- INSTITUTE FOR PUBLIC HEALTH OF THE REPUBLIC OF MACEDONIA
- MINISTRY OF HEALTH OF THE REPUBLIC OF MACEDONIA
- DOCTOR'S CHAMBER OF MACEDONIA

Vaccination in Republic of Macedonia: Standards and Actual Trends

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Vaccination and Communicable Diseases

- Vaccines are one of the greatest achievements in the history of medicine and public health, and vaccination is one of the most cost-effective health investments!!!

- Vaccination is a proven tool for controlling and eliminating life-threatening communicable diseases!!!

Legislation on Vaccination in R. Macedonia

- Law on Protection of Population against Communicable Diseases (Official Gazette of RM No. 66/2004)
- Regulations for immunoprophylaxis, chemoprophylaxis, people subject to these measures, means of realization and keeping records and documentation (Official Gazette of RM No. 65/2010)
- Compulsory Immunization Program for the population in the Republic of Macedonia and National Annual Public Health Program in the Republic of Macedonia (annually, Off. Gazette of RM)

Compulsory Vaccination in R. Macedonia

Compulsory vaccination in RM has two periods:

- first campaign period until 1960 and
- second continuous period since 1960.

Continuous compulsory immunization in Macedonia is implemented against:

1. **Tuberculosis** (introduced in 1948)
2. **Diphtheria** (introduced in 1951)
3. **Tetanus** (introduced in 1951)
4. **Pertussis** (introduced in 1960)
5. **Poliomyelitis** (introduced in 1961)
6. **Morbilli** (introduced in 1972)
7. **Parotitis epidemica** (introduced in 1982)
8. **Rubella** (introduced in 1982)
9. **Hepatitis B** (since October 2004)
10. **Haemophilus influenzae type B** (since September 2008)
11. **Human Papillomavirus** (since October 2009)

Implementation of Compulsory Vaccination of the Population in the Republic of Macedonia in 2013

VACCINATION SCHEDULE IN 2013

Age of people subject to compulsory vaccination	Disease against the vaccine is administered	Vaccination Revaccination
up to 24 hours of birth, 1 and 6 months	Hepatitis B (3 doses)	Vaccination
up to 12 months	Tuberculosis (without testing) (1 dose)	Vaccination
2, 3 and 5 months	Infections with Haemophilus influenzae type B (Hib) (3 doses) Diphtheria, Tetanus, Pertussis (3 doses)	vaccination Vaccination
2, 3 and a half and 5 months	Poliomyelitis (3 doses three-type oral vaccine)	Vaccination
12 months	Morbilli, Rubella, Parotitis epidemica (1 dose)	Vaccination
18 months	Infections with Haemophilus influenzae type B (Hib) (1 dose) Diphtheria, Tetanus, Pertussis (1 dose) Poliomyelitis (1 dose)	I revaccination I revaccination I revaccination
4 years	Diphtheria, Tetanus, Pertussis (1 dose)	II revaccination
6 years (I grade)	Morbilli, Rubella, Parotitis epidemica (1 dose)	I revaccination
7 years (II grade)	Poliomyelitis (1 dose) Diphtheria, Tetanus (1 dose)	II revaccination III revaccination
12 years, 2 and 6 months after the first dose (VII grade)	Infections with Human Papillomavirus (HPV) (only girls) (3 doses)	Vaccination
14 years (final year of primary school)	Poliomyelitis (1 dose) Diphtheria, Tetanus (1 dose)	III revaccination IV revaccination
18 years (final year of secondary school)	Tetanus (1 dose)	V revaccination

Primary Vaccination in Macedonia in 2013

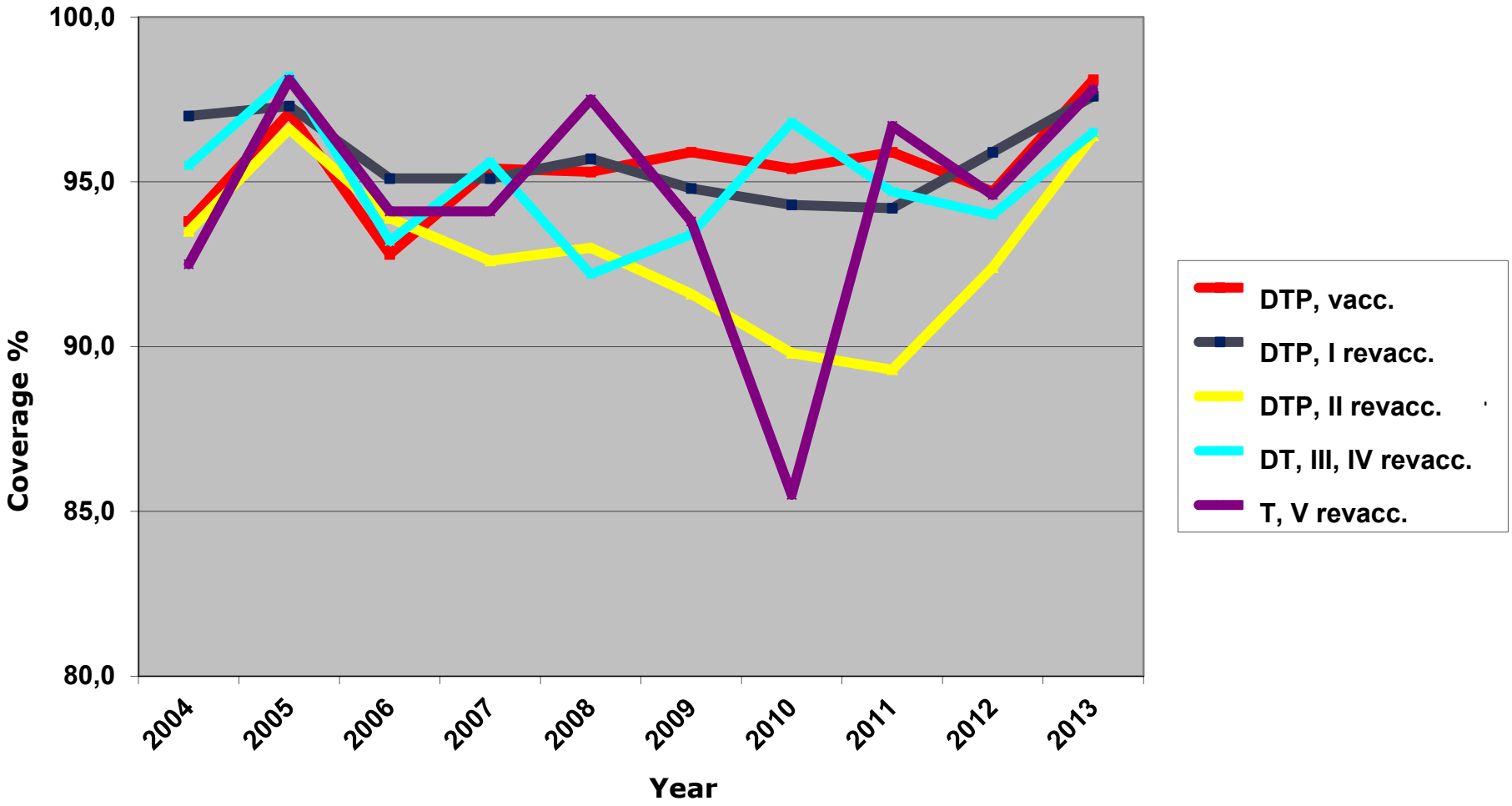
TYPE OF VACCINE	COVERAGE
DTP vaccine	98,1%
OPV vaccine	97,9%
Vaccine against Haemophilus influenzae type B	97,1%
Vaccine against Hepatitis B	96,5%
MRP vaccine	96,1%
HPV vaccine	40,1%

