



ESR Epidemiological Skills Development Programme

Module 2.1

Outbreak Investigation and Control Course

Course Outline

Christine Roseveare
Toby Regan

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Aims and Objectives and Learning Outcomes

Purpose of this course

To strengthen the ability to investigate and control outbreaks of disease

Overall objectives

By the end of the course students will be able to:

- Understand the importance of outbreak investigation
- Identify potential outbreaks
- Plan and execute all the necessary steps to carry out a simple investigation, and be able to support a more complex one
- Understand the importance of the laboratory component of an outbreak investigation
- Identify and carry out effective disease control measures

Competencies

The course will develop competencies in the following areas:

- Surveillance
- Epidemiological concepts
- Outbreak Investigation skills
- Epidemiological Analysis
- Reporting
- Outbreak Prevention and Control
- Organisation and management of outbreak response

Desired Learning Outcomes

On successful completion of this course participants will **know/understand**:

- The importance of outbreak investigation
- The roles and responsibilities of the main agencies involved in outbreak investigation
- The role of formal and informal surveillance systems in detecting outbreaks
- The essential organisational and operational aspects of an outbreak investigation
- The objectives of environmental investigation
- The critical role of community and specialist laboratories in an outbreak
- The two types of epidemiological study
- The steps involved in carrying out a retrospective cohort study
- Likely public health service role in a dispersed multijurisdictional outbreak and case control studies
- Know and understand the importance of the ESR Outbreak Guidelines

On successful completion of this course participants will **be able to**:

- Describe the steps of an outbreak investigation

- Confirm an apparent increase in cases as representing an outbreak
- Develop and use case definitions
- Apply the process of case finding
- Describe data by person place and time
- Develop and interpret epidemic curves
- Calculate incubation periods
- Recognise good interview techniques?
- Follow an analysis plan
- Understand how to construct an attack rate table
- Understand attack rates and measures of association
- Understand how to interpret tests of significance
- Describe measures available to control outbreaks
- Accurately document an outbreak report form
- Prepare an in house outbreak report
- Take a significant role in an investigating and controlling a common event outbreak/outbreak requiring a retrospective cohort study
- Provide support to a multi-region outbreak investigation requiring a case control study
- Lead a post outbreak debrief with the local outbreak team

Session content overview

The sessions reflect the ESR outbreak manual

Session 01: Context and importance and overview of outbreak investigation

- What is an outbreak
- Why outbreak investigations are important
- The main types of outbreaks
- The key agencies involved and their roles
- Key legislation (Privacy Act, Health Act)
- The steps in an outbreak investigation
- An example of an outbreak

Session 02: Surveillance, identification, confirmation and assessment

- Methods of identifying outbreaks
- Confirming that increases are real
- Verifying diagnosis
- Assessing risk and appropriate level of response/investigation triggers

Session 03: Investigation, preparations and practicalities

- Being prepared
- The outbreak team
- Protocols
- Materials and supplies
- Important Initial actions/Investigation triggers

Session 04: Case definitions and case finding

- How to establish case definition by time, place, and person
- Possible, probable and confirmed case definitions
- Selection of case definition
- Examples from selected outbreaks
- Methods for finding cases
- Creating line listings

Session 05: Epidemic curves and incubation periods (Descriptive Epidemiology)

- Frequency distributions
- How to plot epidemic curves
- Selected examples from published outbreaks
- Curve interpretation: determining the mode of transmission, exposure or incubation period
- Common mistakes in the preparation and analysis of epidemic curves
- Describing person, place and time

Session 06: Analytical epidemiology: Study design and data collection

- Study design options
- Retrospective cohort studies and case control studies
- The main steps involved in carrying out a retrospective cohort study
- Pluses and minuses of various ways of collecting study data
- Interview techniques
- Data Collection

Session 07: Role of the laboratory

- Importance of the laboratory
- Working with the lab
- Tips and traps when taking clinical samples
- Case study: A success story of working with the laboratory
- Introduction to the laboratory and key staff
- Taking samples (food, environmental, water)

Session 08: Environmental investigations

- Objectives of environmental investigation
- Tips for effective investigations
- Protocols and frameworks that might help
- Taking samples (food, environmental, water)
- Interpreting the findings of a site investigation

Session 09: Analytical epidemiology: Analysing and interpreting data

- Data analysis plan - What you do
- Calculating attack rates
- Risk ratios
- Strength of association
- Interpreting results
- Is the association real?
- Statistical significance and confidence intervals
- Challenges: no association, multiple associated exposures, few explained cases
- Practical examples

Session 10: Options streams

We offer two sessions allowing participants an option to explore an aspect of the two main investigation streams (analytical epidemiology and field investigation (environmental)).

