

# INVASIVE MENINGOCOCCAL DISEASE IN THE CZECH REPUBLIC IN 2016



Z. Okonji, P. Krizova, M. Musilek

National Reference Laboratory for Meningococcal Infections, NIPH, Prague, Czech Republic

zuzana.okonji@szu.cz

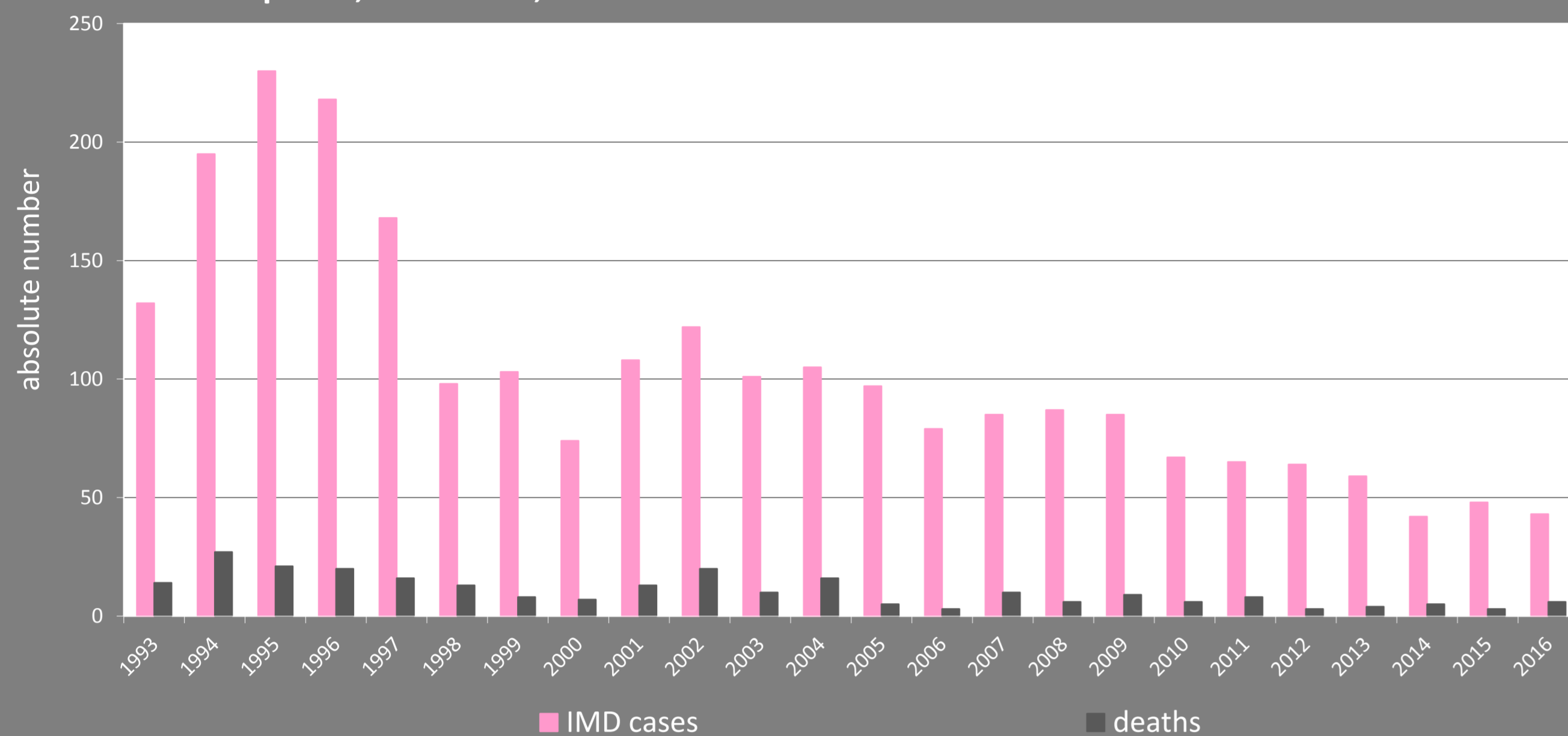
## Background

Nationwide enhanced surveillance of invasive meningococcal disease (IMD) was implemented by the National Reference Laboratory for Meningococcal Infections (NRL) in 1993. IMD has a decreasing trend in the Czech Republic (CR) in the last years. However, it still has a high case fatality rate. For this reason, the recommendation for the optimal vaccination strategy is required.