Revaccination in Macedonia in 2013

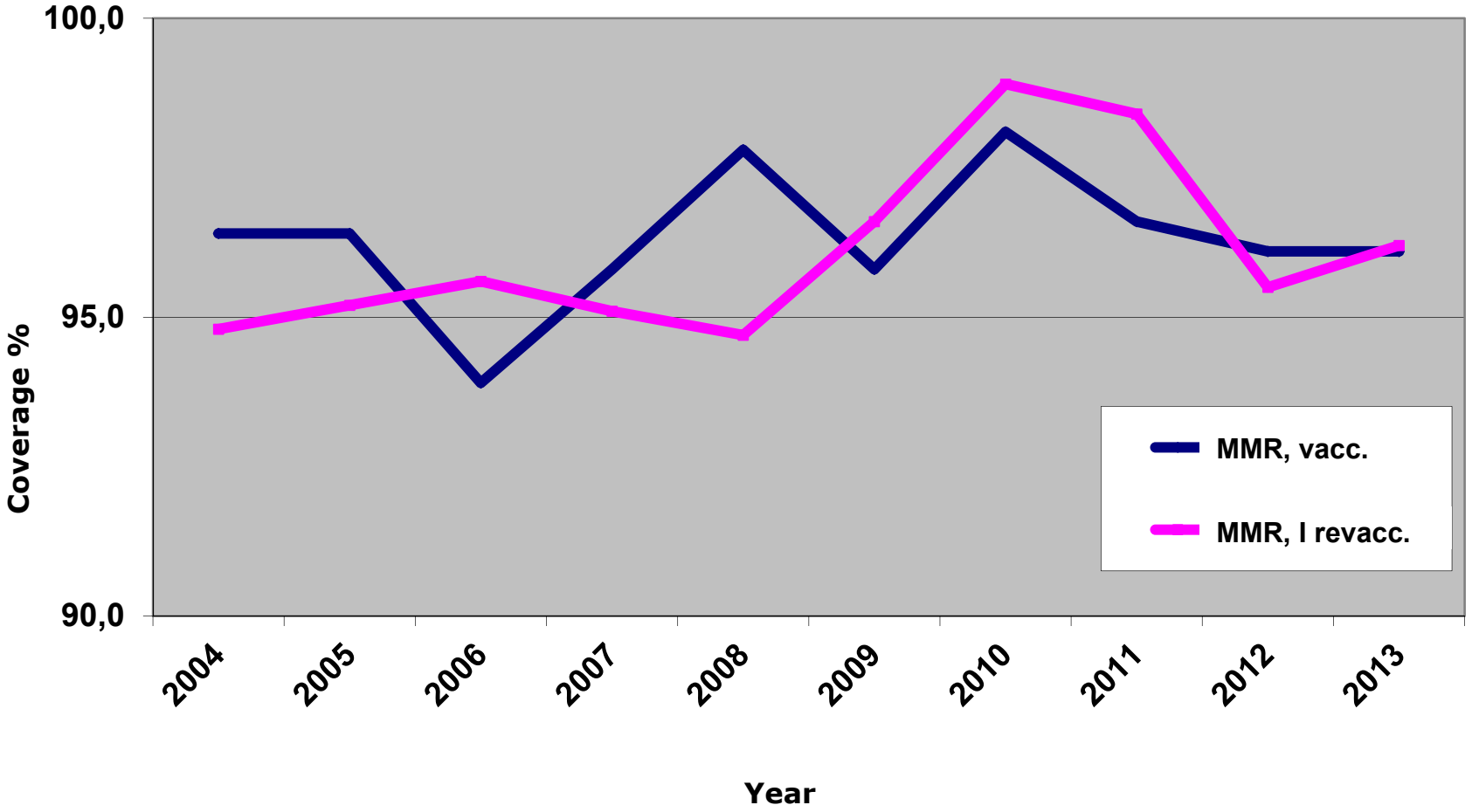
Type of revaccination	Order	Coverage
Vaccine against Haemophilus influenzae type B		96,2%
DTP vaccine	I	97,6%
	II	96,4%
	III	95,7%
	IV	97,3%
	V	97,8%
OPV vaccine	I	97,3%
	II	95,0%
	III	97,2%
MRP vaccine		96,2%

Vaccination and Revaccination Coverage of the Population in Macedonia in Ten-year Period from 2004 – 2013

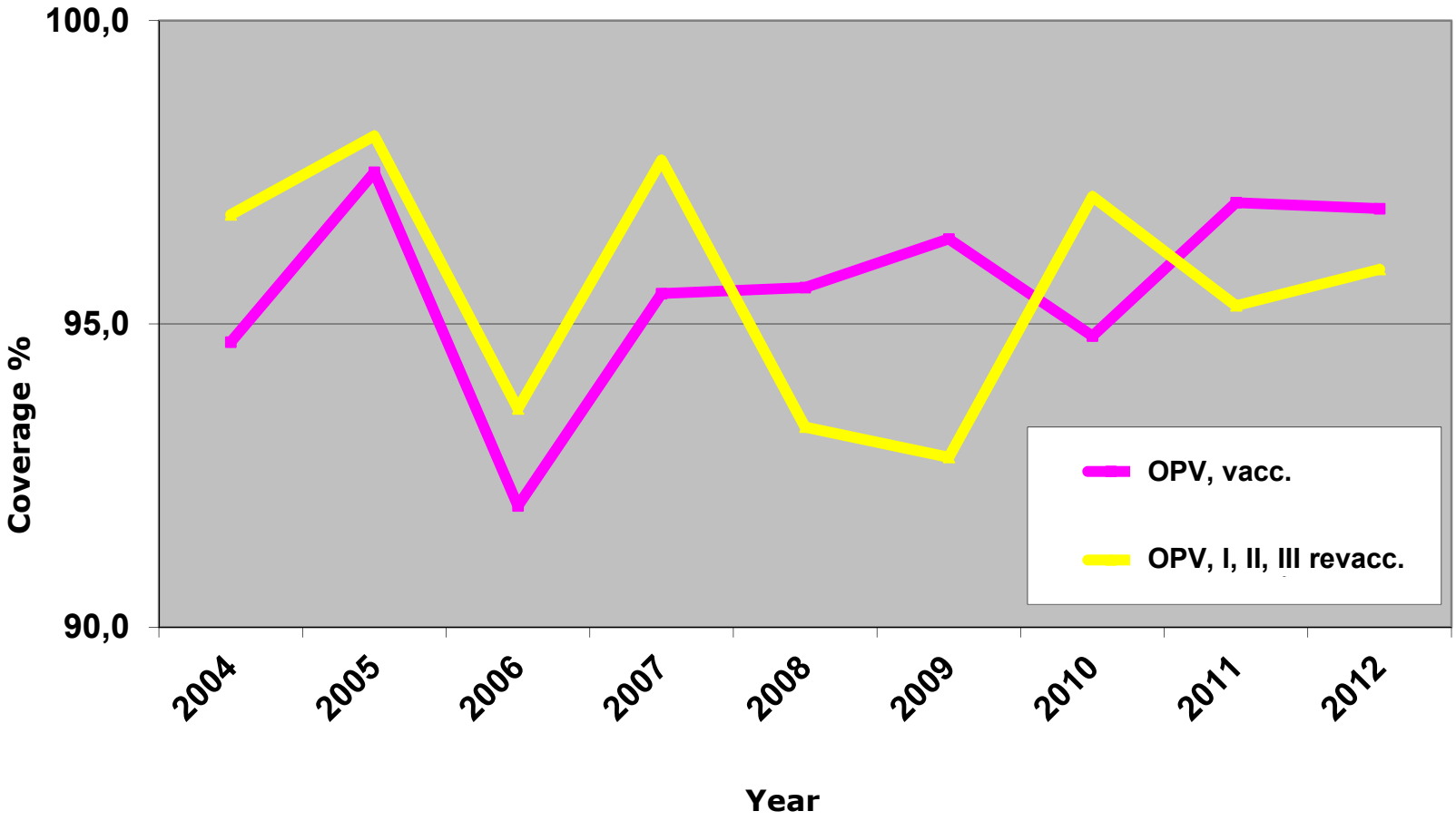
DTP Vaccination and Revaccination Coverage in R. Macedonia, 2004-2013



