

Recent trends in the epidemiology of invasive meningococcal disease in France

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Background

For more than 20 years in France, incidence rates of invasive meningococcal disease (IMD) have been varying between 1 and 2 cases per 100,000 inhabitants. Serogroup B predominates despite a peak of incidence of C IMD in 2002. Conjugate MenC vaccines have been recommended since 2010 in the second year of life with catch-up up to 24 years.

Methods

Epidemiological follow-up of IMD is based on mandatory notification of cases to the French Institute for Public Health Surveillance. Laboratories send isolates or samples to the National Reference Centre for Meningococci for confirmation, typing (serogroup:PorA-VR1, PorA-VR2:FetA:CC) and antibiotic sensitivity testing. The completeness of mandatory notification system has been regularly assessed in Metropolitan France with two or three sources capture-recapture analysis. It has been estimated at >90% since 2005.

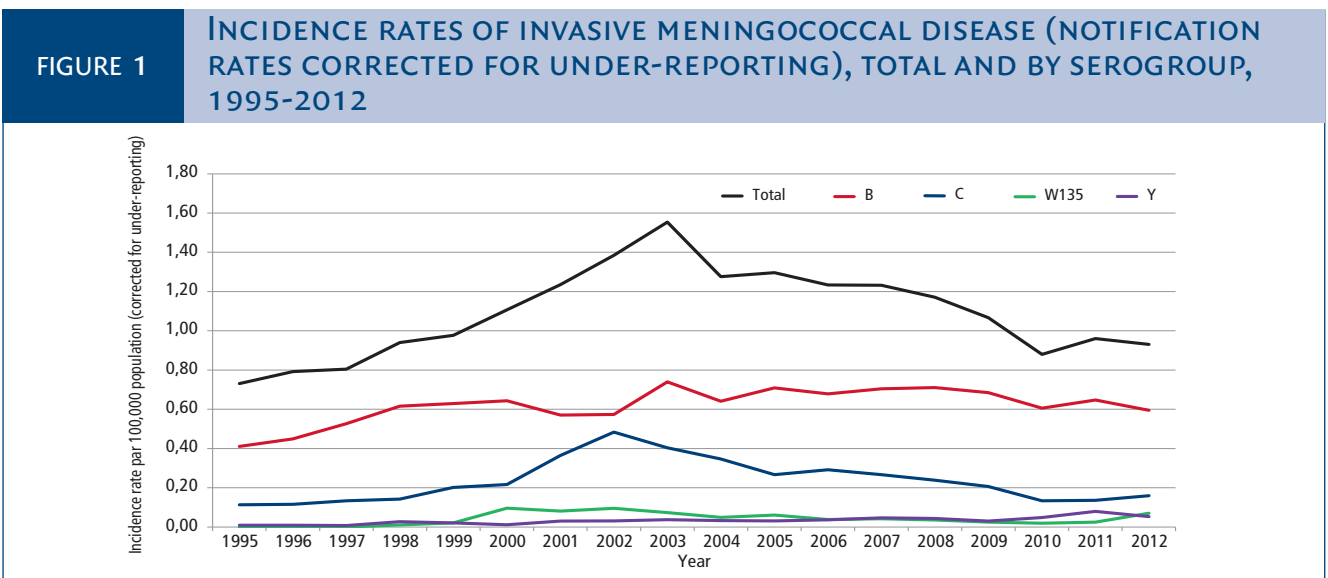
IMD NOTIFICATION CRITERIA

- *N.meningitidis* isolated or positive PCR from a normally sterile site;
 - Detection of Gram-negative stained diplococci in CSF (microscopy);
 - Purulent CSF associated to the detection of *N.meningitidis* antigens or presence of petechiae;
 - *Purpura fulminans*.
- Vaccination coverage rates are issued from the National Health Insurance Information System.

