MINISTRY OF HEALTH
SINGAPORE

Control of Outbreak: Overview


BIRD FLU...
ME?? I FEEL GREAT! HONESTLY! JUST FINE. NOT EVEN A HINT OF A SNIFFLE... NEVER BEEN BETTER...
©Fowlings
fowlingc.ca


OUTBREAK
WARNER BROS. PRESENTS
AN ARNOLD KOPELSON PRODUCTION
IN ASSOCIATION WITH PUNCH PRODUCTIONS, INC.
A WOLFGANG PETERSEN FILM
DUSTIN HOFFMAN RENE RUSSO MORGAN FREEMAN "OUTBREAK" CUBA GOODING, JR. PATRICK DEMPSEY
WITH DONALD SUTHERLAND AND KEVIN SPACEY MUSIC BY JAMES NEWTON HOWARD
EDITED BY NEIL TRAVIS, A.C.E. LYNZEE KLINGMAN, A.C.E. AND
PRODUCTION DESIGNER WILLIAM SANDELL
DIRECTOR OF PHOTOGRAPHY MICHAEL BALLHAUS, A.S.C.
AND ANNE KOPELSON
WRITTEN BY LAURENCE DWORET & ROBERT
PRODUCED
WOLFGANG PETERSEN AND GAIL KATZ
DIRECTED BY WOLFGANG PETERSEN
DVD VIDEO
DOLBY DIGITAL


OUTBREAK

What is an Outbreak

Occurrence of disease above the expected levels.
e.g., endemic (usual occurrence) vs. epidemic (exceeds usual occurrence)

The unexpected occurrence of more than 2 cases:

a) identified with infection – an “uncommon happening”
b) of an usual organism
c) of unusual antibiotics resistance patterns.

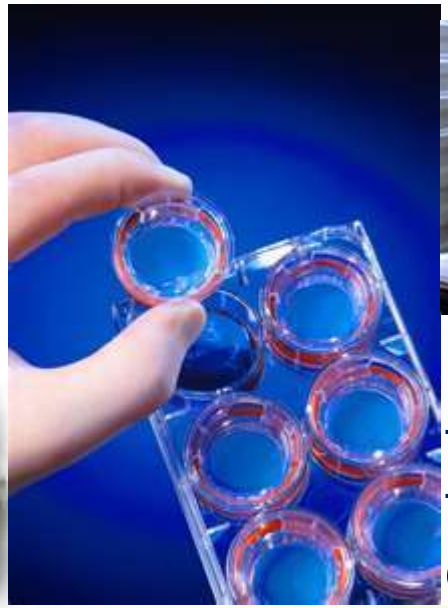
In Early Years

ICN/ ICO

A Team:

- IP/ICO/ICN
- Micorbiologist
- PHOs
- IDs
- statisticians

In Present Day



Technology
Techniques
GIS

Outbreaks in Residential Care Home For the Elderly

- Occur because of
  - susceptible population, multiple potential for exposures and transmission
- Preparation includes
  - clear policies and procedures for investigation of clusters or epidemics
- Potential causes include:
  - Influenza like illness, other respiratory illness, foodborne, norovirus, conjunctivitis ,etc

Purpose of Outbreak Investigation

- Identify the etiologic agents
- Identify the unique reservoir
- Identify the mode of transmission
- Eliminate the reservoir and transmission
- Prevent future outbreaks

In addition:

•To strengthen surveillance activities at local level
•To advance the knowledge about the disease
•To provide training opportunity

Initial Call

What to do?

First….

Steps in Outbreak Investigation

1. Verify the diagnosis
2. Confirm the outbreak
3. Case definition
4. Define population at risk
5. Test and formulate the hypothesis:

   a) source of the agent
   b) mode of transmission - vector or vehicle
   c) exposure that caused disease
   d) analysis and data interpretation

6. Implement control measures
7. Refine the hypothesis
8. Write and distribute a report

- Sequence may vary
- Many steps occur simultaneously and in conjunction with outbreak control
- Facility outbreak Policy and Procedure

1. Verify The Diagnosis

Review clinical findings and laboratory results of the cases identified:

- Check with the laboratory –to exclude errors
- Review and summarise clinical findings of the cases identified
- Determine the infections

2. Confirm existence of the outbreak

- Is there really a problem? Is outbreak truly occurring?

a) True outbreak

b) Sporadic and unrelated cases of same diseases

c) Unrelated cases of similar but unrelated diseases

Supporting Data, Facts, Examples, Evidence

- Determine the expected number of cases before deciding whether the observed number exceeds the expected number

- Compare observed with expected
- Through surveillance data and laboratory records
- Hospital discharge data, registries, mortality statistics

Establish a case definition

- Case definition
  - Includes clinical criteria and restrictions by time, place and person
  - Often contains laboratory data
  - Must be applied consistently and without bias to all persons under investigation
  - Must not contain an exposure or risk factor to be tested (e.g., surgeon, cleaning agent)

Establish Case Definition –How?

