Measles, mumps and rubella

Gone but not forgotten

David Isaacs
Measles is Misery

IMMUNISE AT 15 MONTHS!
Measles

- Highly infectious human disease
- 1 in 15 cases develop complications
  - otitis media, pneumonia, encephalitis, SSPE
- Pre vaccine epidemiology
  - 2 - 5 year cycle of epidemics
  - most common in 5 - 9 year olds
  - world wide 7 - 8 million deaths annually
Measles

- 99.9% of unimmunised children get measles
- 1 in 5,000 to 10,000 cases die
- Mortality: 888,000 deaths in 1998 (more than breast cancer, violence)
- Morbidity: encephalitis (0.1%), convulsions (0.5%), pneumonia (1-7%), otitis media (5-9%)
Measles: a global perspective

- Vaccine available for over 40 years
- Still caused 197,000 estimated deaths in 2007
  - leading vaccine preventable killer of children
- Highest disease incidence in Africa
- Most deaths (98%) are in poorest countries
  - low vaccination coverage, high case fatality ratio
REPORTED MEASLES AND SUBACUTE SCLEROSING PANENCEPHALITIS (SSPE) CASES, UNITED STATES

YEAR


MEASLES CASES (THOUSANDS)

Vaccine Licensed

SSPE Onset

SSPE CASES

600 500 400 300 200 100 0

60 50 40 30 20 10 0
Measles in Australia

- Notifications
- Hospitalisations

- Nov 1993 – 2nd dose introduced for 10-16 yo
- Jul 1998 – 2nd dose moved to 4-5 yo
- Measles Control Campaign conducted
Measles elimination in Australia: 1

The Measles Control campaign (MCC)

- July-December 1998
- mass vaccination 1.7 million primary school children (96% vaccinated)
- reminder letter to overdue infants
- information pack to secondary school students
Measles elimination in Australia: 2

Since the MCC

- Outbreaks in young adults
- Cohort born in 1970s + early 1980s most susceptible
- $20 million funding to vaccinate 18-30 y/o in 2001
- Lowest rates on record in 2005 (10 cases) and 2007 (11 cases)
Measles global control

- Measles Initiative
  - UN, Red Cross, CDC, WHO, Unicef
  - 74% ↓ measles deaths between 2000 & 2007
  - Goal: 90% ↓ measles deaths by 2010

- Strategy
  - strong routine immunisation
  - opportunity for 2nd dose to all children
  - effective surveillance
  - better treatment of measles
Dear Friends

I have been thinking about organizing an approach to the Gates Foundation about supporting the global elimination of measles and rubella.

Traditionally, Gates has been more interested in new technology than in using already proven vaccines, but as these are “low hanging fruit,” perhaps it would be willing to support activities other than vaccine purchase to accomplish elimination.

A recent modelling meeting at Princeton on the burden of measles and rubella should soon provide a report that will be useful.

The March of Dimes will support this effort, and I hope GAVI also.

Would you be willing to sign a letter in support of this initiative?

With kind regards,

Stanley
Measles global elimination

- Countries with low measles incidence

- Strategies
  1. prolonged high coverage (> 95%) with 2 doses of MMR
     - USA, Finland
  2. mass vaccination- ‘catch up’ campaign
     - Americas, UK, Australia
     PLUS ‘keep-up’ coverage and ‘follow-up’ campaigns

- Other requirements for elimination
  - surveillance, rapid outbreak response
Mumps

To mump is to mope

Before vaccine:

- 500 admissions per year in Australia
- Meningitis or encephalitis
- Pancreatitis
- Oophoritis
- Orchitis
History of mumps immunisation in Australia

- 1981: mumps vaccine for children > 1 year
- 1983: replaced by a measles–mumps vaccine
- 1989: MMR vaccine
- 1994: Second dose of MMR vaccine for 10-16y
- 1998: Second dose moved to 4y
Proportion of Australian population (n = 2787) seropositive for mumps in 1997, by birth cohort, age group and immunisation program history*†
Year of birth and susceptibility

- Born before 1970: natural immunity, low incidence

- Born in 1980s: single dose, coverage 68% <5y
  - low coverage
  - decreasing exposure to wild-type virus
  - highest incidence

- Born after 1990: good vaccine coverage
  - low incidence
Mumps notifications by age & gender, Australia, 2007

- Male
- Female

Notifications

0 - 4
5 - 9
10 - 14
15 - 19
20 - 24
25 - 29
30 - 34
35 - 39
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
75 - 79
80 - 84
85+
Unknown
Rubella

Mild illness with rash, cervical lymphadenopathy, arthritis, mild fever

Congenital rubella syndrome
- mainly first trimester
- congenital cataracts
- sensorineural deafness
- cardiac defects
- mental retardation
Rubella (German measles)

- Usually mild childhood disease
- Infection in pregnancy
  - fetal death
  - congenital rubella syndrome
- Pre-vaccination
  - seasonal (spring) epidemics every 5-9 years
  - USA 1964/5 - 20,000 cases of CRS
  - Australia 120 cases of CRS per yr
- Vaccination strategies
  - no vaccination
  - vaccinate women of child-bearing age
  - universal infant vaccination (coverage >80% required)
Rubella in Australia

- 1971 School girl vaccination
- 1989 Infant vaccination
- 1993 2nd dose added for 10-16y
- 1998 2nd dose moved to 4y
Rubella epidemic in Greece, 1983

Introduction of immunisation

Rubella notifications per 100,000 population

Year
Incomplete immunisation shifts age of infection to right

- 1986 (n=117)
- 1993 (n=326)
Countries using rubella vaccine in their national immunization system

1996
65 countries
12% of birth cohort

2007
125* countries
31% of birth cohort
(1 country partially introduced)

*Does not include China

193 WHO Member States. Data as of September 2008
Date of slide: 3 September 2008
Susceptibles

- Women born in countries not using rubella vaccine, e.g. South-East Asia

- Women born in Australia and never immunised

- Serological screening disasters (very rare)
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The epidemiology of vaccine preventable diseases

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