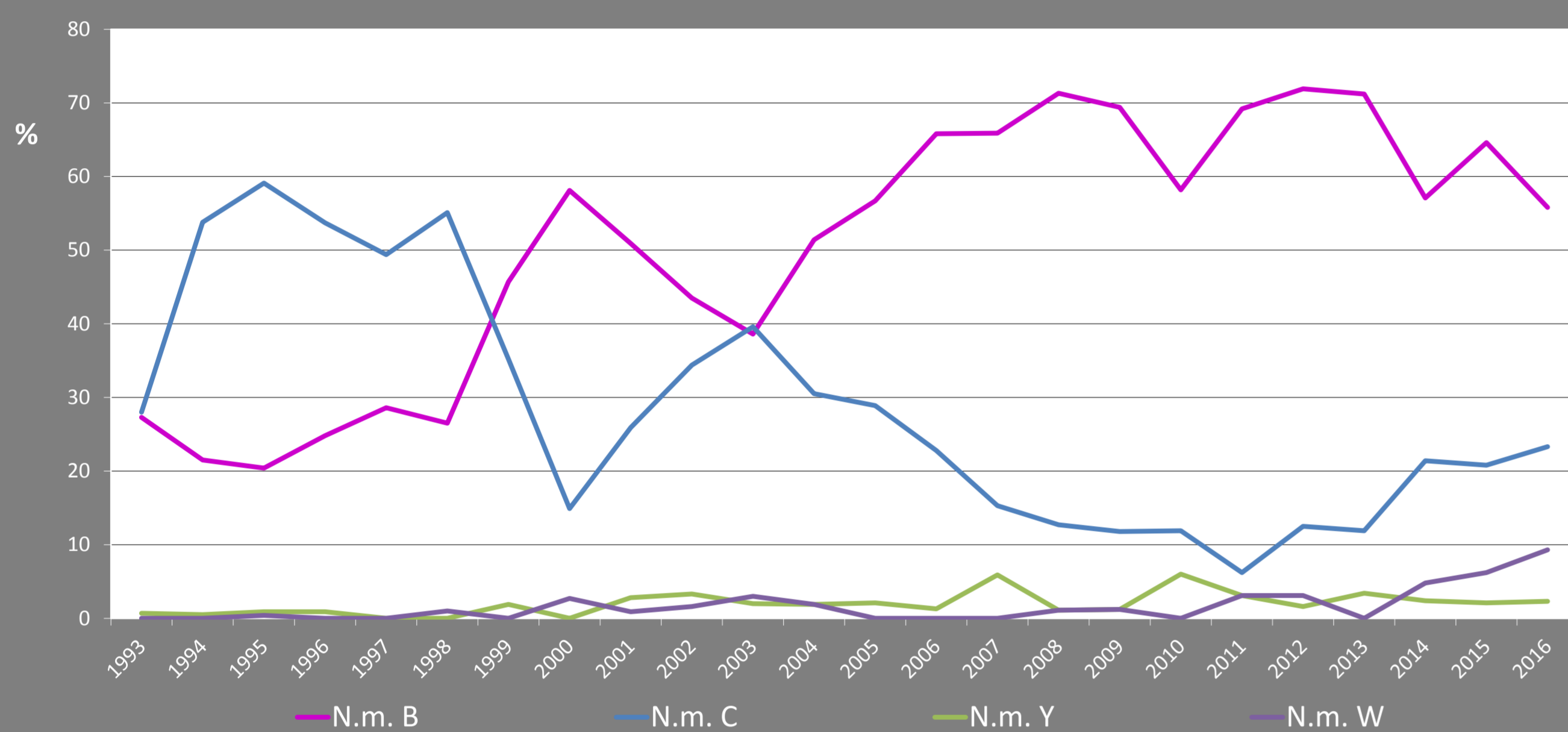
## Material and methods

Laboratory confirmation of cases was based on culture and PCR. Notification is compulsory and *Neisseria meningitidis* isolates from IMD cases are referred to the The NRL to be characterized by serogrouping, PorA