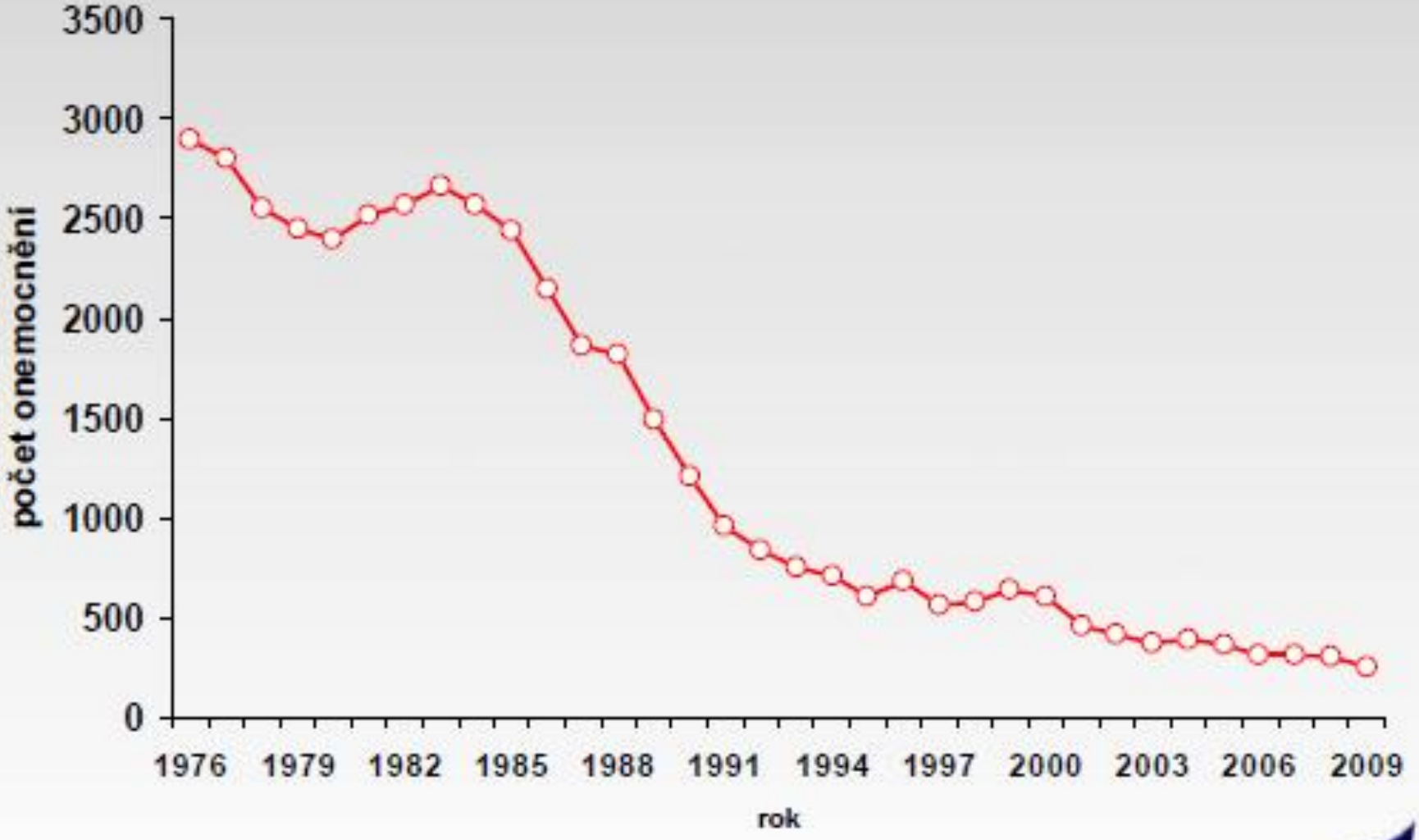
- progressive reduction of type b serotype infections.

 Even though there appears to be a trend towards an increase in disease due to non-capsulated (nontypeable) strains, European data is too scarce to draw conclusions on serotype replacement.

 Continued monitoring of strains, together with their associated clinical syndromes, is essential for assessing the effect of interventions.

In 2012, 2 545 confirmed cases of invasive Haemophilus influenzae disease (all serotypes) were reported by 27 countries, 24 of which have surveillance systems with national coverage. Belgium, France and Spain reported data from sentinel surveillance and therefore had to be excluded from the notification rates analysis, while no confirmed cases were reported from Malta for 2012.

