ORIGINAL ARTICLES

Surveillance report

RUBELLA CONTROL IN FRANCE

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In the pre-vaccination era, rubella was regarded as only a mild exanthematous acute viral infection of children. The devastating effects of the disease were first identified in the early 1940s by an Australian ophthalmologist, and further confirmed during the 1962-65 rubella pandemic in Europe and the United States. They result from the transmission of the virus by infected pregnant women to their fetus. The resulting congenital rubella syndrome (CRS) comprises a lengthy list of abnormalities. The most common ones are deafness, ocular and cardiac defects and mental retardation. The objective of rubella vaccination, to which France has subscribed, is the elimination of CRS [1].

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History of immunisation strategy in France

Rubella vaccination was introduced in France in 1970 as a selective strategy for pre-adolescent girls. Epidemiological analysis, together with results from mathematical modelling, have shown that this strategy alone cannot eliminate CRS [2]. France, like other industrialised countries, therefore added rubella vaccination for young children of both sexes into the immunisation schedule first as measles-rubella vaccination in 1983, and since1986, as the measles, mumps, and rubella (MMR) vaccination. A second dose of MMR was introduced in the schedule in 1996, mainly as a catch-up for measles vaccination primary failures, in the context of the measles elimination objective. The current immunisation schedule for rubella includes two doses, the first of which is given from the age of 12 months and the second of which is given between the age of 3 and 6 years (with the possibility of earlier administration, provided that at least one month has elapsed since the first dose). It also includes a catch-up for all non-immunised children up to the age of 13 years with a MMR vaccine and for female adolescents and young women with the rubella vaccine alone. Non-immune women of childbearing age should also be vaccinated [3]. In addition, prenuptial and prenatal rubella testing are mandatory.

Measuring vaccine coverage

Childhood vaccine coverage is measured annually for children aged 2 years , by analysis of the health certificates that must be filled in for each child during the 24th month of its life. Until 2000, a school-based sample survey was performed bi-annually at 6 years of age [4]. Since 2001, this survey has been performed annually, on different school grades. In 2001, the study was carried out in children aged 14 to 17 years. There is no routine measurement of coverage for older age groups.

Rubella surveillance

Rubella is not a notifiable disease in France. Surveillance of rubella infections during pregnancy and of CRS has been carried out since 1976, based on the network of all laboratories, both private and public, performing rubella IgM testing. When the list of such laboratories was last updated in 2001, 278 laboratories were participating in the network. For each diagnosis of rubella infection during pregnancy or in a product of pregnancy termination or at birth, the clinician in charge (usually a gynaecologist or a paediatrician) is asked to fill in a questionnaire which includes demographic, biological and clinical data on the woman and/or either the fetus or the newborn [5].

Serologic surveillance

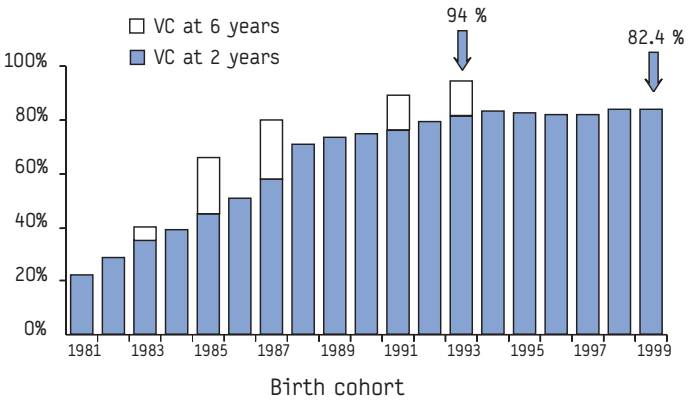
Through the European Sero-Epidemiology Network (ESEN), a nationwide sero-survey for various vaccine preventable diseases, including rubella, was carried out in 1998. About 3500 sera were collected, based on quota for age, sex and geographical location, yielding a reasonably representative sample of the general population. To allow inter-country comparisons, assay results were standardised [6].