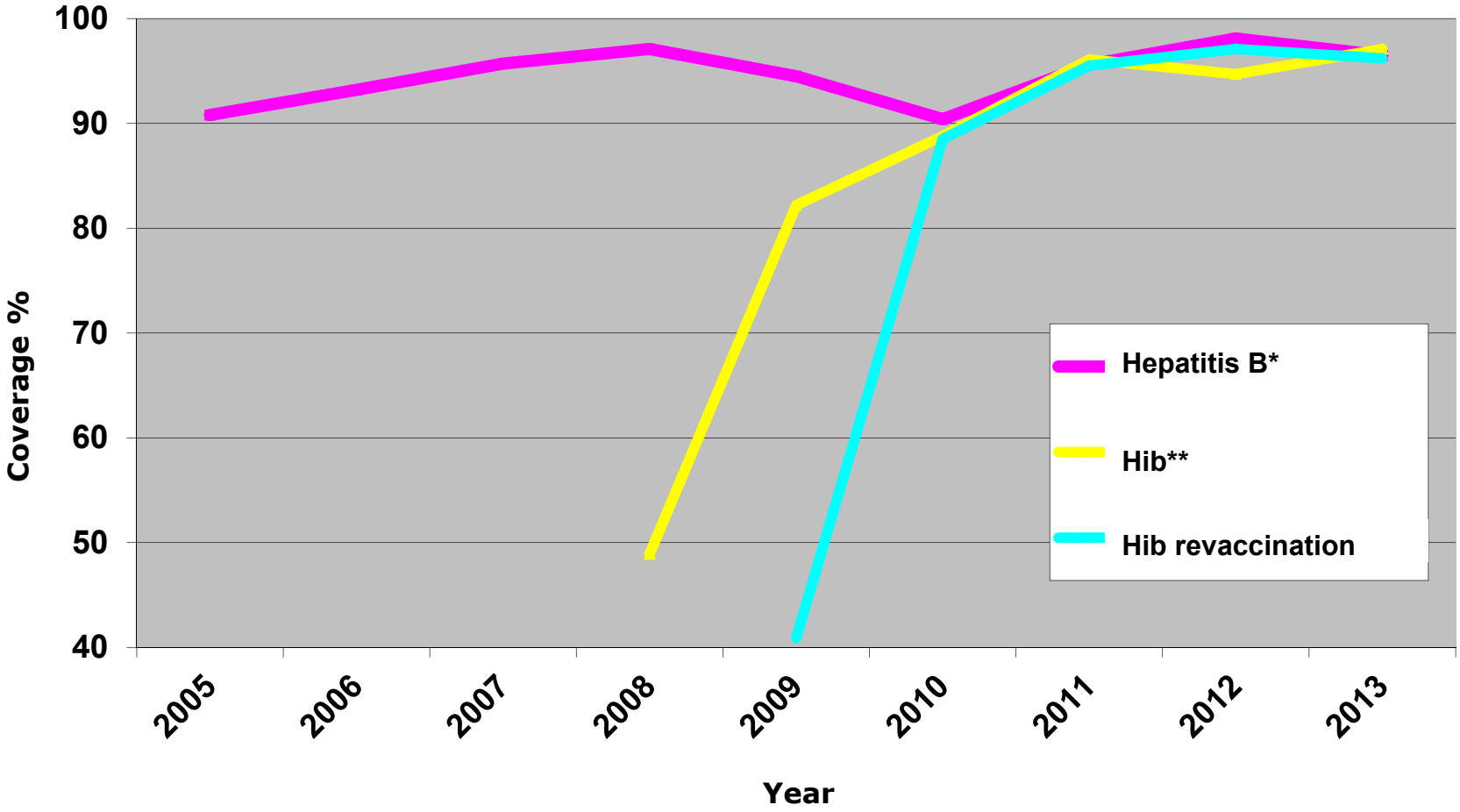
MRP Vaccination and MRP Revaccination Coverage in R. Macedonia, 2004-2013