Akutní hepatitida B (B16), Česká republika, 1976-2009, počet hlášených nových onemocnění



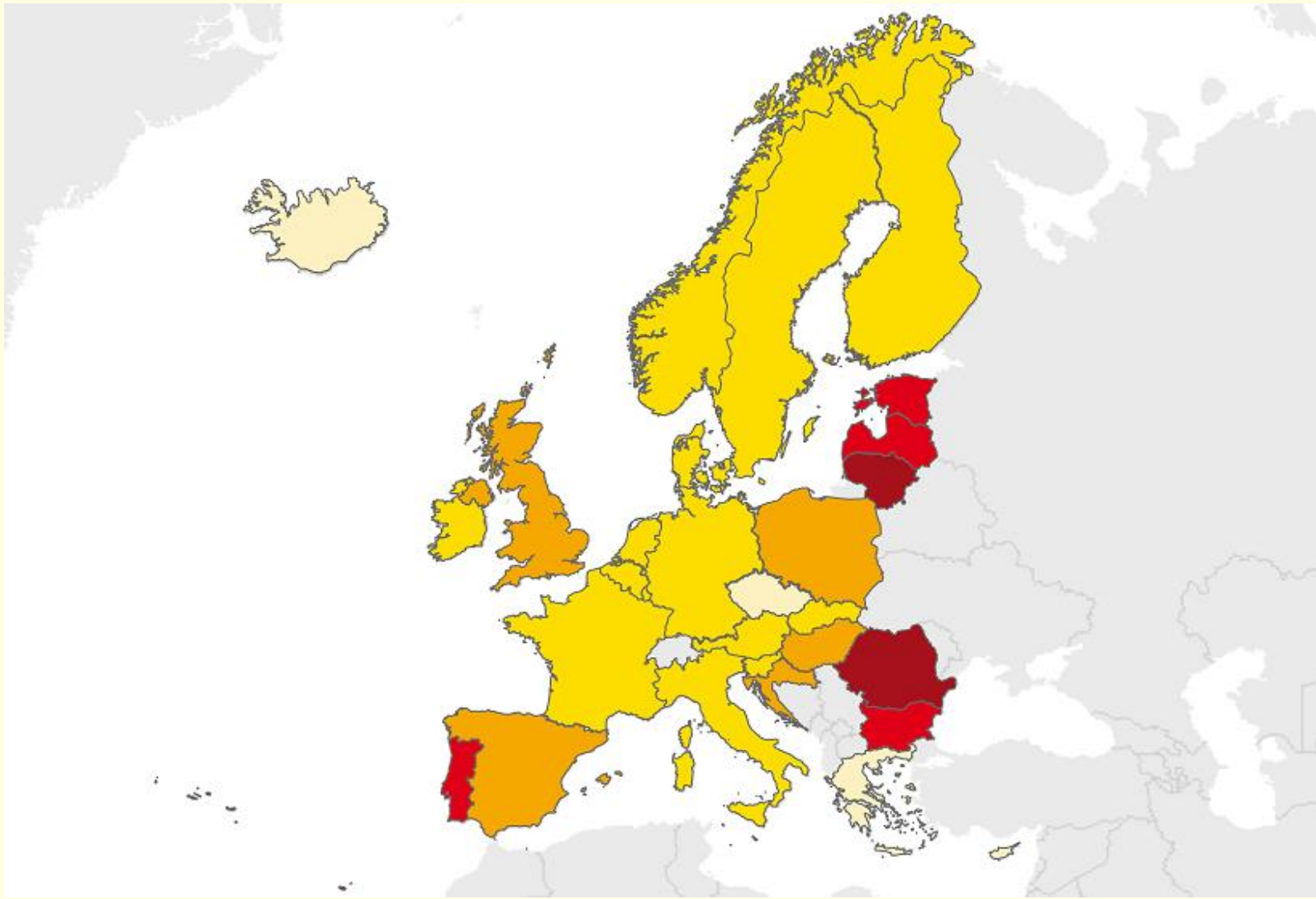
Očkování proti TBC

- Od 1. 11. 2010 platí novela vyhlášky č. 299/2010 Sb., kterou se mění vyhláška č. 537/2006 Sb., o očkování proti infekčním nemocem, podle které je očkování **povinné pouze** pro děti s těmito indikacemi:
- jeden nebo oba z rodičů nebo sourozenec nebo člen domácnosti, v níž dítě žije, měl/má aktivní tuberkulózu,
- dítě, jeden nebo oba z rodičů nebo sourozenec dítěte nebo člen domácnosti, v níž dítě žije, se narodil nebo souvisle déle než 3 měsíce pobývá/pobýval ve státě s vyšším výskytem TBC než 40 případů na 100 tis. obyvatel (Min. zdravotnictví každoročně uveřejní seznam států s vyšším výskytem tuberkulózy do 30 dnů od aktualizace provedené WHO), seznam států na www.mzcr.cz
- dítě bylo v kontaktu s nemocným tuberkulózou.