- Classification:
  - Definite (confirmed by lab)
  - Probable (not confirmed by lab- but typical clinical features)
  - Possible (suspected- less clinical features)

- Early in investigation will establish a wide (broad) case definition:

  - better to collect more than less
  - to identify extent of problem and population affected
  - to generate hypothesis

- Later in investigation- the case definition may be “tightened” when hypothesis are sharpened

Action to be taken

With a suspected diagnosis:

Initiate/ implement outbreak control measures as soon as possible to manage the infected residents/staff and spread of infection.

4. Define population at risk

1. Determine Information to be collected
- Administrative data

Lab report, duplicate records, location & demographics

- Clinical finding
- Risk factor information

2. Develop data collection forms

Standard case report form/ questionnaire

3. Line listing

Should contain Key information

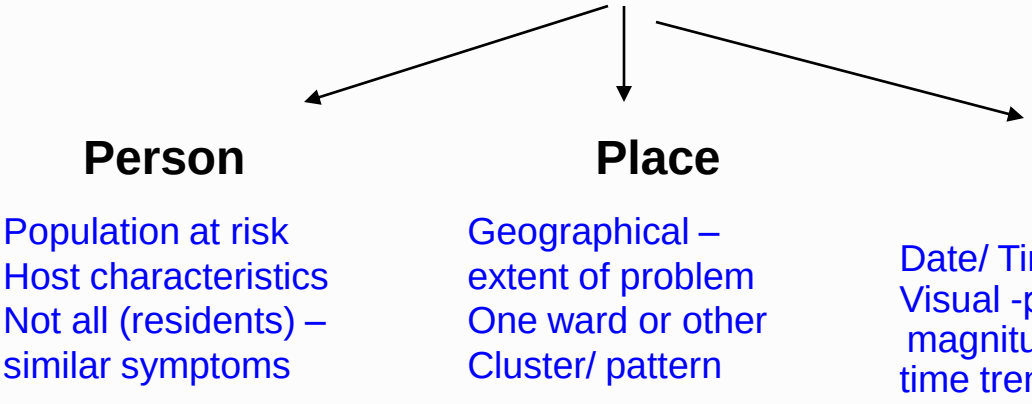
Line Listing of Cases

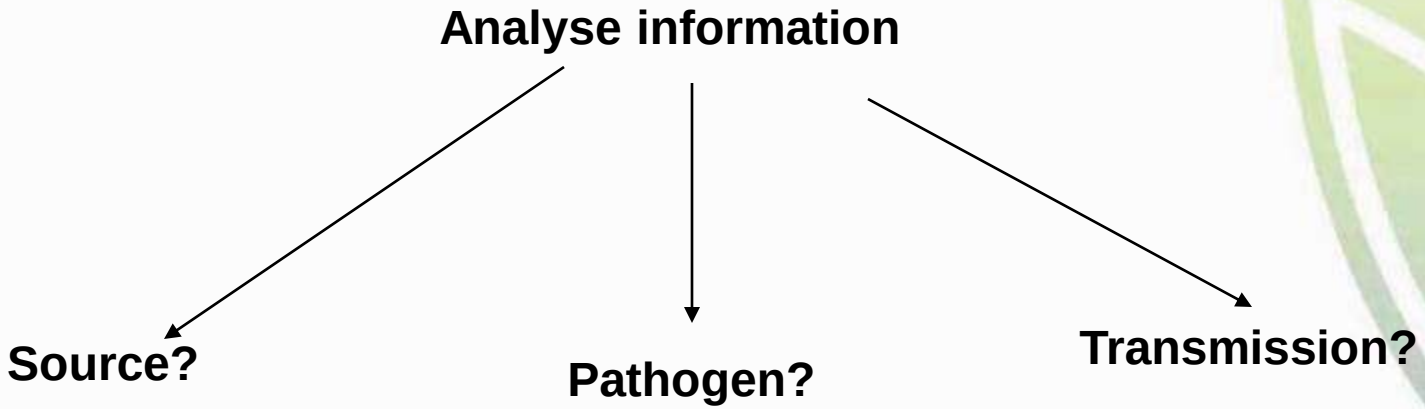
CASE #	Init	Date of Report	Date of Onset	MD DX	N	V	F	Other	Lab	Age / Gend	Ward
1	JG				+	+	-				
2	BC				+	+	-				
3	LW				+	+	+				
4	RD				+	+	+				
5	KW				+	+	-				

Laboratory Investigation

- Appropriate clinical specimens
- Time of sample collection
- Method
- Selection of transport media
- Labeling
- Storage and transportation of samples
- District laboratory

From the data-characterize the outbreak by:





