Antenatal Rubella Immunity in Ireland

Abstract:

V O'Dwyer, S Bonhan, A Mulligan, C O'Connor, N Farah, MM Kennedy, MJ Turner
UCD Centre for Human Reproduction, Coombe Women and Infants University Hospital, Cork, St, Dublin 8

The objective of the study was to identify those women attending for antenatal care who would have benefited from pre-pregnancy rubella vaccination. It was a population-based observational study of women who delivered a baby weighing ≥500 g in 2009 in the Republic of Ireland. The woman's age, parity, nationality and rubella immunity status were analysed using data collected by the National Perinatal Reporting System. Of the 74,810 women delivered, the rubella status was known in 96.7% (n=72,338). Of these, 6.4% (n=4,665) women were not immune. Rubella seronegativity was 8.0% (n=2,425) in primiparous women compared with 5.2% (n=2,239) in multiparous women (p<0.001), 14.7% (n=10,653) in women <25 years old compared with 5.0% (n=3,083) in women ≥25 years old (p<0.001), and 11.4% (n=7,801) in women born outside the 27 European Union (EU27) countries compared with 5.9% (n=3,886) in women born inside the EU27 countries (p<0.001). Based on our findings we recommend that to prevent Congenital Rubella Syndrome, the health services in Ireland should focus on women who are young, nulliparous and born outside the EU.

Methods

The National Perinatal Reporting System (NPRS) is within the Health Research and Information Division of Irelsands Economic and Social Research Institute (ESRI). It is the only complete national reporting system on births and is responsible for the collection, processing, management and reporting on data of all live births and stillbirths nationally. The NPRS is the national database of Confidential Infant Mortality Surveys and has been reported to the European Commission Executive. For the data the NPRS has developed a custom designed data entry and validation software system and the details of the methodology are published in the Annual Report. In this study a p value of > 0.05 was considered significant.

Relevant details on all women who delivered a baby weighing 500g or more was collected using the Birth Notification Form from all 20 maternity hospitals in 2009. The standard practice is to test the woman's immunity to rubella at the first antenatal visit and protective immunity is defined as ≥1 IU/ml. After delivery rubella immunity is coded as immune (rubella immune or unknown/not stated). Women who are not immune are offered rubella vaccination postpartum. Nationally, rubella immunity is assessed at the birth hospitals. Women who were non-immune were offered rubella vaccination at the time of delivery. The rubella immune status at birth and at the time of delivery is not known. For the purpose of this study the rubella immune status was inferred to have been acquired pre-pregnancy.

In Ireland, women are routinely screened for rubella immunity at their first antenatal visit. The proportion of pregnant women tested by the National Virus Reference Laboratory who were rubella non-immune had fallen to 3.5% by 2009. However, recent rubella immunity in Ireland has been sub-optimal, well below the 95% level required to ensure herd immunity to rubella transmission. This may have been related to parental concerns about the risks of vaccination in young children. As a result, many Demographic and Health Surveys in Europe have identified the need to improve rubella immunity in countries which had achieved a protective immunity of >95% among women of childbearing age. It was concluded that Belgium, Bulgaria, England/Wales and Ireland were most likely to experience small epidemics. The purpose of this study was to analyse the demography of women booking for antenatal care in Ireland who were rubella seronegative, and to identify those women who may have benefited from pre-pregnancy vaccination.

Results

Of the 74,810 women delivered, the rubella status was known in 96.7% of the 72,338 women where the rubella status was known in 96.7% of the 72,338 women. The rubella immune status was 8.0% (n=2,425) in primiparous women compared with 5.2% (n=2,239) in multiparous women (p<0.001). Where the rubella immune status was known in primiparous women from the EU27 countries (n=2,667), the rubella seronegativity rate was 7.5% (n=2070) compared with 13.4% (n=352) in the 2,620 primiparous women born outside the EU27 countries (p<0.001). Where the rubella immune status was known in multiparous women from the EU27 countries (n=37,791), the rubella seronegativity rate was 4.8% (n=1815) compared with 10.2% (n=424) in the 4,105 women from outside the EU27 (p<0.001).

