Vaccine Preventable Diseases (VPD)

Immunisation Study Day
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Some VPD that are notifiable

- Tuberculosis
- Diphtheria
- Pertussis
- Tetanus
- Invasive *Haemophilus 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-sanguinous 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 rhinorhoea, 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 <21 days 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: 4-21 days
- 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 notification 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
• 1\textsuperscript{st} notification of these cases to PHD, although suspected clinically to be measles
• 20 cases over 2 months
• Multidisciplinary OCT convened
Onset dates and actions

Epi Curve

Onset Date

no of cases

0
1
2
3
4
5

13-Sep
15-Sep
17-Sep
19-Sep
21-Sep
23-Sep
25-Sep
27-Sep
01-Oct
03-Oct
05-Oct
07-Oct
09-Oct
11-Oct
13-Oct
15-Oct
17-Oct
19-Oct
21-Oct
23-Oct
25-Oct
27-Oct
29-Oct
31-Oct
02-Nov
04-Nov
06-Nov
08-Nov
10-Nov

Probable
Probable
Unvaccinated
Probable
Early 1st MMR
Probable
1st Defaulter letter
MMR2 school
notification of OB to PH dept

1st Defaulter letter

2
2
1
1
0
0
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 J1 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 precede rash
- Rash starts on face and neck - short lived, not specific
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 occurs 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