Results

Figure 1 shows that vaccine coverage at 2 years of age has increased steadily during the eighties but has been levelling off in the last

FIGURE 1

Vaccine coverage against rubella* at 2 years by birth cohort - France 1983-2001



* Until 1989, measles coverage data, in the absence of specific data for rubella
Source : DREES (24 months old health certificates and school-based surveys)

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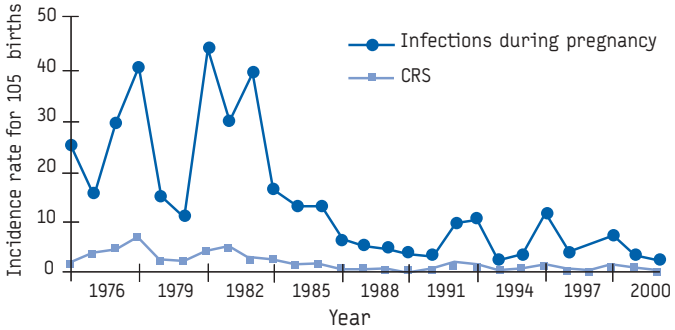
decade below 85 % (84.2% in 2001). The coverage at 6 years, measured in 1999-2000, shows an incomplete catching-up (94%).

FIGURE 2

Incidence of rubella infections during pregnancy and CRS in France from 1976 to 2002

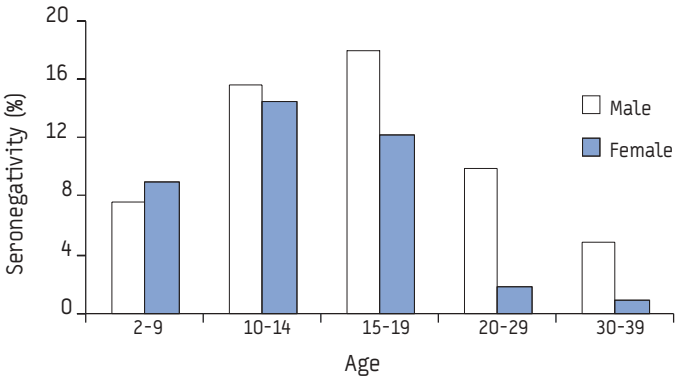


* Source : Renarub Network [5]

Figure 2 shows the dramatic impact on the incidence of rubella infections during pregnancy of the addition in 1983 of routine immunisation of children on the top of the selective pre-pubertal vaccination strategy. It also shows the persistence of rubella virus circulation in young adults with regular limited outbreaks. The last two peaks occurred in 1997 and 2000 with respectively 12 and 7.9 cases per 100 000 live births. The incidence of CRS for the period 1998-2000 has been 1 case per 100 000 live births or fewer, but each year at least one case has been notified.

FIGURE 3

Susceptibility to rubella according to age and sex - France (n= 2424)



Source : ESEN 1998 [6]

Figure 3 shows the results of the sero-survey according to age and sex. The lower susceptibility after 15 years of age for girls, compared with boys, reflects the impact of the selective sex-based vaccination strategy. However, the most striking finding is the high level of susceptibility in 15 to 19 year old girls (12%). This reflects the fact that these girls have grown up at a time when increasing vaccination activities for children were taking place, therefore reducing the risk of infection for those who had missed both the vaccination as a toddler and catch-up as an older child.

Even if it can be anticipated that some of these post-adolescent girls will benefit from natural infection or vaccination before their first pregnancy, it is most likely that, if vaccination activities remain at the 1998 level, periodic outbreaks of rubella infections during pregnancy may be predicted from this high susceptibility gap, when these cohorts become pregnant.

An intensified promotion of rubella vaccination has been undertaken since 1998. Vaccine sale data show a very significant increase in vaccination activity in children aged more than 6 years, but it is impossible to distinguish between late second dose administration and catch-up activities for the first dose in unvaccinated children. Preliminary results from the school-based survey performed in 2001 on cohorts born between 1984 and 1987 are encouraging, showing a rubella vaccination coverage close to 90% for girls. A new sero-survey is planned for 2005.

Conclusions

Even if the incidence of CRS has in recent years been below the World Health Organization European target for 2010 of less than 1 case per 100 000 live births, the past and current insufficient vaccination coverage at 2 years and the suboptimal catch-up of non-immune girls allow respectively the persistence of rubella transmission and the occurrence each year of several dozen rubella infections during pregnancy. This leads to spontaneous or induced early pregnancy terminations and the occurrence of a few cases of CRS. This situation is unacceptable, since rubella vaccination strategies, based on a very safe and widely available vaccine, and designed to protect women of childbearing age and to interrupt transmission through childhood vaccination, have been implemented for over 30 and 20 years respectively. Ongoing effort is needed to empty the reservoir of susceptible young women if future outbreaks, worse than those seen during the 1990, are to be avoided.

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