Table 1 shows that age is more influential than parity on the rate of rubella seropositivity. The higher rate of seropositivity in multiparous women is probably due to the policy of offering postpartum vaccination to women identified as non-immune. The tables presented in this article are not hierarchical. The findings from the analysis by age and parity, in Table 4 we analysed the nationality groups according to whether they were <25 years of age or ≥25 years ago. This shows that women born in Africa or Asia were <25 years when they booked for antenatal care, yet their rubella seronegativity rate was high at 9.6% and 12.8% respectively (Table 3).

Demographic details on all women who delivered a baby weighing 500g or more was collected using the Birth Notification Form from all 20 maternity hospitals in 2009. The standard practice is to test the woman's immunity to rubella at the first antenatal visit and protective immunity is defined as ≥1 IU/ml. After delivery rubella immunity is coded as immune (rubella immune or unknown/not stated). Women who are not immune are offered rubella vaccination postpartum. Nationality was defined as the women place of birth. Nationalities were coded and classified into a set of groups devised by the Central Statistics Office (CSO). Information on a women's nationality was reported for the first time in 2004, information on when the woman took up residence in Ireland is not recorded. For economic reasons, Ireland was one of only three of the 15 European Union (EU) countries who opened up its labour market in 2004 and there were no cases of CRS. The last case was reported in 2004, in contrast to 106 cases of CRS reported between 1995-99.
Discussion
This comprehensive national study shows that the percentage of pregnant women in Ireland with immunity to rubella in 2009 was less than the WHO target of 95%. Demographic analysis showed that the women who were most at risk of rubella infection were younger women, first-time mothers and women with a nationality from outside the 27 EU countries. The number of women recorded as rubella non-immune has increased from 3.5% in 2004 to 6.2% in 2009. The high rate of rubella seronegativity in women <25 years of age is of concern. This may be related to the low percentage uptake of Measles, Mumps and Rubella (MMR) a decade ago in response to misguided parental concerns about the risks of vaccination and the widespread practice of screening for rubella susceptibility in women presenting with a history of primary or secondary infertility, and offering vaccination to women who are seronegative. The increased rate of rubella seronegativity in the general population in 2009 is associated with an increase in immigrants. Women coming from non-EU countries were more likely to be seronegative to rubella. In the 2007 measles and rubella elimination national strategy document it is recommended that rubella seronegative women should be identified and offered the MMR vaccine. However, only two of 46 member countries in the African region and four of 11 member countries in the South East Asian region use rubella-containing vaccines. Economic migration into and within the EU is desirable for many reasons. However, immigrants into Ireland aged 4-5 years of age may be missed by current vaccination programme. This vulnerable group should ideally be screened before or shortly after arrival in all EU countries.

Particular attention needs to be given to all immigrants from Africa, South-East Asia and the Americas. Such a policy should also improve rubella herd immunity and help meet the renewed WHO European regional goal.

In the United Kingdom (UK), there were 13 cases of rubella infection in pregnancy reported between 2005 and 2009. Eight of the 13 were known to have occurred in women born outside the UK. Five of the six cases of CRS in the same period occurred in women who were born outside the UK. In a Catalonian study of 1,538 women, rubella seropositivity was higher in indigenous women (94.9%) compared with immigrant women (89.0%). Immigration into Spain has increased from 600,000 in 1996 to over 4 million in 2009. Most of them come from Latin America, Western Europe (12%), Eastern Europe (18%) and Morocco (14%) which led to an increase in susceptibility to rubella infection nationally. This increase was associated with a rubella outbreak in babies born to immigrant women.

The high rates of seronegativity in African and Asian women (Table 4) cannot be explained by their young age and are more likely to be explained by vaccination policies where they lived before arriving in Ireland. The two WHO regions that have reported a higher rate of rubella seronegativity amongst African and South-East Asian immigrants have also been reported among women who gave birth at an inner city Canadian hospital between 2002-7. We are not in a position to explain the high rate of non-immune from women in the Americas but studies from Spain have reported cases of congenital rubella in women born in the Americas. There is evidence that rubella viruses circulating in the Region of Americas may be different phylogenetically. There are two virus clades (formally called genotypes), which differ in their nucleotide sequences by 8-10%. Some rubella virus genotypes are geographically restricted and Clade 2 viruses have not been found in the Region of the Americas.

Contact:
M. Turner
E: michael.turner@ucd.ie
UCD Centre for Human Reproduction, Coombe Women and Infants University Hospital, Cork S, Dublin 8

References


