

Decline of invasive meningococcal disease in Switzerland between 2001 and 2004

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Background

Switzerland has been producing statistics on invasive meningococcal disease (IMD) since 1974. Like in other European countries, the incidence of IMD rose in the late 90s and peaked at 2.5/100000 in 2000 with serogroup C accounting for 61% of cases.

So far, meningococcal immunisation has only been recommended for medical high risk groups, laboratory personnel, travellers to countries with epidemic IMD, military recruits and close contacts of primary cases.

Our aim is to present methods, results and conclusions of Swiss IMD surveillance between 2001 and 2004 as well as some recent changes in the vaccination policy.

Methods

Surveillance system

IMD is notifiable to cantonal and federal health authorities within 24 hours of diagnosis by the treating physician and the laboratory confirming the diagnosis.

In 70 to 80% of cases, meningococcal strains isolated at peripheral laboratories are sent to the National Centre for Meningococci (NCM) for serotyping (dot-ELISA), genotyping (MLST) and antimicrobial resistance testing.

Data are collated, analysed and published in weekly and annual reports by the Swiss Federal Office of Public Health which also receives the number of sold vaccine doses from the vaccine manufacturers on a voluntary basis.

Data analysis

Numbers of IMD cases notified in Switzerland between 2001 and 2004 and population data from the Federal Statistics Office served to estimate incidence rates by year, serogroup and age group. The serogroup distribution determined at the NCM was also assumed for strains the NCM did not receive. Ninety-five percent confidence intervals (95% CI) of incidence rates were calculated based on the assumption that IMD occurrence followed a Poisson distribution. Differences between incidence rates were considered statistically significant if their 95% CIs did not overlap.

Changes in the proportions of the five most frequent group C serotypes/-subtypes were analysed by a Chi² test for trend with $p < 0.05$ indicating statistical significance.

Results

Figure 1: Notified cases of invasive meningococcal disease per 100000 population, by serogroup, 2001-2004

