The Communicable Disease Outbreak Plan: Operational Guidance
## DOCUMENT INFORMATION

<table>
<thead>
<tr>
<th>Title</th>
<th>The Communicable Disease Outbreak Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors</strong></td>
<td>Caroline Hird, Lorraine Lighton, Marian McEvoy, Dily Morgan</td>
</tr>
<tr>
<td><strong>Other Contributors</strong></td>
<td>Sooria Balasegaram, Graham Bickler, André Charlett, Vivien Cleary, Mark Evans, Helen Maguire, Roberta Marshall, Isabel Oliver, Catherine Quigley, Amal Rushdy &amp; John Simpson, HPA David Kidney &amp; Ian Gray, Chartered Institute of Environmental Health</td>
</tr>
<tr>
<td><strong>Approved by</strong></td>
<td>Paul Cosford</td>
</tr>
</tbody>
</table>

## DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Reason for Change</th>
<th>Issue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18th May 2012</td>
<td>Appendix 6. Media relations revised</td>
<td>v1.3</td>
</tr>
</tbody>
</table>

## DOCUMENT REVIEW PLAN

<table>
<thead>
<tr>
<th>Responsibility for Review</th>
<th>Dilys Morgan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next Review Date</td>
<td>4th November 2012</td>
</tr>
<tr>
<td>Nominated Lead - Programme Board sign off</td>
<td>Date</td>
</tr>
</tbody>
</table>
Contents

Abbreviations List ................................................................................................................................. 4
Standards for Managing Outbreaks ........................................................................................................ 5
Outbreak Management Overview .......................................................................................................... 6
1. Introduction ........................................................................................................................................ 7
2. Aim of Guidance ............................................................................................................................... 7
3. Management Arrangements for Handling Outbreaks ..................................................................... 7
4. Recognition of an Outbreak .............................................................................................................. 8
5. Declaration of an Outbreak ............................................................................................................... 9
6. Outbreak Control Team .................................................................................................................. 10
7. Investigation and Control of the Outbreak .................................................................................... 11
8. Legal Issues ..................................................................................................................................... 12
9. Communication ................................................................................................................................ 12
10. End of Outbreak ............................................................................................................................ 13
11. Review and Audit .......................................................................................................................... 13

Appendix 1 – Risk Assessment ............................................................................................................. 15
Appendix 2 - Outbreak Control Team .................................................................................................. 19
   A2.1 Membership of the OCT .............................................................................................................. 19
   A2.2 OCT Terms of Reference ............................................................................................................ 21
   A2.3 Template Agenda for OCT Meeting .......................................................................................... 22
   A2.4 Roles and Responsibilities of Usual Members of the OCT ...................................................... 23
   A2.5 Roles and Responsibilities of Organisations ........................................................................... 27
Appendix 3 - Outbreak Investigation and Control .................................................................................. 30
Appendix 4 – Analytical Studies .......................................................................................................... 33
Appendix 5 – Investigation Protocol ................................................................................................... 36
Appendix 6 – Media Relations .............................................................................................................. 38
Appendix 7 – Final Outbreak Investigation Report ................................................................................ 39
   A7.1 Standard Structure .................................................................................................................... 39
   A7.2 Legal and Confidentiality Issues Related to Final Outbreak Reports ...................................... 43
   A7.3 Disclosure of Outbreak Reports ................................................................................................. 45
Appendix 8 – Audit Tool for Outbreak Standards ................................................................................ 48
Appendix 9 – Outbreak Specific Guidance .......................................................................................... 50
   A9.1 Hospitals and other Health Care Premises ............................................................................... 50
   A9.2 Water Specific ............................................................................................................................ 51
   A9.3 Food Specific Outbreaks ........................................................................................................... 52
   A9.4 Other Specific Outbreaks ........................................................................................................... 54
Appendix 10 - Bibliography .................................................................................................................. 55
Abbreviations List