Topics include:

Theme	Description
Analytical option session	Introduction to EpiInfo. This session will provide a hands on session to provide participant with a 'taste' of what EpiInfo can do and how it might be used in an outbreak situation. It is not expected that participant will be competent to analyse outbreaks following this

	session, ESR offers a two-day intensive training course that provides these skills (2.2 EpiInfo and EpiData course).
Environmental investigation option session	This session is provided by practicing Health Protection Officers with expertise in the field and aim to update the investigator on the investigation skills and procedures on the disease in question

Session 11: Outbreak reporting

- The national outbreak report form – what is wanted and how to complete it
- Descriptive reports
- The value of reports
- Structure and elements of the report
- Best practice

Session 12: Debriefing outbreak investigations

- Purpose and expectations of debriefing outbreak investigations
- Tools and techniques for successful debriefs

Session 13: Control and Response Measures

- Review of available outbreak control and response measures
- Successes and failures in outbreak control
- Practical examples
- Legislative tools for outbreak control
- Communication during outbreak investigations

Session 14: Introduction to dispersed outbreaks & case control studies

- Things that come into play with dispersed outbreaks
- Case control studies
- Trace back investigations
- Likely public health service role in a dispersed/multi-region outbreak
- Supporting a case control study

The case studies

Overview

During the course, students will be organised into four groups of 4-5. Each group will receive one of two different case studies to be developed during the work sessions with the help of tutors. The case studies are based on unfolding scenarios and are organised into blocks so that participants may apply the theory covered in sessions to a particular case study.

Objectives of the case studies

- To give students the opportunity to apply theory to a realistic situation
- To develop experience in interactive group processes relevant to outbreak investigation
- To develop the ability to prepare and give oral presentations

Case studies used in the course

- Outbreak of gastroenteritis in a remote setting (adapted to New Zealand from a CDC case study on a pilgrimage to Mecca)
- An outbreak of illness associated with a group of church goers (adapted to New Zealand from the CDC case study of a church supper in Oswego)

Both case studies feature investigations of common events using retrospective cohort designs

What is covered in the case study session blocks

Block 1: Topics covered during session 1 and 2

- Identifying if it is a real outbreak
- Assessing the preliminary data
- Defining the potential aetiological agents
- Determining the needs and objectives of the investigation
- Implementing preliminary response measures.

Block 2: Topics covered in sessions 3 – 6

- Obtaining more detailed information
- Establishing the case definition
- Preparing and analysing the epidemic curve
- Planning the investigation
- Study design

Block 3: Topics will be covered in sessions 7-9

- Data collection and collection of various types of samples
- Analysis of attack rates and identification of possible transmission sources or risk factors.

Block 4: Topics covered in sessions 10-12

- Control measures
- Reporting

Case study presentations

On the last day of the course, one of the two groups assigned to each topic will be selected to make a Power Point presentation of the most important aspects of their investigation, findings and conclusions (10 minutes). The other group will be asked to respond (5 min prep, 10 min discussion), specifically focusing on:

- Asking / Probing with insightful questions (two questions)
- Comment on how the investigation / presentation could have been strengthened (two points)
- Key strengths of first groups presentation (two key points)

A tutor will then close the discussion with a final review (5 minutes).

The tutors/facilitators will assist the groups in the development of the case studies. They will also clarify concepts related to the presentations. A tutor will be permanently assigned to one group and he/she will be present during the entire course.

Assessment

Method of Assessment

The course will consist of three separate assessments:

- In-course case study report (group report) 20%
- Final course test 10%
- Post course assignment 70%

All participants who attend the full course will receive a certificate of attendance. Additionally students will **pass** the course if they

- They achieve a mark of 50% or higher on the final course test,

AND

- Actively participate in and successfully completes their in-course group project,

AND

- They achieve a grade of 50% or higher for the post course assignment.

Feedback on assignments and in course work will be provided to students individually. Certificates confirming successful completion of the course will be sent to the sponsoring agency for presentation to students.

Students that do not submit the post course project within the agreed time frames will not be eligible to pass the course. Students that submit projects that are below the standard required may be provided additional advice and support, at the discretion of the supervisor, to bring the projects up to an acceptable standard.

Post course assignment

The student will be required to prepare and submit a narrative outbreak report on a suitable (approved) outbreak that has occurred within their area (if no suitable outbreaks can be identified your supervisor will provide data). The report should follow the form of a brief outbreak report that could appear in the *New Zealand Public Health Surveillance Report*. It should include the following sections.

Section	Topic
1	Abstract
2	Background
3	Methods
4	Results (frequency of symptoms attack rate table)
5	Discussion
6	Limitations of the investigation,
7	Recommendations

The reports should also acknowledge and describe the analysis in a critical manner and how the limitations or missing information may affect the results and conclusions.

Course tutors will assist students to select the topic, provide guidance for students working on this assignment. The course tutors will grade the assignment.