5. Formulation of hypothesis (1)

Based on data analysis and interpretation

Hypothesis should address:

-Source of the agent

-Mode of transmission

vector or vehicle

- Exposure that caused disease

5 .Formulation of hypothesis (2)

Develop hypotheses

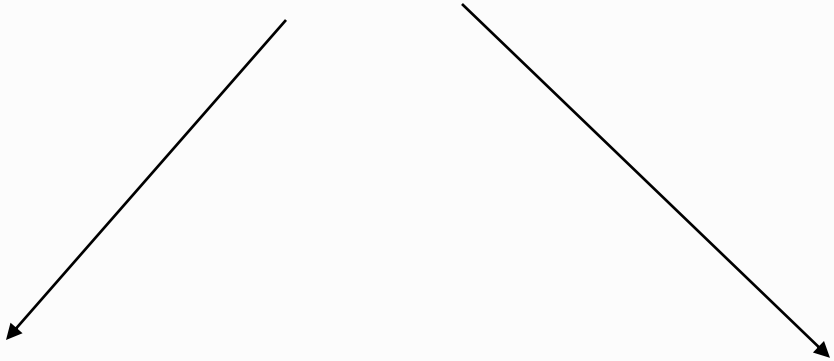
- Who is at risk of becoming ill?
- What is the disease causing the outbreak?
- What is the source of infection?
- What is the mode of transmission?

Compare hypotheses with facts

5. Formulation of hypothesis (3)

Test specific hypotheses

Analytical epidemiological studies
Test specific hypotheses
Formulation



Cohort

Cohort: a well-defined group of people who have had a common experience or exposure. eg all attended the same dinner

Case-control

Starts with effect disease) and looks for cause(exposure)

- Cases (with disease) are identified
- Controls are chosen for comparison
- Uses retrospective data
- Useful for analysis of HAI outbreaks

Attack rate (AR)

- Risk during an outbreak-

  Usually expressed for the entire epidemic period, from the first to the last case

Eg: Outbreak of cholera in country X in March 1999

- Number of cases = 490
- Population at risk = 18,600
- Attack rate = 2.6%

Case-fatality (CFR)

The proportion of people with a disease who dies from *that disease* during a time period that usually corresponds to the duration of the disease. Used for acute diseases. The cumulative incidence of deaths.

The risk of dying from a disease in a time period (the duration of the disease)

CFR = $\frac{\text{number of deaths from the disease}}{\text{number of people with the disease}}$

CFR = 0 to 1, or percent, per million etc., but the period must be stated

6. Implement Prevention/ Control Measures

Implement control measures as soon as possible

May be aimed at agent, source or reservoir

Short or long term

6. Implement Prevention/ Control Measures (2)

Basic control measures

Institute as early as possible!

HH
Use effective product eg chlorites

Control the reservoir or source of infection

Remove the source/ thorough cleaning

Interrupt route(s) of transmission

Segregate affected residents
Wear appropriate PPE

Modify host response

Communication
-Staff informed of findings
- additional precautions/measures?

Prevent recurrence

8. Refine Hypothesis/Additional Studies

- What control measures – to consider at this point?
- What further studies – you might do?

9. Write a Report

- Summary/ Abstract
- Background
- Description of the outbreak
- Methods
- Results
- Discussions
- Lessons Learned
- Recommendations
- Conclusions

Outbreak Investigation Report:
Who writes, when, who reads

- Who writes
  - The outbreak investigation team
  - Other authors as assigned
- When
  - When the investigation is ‘complete’
  - When the investigation is ‘ongoing’
- Who reads
  - All agencies involved in outbreak investigation and response
  - Policy making bodies, professional colleagues
  - The public, the lawyers, the media

Outbreak Investigation Report: What and Why

- What
  - Findings during different stages of outbreak investigation
- Why
  - To document for action
  - Share new insights
  - Provide record of performance
  - To verify and substantiate recommendations

In order to:

  - To enhance quality of investigations
  - prevent future outbreaks
  - assist in investigation and control of similar incidents
  - provide a document for potential legal issues

Summary

- Effective outbreak management:
- - early reporting /identification
- - rapid implementation of control measures
- - outbreak control team
- - roles and responsibilities
- - communication
- - implement recommendations

Summary: Steps in Outbreak Investigation

- Verify the diagnosis
- Confirm the outbreak
- Case definition
- Descriptive epidemiology
- Develop a hypothesis
- Test the hypothesis
- Implement Control Measures
- Refine hypothesis / Execute additional studies
- Write and distribute a report

Acknowledgement and thanks for sharing her materials for this presentation:

Ms Barbara M. Soule, RN, MPA, CIC
Practice Leader, Infection Prevention and Control Professional
Joint Commission International

MINISTRY OF HEALTH
SINGAPORE

Thank You