Vaccine Preventable Diseases (VPD)

Immunisation Study Day
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Some VPD that are notifiable

- Tuberculosis
- Diphtheria
- Pertussis
- Tetanus
- Invasive *Haemophillus influenzae* disease
- Polio
- Hepatitis B
- Invasive *Streptococcus pneumoniae* disease
- Meningococcal Disease
- Measles
- Mumps
- Rubella

- Influenza

When and how to notify

- Notifications should be made by a medical practitioner “as soon as he becomes aware or suspects that a person on whom he is in professional attendance is suffering from or is a carrier of an infectious disease” (Infectious Diseases Regulations 1981)
- Notifications in writing or by telephone to your local Public Health Department (PHD) (056-7784142)

Clarification of notification

- Depending on who informs (e.g. creche/school) further details may need to be obtained
- PHD may contact clinician to obtain information/seek clarification (cf case definition)
- Laboratory confirmation may be requested

Strategies for prevention

- Surveillance
  - Monitoring of vaccination campaigns
  - Early identification of outbreaks
- Vaccination programmes
- Notification of cases: advice to case and to contacts
  - Infection prevention advice, including exclusion
  - Prophylaxis
  - Vaccination

Tuberculosis

- Human TB is caused by infection with bacteria of the *Mycobacterium tuberculosis complex (MTB or M.Bovis)*
- Initial infection may be eliminated, may lead to latent infection or to active TB
- Mostly involve the respiratory system (70%)
- Symptoms (pulmonary): persistent cough, fever, weight loss, night sweats, may have blood stained sputum
- Those with smear positive sputum are most infectious
- Most at risk: Coming from high incidence country; poor nutrition/housing; immune deficiency/chemotherapy/ steroids/TNFs/old age (latent TB)

Tuberculosis South East 2013

- 31 cases 2013 (prov., vs 25 cases 2012)
- 464 contacts (ave. 12 contacts/case)
- 5 active TB, 117 latent TB (82 treatment)
- 6 cases contacts in congregate settings:
  - two third level institutions
  - one general hospital
  - one day care centre for the elderly
  - one direct provision centre for immigrants
  - one residential facility for people with physical and intellectual disabilities
- Outbreak with 7 active cases in a city