Results

NUMBER OF CASES AND INCIDENCE RATES

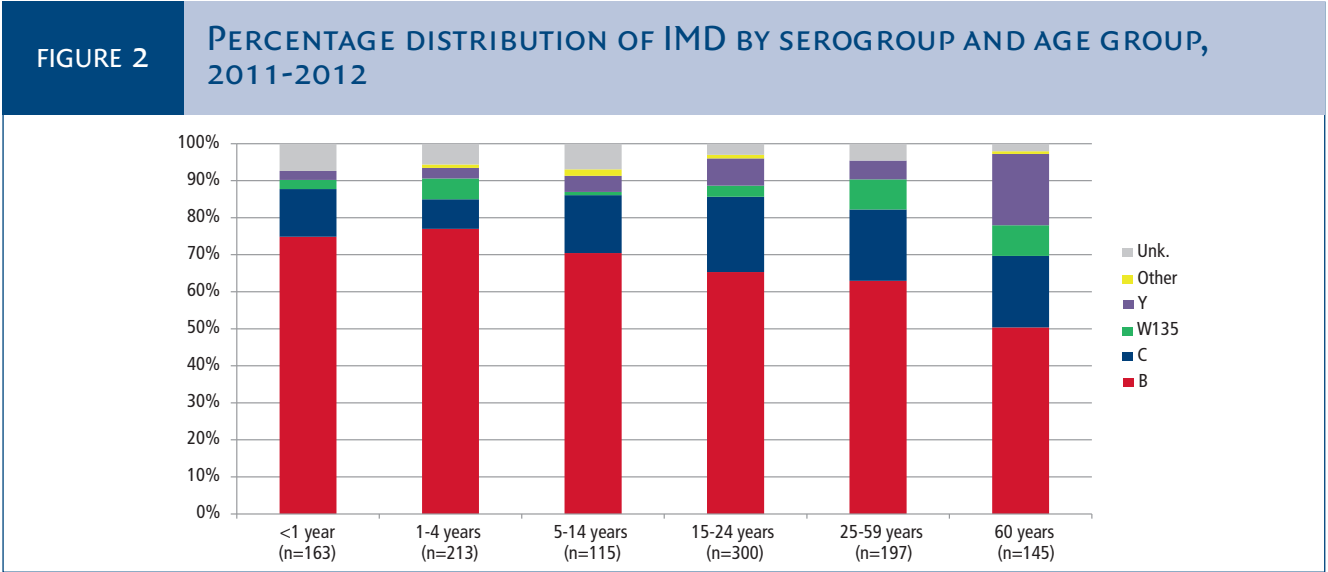
A total of 574 and 559 cases were notified in 2011 and 2012 respectively corresponding to incidence rates (notification rates corrected for under-reporting) equal to 0.96 and 0.93 per 100,000 inhabitants.



CHARACTERISTICS OF THE NOTIFIED IMD CASES IN 2011-2012 (N=1,133)

- Of the 1,133 reported cases, the male/female ratio was 1.1 (606/527, table) but differed according to the age groups (2.0 in children <1 year and 0.5 in adults ≥60 years).
- Serogroup B accounted for 70 % (n=2,532) of IMD cases for which serogroup information was known, followed by serogroup C (16%), Y (7%) and W (5%).
- The case fatality ratio was 9% (6% and 15 % for serogroups B and C respectively); being higher in presence of purpura fulminans (23% vs 5%, p<0.001).
- CSF was the most frequent site of infection accounting for 75% of all cases.
- The serogroup B represented more than 80% of the cases with known serogroup aged 0-4 years, the proportion of serogroup Y reached 20% in ≥60 years (figure 2).

TABLE		GENDER, AGE, SITE OF INFECTION AND SEVERITY				
		B N=760	C N=183	W135 N=54	Y N=75	Total N=1,133
Gender	% of males	55%	49%	46%	47%	53%
Median age	Years	15	20	30	27	17
Site of infection	% septicemia	21%	24%	24%	28%	23%
	% meningitis	46%	38%	39%	29%	43%
	% both (blood and CSF)	32%	36%	31%	41%	32%
	% other	2%	3%	6%	1%	2%
Severity	% purpura fulminans (PF)	24%	28%	17%	12%	25%
	Case fatality rate	6%	15%	7%	15%	9%
	With PF	17%	33%	44%	44%	23%
	Without PF	3%	8%	0%	11%	5%



SEROGROUP B IMD

In 2011 and 2012, the highest notification rates were reported among children aged <1 year (8,7 and 6,5 respectively) and 1-4 years (2,8 and 2,3 respectively). The notification rates were stable in older age groups.

SEROGROUP C IMD

- The decrease of incidence between 2006 and 2009 did not continue after except among the 1-14-years. After 2010, the incidence increased among <1 year and ≥25 years but the trends were not statistically significant.
- The region of Brittany was the most affected in 2012 (notification rate of 0,77 per 100,000).
- MenC vaccination coverage was 50% at 2 years in 2012 but less than 10% among the 15-24 years.