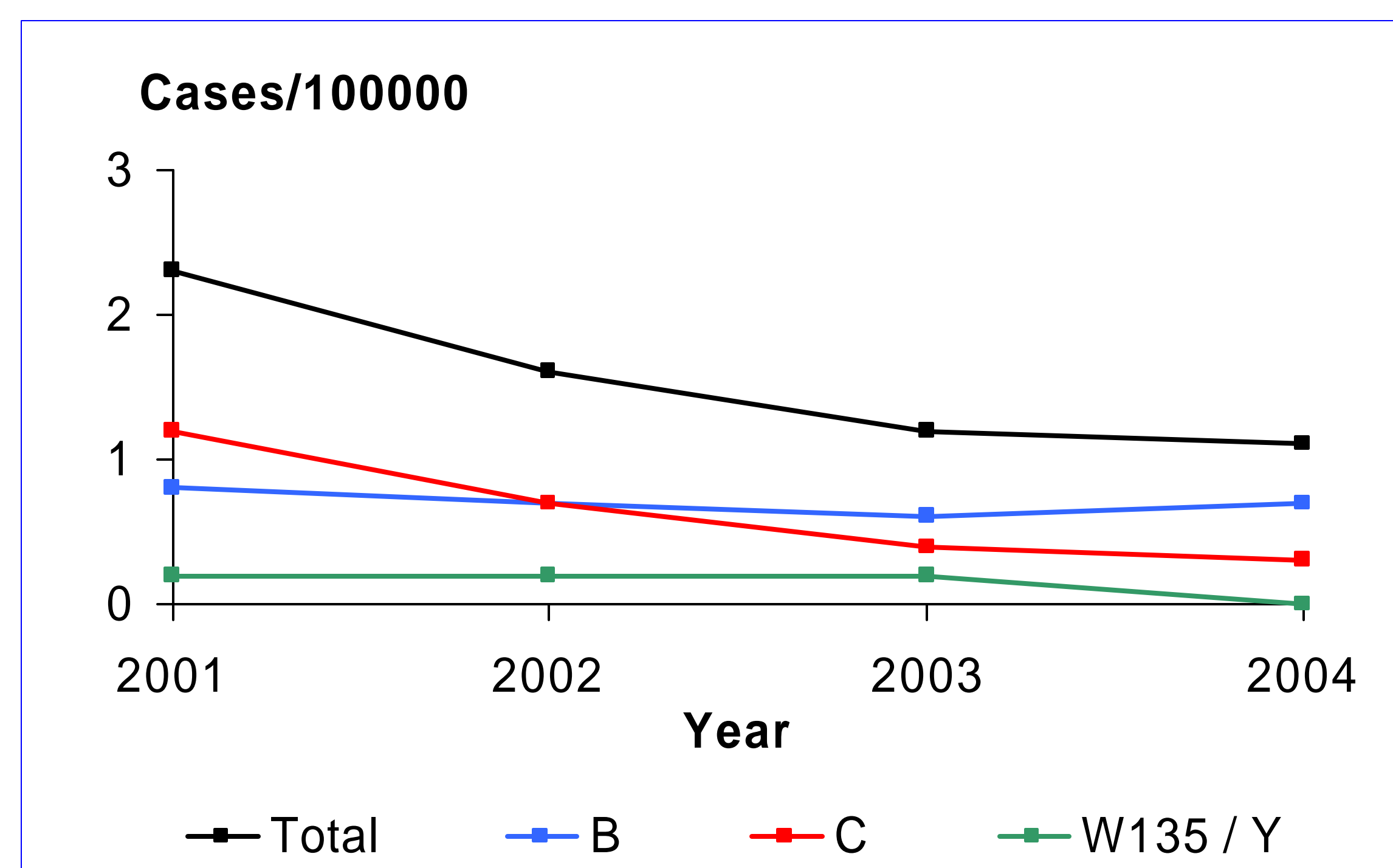


Figure 2: Notified cases of group C invasive meningococcal disease per 100000 population, by age group, 2001-2004