Diphtheria

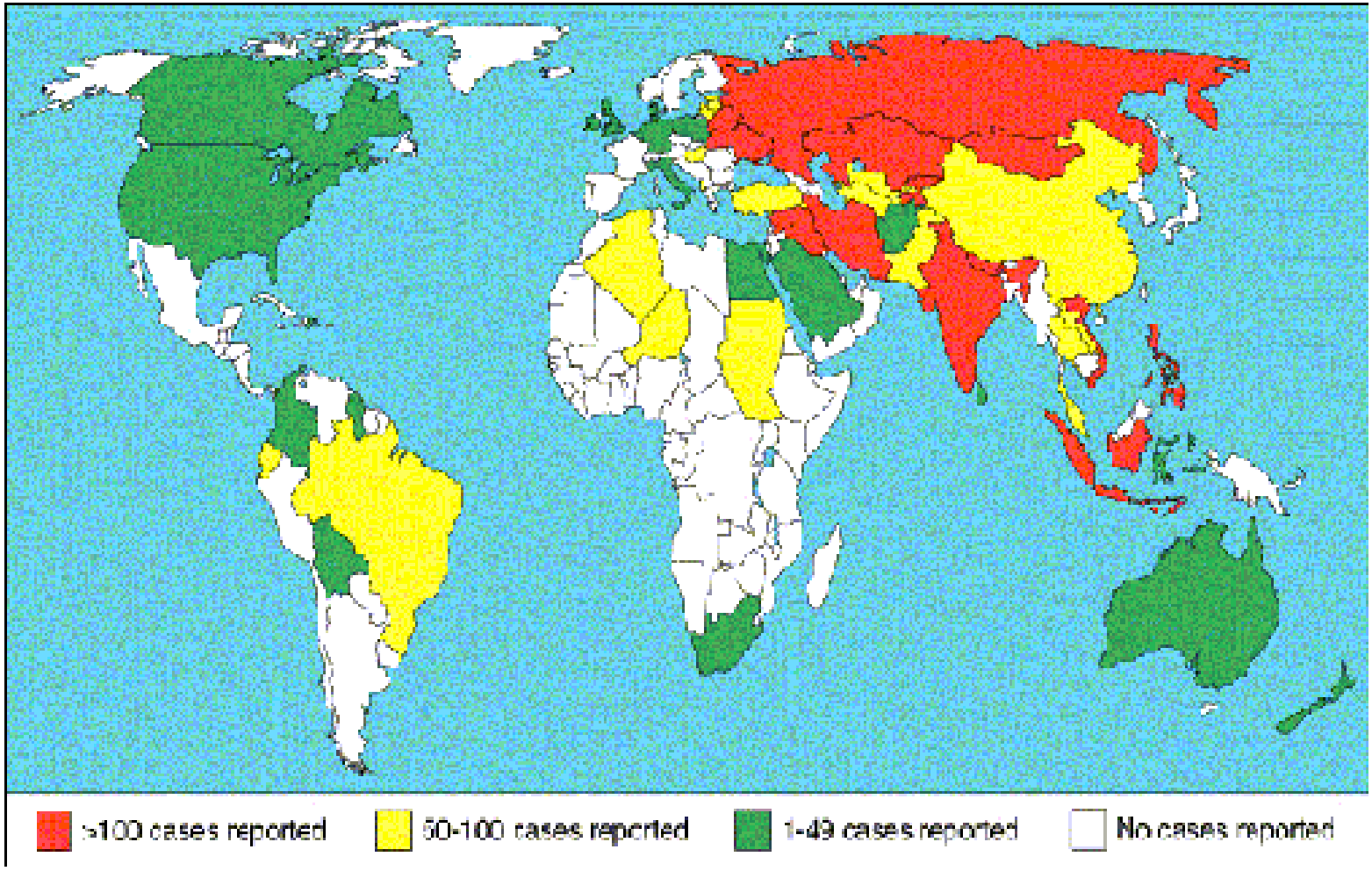
- **Clinical presentation (IP 1-5 days)**
  - low-grade fever precedes →pharyngeal pseudomembrane & lymphadenopathy
  - Nasal diphtheria (sero-sanguionous discharge)
  - Skin/wound ulceration

  Systemic effects of toxigenic diphtheria
  - Myocarditis, polyneuritis

- **Early diagnosis essential**
  - Early treatment– diphtheria anti-toxin and antibiotics (macrolides or penicillin)
  - Rapid investigation and control measures

- **Prevention**
  - High diphtheria vaccination coverage must be maintained

Diphtheria Hotspots 1997 - 2006; cases reported to the WHO



Source WHO

Pertussis (Whooping cough)

- IP: 4-21 days
- Initial rhinorrohea, then irritating cough, then cough spasms +/- vomiting, whoop. Apnoea/cyanosis in babies
- Easily spread by droplets (coughing/ sneezing), often from older child/adult (often mild disease)
- Vaccine/disease immunity wanes over time
- Early notification (on clinical suspicion) essential for protection of vulnerable contacts
- Antibiotics v early can reduce length of disease/transmission or reduce severity in contacts
- Vaccination of pregnant women and HCWs in close contact with infants advised

Pertussis South East

- Increase in notifications 2011 and 2012 (x 4 2011)
- Similar increase in activity throughout developed world – decreased immunogenicity acellular pertussis vaccine (1996)

Diagnosis

- Laboratory confirmation, serology or nasopharyngeal aspirate preferred but perinasal acceptable (esp in very young)
- Do not wait for confirmation before notifying to PHD (NB for protection of vulnerable contacts)
- Standard and droplet precautions advised to minimise risk of transmission

Public Health action, Pertussis

- Exclude case from creche/school/work until completed 5 days of appropriate antibiotic treatment or for 21 days after onset of illness if no antibiotic treatment given
- Contact management proceeds for all cases regardless of confirmation
- Family members or people sharing a house are considered household contacts
- Other types of contacts e.g.work/school/creche generally not considered close contacts