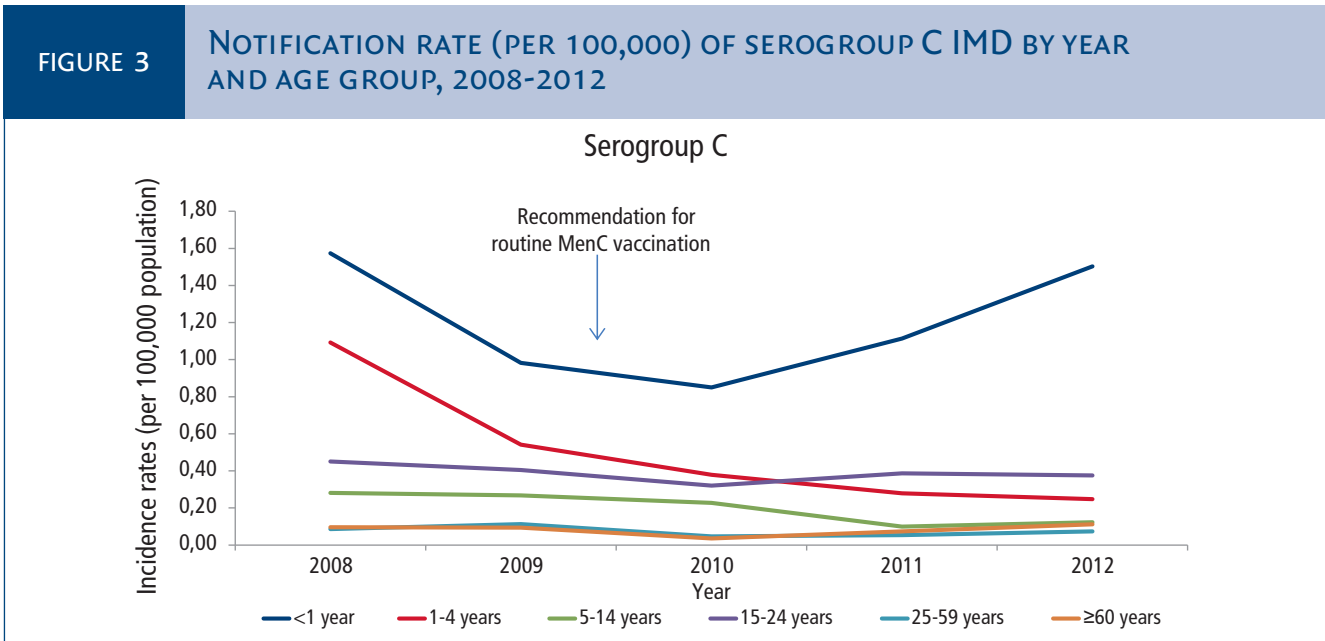
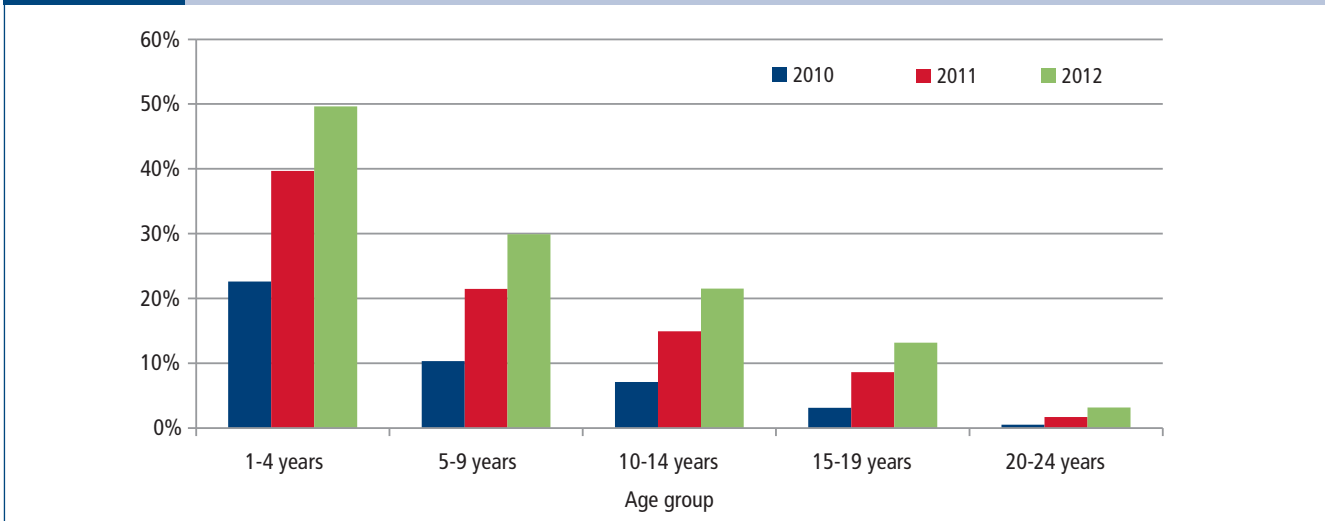