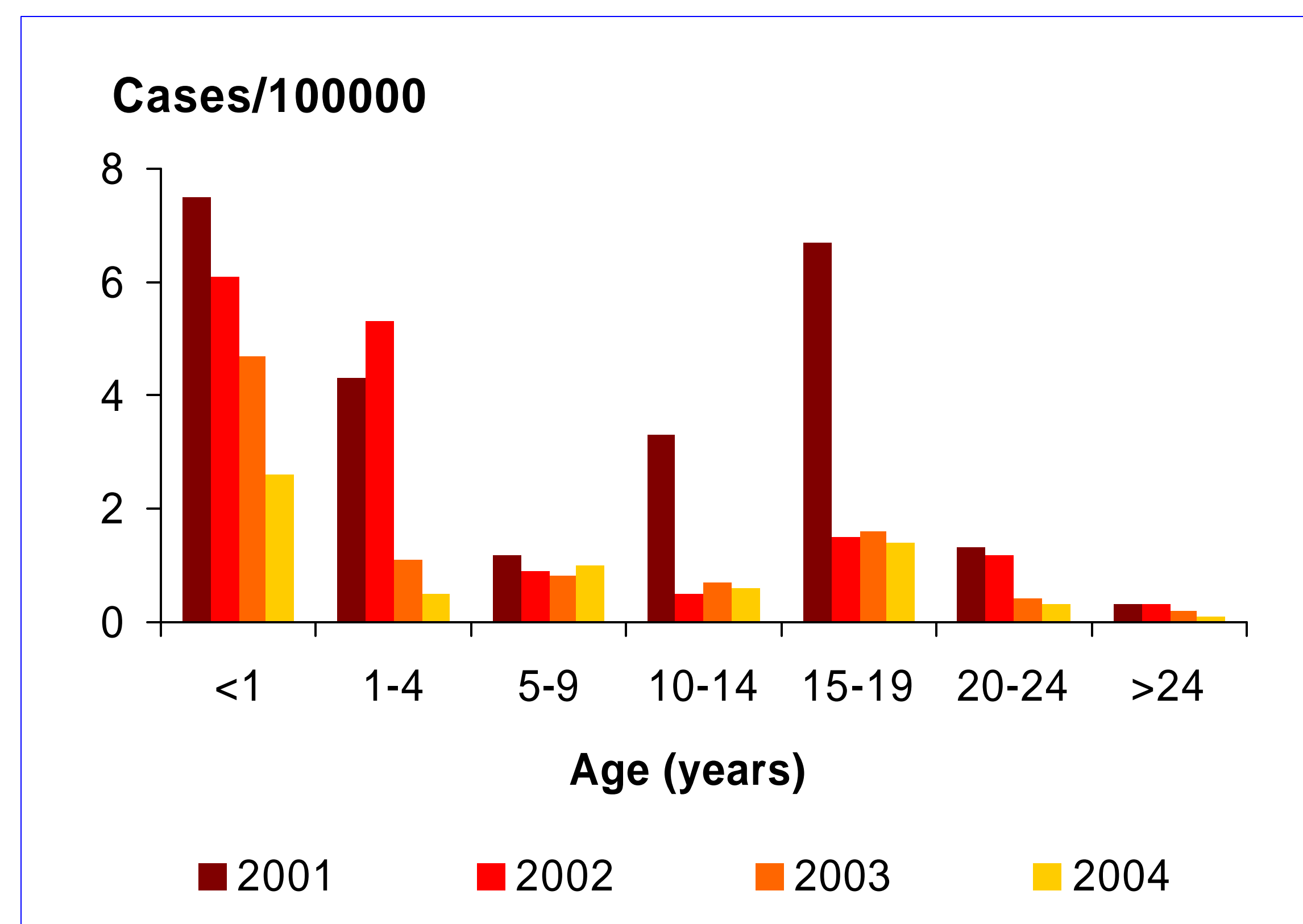
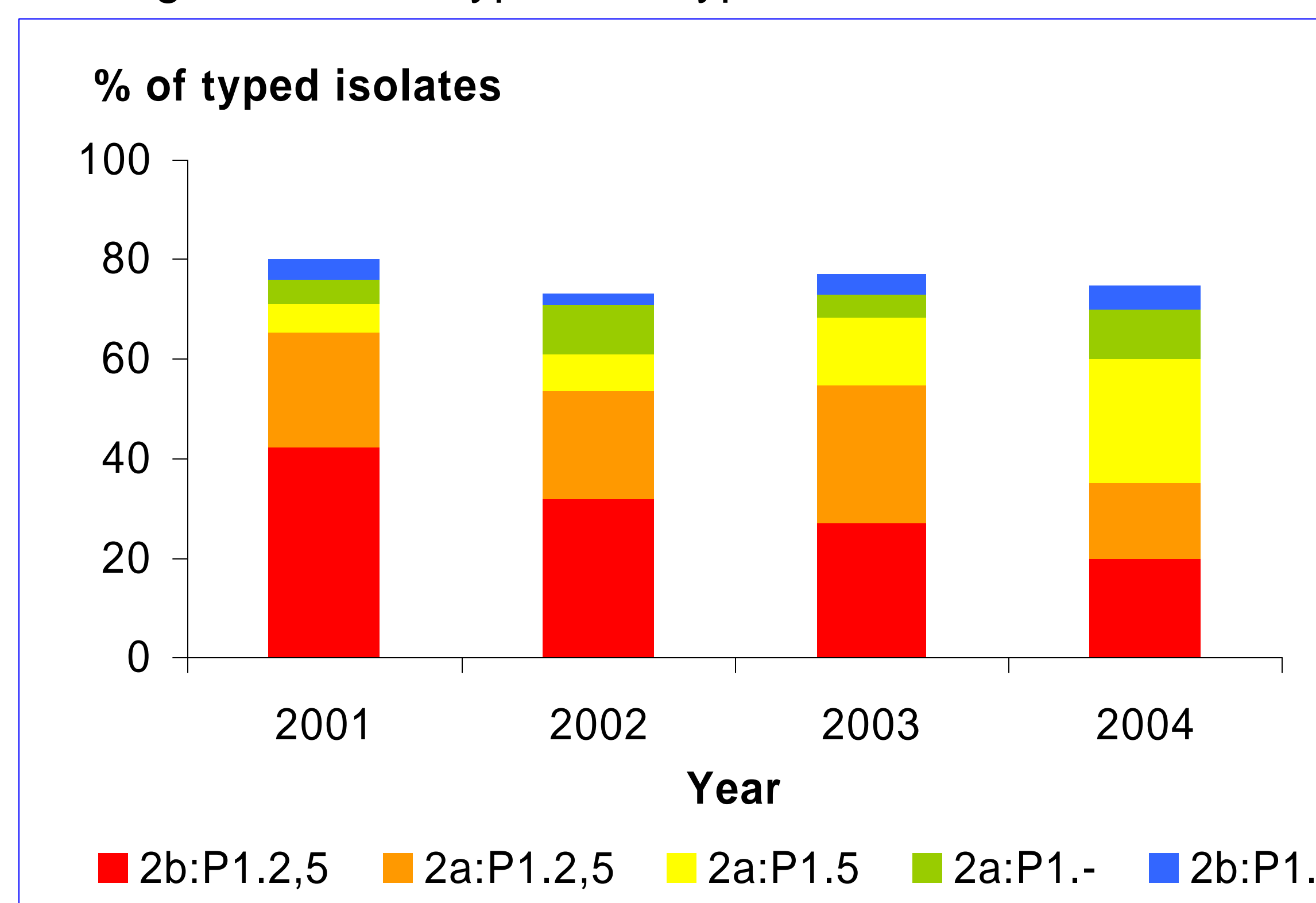


