Congenital Rubella Surveillance

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National Congenital Rubella Surveillance Programme

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Rubella and CR surveillance in the UK

• Health Protection Agency and Health Protection Scotland
  – Acquired infection, notifications and laboratory confirmed cases, including rubella in pregnant women, (male/female ratio)
  – Serosurveys (eg based on antenatal screening samples)
  – Immunisation uptake data (COVER / measles)

• Infectious Diseases in Pregnancy Screening Programme
  – National and regional data on uptake and outcome of infection screening, including rubella susceptibility

• Office for National Statistics / NHS Information Centre
  – Terminations for rubella contact, disease, vaccination in pregnancy

• National Congenital Rubella Surveillance Programme
COVER data (HPA & HPS)
MMR1 reported uptake by 24 months, 1996-2011

In England, 85% had MMR2 by age 5 in 2011
Antenatal screening

• Routine offer of rubella susceptibility screening in place for 40 years
• Antenatal screening standards updated 2011
• Rubella susceptibility uptake >95%
• Approximately 4% screen susceptible
• MMR should be given after delivery, before discharge, with second dose by GP
• But delivery of post-partum MMR variable
• Policy currently under review
• Alternatives?

http://infectiousdiseases.screening.nhs.uk/standards
Rubella seroprevalence in ethnically diverse population of pregnant women in London, 2004

- 18,882 newborn screening blood spot samples
- Maternal rubella IgG antibody levels measured
- Latent class regression finite mixture models used to classify samples as **seronegative** to rubella
- Estimated 2.7% (95% CI 2.4%–3.0%) seronegative
- Women born in Sub-Saharan Africa 4.2 (95% CI 3.1–5.6) times more likely to be seronegative than UK-born; those born in South Asia 5.0 (3.8–6.5) times more likely (aORs)
- Women under 25, and particularly under 20, significantly more likely to be seronegative than women in their early thirties

_Hardelid et al, J Med Screen 2009;16:1–6_
Audit of rubella IgG antibody status in antenatal women in a Welsh NHS Trust 2005–09 (12,000 pregnancies): susceptibility cut-off at <4 IU/ml and <10 IU/ml

Matthews et al. Epidemiol and Infect 2010
Serprevalence of low rubella IgG antibody levels among antenatal women in England, 2004-2009

- 440,000 antenatal samples from ethnically mixed population, 25% black or minority ethnic group
- BME women twice as likely to be susceptible
- Among BME women with <10 IU/ml, 70% were <4
- Women born 1986-90 6 times more likely, born after 1990 30 times more likely, to be <10, than those born 1976-80
- Could not distinguish between UK and non-UK born, or assess by parity

*Byrne et al, Vaccine 2012; 30: 161-167*
NCRSP Monitoring effect of rubella vaccination policy since 1971

1971-1989 Passive reporting by audiologists, GPs, other health professionals, originally to two registries (Leeds and London), and from 1985 to combined registry at Institute of Child Health, London

1990-date Active surveillance of Congenital Rubella through the British Paediatric Surveillance Unit mechanisms

Funding history
• Originally funded by the Medical Research Council, subsequently supported by PHLS/HPA and ICH, additional occasional support from Sense (charitable).
• Currently no funding – future uncertain
BPSU active reporting scheme

- Established 1986
- Currently >3000 respondents: mainly consultant paediatrician members of the Royal College of Paediatrics and Child Health
- Response rate >94%

- Monthly report card sent to all respondents
- Respondents tick any reportable condition seen in the preceding month, or ‘nil return’ box, and return card to BPSU
- BPSU notifies ‘Positive’ returns to appropriate investigator, who contacts reporting clinician for further details
BPSU active reporting scheme

- **Case definition:** Any infant (live or still born) or child up to 16 years of age who, in the opinion of the notifying paediatrician, has suspected or confirmed congenital rubella with or without defects, based on history, clinical and/or laboratory findings.

