

SHORT ARTICLE

Experience of vaccination against invasive bacterial diseases in Veneto Region (North east Italy)

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Key words

Vaccination coverage • Meningitis surveillance

Summary

The goal of this study was to describe and comment the experience of the Veneto Region in the bacterial invasive disease. Vaccination coverage was 93% against pneumococcus and 95% against haemophilus influenzae type B. Regard to meningococcus C the coverage rate was 90.1% in children, 81% at 6 years of age and 78.2% at 15 years. The preliminary data of an active surveillance of invasive bacterial diseases show that the Streptococcus pneumoniae was the main agent involved and that its consequences were particularly serious in elderly

subjects. With regard to Neisseria meningitidis, we observed a substantial reduction in the number of cases due to serogroup C and a concomitant rise in the percentage of cases due to serogroup B. The suspension of mandatory vaccination should be maintained, the monitoring of vaccination coverage and the active surveillance proved to be a very good assessment tools.

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Introduction

It is essential to achieve the objectives of improving vaccination policy and maintaining vaccination coverage if the “suspension of mandatory vaccination” in the Veneto Region is to be maintained. To this end, activities are being carried out to raise public awareness, to implement ongoing training for healthcare workers and to perform continual (6-monthly) monitoring of vaccination coverage rates.

As part of its plans to improve the vaccination system, the Veneto Region has introduced a New Vaccination Calendar for the developmental age (DGR 4403/05 and DGR 411/08). The aim is to consolidate the high levels of coverage of the formerly mandatory vaccinations and to introduce, in a regime of active call, the anti-pneumococcal conjugate, anti-meningococcal C (age-cohorts: 13th month, 6th year and 15th year) and anti-varicella vaccines. Among the actions related to these activities, other projects have been planned and implemented. One such project is the “Surveillance of meningitis and pathologies related to the newly introduced vaccinations”, which has been incorporated into the 2010-2012 Regional Prevention Plan.

The aims of the present study were to describe the experience of the Veneto Region in the field of invasive diseases, to assess the coverage rates achieved and to present the preliminary data collected by the meningitis surveillance system.

Materials and methods

The data on anti-pneumococcal, anti-meningococcal C and anti-haemophilus influenzae type B vaccinations were taken from a dedicated form, “Annex C” to DGR 2043/2006, which was correlated with the new vaccination calendar for the developmental age (DGR 4403/2005 and subsequent modifications, DGR 411/08; Tab. I) and completed by the Local Health Authorities in the Veneto Region.

The denominator was taken as the number of subjects eligible for vaccination in each individual age-class, with reference to the 1st, 2nd and 3rd doses of the anti-pneumococcal and anti-haemophilus influenzae type B vaccines and to the single dose of the anti-meningococcal C vaccine.

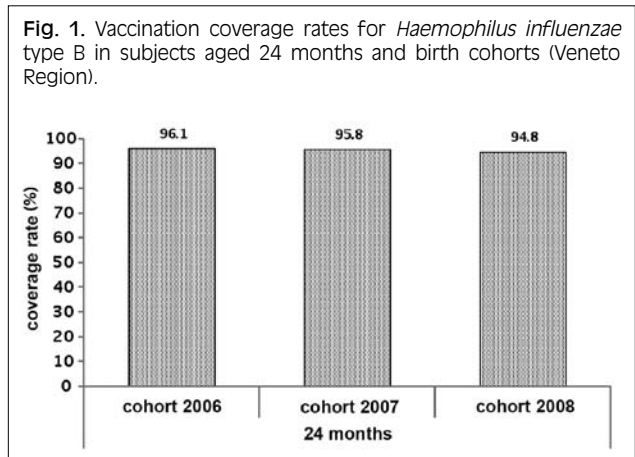
In January 2007, a system of active surveillance of invasive bacterial diseases was implemented in the Veneto Region with the aim of continuously monitoring the epidemiological trends of these diseases. The data used are collected by the microbiology laboratories of the hospitals and local health authorities.