A&E  Accident and Emergency Department
AHVAL  Animal Health and Veterinary Laboratory Association
CCDC  Consultant in Communicable Disease Control
CDPA  Copyright, Designs and Patents Act
CE  Consultant Epidemiologist
CHP  Consultant in Health Protection
DEFRA  Department for Environment Food and Rural Affairs
DIPC  Director of Infection Prevention and Control
DPH  Director of Public Health
EHD  Environmental Health Department
EHO  Environmental Health Officer
FSA  Food Standards Agency
FOI  Freedom of Information
FOIA  Freedom of Information Act
GP  General Practitioner
HPA  Health Protection Agency
HPS  Health Protection Services
HPU  Health Protection Unit
IERP  Incident and Emergency Response Plan
IT  Information Technology
HSE  Health and Safety Executive
LA  Local Authority
NHS  National Health Service
OCT  Outbreak Control Team
PCT  Primary Care Trust
## Standards for Managing Outbreaks

<table>
<thead>
<tr>
<th>Outbreak Recognition</th>
<th>Initial investigation to clarify the nature of the outbreak begun within 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immediate risk assessment undertaken and recorded following receipt of initial information</td>
</tr>
<tr>
<td>Outbreak Declaration</td>
<td>Decision made and recorded at the end of the initial investigation regarding outbreak declaration and convening of outbreak control team</td>
</tr>
<tr>
<td>Outbreak Control Team</td>
<td>OCT held within three working days of decision to convene</td>
</tr>
<tr>
<td></td>
<td>All agencies/disciplines involved in investigation and control represented at OCT meeting</td>
</tr>
<tr>
<td></td>
<td>Roles and responsibilities of OCT members agreed and recorded</td>
</tr>
<tr>
<td></td>
<td>Lead organisation with accountability for outbreak management agreed and recorded</td>
</tr>
<tr>
<td>Outbreak Investigation and Control</td>
<td>Control measures documented with clear timescales for implementation and responsibility</td>
</tr>
<tr>
<td></td>
<td>Case definition agreed and recorded</td>
</tr>
<tr>
<td></td>
<td>Descriptive epidemiology undertaken and reviewed at OCT. To include: number of cases in line with case definition; epidemic curve; description of key characteristics including gender, geographic spread, pertinent risk factors; hypothesis generated.</td>
</tr>
<tr>
<td></td>
<td>Analytical study considered and rationale for decision recorded</td>
</tr>
<tr>
<td></td>
<td>Investigation protocol prepared if an analytical study is undertaken</td>
</tr>
<tr>
<td>Communications</td>
<td>Communications strategy agreed at first OCT meeting</td>
</tr>
<tr>
<td></td>
<td>Absolute clarity about HPA lead at all times with appropriate handover consistent with handover standards</td>
</tr>
<tr>
<td>End of Outbreak</td>
<td>Final outbreak report completed within 12 weeks of the formal closure of the outbreak</td>
</tr>
<tr>
<td></td>
<td>Report recommendations and lessons learnt reviewed within 12 months after formal closure of the outbreak</td>
</tr>
</tbody>
</table>
Outbreak Management Overview

Incident notified / identified

Initial response & investigation

No outbreak

Outbreak declared

OCT established

No OCT established

Actions

Review as required

Investigation

Control measures

Communications

End of outbreak

---

Epidemiological
Microbiological
Environmental
Veterinary

The source
Mode of spread
Protect persons at risk
Monitor effectiveness

OCT minutes
Communication protocol
Follow IERP protocols
Media

Declare outbreak over
Final outbreak report
Action lessons learnt
1. Introduction
This document provides a framework for the management of outbreaks of communicable disease in England at all levels of the Health Protection Agency (HPA). It is summary operational guidance and not designed to be an in-depth resource for which other texts are available. Although clarity over roles and responsibilities in managing outbreaks is essential, organisation changes over the next year means that a flexible approach may be required during this transitional period. It is suggested that this plan is reviewed at least annually until the new organisational arrangements are established.