Figure 3: Proportions of the 5 most frequent group C meningococcal serotypes/-subtypes, 2001-2004



From 2001 to 2004, the annual number of notified IMD cases decreased from 168 (2.3/100000; 95% CI 2.1-2.9) to 81 (1.1/100 000; 95% CI 0.9-1.4). The incidence of serogroup C IMD fell from 1.2 (95% CI 1.0-1.5) to 0.3 (95% CI 0.2-0.5) whereas the incidence of serogroup B IMD remained stable ranging between 0.6 and 0.8 (Figure 1).

The age groups most affected by IMD were infants, children aged 1 to 4 and adolescents aged 15 to 19 with mean annual incidence rates of 9.2, 3.0 and 2.1, respectively, for serogroup B IMD, and 5.2, 2.8 and 2.8, respectively, for serogroup C IMD. From 2001 to 2004, group C IMD decreased significantly only among the 15 to 19-year-olds (from 6.7, 95% CI 4.7-9.7, to 1.4, 95% CI 0.6-3.1), but a similar trend was observed in all age groups (Figure 2).

A decrease was also found in the summed proportion of phenotypes C:2b:P1.2,5 (mostly MLST 8) and C:2a:P1.2,5 (mostly MLST 11) which dropped from 44 (65%) of 69 typed group C isolates in 2001 to 6 (35%) of 17 such isolates in 2004 ($p=0.035$, Chi² test for trend) (Figure 3). Among the 15 to 19-year-olds, the summed proportion of the same two phenotypes dropped from 73% in 2001 to 25% in 2004 ($p=0.09$, Chi² test for trend, data not shown).

While the annual number of sold doses of meningococcal polysaccharide vaccine diminished between 2001 and 2003, sales of group C conjugate vaccine during this period increased from 20000 to 57000 doses, largely due to the newly introduced vaccination of military recruits aged 19 to 20 with an uptake >90%.

Conclusions

Between 2001 and 2004, Switzerland saw a decline of overall IMD incidence by 52% and thus a return to pre-peak levels of the mid 90s. This development was largely attributable to a 75% drop of group C disease incidence affecting all age-groups but being especially pronounced in adolescents aged 15 to 19. The immunisation of 20000 to 30000 military recruits per year is unlikely to have caused a herd immunity effect of this magnitude. The reduced prevalence of the formerly predominating phenotypes C:2b:P1.2,5 and C:2a:P1.2,5 can therefore be considered a mostly natural phenomenon.

The current epidemiology of IMD in Switzerland does not justify routine meningococcal immunisation. However, the Swiss Federal Immunisation Committee has decided in early 2005 to recommend group C meningococcal conjugate vaccine as a complementary immunisation at 12 months and 11 to 15 years of age whenever parents are unwilling to accept their child's low but not entirely negligible risk of contracting group C IMD.

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