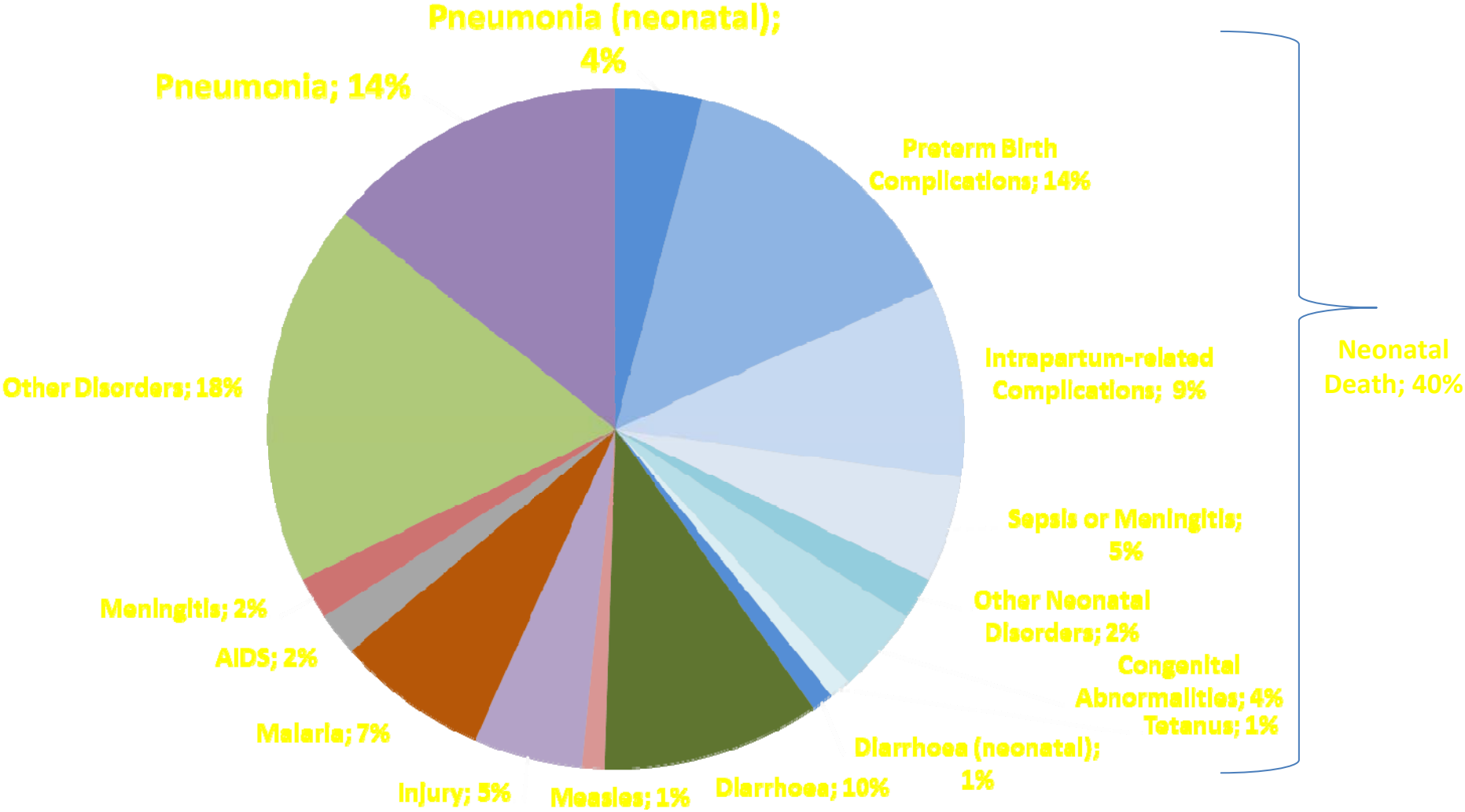
# Vaccine-Preventable Diseases

Dublin, Sept.11th, 2014

Kevin Connolly