In recent years, there have been many outbreak plans extant for the investigation and control of communicable disease in England. Whilst these plans are broadly similar, there has been little consistency of approach and no agreed standards across all parts of the agency. In preparing this HPA Outbreak Plan, a set of standards have been developed, building on previous work. Existing plans currently in use have been reviewed and examples of good practice incorporated in order to establish a common approach applicable at various levels across the agency. The plans reviewed as part of this process are listed in the bibliography. Where comprehensive plans exist for specific outbreak situations, then these will also be highlighted.

The HPA’s Incident and Emergency Response Plan (IERP) applies the principles of integrated emergency management to the preparedness and response to incidents. It provides a strategic overview and describes the key operational procedures which will be activated to enable the agency to response to incidents and emergencies. This plan is intended to complement and be used in conjunction with the IERP.

2. Aim of Guidance
This plan aims to ensure an effective and coordinated approach is taken in the management of an outbreak from the initial detection to the formal declaration that the outbreak has ended and review of lessons identified. It promotes a consistent approach based on best practice across all levels of the HPA through a set of standards for outbreak response.

The appendices contain additional guidance such as: identifying the roles and responsibilities of the key organisations and individuals, management and organisational aspects, investigation and control procedures, media relations, as well as guidance for specific outbreaks.

3. Management Arrangements for Handling Outbreaks
The primary objective in the management of an outbreak is to protect public health by identifying the source of an outbreak and implementing necessary control measures to prevent further spread
or recurrence of the infection. This should be underpinned by a risk assessment, with regular re-
assessment of the risk.

The protection of public health takes priority over all other considerations and this must be un-
derstood by all members of the Outbreak Control Team.

The secondary objectives include refining outbreak management, provide training, add to the
evidence base about sources and transmission of infectious agents, and learn lessons to improve communicable disease control for the future.

Responsibility for managing outbreaks is shared by all the organisations who are members of the Outbreak Control Team (OCT). This responsibility includes the provision of sufficient financial and other resources necessary to bring the outbreak to a successful conclusion.

The great majority of incidents and outbreaks are dealt with as part of normal acute service provision and may not impact greatly on routine services or require an OCT to be convened. On occasion, outbreaks are of such magnitude that there may be very significant implications for routine services and additional resources are required. The major incident plans of organisations affected will be invoked as appropriate. Within the HPA, the IERP should be used to determine the appropriate level of response and triggers for escalation. If it is foreseen that the level of service within any functional sectors of the HPA may become compromised, the relevant Director must be alerted as outlined in IERP and a contingency plan implemented to ensure a satisfactory service can be maintained, using mutual aid arrangements if necessary.

If any party is concerned with another organisation’s response to an outbreak, and this cannot be resolved by discussion between the parties, they should initially take this up with their own line manager and follow their own organisation’s arrangements for escalation.

Response to outbreaks confined to specific NHS Trust premises, whether acute or community or mental health trust will usually be led by the relevant NHS Trust in accordance with their operational plans. However, if the outbreak has any potentially serious public health implications then HPA staff may want to encourage partners to meet the outbreak standards set out in this plan.

4. Recognition of an Outbreak

Broadly, an outbreak or incident can be defined as:
• an incident in which two or more people experiencing a similar illness are linked in time or place;
• a greater than expected rate of infection compared with the usual background rate for the place and time where the outbreak has occurred;
• a single case for certain rare diseases such as diphtheria, botulism, rabies, viral haemorrhagic fever or polio; or
• a suspected, anticipated or actual event involving microbial or chemical contamination of food or water.

This plan primarily covers the first two scenarios. However an incident team is likely to be set up in the third and fourth scenario with often very similar aims and membership to an OCT.

Outbreaks may be recognised by the HPA, Local Authorities or NHS Microbiologists. Each organisation has its own procedures for surveillance, detection and control and as soon as it becomes apparent that an outbreak may exist, immediate contact between these parties is essential. Initial investigation to clarify the nature of the outbreak should begin within 24 hours of receiving the initial report. Immediate control measures should be implemented if necessary. To establish key facts and inform the decision to declare an outbreak the following steps may be undertaken:

• Confirm the validity of the initial information upon which the potential outbreak is based (including ascertainment bias; the possibility of laboratory false positives etc)
• Consider whether or not the cases have the same diagnosis and what the tentative diagnosis is
• Conduct preliminary interviews with initial cases to gather basic information including any common factors
• Collect relevant clinical and/or environmental specimens
• Form preliminary hypothesis
• Consider the likelihood of a continuing public health risk
• Carry out an initial risk assessment to guide the decision-making process (see Appendix 1).