Contact risk assessment

- Clinical history obtained
- Vaccination record required and advised to complete age appropriate vaccinations
- Chemoprophylaxis only when both:
  - Onset of disease in index case is <21days AND
  - There is a vulnerable close contact present

Vulnerable contacts

- Newborn infants born to mothers with suspected or confirmed pertussis, who are still infectious at delivery
- Infant <1yr who have not received 3 doses of pertussis containing vaccine
- Children <10 not age appropriately vaccinated
- Women in last month of pregnancy
- Adults who are HCW, social care or childcare facility and have contact with vulnerable individuals

Tetanus

- Incubation period: 4-21days
- Acute neurological condition – muscle rigidity and contractions
- Caused by toxin produced by *C tetani*
- Spores present in soil and gut/faeces of cows, sheep, horses, chicken, heroin
- Anaerobic
- Vaccine protection ↓ with time – without booster up to 50% of 20yr olds and up to 70% of 70yr olds may be unprotected

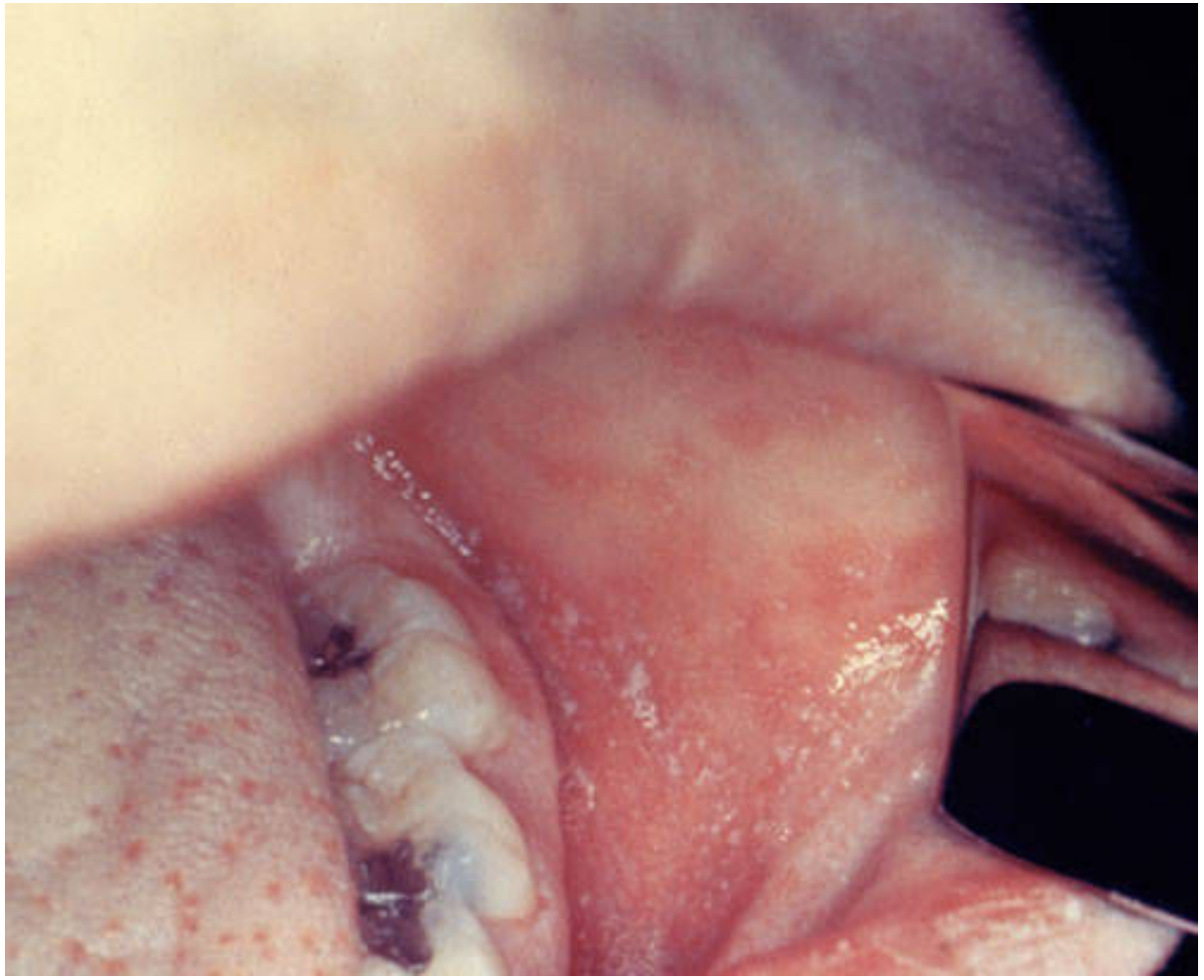
Polio

- Highly infectious viral disease
- Faecal-oral transmission
- 95% of infected no symptoms
- primarily affects children < 5 yrs of age
- Causes paralysis 1 in 1000 infants, 1 in 10 adults.
- Before 1988 Global Polio Eradication initiative
  - polio paralysed > 1,000 children a day
  - ↓ by 99% (406 cases 2013)
- 2002 Europe certified polio free
- 36 cases Syrian Arab Republic since 2013 (last previous case 1999)

Measles

- IP: 7-18 days
- Highly infectious, spread by droplets
- Infectious from 4-5 days before to 4 days after rash onset
- Prodrome: fever, unwell, rhinorrhoea, conjunctivitis, cough; Kopliks spots
- Rash – red, maculopapular, starts behind ears face, trunk and limbs; lasts at least 3-4 days; may leave brown colour
- ~30% cases have complications – pneumonia, otitis media, diarrhoea, convulsions, encephalitis (0.1%), death (0.5-0.1%)
- In pregnancy can cause spontaneous abortion or premature labour

Koplik’s Spots



Measles rash

Public Health Actions

- Early notification NB, if Caredoc ensure notifcation next working day
- Obtain clinical history from clinician
- Request laboratory confirmation –buccal swab
- Advise remain off work/school/creche for 5 days
- Obtain information on close contacts during infectious period