OPV Vaccination and Revaccination Coverage in R. Macedonia, 2004-2013



Vaccination Coverage against Hepatitis B and Hib in R. Macedonia, 2005-2013



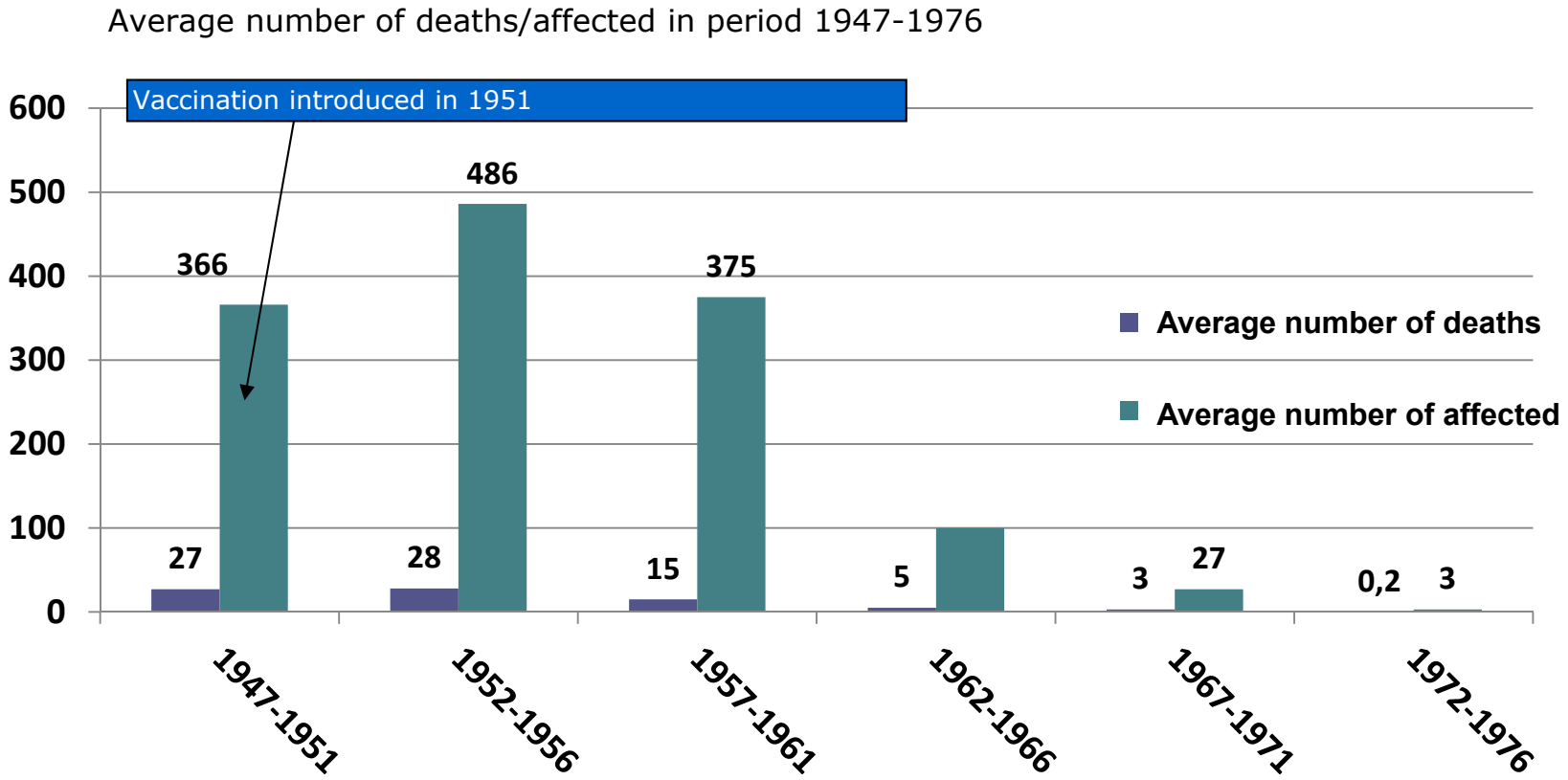
* vaccination against Hepatitis B of all newborns has been initiated since 2004

** vaccination against diseases caused by Haemophilus influenzae type B has been initiated since 2008

Vaccine-preventable Diseases in the Republic of Macedonia – Before and After the Introduction of the Vaccination

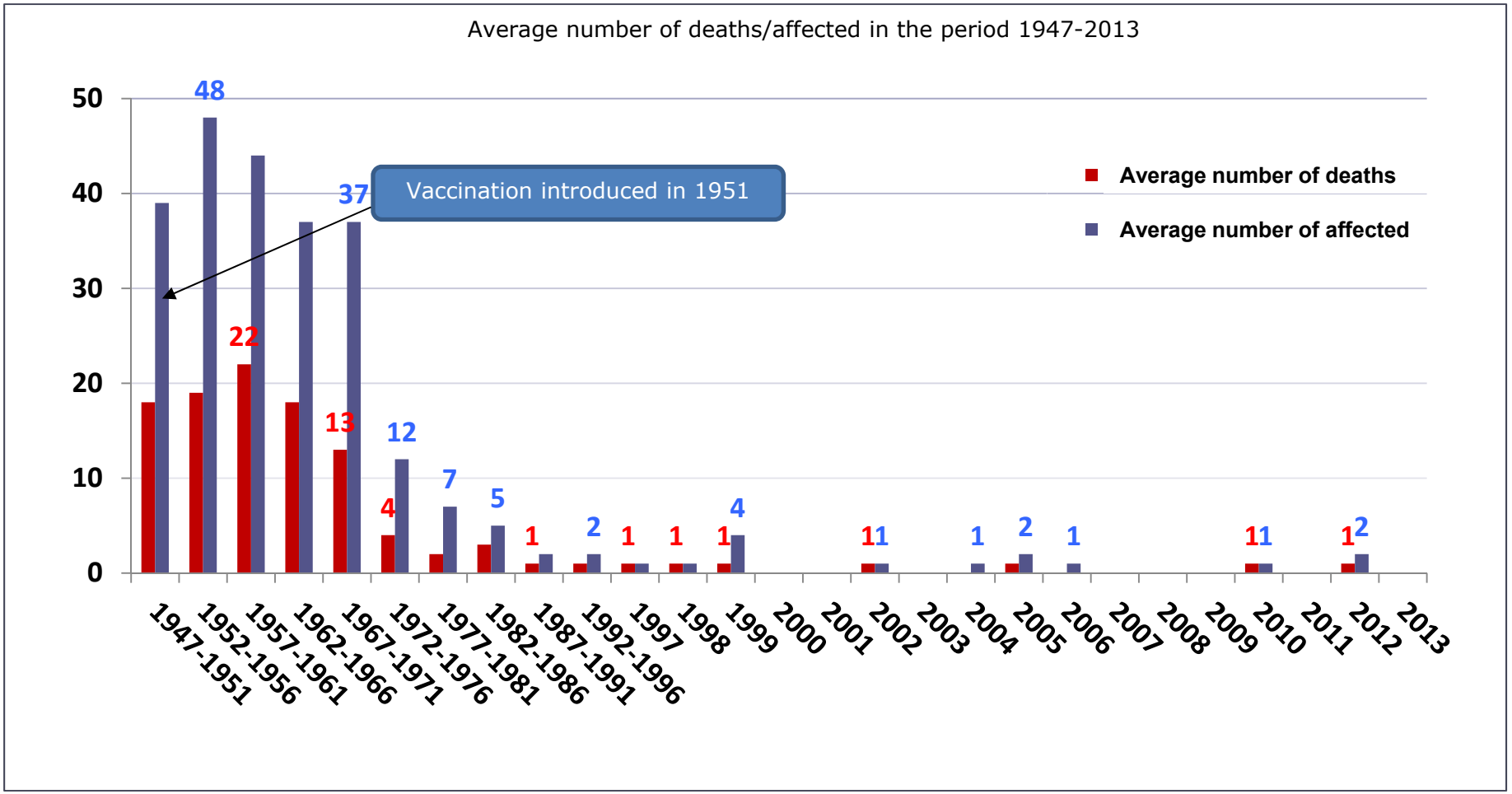
Diphteria

- **The last recorded death was in 1972**
- **The last recorded case of disease was in 1976**



Tetanus

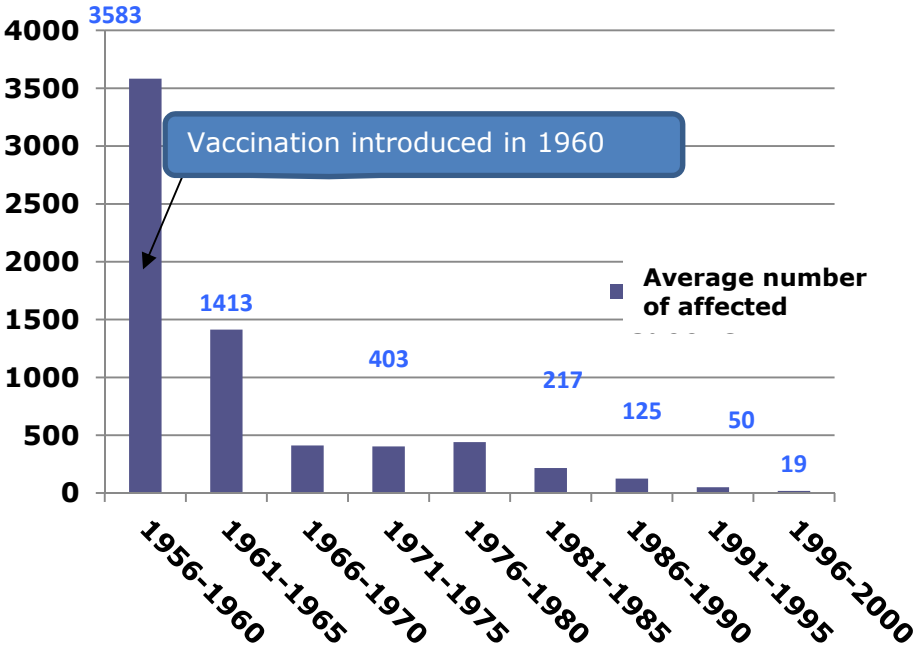
The last recorded case in newborns was in 1993