and FetA sequencing (<http://neisseria.org/nm/typing/>), and multilocus sequence typing (MLST) (<http://pubmlst.org/neisseria/>).

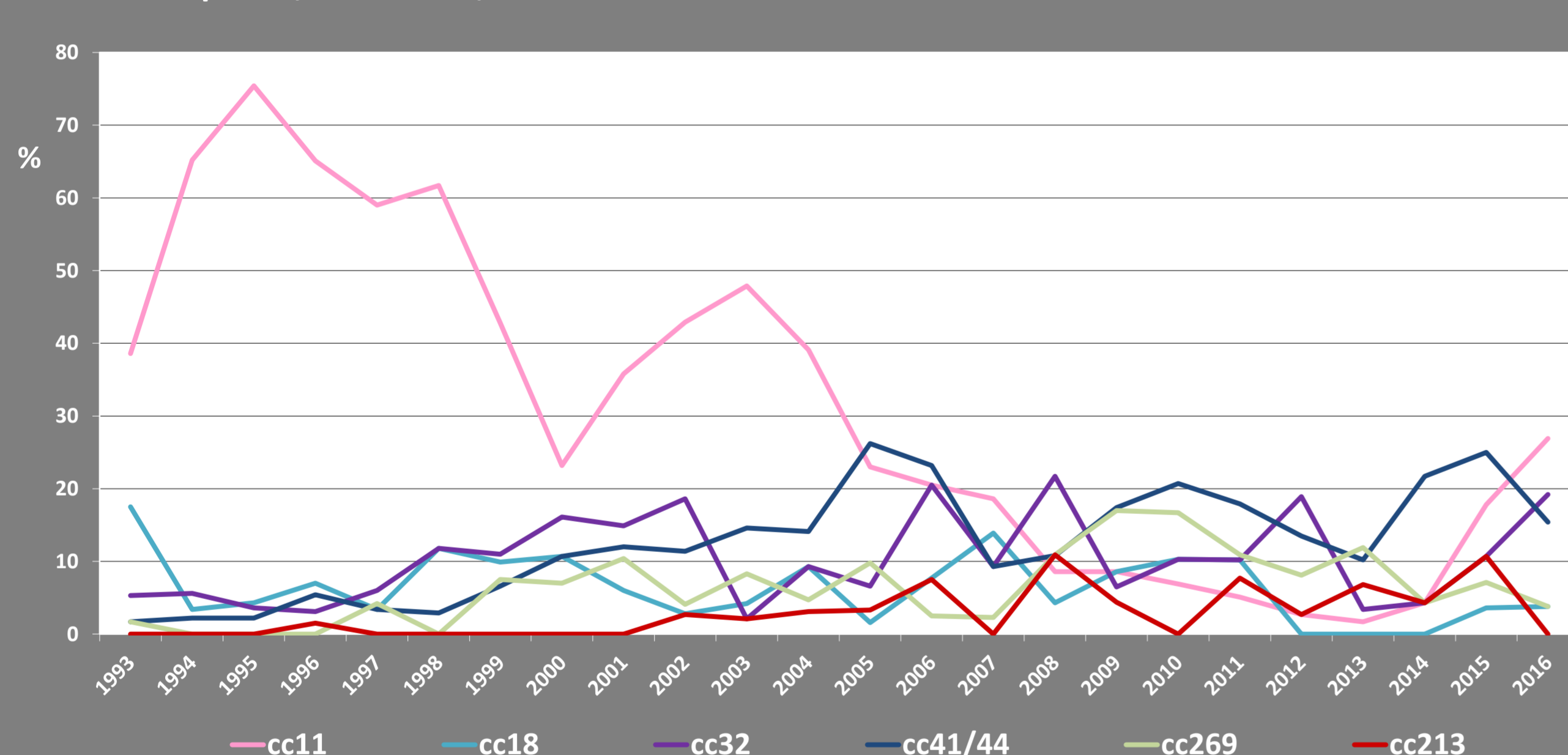
**Figure 1** Invasive meningococcal disease and deaths  
Czech Republic, 1993-2016, surveillance data