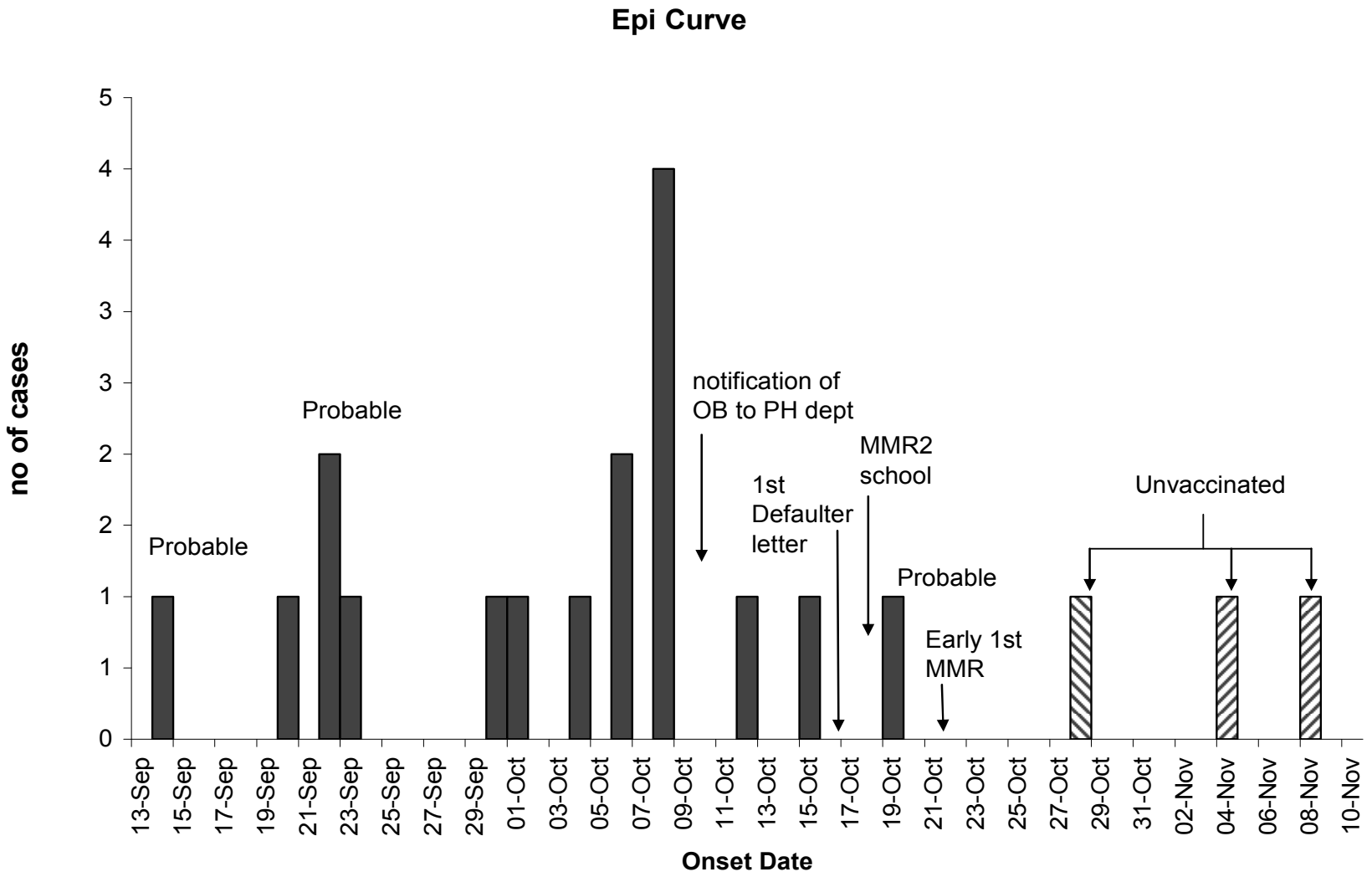
Contact Management

- MMR within 72h of contact with case may prevent/attenuate illness in susceptible contacts
- Household contacts:
  - MMR for un- or partially immunised contacts without a history of measles infection born since 1978;
  - early second MMR for pre-school age household contacts over twelve months;
  - Consider early first MMR for household contacts between six and twelve months;
- Crèche/School: ensure all contacts age-appropriate vaccination
- identification of vulnerable contacts, including pregnant women, infants 5-12 months and immunosuppressed and assessment of immunity/need for human normal immunoglobulin (HNIG);
- recognition of measles in contacts and seeking medical attention.
- If vaccination required or a letter distributed PHD will inform
  - CHIO & Vaccination team
  - Local GP's