FIGURE 4 COVERAGE WITH MENC VACCINE, 2010-2012



SEROGROUP W 135 IMD

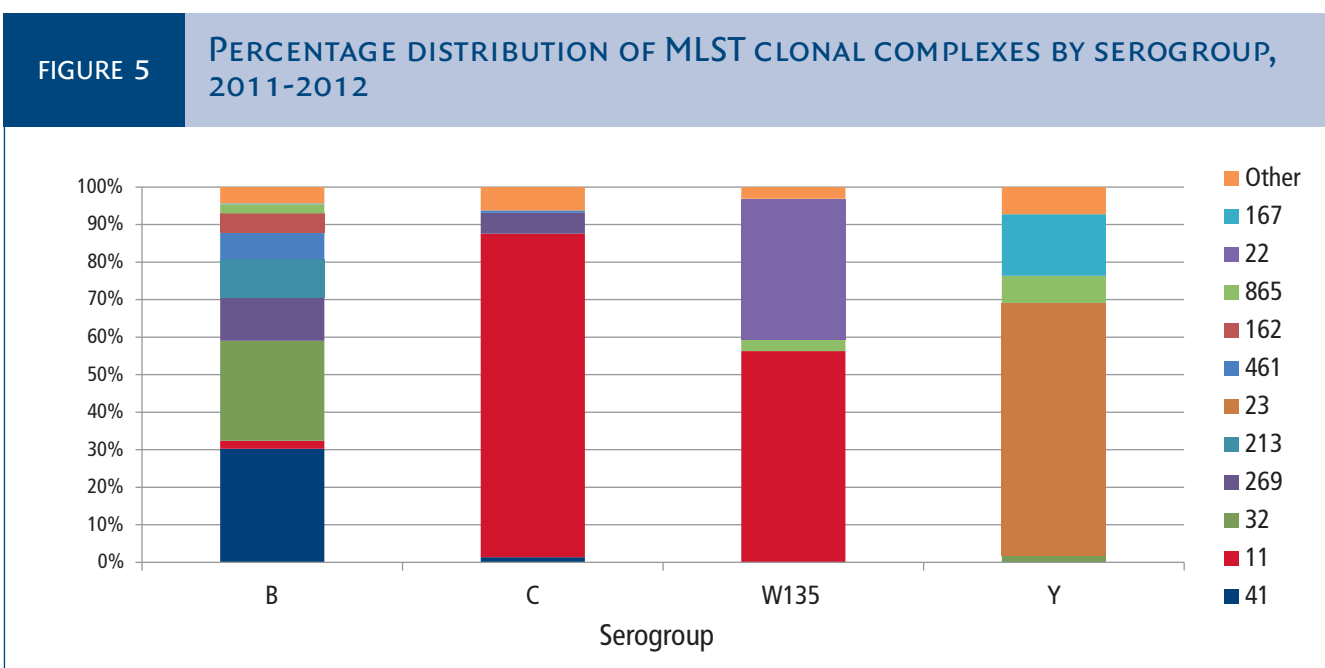
From January to April 2012, 8 among 16 W135 IMD were linked to a recent travel history to West Sub-Saharan Africa of the cases (3 of them were considered as probably imported) or the family members. All the 8 isolates shared the same markers (PorA-VR1=5, PorA-VR2=2, FetA=F1-1, penA=1, ST-11)*. The other 8 cases without travel history showed different markers.

SEROGROUP Y IMD

Y IMD incidence rates (per 100,000) increased between 2009 (0,03) et 2011 (0,07) but this trend did not continue in 2012. The median age decreased from 48 to 21 years between 2005 and 2011, being 52 in 2012. Most of the Y isolates belong to the clonal complex ST-23.

MOLECULAR TYPES OF *N.MENINGITIDIS*

- There is a high diversity of B strains, 30% being linked to the clones "B:P1.7-2,4:F1-5:cc41"; "B:P1.7,16:F3-3:cc32"; "B:P1.22,14:F5-5:cc213".
- The most common SgC clones are "C:P1.5,2:F3-3:cc11" (28%); "C:P1.7-1,1:F3-6:cc11" (22%) and "C:P1.5-1,10-8:F3-6:cc11" (15%). Half of the "C:P1.5,2:F3-3:cc11" were isolated in the region of Brittany, were the incidence increased early 2012.



Conclusions

IMD is predominated by serogroup B isolates; the incidence has slightly increased for serogroup C and W135 in 2012 compared to 2010.

The observed decrease of C IMD incidence among the 1-to-14-year-old children is likely due to the conjugate MenC vaccination. However, the low vaccination uptake did not prevent any increase in other age groups likely reflecting a new cycle, nor induced an indirect protection for infants, as expected. The increasing trend of C IMD continues in 2013 (up to July), serogroup C accounting for 25% of all cases with known serogroup.

*Parent du Châtelet I, Barboza P, Taha MK. W135 invasive meningococcal infections imported from Sub-Saharan Africa to France, January to April 2012. Euro Surveill. 2012;17(21):pii=20181.