**Figure 3** Main serogroups of *Neisseria meningitidis* causing IMD  
Czech Republic, 1993-2016, surveillance data



**Figure 5** Main hypervirulent clonal complex of *Neisseria meningitidis* causing IMD  
Czech Republic, 1993-2016, surveillance data



## Results

Within the surveillance program, 43 cases of IMD were reported in the Czech Republic in 2016 (0.4/100 000 population) - **Table 1**. Six of the 43 cases were fatal - **Fig 1**, and the overall case fatality rate increased from 6.2 % in 2015 to 13.9 % in 2016. Four deaths were caused by serogroup B *Neisseria meningitidis*, one death by serogroup C, and one death by serogroup W. The highest age-specific incidence is constantly found in the age group under 1 year, followed by the age groups 1-4 years and 15-19 years - **Fig 2**. In comparison with the previous year, the percentage of cases caused by serogroup B dropped from 64.6 % in 2015 to 55.8 % in 2016 while the involvement of *N. meningitidis* C in IMD slightly increased from 20.8 % in 2015 to 23.3 % in 2016, similarly to serogroup W (from 6.2 % in 2015 to 9.3 % in 2016) - **Fig 3**. One case of IMD was caused by serogroup Y. The rate of cases where the causative serogroup was not determined (ND) increased from 4.2 % in 2015 to 9.3 % in 2016 - **Fig 4**. The percentage of cases of IMD diagnosed by PCR was nearly the same in both years, i.e. 52.4 % in 2015 and 53.5 % in 2016. In 25.6 % of patients with IMD, PCR was the only method to detect positivity. In 2016, the NRL performed multilocus sequence typing (MLST) of all referral strains from IMD. The most common causative hypervirulent complex involved in IMD in 2016 was cc11 (26.9 %), typical for serogroup C - **Fig 5, 6**.