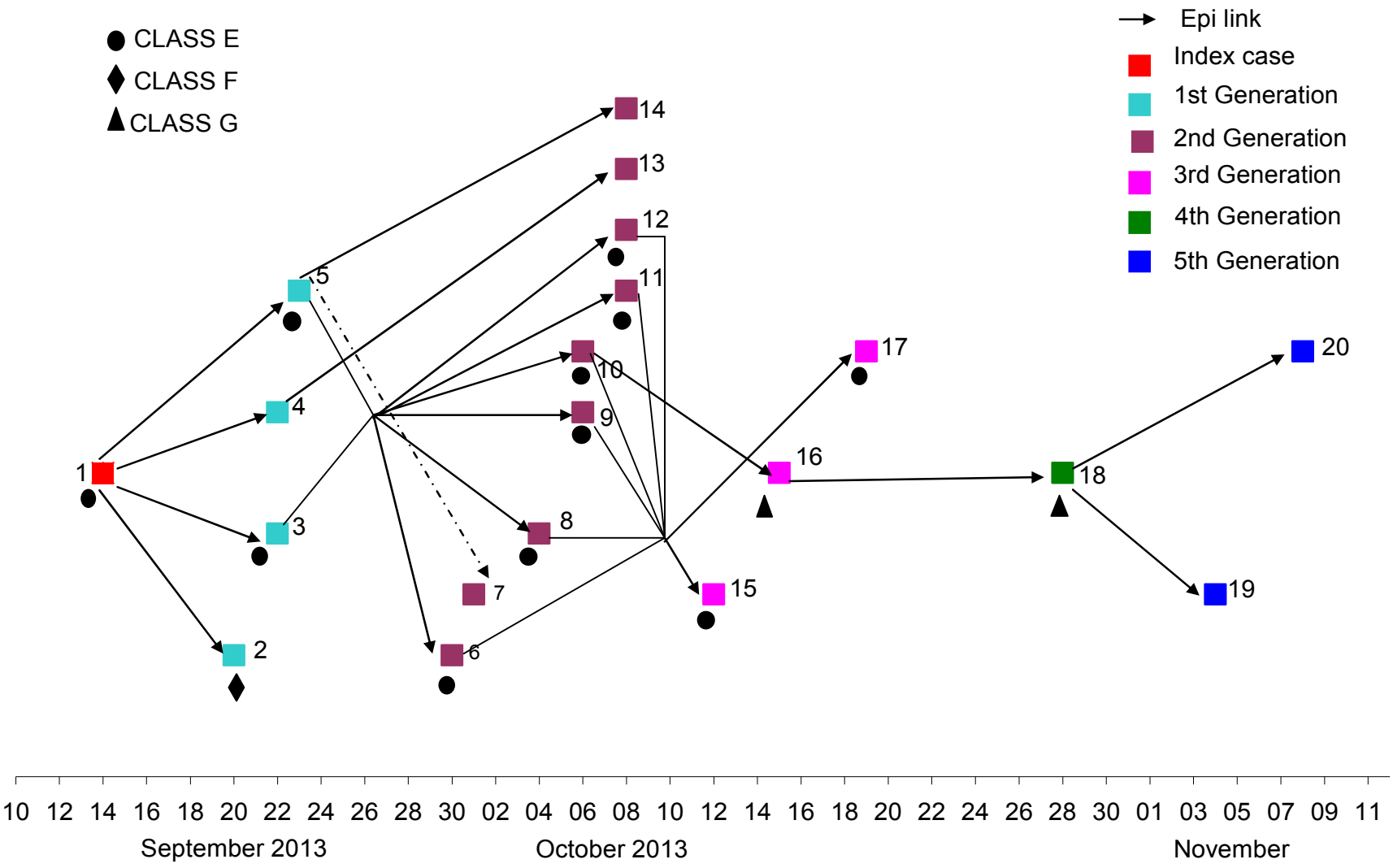
Measles Outbreak Waterford 2013

- Vaccination team notified PHD of 5 cases of rash-illness in a school, reported to them on routine vaccination programme visit
- Case of “measles” a couple of weeks earlier
- 1st notification of these cases to PHD, although suspected clinically to be measles
- 20 cases over 2 months
- Multidisciplinary OCT convened

Onset dates and actions



Chain of transmission



Outbreak control measures

- **Case follow-up and contact tracing (as above)**
- **Advice to school: vaccination and exclusion – unvaccinated and immunocompromised**
- **Vaccination control measures:**
  - **Early 2nd MMR in JI class**
  - **Planned catch-up prog brought forward**
  - **Unvaccinated identified and advised**
  - **Early 1st MMR for 6-12 months**
  - **Early 2nd MMR if in creche**
- **Advice to creches**

Mumps – an acute viral infection

- Swelling of salivary glands
- Incubation 14-25 days
- Up to 40% asymptomatic
- Complications:
  - Parotitis: 30-40% cases
  - Orchitis 20-50% post pubertal males
  - CNS involvement 15%
  - Pancreatitis 2-5%
  - 1/20,000 deafness
- 2 national outbreaks 2004/5 and 2008/9:teenagers/young adults

Rubella

- Transmission by droplet or direct
- IP: 14-21 days
- Infectious: 7 days before to 7 days after rash
- Prodromal symptoms - rare in children
- Lymphoadenopathy neck may preceed rash
- Rash starts on face and neck - short lived, not specific

Congenital Rubella Syndrome (CRS)

CRS may include all or some of the following:

- Deafness
- Cataracts
- Heart defects
- Microcephaly
- Mental retardation
- Hepatitis, splenomegaly
- Growth retardation

Invasive Meningococcal Disease

(Neisseria meningitidis)

