# Public Health and Outbreak Realistic Management



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### **Summary of Presentation**

- 0 Background of outbreaks and public health
- 0 What is surveillance of infectious disease?
- 0 Why is it necessary?
- 0 What is the legislation in this area?
- 0 The notification process
- O How surveillance provides **evidence** for public health action

## ••• 19<sup>th</sup> Century London



- Poor sanitary conditions
- Cesspools in basements
- Waste dumped in to River Thames

### • • • Cholera



- Severe Diarrhoea
- Dehydration Shock Death









Talked with locals

Histories / exposures

Studied pattern of disease - mapping

#### 1854 Broad Street Cholera Outbreak



# Public water Broad St Pump



 'The result of the inquiry, then, is, that there has been no particular outbreak or prevalence of cholera in this part of London except among the persons who were in the habit of drinking the water of the above-mentioned pump well.'

• Control measure: • Remove Handle



### ••• US Outbreak 1980's

o The initial cases were a cluster of injecting drug users and homosexual men with no known cause of impaired immunity who showed symptoms of 'Pneumocystis carinii' pneumonia (PCP)



## ••• US Outbreak 1980's

• Number of homosexual men developed a previously rare skin cancer called Kaposi's . sarcoma



o Many more cases of these rare forms of pneumonia and sarcoma occurring together





- CDC task force formed to monitor the outbreak
- o "the 4H disease"
- heroin users, homosexuals, haemophiliacs and Haitians
- o "GRID"
- o gay-related immune deficiency
- o 1982: Acquired Immunodeficiency Syndrome



#### Surveillance – why?

- To allow planning for ID prevention and control
  - particular diseases of public health importance e.g. TB, meningococcal disease, malaria ...
  - particular disease problem e.g. antimicrobial resistance
- National Infectious Disease Legislation
- o International requirements



STATUTORY INSTRUMENTS.

S.I. No. 452 of 2011

INFECTIOUS DISEASES (AMENDMENT) REGULATIONS 2011

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#### **Departments of Public Health (8)**

- Director of Public Health
- Public Health Medicine Specialists
- Senior Medical Officers (SMOs)
- Specialist Registrars (SpRs)
- Surveillance Scientists
- Nursing Professionals
- Research Officers
- Information Officers
- Administration Staff
- +/- Other

### Methods of Notification



### ••• Methods of Notification



- Electronic information system
- o All Depts of Public Health
- o All major Microbiology labs





## What happens following a notification? Role of Public Health Doctor

#### S.I. No. 390/1981 – Infectious Diseases Regulations 1981

On becoming aware of a case or a suspected case of an infectious disease shall:

- make enquiries to investigate the nature and source of infection
- for preventing the spread of infection
- and removing conditions favourable to such infections

### What happens following a notification?

- Most notifications are sporadic i.e. individual case of salmonella associated with a BBQ
- o Generic questionnaire is completed

• •

 Broad exposure data collection – demography, onset of symptoms, symptoms, outcome of illness



### What happens following a notification?

- Specific questionnaire
  - Risk factors especially in high risk groups
  - Focused exposure data collection food histories, foreign travel, exposure to animals, water
- Food or water source suspected
  - Environmental Health Officer
  - Food or water samples taken





#### Surveillance data - how used?

For the prevention, management and control of ID

o Control spread of disease

#### o Identify outbreaks early

 An episode in which two or more people, thought to have a common exposure, experience a similar illness or proven infection

 $\bullet \bullet \bullet$ 

#### Who is involved? Depends on organism

• Public health doctors



- o Microbiologists and lab staff / Infection Control Staff
- Veterinary officers
- Department of Agriculture staff

• Environmental health officers

- · Food Safety Authority of Ireland
- Health Protection Surveillance Centre
- Others as required

#### Surveillance data - how used?

For the prevention, management and control of ID

- Monitor disease trends - changing?
- Provide evidence for public health interventions - immunisation programmes
  - information campaigns



#### **Evidence for Intervention**

First Example: Meningococcal Disease

- Ireland had highest levels of meningococcal disease in Europe
- Group B (2/3) and Group C (1/3)
- 11 Group C deaths between July 1999-June 2000
- o Highest risk in the under 5's and 15-18 years

Evidence for public health intervention Men C vaccine introduced Oct 2000

#### **Meningococcal Disease**

Cork & Kerry 1998-2011





#### **Evidence for Intervention**

Second Example: VTEC Infection

- o Verocytotoxigenic E.coli (VTEC)o Potentially very serious ID pathogen
- Caused by no. different strains [best known E.coli O157]
- 5-10% complication HUS Haemolytic Uraemic Syndrome



#### VTEC Notifications HSE-South 2012



Marked increase in VTEC notifications

 rural areas in particular

- doubling of rate of HUS notifications

### ••• VTEC Outbreak

Contaminated private well water supplies

↑ average rainfall



Need for public health intervention

National multi-agency expert group established (HSE, EPA, Local Authorities, FSAI) Fieldmanneter na Scitthise Stilme Bealth Service Executive



Sh June 2014: The Environmental Protection Agency (EPA) and the Health Senice Executive (HSE) are advising people that water supplies from private wells can be contaminated with E-coli. The HSE meanshift exposts a growing number of cases of UFEC a particulary serious and nastly from of E-coli. Analysis of cases shows that people treated for VTEC are four times more likely









FSAI Urges Farms to be More Vigilant Against Verotoxigenic E. coli Infection

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#### Deadly E-coli strain is now widespread in private wells sam Griffin PUBLISHED EF E



A number of private wells have been infected with e-coli



### ••• Ebola







- Viral Haemorrhagic Fever
- Severe disease in humans and nonhuman primates (monkeys, gorillas, chimpanzees)

### Ebola cases, per outbreak





### ••• Current Outbreak

 Public Health Emergency of International Concern (PHEIC)









### • • • Spread



- Natural Reservoir unknown
- First person gets infected through contact with an infected animal



### ••• Modes of Transmission

 Direct exposure to the blood, bodily fluids, of a dead or living infected person or animal



 Injury from needles and other sharp implements contaminated by the blood of a dead or living infected person or animal



### Modes of Transmission

 Items that have become contaminated with an Ebola patient's infectious fluids such as soiled clothing, bed linen, or used needles



 Contact with bodily fluids includes unprotected sexual contact with patients up to 12 weeks post recovery

### Incubation Period

 Interval between being in contact with an infected person and developing symptoms of disease varies between 2-21 days



### ••• Treatment





#### **Further information**

- Health Protection Surveillance Centre www.hpsc.ie
- National Immunisation Office www.immunisation.ie
- European Centre for Disease Control www.ecdc.eu
- Centers for Disease Control and Prevention <u>www.cdc.gov</u>
- World Health Organisation www.who.ie