5. Declaration of an Outbreak
It is usual that locally confined outbreaks will be recognised and declared by the Consultant in Communicable Disease Control or in Health Protection (CCDC/CHP) or senior health practitioner
after consultation, where appropriate, with a Consultant Microbiologist and/or senior Environmental Health Practitioner. In the case of a more widespread outbreak, e.g. at national or sub-national level, a Consultant or Senior Epidemiologist (CE) may recognise and declare an outbreak. It should be noted that it is possible for a widespread outbreak to be initially recognised as sentinel “local” outbreaks. Where an incident occurs on NHS Trust premises the Consultant Microbiologist or the Director of Infection Prevention and Control may declare an outbreak.

Following the recognition and declaration of an outbreak, a decision regarding the need and urgency to convene an OCT is required. This decision should be guided by the risk assessment. The establishment of an OCT as soon as possible will normally be the appropriate response if an outbreak is characterised by one or more of the following:

- Immediate and/or continuing significant communicable disease health hazard to the population at risk
- One or more cases of serious communicable disease
- Large numbers of cases
- Involvement of large geographical area suggesting a dispersed source
- Significant public or political interest

There are many minor outbreaks and clusters of disease that occur in England every year that are managed satisfactorily without the need to convene an OCT. For example an OCT will not normally be necessary to support the management of confirmed or suspected viral gastroenteritis in a nursing home, school or similar setting. Not convening an OCT does not necessarily mean that there will be no public health actions required.

When a decision has been made not to declare an outbreak or establish an OCT, the CCDC/CHP/CE should keep the situation under review at appropriate intervals to determine if the formal declaration of an outbreak or convening of an OCT is subsequently required. This may involve consulting with the other parties to assist with ongoing surveillance.

6. Outbreak Control Team
The purpose of the OCT is to agree and coordinate the activities of the agencies involved in the investigation and control of the outbreak in order to assess the risk to the public’s health and ensure that that the aetiology, vehicle and source of the outbreak are identified and control measures implemented as soon as possible and, if required, legal advice sought.
Details regarding the organisation and functioning of the OCT are contained in Appendix 2. Specifically:

- The terms of reference should reflect the team’s purpose and should be agreed upon at the first meeting and recorded accordingly
- The chair of the OCT should be appointed at the first meeting. The chair will normally be the CCDC/CHP/CE, but there may be occasions when it is more appropriate that another member of the OCT is appointed as chair
- Membership of the OCT should be in accordance with Appendix 2. It is the responsibility of the chair and members to ensure that all key individuals relevant to the outbreak are represented and invited
- Responsibility for handling the outbreak should be given to the OCT by the parent organisations, and representatives must be of sufficient seniority to make and implement decisions and to ensure that adequate resources are available to undertake outbreak management
- The OCT should agree further investigations and actions

7. Investigation and Control of the Outbreak

- An aide memoire for outbreak investigation and control is contained in Appendix 3
- Control measures should be documented with clear timescales for implementation and responsibility
- A case definition should be agreed and reviewed as required during the investigation
- Basic descriptive epidemiology is essential and should be reviewed at the OCT. In some outbreaks descriptive epidemiology might be sufficient to take action and it is crucial for generating a hypothesis as to the source of the infection
- The purpose of conducting an analytical study is to confirm a hypothesis regarding the source of infection or mechanism of spread of infection in order to confidently take action to protect public health. Such robust evidence may be needed to provide support for and to justify interventions. In addition it is good practice to do so when possible and practicable. An analytical study should only be undertaken if there is a hypothesis to test. Conducting an analytical study should be considered early in the investigation. Criteria and further information are contained in Appendix 4
• A written protocol for any analytical study should be drawn up at the earliest possible point, with level of detail appropriate to the nature of the outbreak. A template is shown in Appendix 5