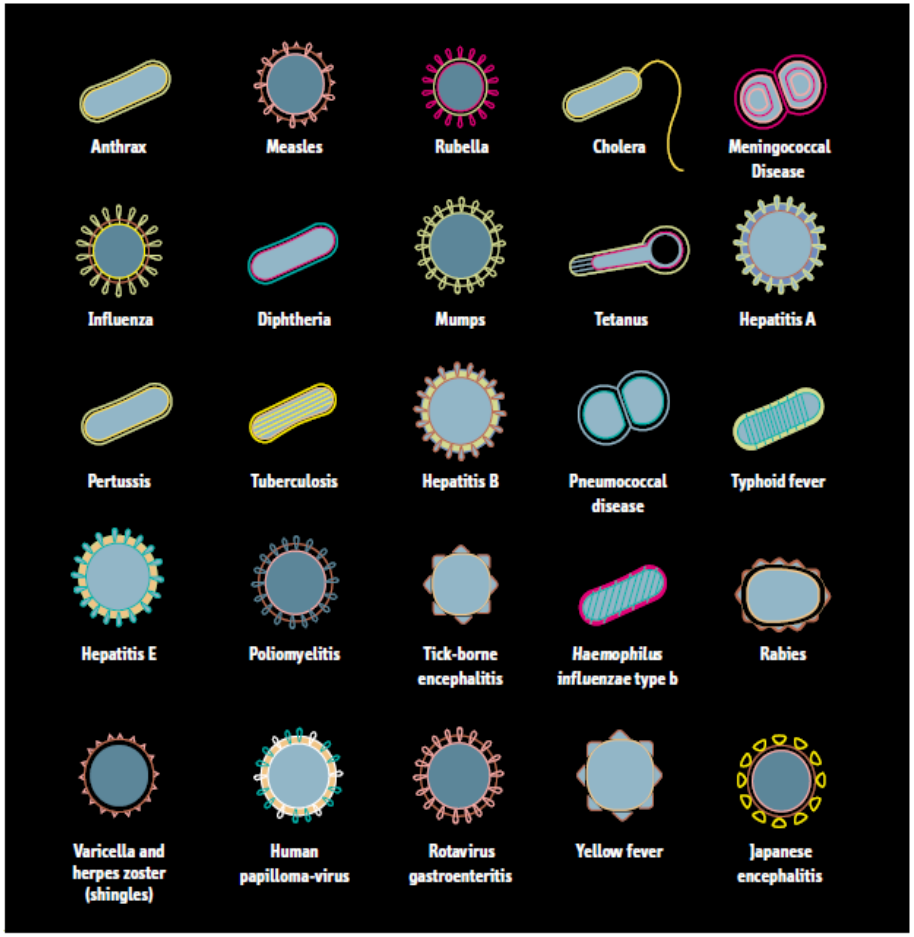
**Another  2 children will have died by the time you finish reading this sentence**