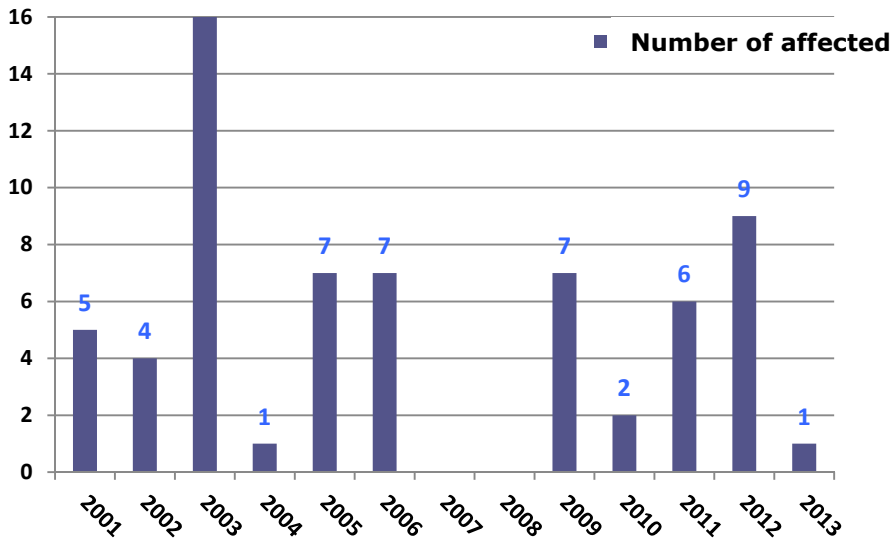
Pertussis

The last recorded epidemic was in 1987

Average number of affected in period 1956-2000

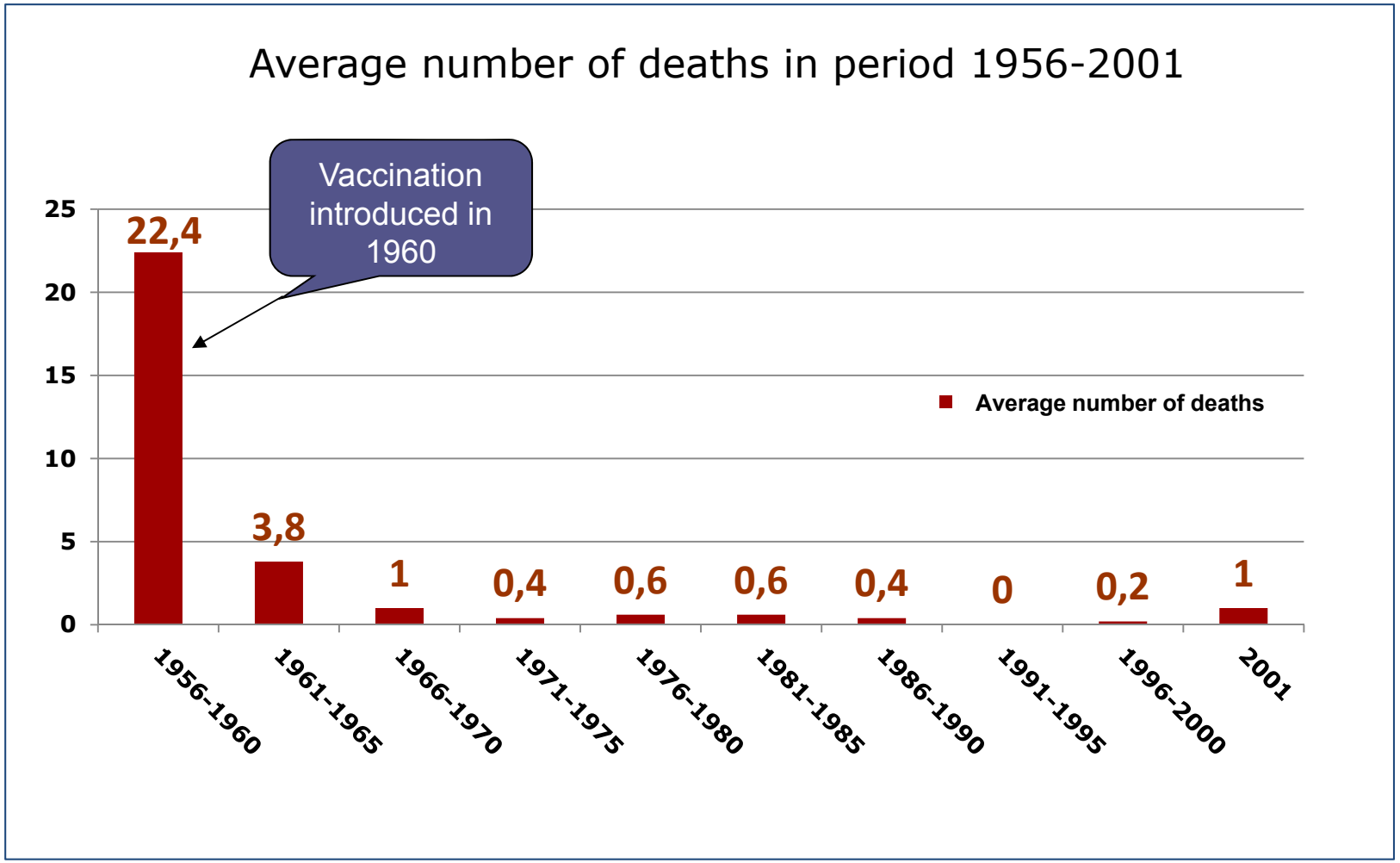


Number of pertussis cases, 2001-2013



