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EPIDEMIOLOGY OF RUBELLA AND CONGENITAL RUBELLA SYNDROME IN GREECE, 1994-2003

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T Panagiotopoulos, T Georgakopoulou
Hellenic Centre for Infectious Disease Control, Department of Surveillance and Intervention, Athens, Greece

In 1993, there was a large epidemic of rubella and congenital rubella syndrome (CRS) in Greece. The epidemiology of rubella and CRS after 1993 is described in this paper using information from surveillance data and published studies and reports. The incidence of rubella fell sharply after 1993, but a smaller outbreak occurred in 1999, mainly in young adults, and four CRS cases (4.0 per 100 000 live births) were recorded. A very high proportion of the child population in Greece are currently vaccinated for rubella, while teenagers are inadequately covered (60-80% in different studies). A substantial proportion of women of childbearing age are susceptible to rubella (10-20% in urban areas). This could lead to local or more extended outbreaks. This situation shows that a comprehensive preventive policy should be implemented.

Introduction

Rubella is usually a mild disease, but infection during the first months of pregnancy can have severe consequences, which include spontaneous abortion, stillbirth and congenital rubella syndrome (CRS) [1]. Immunisation programmes to prevent CRS are implemented in many countries, and the World Health Organization Regional Office for Europe has designed a strategic plan aiming at controlling CRS in Europe by the year 2010 [2].

As described elsewhere, Greece experienced a large outbreak of CRS in 1993 [3]. There is evidence that this outbreak was the consequence of immunisation practices that had been followed. The measles, mumps and rubella vaccine (MMR) became commercially available in Greece around 1975, and started being administered to children of both sexes in their second year of life without adopting policies to protect adolescents and young women or policies to attain high immunisation coverage of children - until 1989 when the MMR vaccine was introduced in the national immunisation schedule. During the 1980s, immunisation coverage for rubella remained consistently below 50% and the proportion of pregnant women susceptible to rubella gradually increased to around 20-35% in the late 1980s and early 1990s in urban areas. In 1993, when a major rubella epidemic took place in Greece, a shift in the age distribution of rubella cases towards older ages was observed (64% of cases were 15 years old or more), and the incidence of the disease in persons of childbearing age was higher than in any previous epidemic year. The congenital rubella outbreak that followed, with 25 serologically confirmed cases recorded (24.6 per 100 000 live births), was probably the largest in the country after 1950 [3].

The epidemiology of rubella and CRS in Greece, and the immunisation policies adopted and implemented in the 10 year period after the 1993 epidemic are presented in this paper.

Methods

We used national surveillance data to describe the trend of rubella incidence over time, as rubella is a notifiable disease in Greece. We carried out a

over time, as rubella is a notifiable disease in Greece. We carried out a systematic review of the literature published in Greek and in English for information on the age distribution of rubella cases, on immunisation coverage and on serologically detected immunity in women of childbearing age.

We carried out an electronic search in the Athens Institute of Child Health database (<http://www.ich.gr>) for publications in 1993-2003 on rubella / rubella vaccine / rubella virus, and a search in PubMed for similar publications referring to Greece. We also manually searched the major paediatric and other medical journals published in Greece, as well as the proceedings of the annual Panhellenic paediatric and the biannual Panhellenic microbiological and public health conferences (1993-2003).