Results

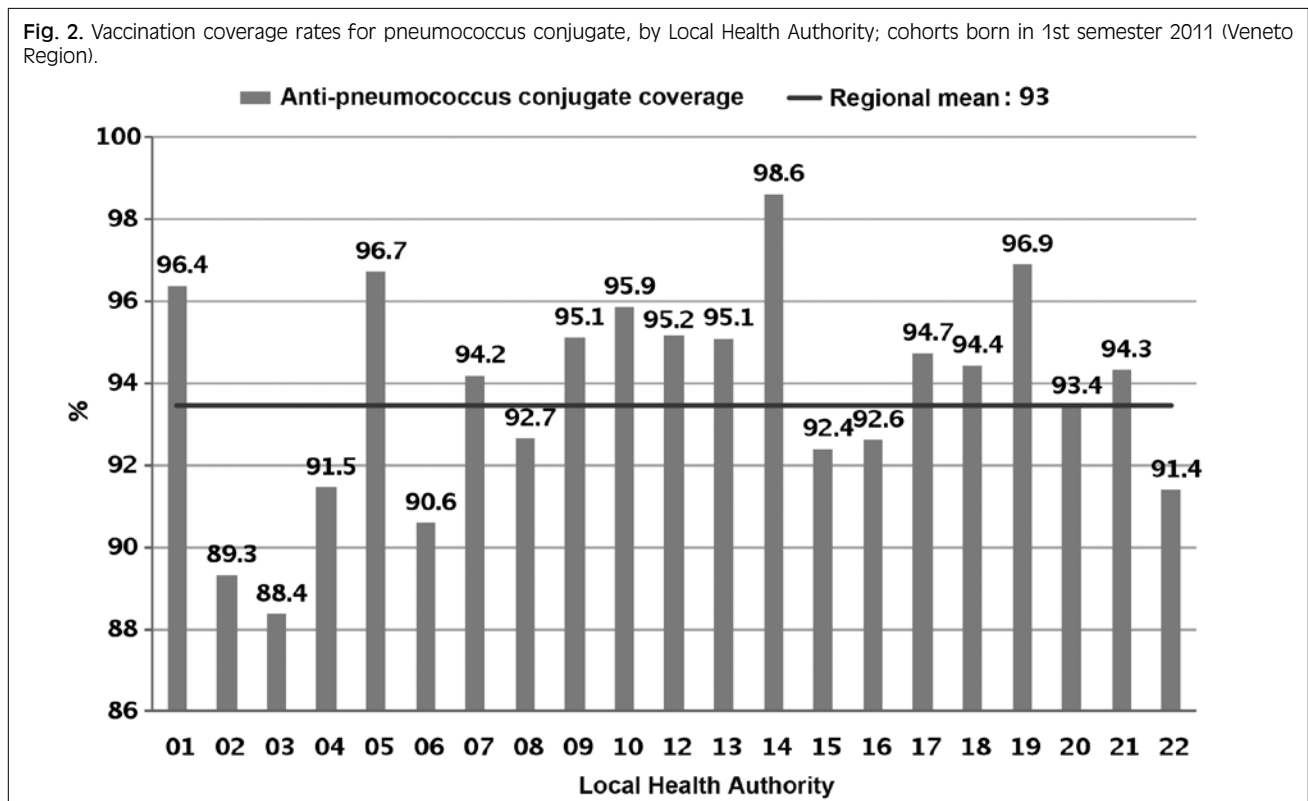
The data from the 6-monthly reports reveal that in the Veneto Region the level of vaccination coverage with regard to Haemophilus influenzae type B is close to the 95% threshold indicated in the National Vaccine Plan (Fig. 1).

Tab. I. Vaccination calendar of the Veneto Region (DGR 411 of 26 February 2008).

Vaccine	Active call, free of charge									Free of charge	
	Birth	3 rd month	5 th month	13 th month	14 th month	15 th month	6 th year	12 th year	15 th year	65 years	> 65 years
DTP		DTaP	DTaP	DTaP			DTaP		DTap		
Tetanus											Tetanus 2
IPV		IPV	IPV	IPV			IPV				
Hepatitis B	HB3	HB	HB	HB							
Hib		Hib	Hib	Hib							
MPRV					MPRV		MPRV4				
Varicella									varicella		
PCV		PCV	PCV				PCV				
Men C				Men C			Men C		Men C		
HPV								HPV			
PV 23-valent											PV 23-valent
Influenza											Influenza Influenza



With regard to the anti-pneumococcal vaccine, the mean regional coverage rate for the first dose was 93.5% for the cohort born in the first semester of 2011 (measured on 30.09.2011); this was slightly lower than the figure recorded in the cohort born in the second semester of 2010 (93.8%). When the coverage rate is broken down by Local Health Authority area, it emerges that, among subjects born in the first semester of 2011, coverage of more than 90% was achieved in 19 of the 21 Local Health Authority areas in the Region (Fig. 2). The mean vaccination coverage against meningococcal C among the cohort born in the first semester of 2010 proved to be 90.1%, a slightly higher value than that recorded among those born in the second semester of 2009. For anti-meningococcal C vaccination, coverage rates were



81% at 6 years of age and 78.2% at 15 years (Fig. 3).

Unlike vaccination coverage against pneumococcus conjugate, which displayed a slight downward trend (93.5% vs. 93.8%), coverage against meningococcus C was seen to be slightly higher (90.1%) than in the previous semester (89.7%: data recorded on 31/03/2011; subjects born in the second semester, 2009).