TB notifications by country

- In 2013, 64 844 TB cases were reported in the EU/EEA.
- The notification rate was 12.7 per 100 000 population (range 3.4–83.5).

Figure 1: TB notification rate per 100 000 population by country, EU/EEA, 2013



WHO bije na poplach: 4400 lidí denně umírá na tuberkulózu

Světová zdravotnická organizace (WHO) ve středu (28:10.2015) vyzvala k dalšímu boji proti tuberkulóze (TBC), která stále patří k hlavním příčinám úmrtí ve světě a na kterou denně umírá 4400 lidí.

Toto číslo je podle autorů zprávy WHO o to „nepřijatelnější" a smutnější, že v současnosti již lze diagnostikovat a vyléčit téměř všechny nemocné TBC.

Dosavadní úsilí proti TBC umožnilo, aby se úmrtnost na toto onemocnění ve světě od roku 1990 snížila o polovinu. Situace se zlepšila hlavně po roce 2000. Nové diagnostické a léčebné metody umožnily zachránit na 43 miliónů životů. Podle WHO je však třeba pokračovat a zesílit boj proti TBC, který nyní brzdí hlavně nedostatek peněz.

Loni se objevilo 9,6 miliónu nových případů onemocnění. Více než polovina současných případů TBC připadá na Čínu, Indii, Indonésii, Nigérii a Pákistán, upřesnila WHO.

Počty onemocnění v ČR trvale klesají, loni bylo hlášeno 512 případů. Česko tak patří se 4,8 případu na 100 000 obyvatel k zemím s nejnižším výskytem TBC na světě.

Anthrax

Cervical Cancer

Diphtheria

Hepatitis A

Hepatitis B

Haemophilus influenzae type b

Human Papillomavirus (HPV)

H1N1 Flu (Swine Flu)

Influenza (Seasonal Flu)

Japanese Encephalitis (JE)

Measles

Meningococcal

Mumps

Pertussis (Whooping Cough)

Pneumococcal

Poliomyelitis (Polio)

Rabies

Rotavirus

Rubella (German Measles)

Shingles (Herpes Zoster)

Smallpox

Tetanus

Tuberculosis

Typhoid Fever

Varicella (Chickenpox)

Yellow Fever

Rotavirus vaccination in routine childhood immunisation programmes?

Rotavirus infection is an infectious disease mainly affecting children. It causes acute gastroenteritis (fever, vomiting, diarrhoea) which leads to significant fluid loss and dehydration. Every year in the EU/EEA, an estimated 75 000 to 150 000 children under five years old are hospitalised due to rotavirus infections. The two vaccines in use in the EU/EEA since 2006 have been shown to be effective in preventing severe rotavirus-induced gastroenteritis. However, the uptake of rotavirus vaccination in childhood immunisation programmes varies across the EU/EEA. Many countries have already introduced rotavirus vaccination, but many haven't yet decided whether or not to do so.

To assist health authorities with this decision, ECDC has published an expert opinion which provides relevant scientific information and highlights the issues that need to be considered before and after introducing rotavirus vaccines into the national vaccination programme. The document is based on the available scientific evidence, evaluated by a group of independent public health experts from across the EU/EEA. It is open for public consultation until 28 November 2016.

I would like to point out how important it is for ECDC to receive comments from the scientific community and stakeholders. We want to make sure that the final document will take into account all important considerations to support EU/EEA countries in their decision on the possible introduction and monitoring of rotavirus vaccination.

Andrea Ammon, Acting Director of ECDC

Immunity

- Self vs. nonself
- Protection from infectious disease
- Usually indicated by the presence of antibody
- Very specific to a single organism

Principles of Vaccination

- Protection produced by the person's own immune system
- Usually permanent
- Protection transferred from another person or animal
- Temporary protection that wanes with time

Passive Immunisation

- Transfer of antibody produced by one human or other animal to another
- Temporary protection
- Transplacental most important source in infancy

Sources of Passive Immunity

- Almost all blood or blood products
- Homologous pooled human antibody (immune globulin)
- Homologous human hyperimmune globulin
- Heterologous hyperimmune serum (antitoxin)

Monoclonal Antibody

- Derived from a single type, or clone, of antibody-producing cells (B cells)
- Antibody is specific to a single antigen or closely related group of antigens
- Used for diagnosis and therapy of certain cancers and autoimmune and infectious diseases

Active Immunisation

- A live or inactivated substance (e.g., protein, polysaccharide) capable of producing an immune response
- Protein molecules (immunoglobulin) produced by B lymphocytes to help eliminate an antigen

Contraindications

- Generaly
  - Acute illnes
  - Reaction after last vaccination
  - Anaphylactic reactions
  - Recovery time
  - Incubation period of some infectious diseases
  - Pregnancy
  - Immunosupression – therapy
  - Hemoblastosis and other oncologic disease

Contraindications

- Specific
  - Depends on the types of vaccine (exampl.- alergic reaction on the some substances

Apliccation

- Under aseptic conditions !
- i.m.
- s.c.
- intradermal (epidermis)
- p.o.
- scarification
- …..