# Global Deaths, Children <5 Years, 2010

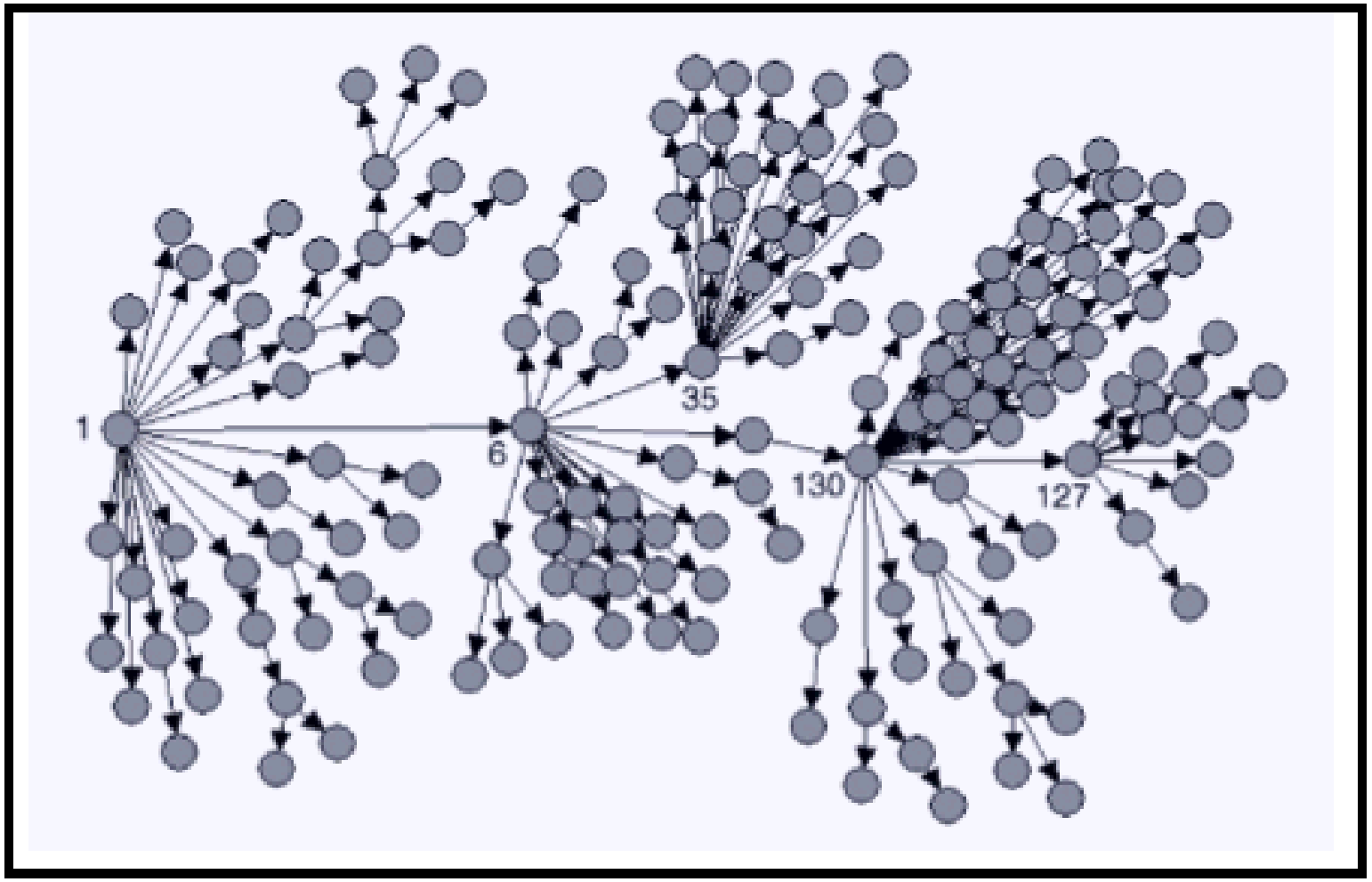



*Adapted from Liu L et al. Lancet. 2012;379:2051-61*

# 25 vaccine preventable diseases



# Reproductive number & conditional infection rate SARS, 2003



# Polio

- Highly infectious
- Can cause irreversible paralysis in hours
- Faeco-oral spread, multiplies in the intestine
- Spreads rapidly if poor hygiene and sanitation
- 90% of infected people - no/mild symptoms
- Long-term paralysis, respiratory depression, post-polio syndrome, death,

# Polio in India

- 2009-had  nearly half the world's polio cases
- Problems:
  - high population density
  - migrant populations
  -poor sanitation
- 2.3 m. vaccinators immunised 175 million children during National Immunization days
- January 2011-last case of wild polio

- ***Resurgence of polio could paralyse >200,000 children every year by 2025***

# Tetanus

- Bacteria lives in soil and intestines and faeces of animals
- Enters body through cuts, punctures, burns
- Incubation period  3 days to 3 weeks
- Stiffness, difficulty swallowing, lockjaw, muscle rigidity, painful convulsions
- Broken bones, coma, death
- Vaccine immunity wanes in <10 yrs

# Measles Complications

- Top of Page
- **Complications**
  - Otitis media, pneumonia, LTB, diarrhoea
  - 1/1,000 acute encephalitis, permanent brain damage
  - 0.3-2/1,000 will die
  - SSPE fatal degenerative disease, developes 7 to 10 years after infection
- 
- **People at High Risk**
  - Aged <5 , >20 years
  - Pregnant women
  - Immune deficient
-

# Rubella, Japan- a cautionary tale

- 1976: rubella vaccine girls
- 1989: MMR introduced, 1-6 yrs
- 1993: MMR withdrawn (aseptic meningitis)
- 1995: all vaccines recommended, not mandatory
- 2006: MR introduced (1–2 and 5–7 years)
- 2007 -2008 large measles outbreak
- Catch-up MR program to ensure herd immunity in those aged 12–22 years
- Then.....