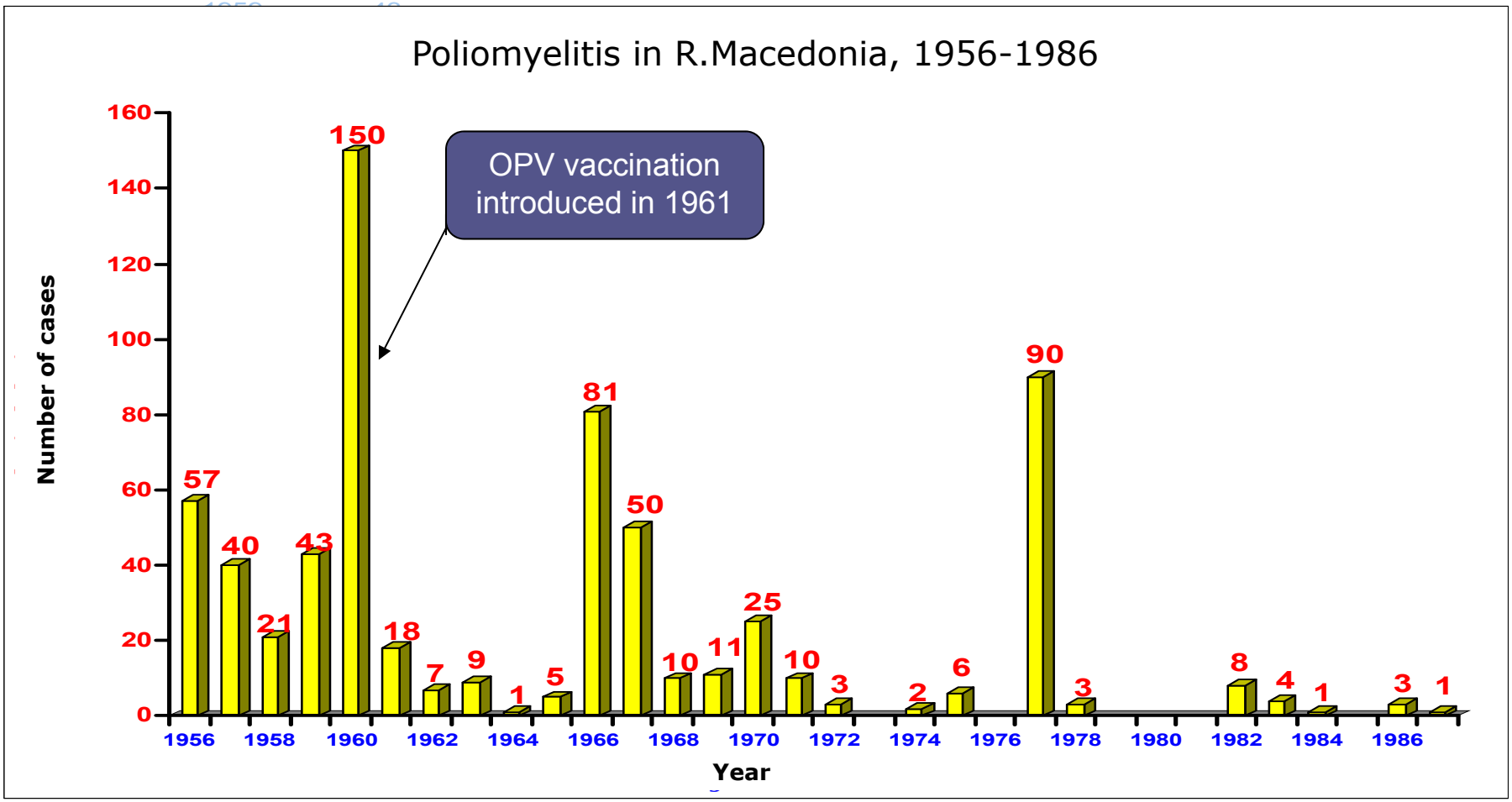
Pertussis

The last recorded death was in 2001



Poliomyelitis

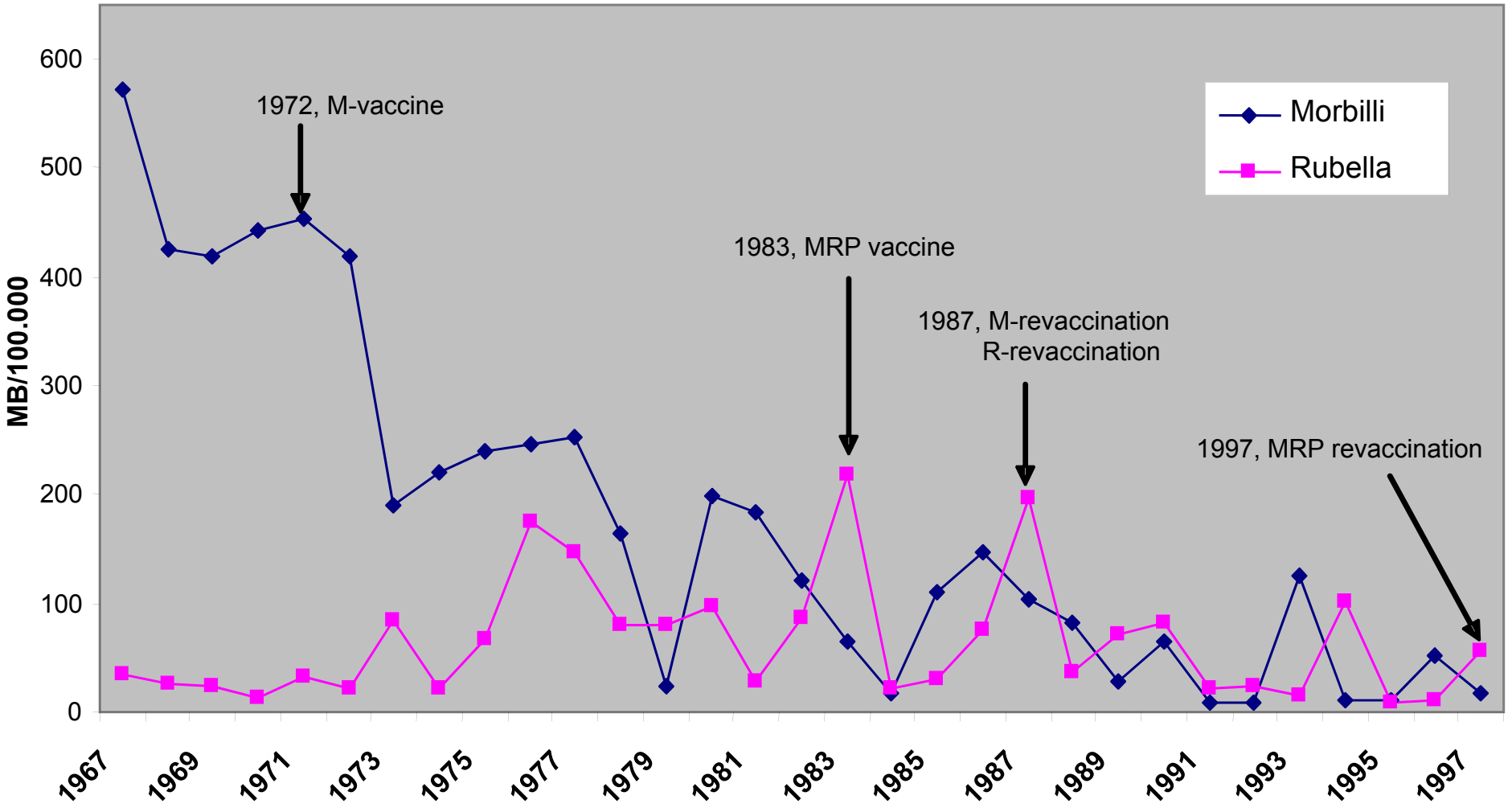
The last case of disease was recorded in 1987