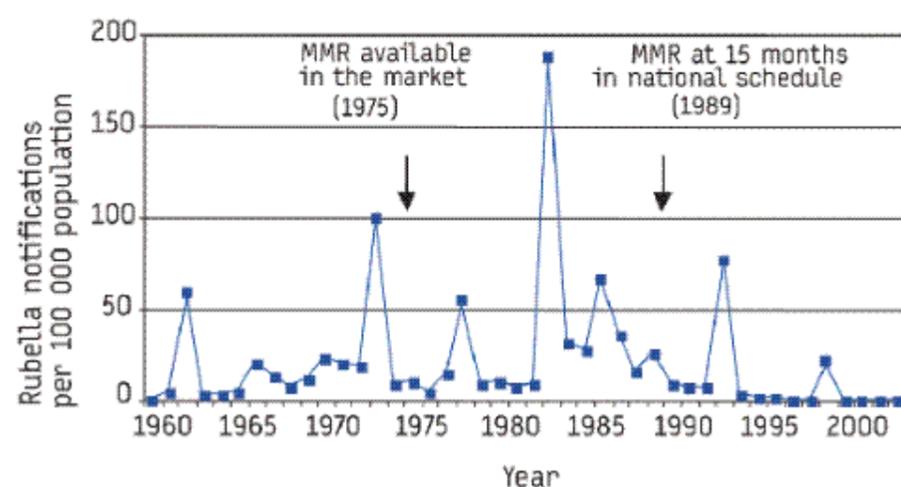
Results

Occurrence of rubella and congenital rubella syndrome

After the epidemic of 1993, the incidence of rubella in Greece decreased sharply, but in 1999 there was another epidemic of smaller magnitude (FIGURE 1). After this, an all-time low rubella incidence is observed. Four confirmed cases of CRS were recorded after the epidemic of 1999 (corresponding to 4.0 per 100 000 population) and none in 1995-1999 and 2001-2003.

FIGURE 1

Notified cases of rubella in Greece, 1960 - 2003



Age distribution of rubella cases

In 1999, 75% of notified cases with known age were in patients of 15 years or older, but only 18% of reports (259 of 1438 cases) included this information. Patients with rubella aged 15 years or older were estimated to be 74-93% and 67-94% in two studies of patients with rubella visiting the outpatient department of two large hospitals in 1999 (Athens area and Thessaloniki respectively) [4-5]. These figures compare with 64% estimated for the 1993 epidemic and 6-18% estimated for previous epidemics [3].

Immunisation coverage

In a national study of immunisation coverage in Greece, carried out in 2001 in 2-3 year old children, it was found that 89% had been vaccinated by their 2nd birthday with at least one dose of rubella-containing vaccine [6]. We identified 4 local studies on immunisation coverage of children 2-12 years that were carried out in or after 2000; it was found that 94-98% of children were immunised for rubella [7-10]. We also identified 4 studies on coverage of children 12-18 years that were conducted in the same period; immunisation of teenagers for rubella ranged from 49% to 86% [10-13]. An earlier national study (1996-97) showed that 69% of 14 year old adolescents were vaccinated for rubella, ranging from 59% to 78% in the different regions of the country [14]. Studies of minority groups have shown that children in some Gypsy communities have low vaccination coverage for rubella (15-44% in two studies), and that vaccination of other minority groups are comparable to that of the general population [15-16].

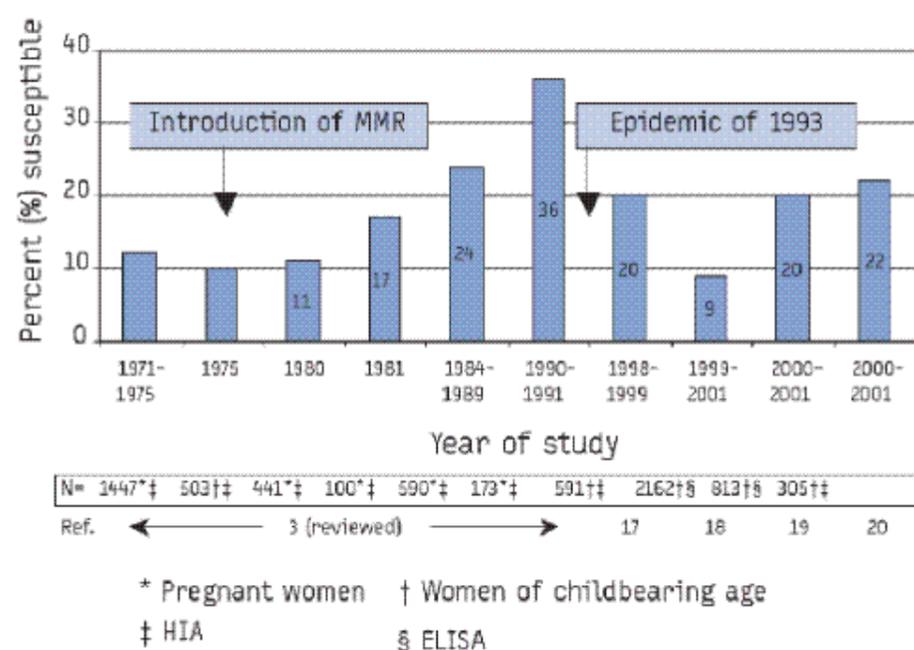
Serologically detected immunity in women of childbearing age