After aplication - 30 min - under oversight !

Reaction after apliccation

- Fysiolocal reaction
  - Local
    - erythema, swelling, soreness …
  - Generally
    - higher temperature, fever, tiredness, hedeache,
    - pain of the muscles, joints,
    - Indigestion
- Alergic reaction

Vaccination

- Active immunity produced by vaccine
- Immunity and immunologic memory similar to natural infection but without risk of disease

Live Attenuated Vaccines

- Attenuated (weakened) form of the "wild" virus or bacterium
- Must replicate to be effective
- Immune response similar to natural infection
- Usually effective with one dose*

Live Attenuated Vaccines

- Severe reactions possible
- Interference from circulating antibody
- Fragile – must be stored and handled carefully

Live Attenuated Vaccines

- Viral — measles, mumps, rubella, vaccinia, varicella, yellow fever, intranasal influenza, (oral polio) (rotavirus)
- Bacterial — BCG, oral typhoid

Inactivated Vaccines

- Cannot replicate
- Less interference from circulating antibody than live vaccines
- Generally require 3-5 doses
- Immune response mostly humoral
- Antibody titer diminishes with time

Inactivated Vaccines

- Viral — polio, hepatitis A, rabies (influenza)
- Bacterial — (pertussis) (typhoid) (cholera) (plague)

Inactivated Vaccines

- Subunit — hepatitis B, influenza, acellular pertussis, (Lyme) (HPV)
- Toxoid — diphtheria, tetanus

Polysaccharide Vaccines

- pneumococcal
- meningococcal
- *Salmonella* Typhi (Vi)

- *Haemophilus influenzae* type b
- pneumococcal
- meningococcal

Pure Polysaccharide Vaccines

- Not consistently immunogenic in children <2 years of age
- No booster response
- Antibody with less functional activity
- Immunogenicity improved by conjugation

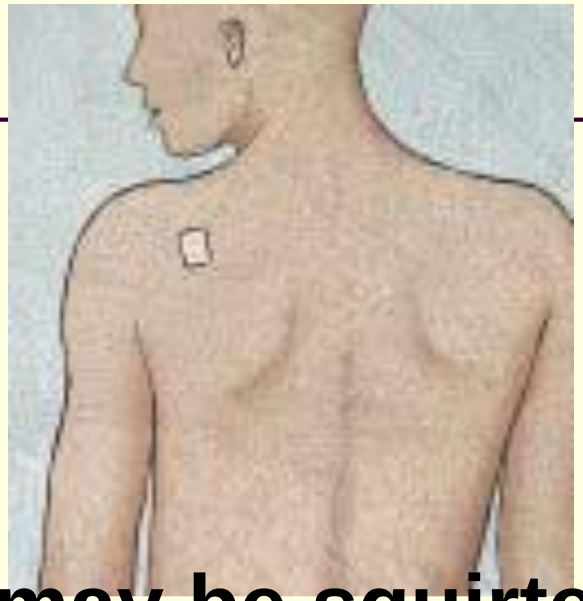
Immunisation in Czech Republic

TBC	only - indication
Di,Te,P(a), Hib, VHB,IPV	from 13th week 3 times in 1 year (each after 1 months) 4th dosis 6th months after 3th dosis
MMR	1st dosis from 15th months 2nd dosis from 6th to 10th months after 1st dosis
Di,Te,P(a)	5 years
Di,Te,P(a),IPV	10 years
VHB	12 years
Te	25 years, revaccination each after 10 - 15 years

Poznámka: TBC , Di (Diphteria), Tetanus (Te), P (Pertussis), Hib (Haemophilus influenzae b), HB (VHB), IPV (poliomyelitis), MMR (measles, mumps, Rubella).

Vaccination before traveling abroad Mandatory vaccination against:

- yellow fever when traveling to Africa and Central and South America; and
- meningococcal meningitis (A, C, Y, W - 135) while traveling to Saudi Arabia.



Future vaccines may be squirted up the nose, worn as a patch, or eaten at the dinner table.