8. Legal Issues
The HPA’s functions and obligations are set out in the Health Protection Agency Act 2004 and include:

• the protection of the community against infectious disease and other dangers to health
• the prevention of the spread of infectious disease and
• the provision of assistance to any other person who exercises functions in relation to above

The majority of statutory responsibilities, duties and powers significant in the handling of an outbreak lie with the Local Authority. Proper Officer powers are limited principally to the receipt of notifications. The role of the HPA under the Public Health (Control of Disease) Act 1984 and associated regulations is to:

• receive information about notifications from the Proper Officer
• receive notifications directly from laboratories
• provide advice where requested by the LA
• provide witnesses where requested by the LA

Legal powers relating to the investigation of food poisoning outbreaks are vested in Local Authorities. The OCT must give due consideration to the possibility of a legal proceedings, and if required seek guidance regarding the chain of evidence for a potential prosecution.

9. Communication
It is essential that effective communication be established between all members of the team and maintained throughout the outbreak in accordance with Appendix 3 (Outbreak Investigation and Control) and 6 (Media Relations). The Chair should ensure that minutes are taken at all meetings of the OCT and circulated to participating agencies in a timely fashion. All key decisions should be recorded and the minute-taker is accountable to the Chair for this function.

To ensure the appropriate dissemination of critical information within the HPA, standard communications protocols as described in the IERP should be followed.
A communications strategy for informing the public and key stakeholders should be discussed and agreed at the OCT. Use of communication through the media may be a valuable part of the control strategy of the outbreak. The OCT should consider the risks and benefits of pro-active versus reactive media engagement in any outbreak.

10. End of Outbreak
The OCT will decide when the outbreak can be considered over and will make a statement to this effect. The decision to declare the outbreak over should be informed by ongoing risk assessment and considered when:

- There is no longer a risk to the public health that requires an OCT to conduct further investigation or to manage control measures
- The number of cases has declined
- The probable source has been identified and withdrawn

At the conclusion of the outbreak the OCT will prepare a written report. Final outbreak reports are primarily for dissemination to a distribution list agreed by OCT members and should be completed within 12 weeks of the formal closure of the outbreak. Lessons learnt and recommendations should be disseminated as widely as possible. Appendix 7 contains a standard format for the final outbreak report and guidance regarding legal issues that need to be taken into consideration.

A debriefing meeting of the OCT would normally be convened after the end of the outbreak to consider lessons learned and any further preventative action required. The lessons learnt should be reviewed within 12 months of the formal closure of the outbreak.

11. Review and Audit
Organisational changes contained in the Health and Social Care Bill 2011 will impact on this plan. It is therefore suggested that this plan is formally reviewed at least annually until the new organisational arrangements are established. This review will include a consultation between the relevant parties and any other organisations or individuals as appropriate regarding organisational arrangements for the management of an outbreak. Records of the plan review and any amendments shall be kept and summarised in the plan.

This plan should be evaluated at regular intervals at every level of the Agency, preferably through auditing outbreaks that have occurred. Ideally this should take place on an annual basis, and exercises considered if it has not been invoked during the preceding year. The HPA has the lead
responsibility for ensuring that evaluation takes place and will ensure that it is tested at every level of the HPA. Audit is crucial to improving health protection service delivery through systematic review of service delivery against explicit criteria and the implementation of change. Appendix 8 contains a suggested audit tool for assessing compliance with the standards for managing outbreaks.

Key organisations and individuals should arrange regular and appropriate training so as to ensure that all staff at any level who are likely to be involved in outbreak investigation and control are familiar with this plan and the management of outbreaks of communicable disease.
Appendix 1 – Risk Assessment

Risk assessment should be based on the Risk Management Model for Communicable Disease Control. This is embedded as the risk assessment tool in HPZONE. The five separate elements that need to be considered are: severity, confidence, spread, intervention and context. Further details and examples are provided below.