Several hospital laboratories that routinely carry out serological tests for rubella antibodies in women of childbearing age occasionally report their results. We identified 9 such published reports in the period 1994-2003, all referring to the period after the 1993 epidemic (another 17 reports referring to the period

period after the 1993 epidemic (another 17 reports, referring to the period before the 1993 epidemic, were previously reviewed [3]). The proportion of women of childbearing age susceptible to rubella ranges from 9.4% to 22.0%, without any clear geographical pattern or time trend in the period 1994-2003. Figure 2 shows the results of published studies in this and the previous review referring to women of childbearing age in Athens [3,17-20].

FIGURE 2

Women of childbearing age susceptible to rubella - Greece, 1971-2001



Immunisation policies

The MMR vaccine became commercially available in Greece around 1975. In 1989 it was introduced into the national immunisation schedule for children aged 15 months, and in 1991 a second dose, at the age of 11-12 years, was also introduced. In 1999 the recommended age for the second MMR dose changed to 4-6 years. No active policy to immunise adults or susceptible women of childbearing age has been implemented to date.

Discussion

After the 1993 epidemic, rubella incidence decreased sharply, but in 1999, when rubella epidemics took place in some other European countries [2], a smaller epidemic occurred in Greece; there was a small increase in the interepidemic period to 6 years compared with 3-5 years in the pre-1993 period. During this, the age distribution of rubella cases shifted towards older ages more than it was observed in 1993. It has been reported that in 1999 the outbreak in the general population was in some instances preceded by outbreaks in army camps [21]. A link of the 1999 epidemic in Greece to outbreaks in at least four colleges and one CRS case in the United Kingdom has been reported [22].

Vaccination uptake has gradually increased during the 1990s: in the early 2000s about 90% of 2 year old children are vaccinated for rubella, and this proportion rises to >95% in school age. Nevertheless, the cohorts that were in their teens during the 1990s and early 2000s are inadequately vaccinated (coverage in the range of 60-80%). According to available evidence, a substantial proportion of women of childbearing age are susceptible to rubella: 10-20% in urban areas compared with about 10% in the pre-vaccination era.

This review has several limitations. There is substantial underreporting in the mandatory notification system and age is recorded for only a small proportion of reported cases, local studies on vaccination coverage give a partial picture and often have methodological problems, serological studies on rubella immunity are local and hospital based. Nevertheless, all these studies as a whole, together with the studies reviewed previously [3], probably give an accurate description of time trends. We used published studies as a source of information on rubella epidemiology, because a comprehensive surveillance system was not in place during the period studied: such a system is designed in

system was not in place during the period studied, such a system is designed in the framework of a major revision of the surveillance system of infectious diseases in Greece, which is currently (2003-2004) being instituted.

In conclusion, a very high proportion of the child population in Greece is presently vaccinated for rubella, which contributes importantly to the reduction of viral circulation in the population. Nevertheless, teenagers are inadequately covered and there is evidence that a substantial proportion of young adults / women of childbearing age are susceptible to rubella. This can lead to local or more extended outbreaks in which young adults would be predominantly affected, and CRS cases could appear. There is a need for the implementation of a comprehensive preventive policy, which should probably include catch-up vaccination of young adults / women of childbearing age.

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