- Meningitis: bacterial organisms include Group B *Streptococci*, *E. coli*, *N. meningitidis*, HiB, *S. pneumoniae*
- *N. meningitidis* serogroups A, B, C, Y, W, etc
- Invasive *N. meningitidis* causes meningitis, septicaemia
- 10% pop. carry *N. meningitidis* in nasopharynx – peak in 15-19 age group
- Why invasive for some? RTI (inf); smoking; living in closed or semi-closed communities
- Most common infancy and early childhood, 2nd small peak adolescents
- Winter and early spring in Ireland

Meningococcal Disease

Non-blancing rash:

Source: courtesy of www.meningitis-trust.org

Invasive Hib disease

(*Haemophilus influenza type b*)

- Most invasive *H.influenzae* infections: type b
- Common cause meningitis (50-65% cases)
  - Mortality ratio 2-5%
  - Permanent neuro sequelae 15-30%
- Epiglottitis 17%
- Other sites infection
  - joint (8%), skin (6%), pneumonia (15%), and bone (2%).
- In 2005 (after introduction of 3-dose vaccine in 1992) increase in iHiB in fully-vaccinated children - booster HiB vaccine added at 12/13 months

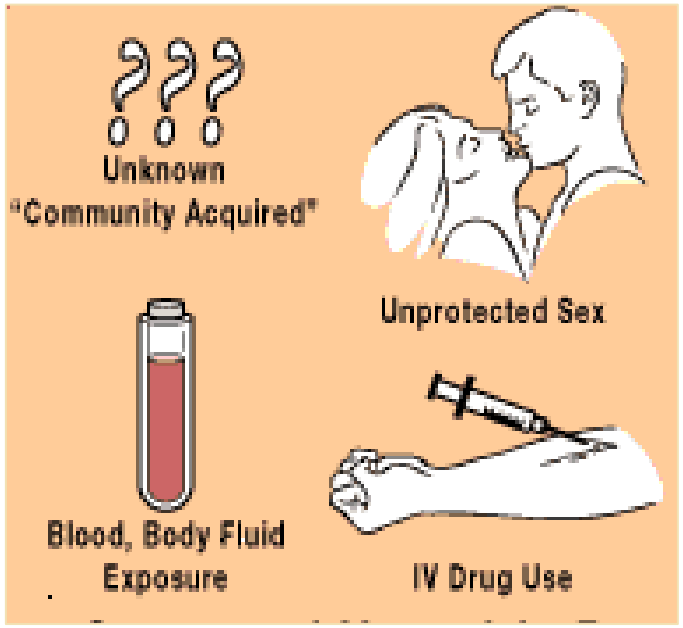
Invasive Pneumococcal Disease (IPD)

- *Streptococcus pneumoniae* can cause both invasive and non-invasive disease
- IPD - disease of early childhood, older adults, immune compromised; asplenia; chronic disease
- 90 serotypes *S. pneumoniae* have been described
- Causes: sepsis, meningitis, pneumonia, sinusitis, acute otitis media, cellulitis, endocarditis

Hepatitis B virus

- BBV; 50-100 times more infectious than HIV
- lasts up to 7 days on surface
- 90% of infected infants and 1-10% of adults - chronic HBV infection
- Chronic infection can lead to chronic liver disease, cirrhosis and/or hepatocellular cancer
- Death from chronic liver disease ocurs in 15-25% of chronically infected people
- Acute infection: Irish; 20-40y olds; symptomatic; usually resolves
- Chronic: Non-Irish born (SE Asia; Africa; East Europe); not symptomatic

- >350 million people chronically infected worldwide
- Vaccine preventable



Influenza

- Highly infectious viral illness
- Incubation period 1-3 days
- Infectious 1-2 days before feeling sick to 5 days after symptom onset
- Unlike common cold, onset is very sudden and one can be sick for a week or more

Public Health Actions

- Surveillance carried out on children <14yrs who are hospitalised
- Investigate and advise long term care facilities where outbreak suspected
- As well as infection prevention and control advice re
  - Confirming diagnosis i.e viral swab
  - Treatment -Tamiflu

Conclusion

- Are you and your staff appropriately vaccinated?
- Annual Flu vaccine
- Pertussis if working with infants