# Recent Pertussis Epidemics


a. Centers for Disease Control and Prevention. http://www.cdc.gov/pertussis/outbreaks/about.html
b. Health Protection Report. http://www.hpa.org.uk/hpr/archives/2012/news5112.htm#prtsss1211
c. Australian Government. National Notifiable Disease Surveillance System. http://www.health.gov.au
d. Pan American Health Organization. Epidemiological Alert, Pertussis, 2012. http://www.paho.org
e. New Zealand Ministry of Health. http://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/whooping-cough

Medscape EDUCATION

# Why has Pertussis incidence increased?

Improved diagnosis
Appreciation that all ages affected
Changes in organism
Acellular vaccines have poor priming,
waning immunity
Adolescents, adults now major transmitters
Less natural boosting

# Pertussis vaccination

Age appropriate vaccination

- 2,4, 6 months (6 in 1)
- Junior infants (4 in 1)
- 1st year (Tdap)
  - introduced 2012/2013
  - given with 3rd dose of HPV (for girls)
  - no interval required between previous tetanus containing vaccine

# Pertussis Vaccination Recommendations

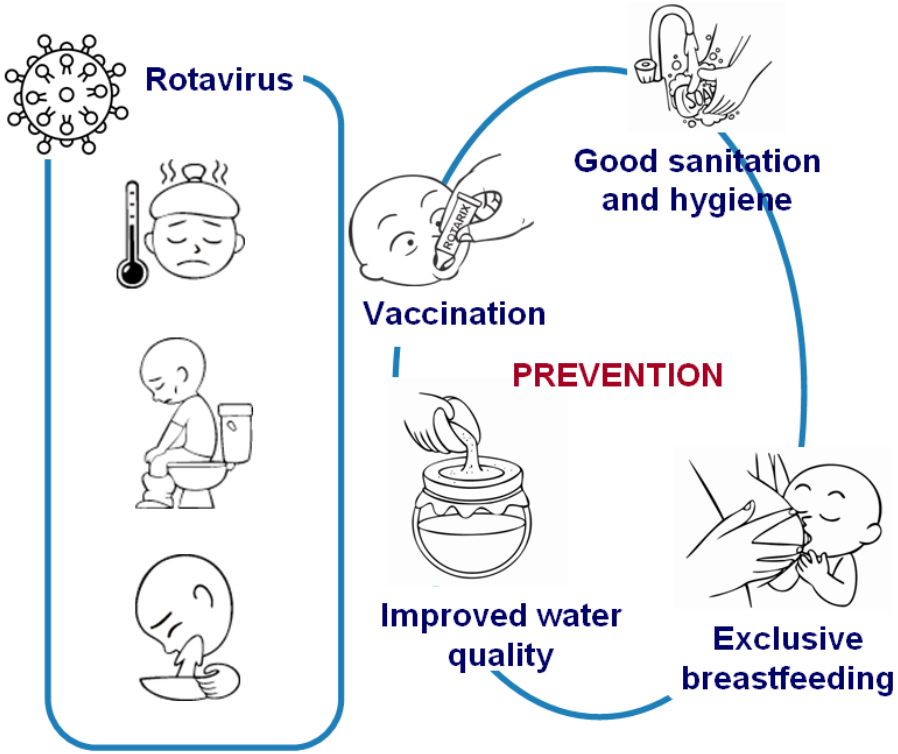
- **Children**
- **HCWs** in contact with
  - infants
  - pregnant women
  - immunocompromised
- **Pregnant women**
  - between 27-36 weeks gestation
  - can be given later or in 1st week post partum (may not be as effective)

# Influenza

- RTI with generalised symptoms
- Seasonally epidemics with low fatality; more deadly pandemics occur several times each century
- Highly changeable virus that infects multiple species, incl. humans, pigs, birds
- Current avian flu may lead to a new pandemic

# Rotavirus - Global

- Over 500,000 deaths /year
  - 85% in low-resource countries
- >2 million children hospitalised with dehydration
- 36% hospitalisations for diarrhoea in children <5 years



# Rotavirus vaccine

- Recommended by WHO (EPI)
- UK, USA, Austria, Belgium, Finland, Zambia, etc
- Live oral vaccine
- 2-3 doses at 2,4 or 2,4 6 months
- Can be given at same time as other vaccines
- All doses by 8 months of age
- Small increase in intussusception
  (benefits >>>risks)