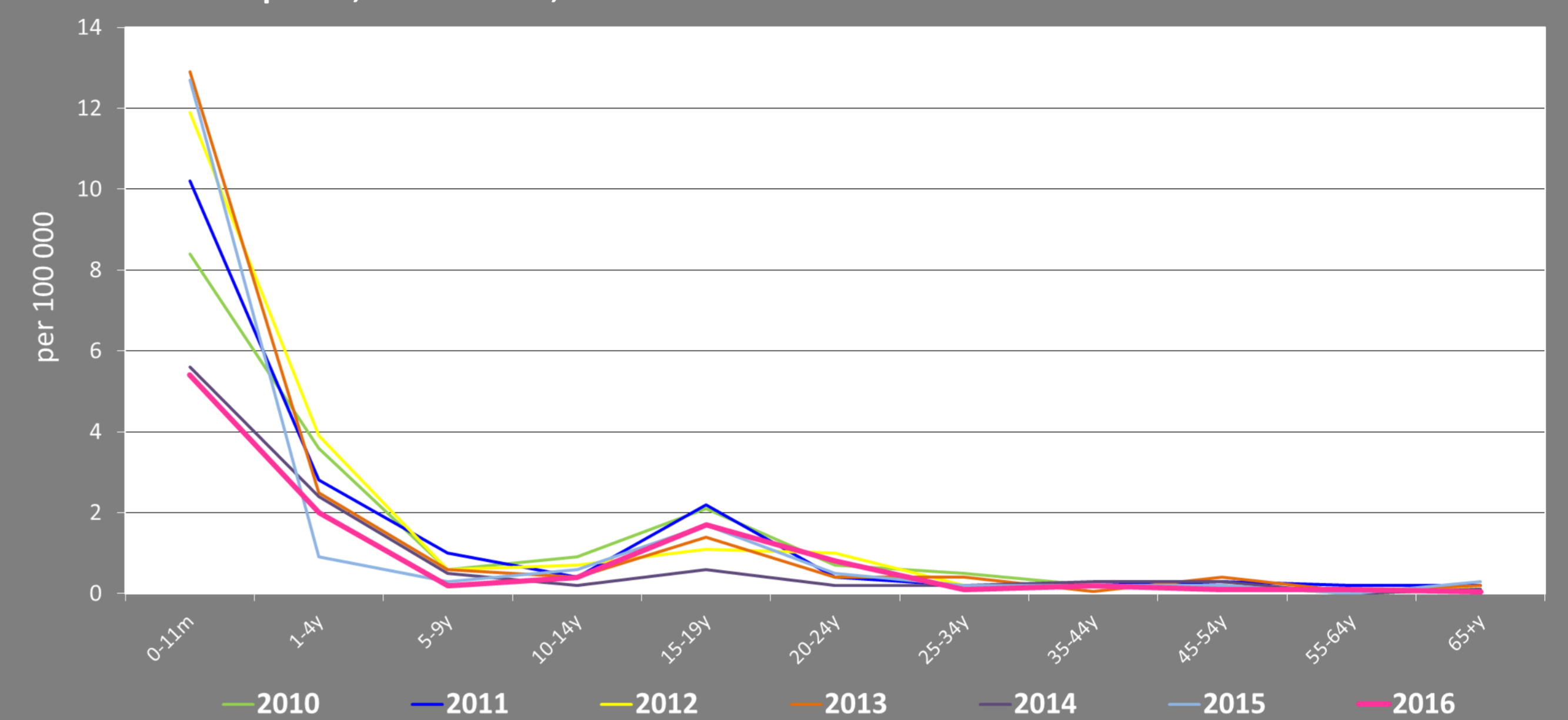
## Conclusion

As the incidence of IMD in the Czech Republic is low, there is no indication for the implementation of mass vaccination. However, the need for individual protection of persons at increased risk of IMD is emphasised. The combination of the conjugate tetravaccine A, C, W, Y and vaccine MenB is recommended.