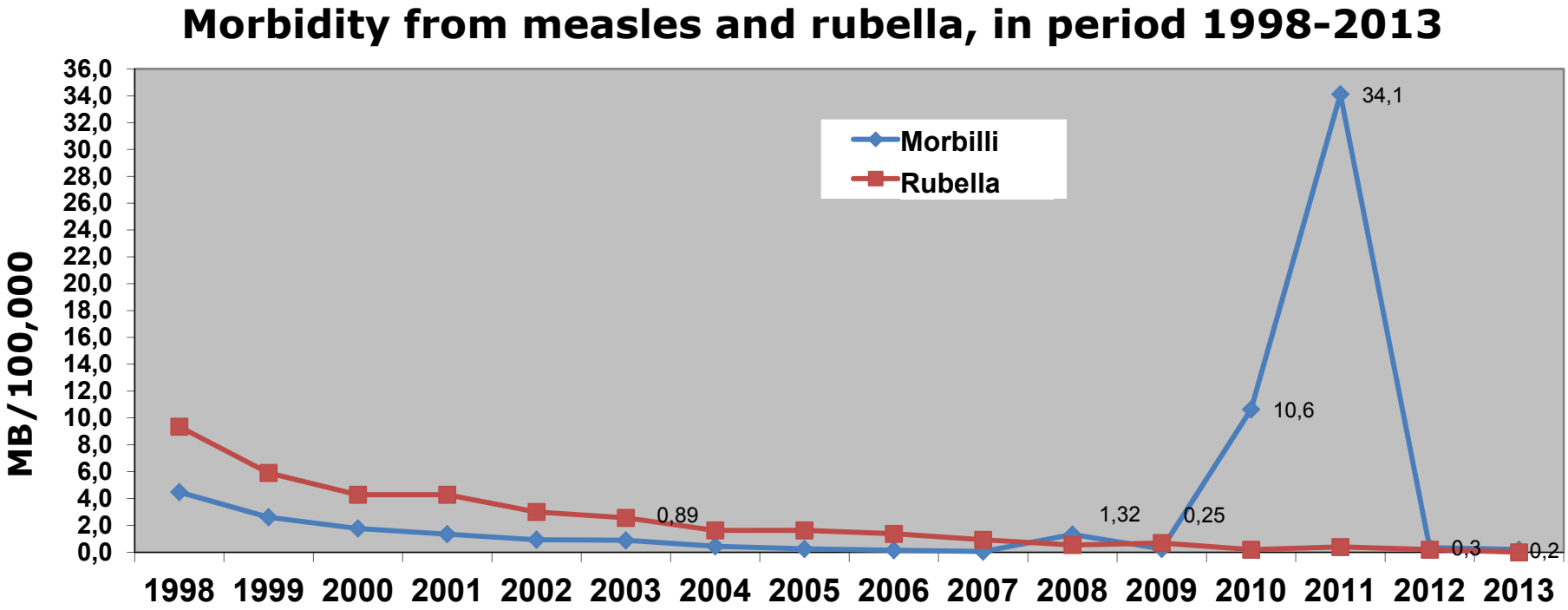
As a member of the European Region, in June 2002 the Republic of Macedonia achieved certification of poliomyelitis eradication by WHO.

Morbilli / Rubella

Morbidity and changes in the Immunization schedule against measles and rubella, in period 1967-1997



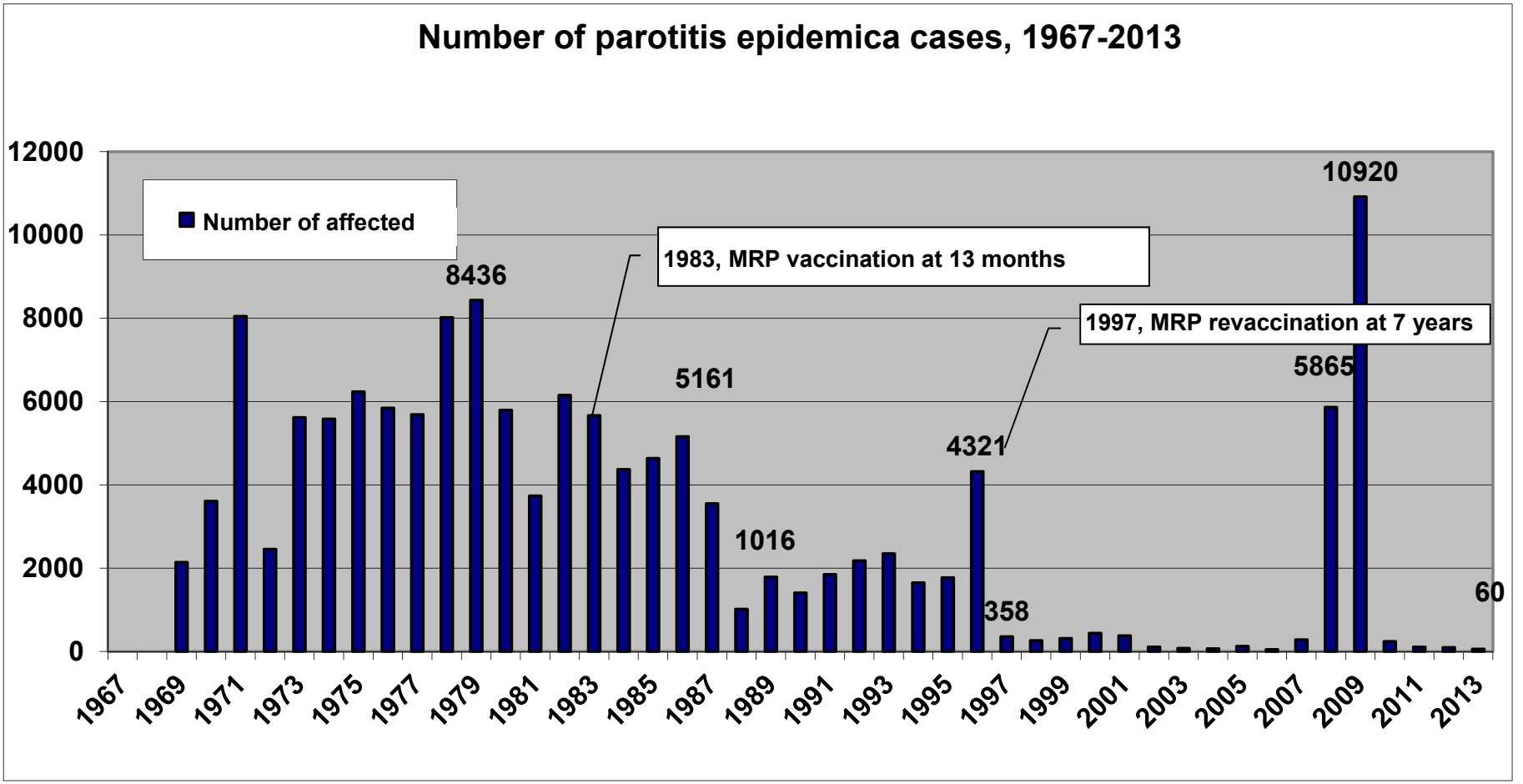
Morbilli / Rubella



The last epidemic of morbilli was in 2010-2011, with 908 affected people in total

- 90.0% (n = 796) of patients with proven vaccination status were unvaccinated or with unknown vaccination status
- Most of the affected were in the age group above 20 years (n = 380)