- Please include “imported cases”, including children born in the British Isles where the maternal infection occurred abroad, AND children who were born abroad.

- **Reporting instructions:** Please report any infant (live or still born) or child seen by you for the first time in the last month who meets the case definition, REGARDLESS OF COUNTRY OF BIRTH.
The International Network of Paediatric Surveillance Units (INoPSU)

- Germany
- Greece and Cyprus
- Ireland
- Latvia
- Netherlands ^
- Portugal
- Switzerland *
- Wales
- Australia *
- Canada
- Malaysia
- New Zealand *
- Papua New Guinea

http://www.inopsu.com
NCRSP information

• Maternal details
  – demographic information (age, ethnic group, parity)
  – immunisation history and laboratory details
  – time, type, symptoms of maternal infection
  – ? imported infection (country of birth, date arrived)

• Infant details
  – demographics, clinical signs and symptoms at birth
  – laboratory details

• Previously provided basis for longer term follow up of reported children and data on late sequelae

• Older cases ‘flagged’ for cancer & death registration
Control and decline of Rubella

• Selective rubella vaccination policy from 1970
  – 1971 – 1975 average 50 CR births, 750 rubella associated terminations reported each year
  – 1981 – 1985 40 births, 150 terminations per year
  – 1986 – 1988 30 births, 75 terminations per year

• MMR introduced 1988
  – Immediate reduction in reported births and terminations
  – 1990s – average 4 CR births, 8 terminations reported each year
  – 2000s – average 1 or 2 CR births reported each year

CR births (n)  Terminations (n)

*Terminations data not published since 2000 because of very low numbers

MMR

CR births (England, Scotland, Wales)

Rubella-associated terminations (England & Wales)
Maternal place of birth and infection

CR infants born in England, Scotland, Wales, 1990-2010

- **0**
- **2**
- **4**
- **6**
- **8**
- **10**
- **12**
- **14**

*90 92 94 96 98 '00 '02 '04 '06 '08 '10*

- **Imported infection**
- **Born abroad, acquired ESW**
- **Born ESW, acquired ESW**

*1 British born woman, 1 born abroad but resident in UK many years

# Associated with outbreak in Greece, but maternal reinfection acquired in UK

Over 60 rubella-associated terminations reported in the same period
Key points

• Most recognised rubella infections in early pregnancy end in termination
• Most congenital rubella births are unexpected
• Most diagnosed reported CR infants have typical severe signs
• CRI or non-specific signs (including isolated hearing loss) now unlikely to be diagnosed and reported (few in recent years)

• BPSU active surveillance
  – comprehensive national coverage
  – highly sensitive to changes in birth prevalence of congenital rubella
Summary of UK position

• Few reported cases of rubella infection in pregnancy, rubella TOPs or congenital rubella (<1 in 100,000 live births since 1996) in recent years
• Fifteen years of inadequate MMR uptake
  – mumps/measles outbreaks, rubella sporadic so far
• High rubella susceptibility in 1st generation immigrants
• Low vaccine uptake, ethnically mixed areas coincide
• Potential for importing infection
  – frequency of travel between UK and countries of origin
CR(S) surveillance challenges

- Maintaining high quality active surveillance when cases rare (NB – feature of mass immunisation strategy is lengthening of epidemic cycle)
- Maintaining awareness of rubella, CR, importation of infection, among health care staff
- Sentinel surveillance – two major typical defects? Cataracts?
  - But prevalence of specific defects depends on local circumstances/epidemiology, eg recognition of infection in pregnancy, availability of TOP for diagnosed pregnancies
CR(S) surveillance challenges

- Overall largest burden is hearing loss – how to identify? Especially if MMR for infants
- Role of (neonatal) hearing screening? Consider rubella?

- In some countries / situations most severely affected may not survive infancy
- Impact of miscarriage, intrauterine death, survival of pre-term or low birthweight infants, termination of pregnancy....
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Ethics

• London Research Ethics Committee
• National Information Governance Board