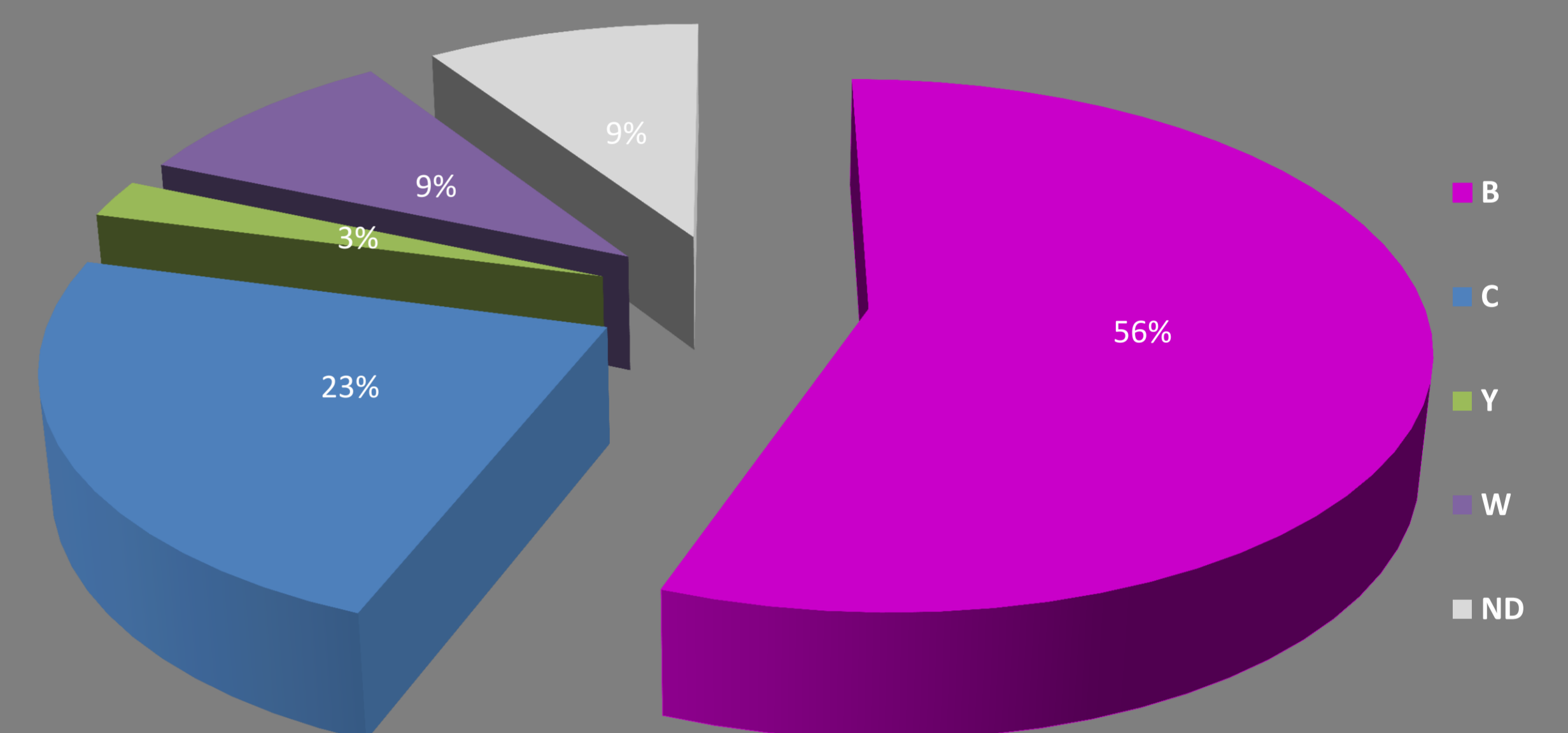
## Acknowledgement

Supported by the Ministry of Health of the Czech Republic, grant no. 15-34887A. All rights reserved.