Parotitis epidemica

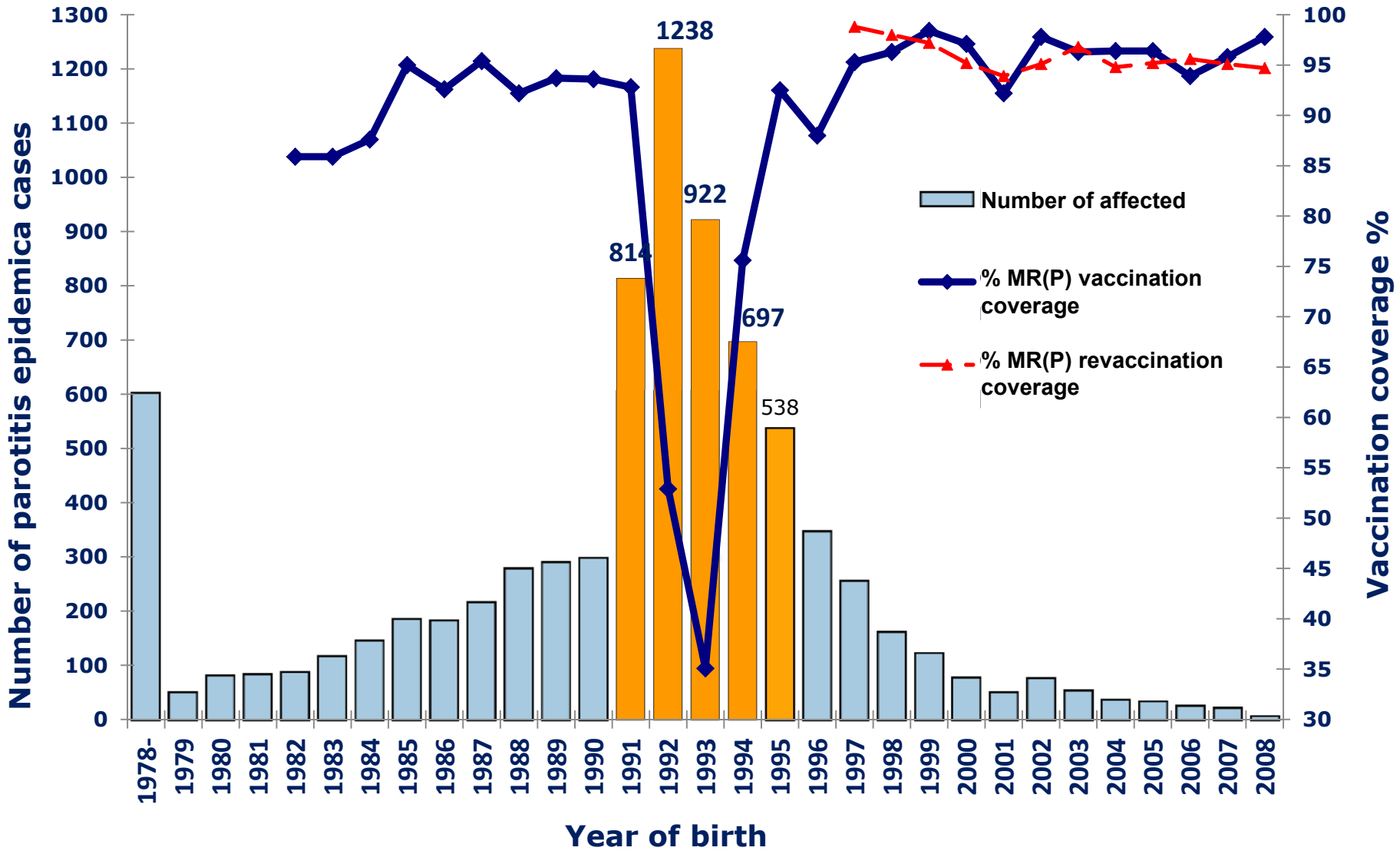


The last epidemic was in 2008-2009, with over 15,000 affected people

Epidemics of parotitis epidemica, 2008-2009

- Most affected is the group born in 1991-1995, which accounts for 51.8% of the recorded cases in total
- The age grouping of patients and the outbreak of the epidemic was probably due to omissions in vaccination in the corresponding period
- There is a negative correlation between the number of affected people by year of birth and vaccination coverage ($r = -0,84$, $p < 0,01$)

Vaccination Coverage in Period 1983-2007 and Distribution of Cases in 2009, Per Year of Birth



Conclusion

- Primary vaccination against diphtheria, tetanus and whooping cough continuously has maintained high coverage over 95% in the last decade, with an exception of three years – when it was between 90 and 95%.
- Vaccination and revaccination with OPV vaccine against poliomyelitis was implemented in the country with high coverage over 95% in the previous ten years, with an exception of four years when primary-vaccination coverage was between 90% and 95%.
- Vaccination and revaccination coverage against morbilli, rubella and parotitis epidemica (MRP vaccine) was high - over 95% in the past ten-year period, with an exception in 2006 and 2008, when the range was between 90 and 95%.
- Since the introduction of compulsory vaccination against hepatitis B for all newborns in 2004, this vaccination coverage has ranged from 90.4% (2010) to the highest 98.1% in 2012.
- Vaccination against infections with Haemophilus influenzae type B (Hib) was initiated in 2008, primary vaccination and revaccination coverage remained under 90% by 2010, after which it increased above the recommended 95%.
- Only the last introduced vaccine in the regular Immunization schedule in 2009 - HPV vaccine has coverage under the recommended 95%.

Conclusion

- Drastic reduction in the number of affected and deaths from vaccine-preventable diseases is evident as a result of the vaccination effects.
- The last recorded case of diphtheria – in 1976,
  and of poliomyelitis – in 1987.
- In the past ten-year period there were 7 recorded cases of tetanus in total, 3 of which ended with death.
- There were individual cases of whooping cough reported, with most cases in the previous ten years recorded in 2012 (n = 9).
  The last death was reported in 2001.
- There has been a steady decline in the morbidity from morbilli and rubella since 1998, with an exception in 2008 and 2010-2011 when there were two outbreaks of morbilli.
- There has been a continuing decline in the number of parotitis epidemica cases since 1997, except in 2008-2009 when there was epidemic of parotitis epidemica.

Challenges

- **Continuous maintenance of the coverage over 95% with vaccination and revaccination in each separate territory ("micro" - "macro" area) around the country**

  - Continuous and active searching for unrecorded, unvaccinated and under-vaccinated individuals, with a special emphasis on hard-to-reach populations (Roma population, migrants, etc.), finding and vaccinating these individuals to complete their vaccination status

- **Promotion and strengthening the system of supervision over vaccine-preventable diseases.**

Challenges

- **Introduction of polyvalent vaccines for successful implementation of continuous immunization, providing an opportunity for introduction of new vaccines in the Immunization schedule**

- **Implementation of standardized immunological studies to control the immunity status of the vaccinated people, determining the level of collective immunity, i.e. assessment of the vulnerability to vaccine-preventable diseases in the population.**

- **Unification (universality) of the system of planning, implementing, recording and supervising the immunization, i.e. introduction of single software with database on immunization.**

Challenges

- **Intensive campaign by all relevant factors in the healthcare system related to the vaccination, which would limit and reduce the effect of emerging anti-vaccine lobby groups that threaten to compromise the regular vaccination.**

- In urban areas, especially in the capital, there is a strong influence by anti-vaccine campaign, already reflected in the reduction of vaccination coverage, especially MRP vaccination coverage.