Rubella and CRS in Finland

Progress Toward Rubella Elimination and CRS Prevention in Europe
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Vaccinations against measles and rubella in Finland

Before MMR
- Measles monocomponent (Swartz strain) vaccine since 1975 for 1 y old children
- Rubella monocomponent (Cendehill strain) since 1975 for 11-13 y old girls and seronegative mothers

MMR vaccinations
- started in 1982 as a goal to eliminate measles, mumps and rubella; doses at the age of 14-18 mo and 6 years
- catch-up vaccinations in 1983-85 (1.5 to 6 y), vaccination of special groups e.g. nurse students; vaccinations during military service in 1986-2000
- high coverage (>95%) since 1987 for 1st dose, according to recent data high coverage also for 2nd dose

Vaccinations coordinated at the National Institute for Health and Welfare (THL): recommendations and vaccines
Age groups vaccinated against measles, mumps and rubella (2010)
Measles and rubella surveillance

• measles and rubella notifiable for decades
• enhanced surveillance of MMR diseases since the beginning of MMR vaccinations 1982
• since 1987 only laboratory confirmed measles and rubella cases could be notified
• since 1995 diagnostic laboratory and clinician send reports to National Infectious Disease Register (mandatory)
• since 2004 specimens of positive measles and rubella cases WHO Measles/Rubella reference laboratory in THL for further characterization
Rubella and measles surveillance

- 100 - 200 samples of measles suspicions tested annually (in 2011 almost 900)
- 400 – 600 samples of rubella and CRS suspicions tested annually (most of them exclusions of CRS)
- Study of suspected vaccine failures showed: clinical suspicion not very accurate
Flow of data and information in NIDR 1.1.2009 -

Microbiology laboratory: notifiable diagnostic finding (automated identification)

 isolate | notification

Automated reminder to notify

Treating physician: physician notification

Hospital district (checking, completion)

8 000
81 000 (90% electronically)

Encrypted www-access

Primary Health Care Center

Population register

NIDR microbial strain collection (THL)

Data for 2009
Notified rubella cases 1960-1982

Rubella vaccinations

number of cases

year


0 2000 4000 6000 8000 10000 12000 14000

NATIONAL INSTITUTE FOR HEALTH AND WELFARE, FINLAND
Measles and rubella cases in Finland 1982-1996

![Graph showing measles and rubella cases from 1982 to 1996]

- **MMR vaccinations**
- **Lab. confirmation of suspicions**

- Red line: Measles
- Green line: Rubella

Number of cases on the y-axis, Year on the x-axis.
Measles, mumps and rubella epidemics

(Peltola et al. NEJM 331:1397-1402, 1994)
Laboratory investigations of measles and rubella

- laboratory confirmation of suspected cases by antibody tests or virus detection
- clinicians recommended and encouraged to send samples also for virus detection, in addition to sera
- characterization of virus strains which caused infections; not possible always
  - measles cases imported from Europe (D4, D8, G3), Asia (D4, D9), South-America, Africa (B3)
  - rubella cases imported from Europe and Asia
Measles and rubella cases in Finland 1995-2011

Source: National Infectious Disease Register
Measles

- in 1996 - 2010 all confirmed measles and rubella cases were imported, no secondary cases
- in 2011 also indigenous transmissions of measles as a result of importations

Rubella

- in 1996 - 2011 all confirmed rubella cases were imported, no secondary cases

CRS

- 1 confirmed in 2011, previous one in 1986
Rubella immunity studies

- screening of rubella immunity in pregnant mothers 1975-1994, rubella vaccine offered for seronegative mothers postpartum
- follow-up of antibody persistence (cohort study) since 1982 (vaccine induced immunity)
- population immunity (naturally and vaccine induced immunity)
- antibody levels against rubella in pregnant mothers (naturally and vaccine induced immunity)
Seropositivity cohort study
(antibodies measured by EIA, cut off 4 IU/ml)

After 1st dose | Before 2nd dose | After 2nd dose | 15-year follow-up | 20-year follow-up | 25-year follow-up

seropositivity %


- measles
- mumps
- rubella

20% < 10 IU/ml
Cohort study
Antibody decline after 2 doses of MMR

**Measles**

![Measles Antibody Decline Graph](graph)

**Mumps**

![Mumps Antibody Decline Graph](graph)

**Rubella**

![Rubella Antibody Decline Graph](graph)
Population immunity

- seroprevalence study, 1500 samples, age groups from 1 to 60+ years
- high rubella seropositivity in all age groups: both vaccinated and naturally infected individuals

Antibody levels against rubella in pregnant mothers

- antibody levels against rubella measured in sera collected in 1983, 2002 and 2007
- antibody levels significantly lower in sera collected in MMR vaccination era than before vaccinations
Current status: rubella elimination and immunity

- MMR vaccinations decreased the incidence of rubella effectively
- Endemic circulation of rubella virus interrupted by mid of 1990s
- MMR vaccine induced high rubella seropositivity
- Although, immunity studies suggest that vaccine-induced antibodies against rubella wane significantly over time, only imported cases have been confirmed
Future challenges

• importations of rubella (and measles) to Finland will continue
• to sustain a high vaccination coverage
• to sustain a reliable surveillance, adequate samples for laboratory investigations
• to maintain an awareness about measles and rubella among health care personnel
• to follow the immunity against measles, and rubella regularly, when increasing part of population is vaccinated