With regard to the surveillance of invasive bacterial diseases in the period 2007-2011, the reference epidemiological centre received 979 forms reporting on 1028 samples, 66% of which were blood samples and 34% samples of cerebrospinal fluid.

The etiological agent was identified in 83.7% of the samples analyzed; in 66.2% it was *Streptococcus pneumoniae*, in 8.9% *Neisseria meningitidis* and in 4.3% *Haemophilus influenzae*.

Since 2007, cases due to *Neisseria meningitidis* serogroup C have declined (44.4% in 2007, 20% in 2008, 33.3% in 2009 and no case in the last two years), while cases due to serogroup B, against which no vaccine is currently available, have increased (37% in 2007, 85.7% in 2010 and 86.7% in 2011). The infection proved fatal in 10 cases: 4 due to serogroup C, 5 due to serogroup B (4 children under 5 years and one 56-year-old adult) and 1 due to serogroup Y (adult).

Streptococcus pneumoniae was isolated from 543 subjects: 62 (11.4%) aged less than 5 years, 186 (34.2%) between 30 and 64 years and 261 (48%) over 65 years of age.

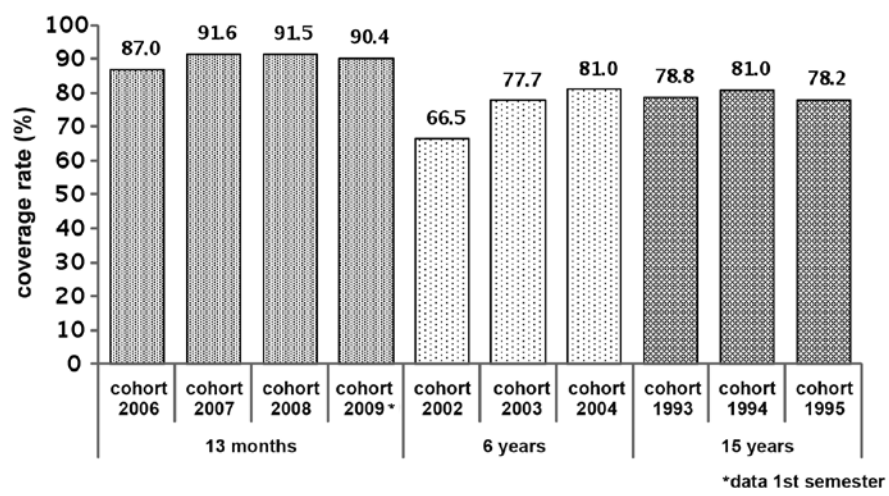
A total of 53.6% of the samples were confirmed and typed in the Regional Reference Laboratory. Among subjects under 5 years of age, 74.3% of cases involved serotypes contained in the 13-valent vaccine, while among subjects over 65 years of age, 68.3% of cases involved serotypes contained in the 13-valent vaccine and 87.2% involved serotypes contained in the 23-valent vaccine.

In the period examined, 42 people died as a result of the three microorganisms considered: 6 children under the age of 5 years (4 cases due to *Neisseria meningitidis*) and 25 subjects aged over 65 years (19 cases due to *Streptococcus pneumoniae*). Mortality displays a downward trend: from 16 deaths in 2007 to 6 in 2011.

■ Received on February 28, 2012. Accepted on March 14, 2012.

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Fig. 3. Vaccination coverage rates for meningococcus C, by vaccination age and birth cohort (Veneto Region).



Conclusions

With regard to the issue of whether the Veneto Region's law N° 7/2007 on the suspension of mandatory vaccination for subjects of developmental age should be maintained, the monitoring of vaccination coverage proved to be a very good assessment tool.

The data on the pathogens isolated from subjects suffering from invasive bacterial diseases revealed that *Streptococcus pneumoniae* was the main agent involved and that its consequences were particularly serious in elderly subjects. With regard to *Neisseria meningitidis*, we observed a substantial reduction in the number of cases due to serogroup C and a concomitant rise in the percentage of cases due to serogroup B.

In support of the law suspending mandatory vaccination and of the vaccination calendar, the Regional Authority has undertaken specific projects: a single software for the management of vaccinations, pre-vaccination counseling and the surveillance of adverse events, training for healthcare workers, the surveillance of vaccine-related pathologies, the promotion of healthcare in the first years of life, and the surveillance and prevention of diseases related to travel and immigration.

To implement these projects, the Veneto Region has scheduled annual financing and has incorporated vaccination objectives into the assessment parameters utilized by the General Directors of the Local Health Authorities (DGR 3140/2010).

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