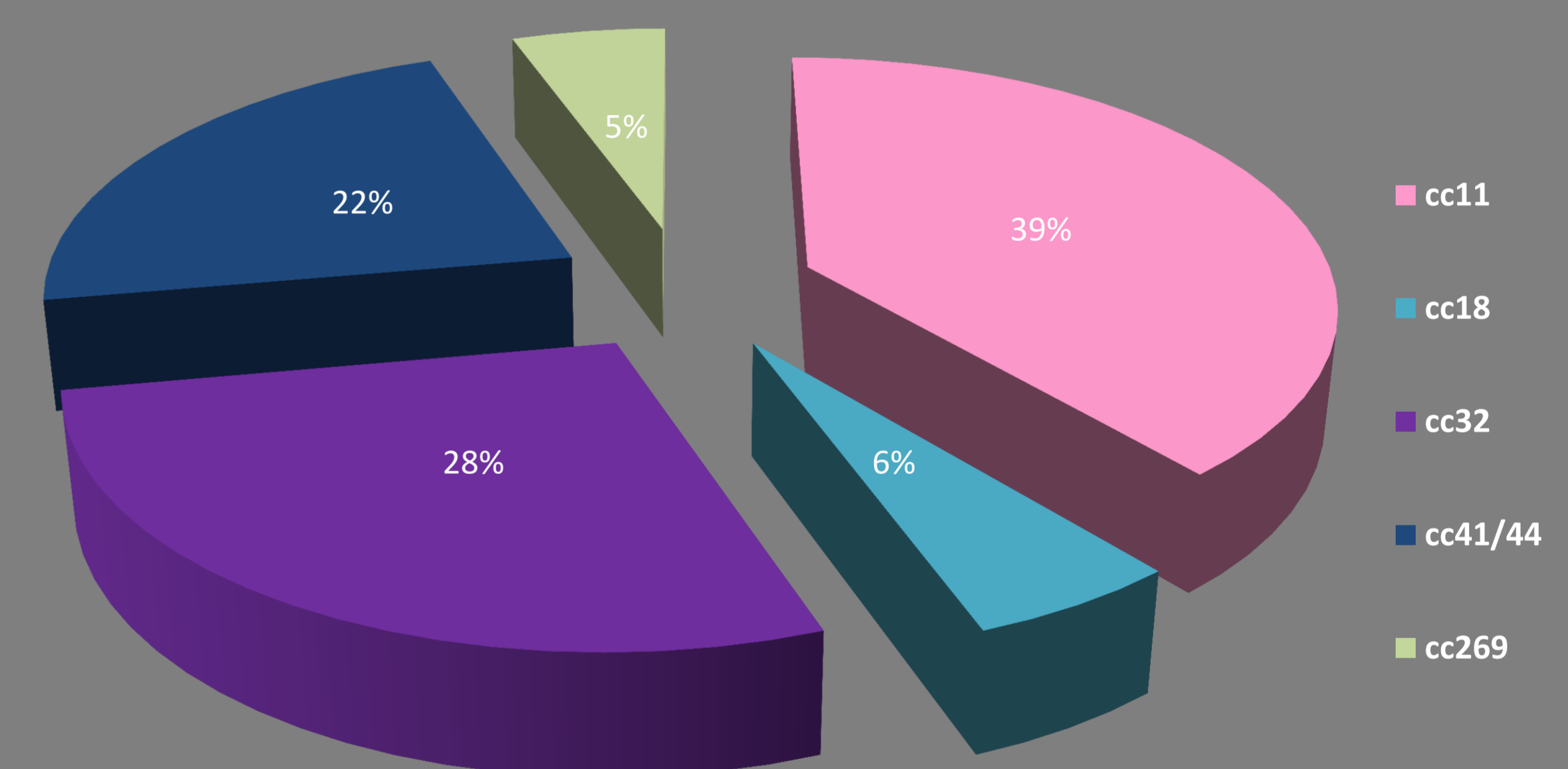
**Figure 2** Invasive meningococcal disease – age specific incidence  
Czech Republic, 2010 – 2016, surveillance data



**Figure 4** Main serogroups of *Neisseria meningitidis* causing IMD  
Czech Republic, 2016, surveillance data



**Figure 6** Main hypervirulent clonal complex of *Neisseria meningitidis* causing IMD  
Czech Republic, 2016, surveillance data



**Table 1** Invasive meningococcal disease (including deaths)  
Czech Republic, 2016, surveillance data

Age	Serogroup of <i>Neisseria meningitidis</i>					Total	Incidence per 100 000		
	B	C	Y	W	ND		Total	B	ACWY
0-11 m	6					6	5.4	5.4	
1-4 y	2	3	1	1	2	9	2.0	0.4	1.1
5-9 y	1	3				4	0.7	0.2	0.5
10-14 y	2					2	0.4	0.4	
15-19 y	4	2		1	1	8	1.7	0.9	0.7
20-24 y	2	1		1	1	5	0.8	0.3	0.3
25-34 y		1				1	0.1		0.1
35-44 y	3			1		4	0.2	0.15	0.05
45-54 y	1					1	0.1	0.1	
55-64 y	2					2	0.1	0.1	
65+ y	1					1	0.05	0.05	
<b>Total</b>	<b>24</b>	<b>10</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>43</b>	<b>0.4</b>	<b>0.2</b>	<b>0.1</b>
<b>%</b>	<b>55,8</b>	<b>23,3</b>	<b>2,3</b>	<b>9,3</b>	<b>9,3</b>	<b>100,0</b>			

ND = not done