**Severity**
The seriousness of the incident in terms of the intrinsic propensity in the specific circumstances to cause harm to individuals or to the population.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very low</td>
<td>Seldom causing severe illness</td>
<td>• Hand foot and mouth disease in a nursery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MRSA in a domestic setting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Head Lice</td>
</tr>
<tr>
<td>1</td>
<td>Low</td>
<td>Occasional serious illness rarely with long term effects or death</td>
<td>• Hepatitis A in a primary school</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Often severe illness occasionally with long term effects or death</td>
<td>• Toxogenic E.Coli O157</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Pulmonary tuberculosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MRSA infection in a high dependency unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Hepatitis B or C infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Legionnaire’s disease</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>Usually severe illness often with long term effects or death</td>
<td>• Meningococcal disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Multi-drug resistant tuberculosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Diphtheria</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• New mutation of flu virus</td>
</tr>
<tr>
<td>4</td>
<td>Very high</td>
<td>Severe illness almost invariably fatal</td>
<td>• Rabies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Ebola</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• vCJD</td>
</tr>
</tbody>
</table>
**Uncertainty**
The level of uncertainty, epidemiologically, clinically, statistically and from laboratory evidence, that the diagnosis is correct in the set of circumstances

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very low</td>
<td>Available evidence suggests that the hypothesis is correct with an empirical probability higher than 85%</td>
<td>• Typical incident picture with increasing confirmation</td>
</tr>
<tr>
<td>1</td>
<td>Low</td>
<td>Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 50% to 85%</td>
<td>• Typical incident picture with out conflicting information</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 25% to 50%</td>
<td>• Alternative hypothesis equally likely</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 10% to 25%</td>
<td>• Alternative hypothesis more likely but cannot exclude the working hypothesis</td>
</tr>
<tr>
<td>4</td>
<td>Very high</td>
<td>Available evidence suggests that the hypothesis is correct with an empirical probability of less than 10%</td>
<td>• Hunch</td>
</tr>
</tbody>
</table>

**Spread**
The intrinsic temporal and spatial spread including the infective dose, the virulence of the organism, the availability of routes of spread, the observed spread and the susceptibility of the population (e.g. lack of immunity) in the set of circumstances

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very low</td>
<td>Very low likelihood of spread with very few new cases</td>
<td>• A single case of campylobacter</td>
</tr>
<tr>
<td>1</td>
<td>Low</td>
<td>Low likelihood of spread with few new cases</td>
<td>• A single case of meningococcal disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A smear negative culture positive case of Tuberculosis</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Moderate likelihood of spread with new cases. May develop into a limited outbreak</td>
<td>• Viral gastro-enteritis in a nursing home</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A handful of cases of hepatitis A occurring over a prolonged period of time in a large community</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A smear positive case of Tuberculosis</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>High likelihood of spread with many new cases. May develop into a large outbreak</td>
<td>• Multiple cases of dysentery in a deprived population of children under 8 years old</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Epidemic of influenza in an army camp</td>
</tr>
<tr>
<td>4</td>
<td>Very high</td>
<td>Spread is almost inevitable</td>
<td>• Measles in a non-immune sub-population</td>
</tr>
</tbody>
</table>
**Intervention**

The feasibility to intervene to alter the course and influence the outcome of the event in terms of containing, reducing or eliminating the transmission of the organism, or assuaging public anxiety. The feasibility of delivering what is needed, to whom it is needed and when and where it is needed, considering the extent to which interventions are intrinsically simple, effective, available, affordable, cost-effective, acceptable, accessible, timely and well targeted.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very easy</td>
<td>Intervention well established with clear benefits and no anticipated difficulties to implement</td>
<td>• Hand washing advice</td>
</tr>
<tr>
<td>1</td>
<td>Easy</td>
<td>Intervention with clear beneficial effects and few difficulties to implement</td>
<td>• Withdrawal of a contaminated food in a closed institution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Measles or hepatitis A immunisation to a small group of vulnerable contacts of a case</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A case of meningococcal infection with contacts confined to the household</td>
</tr>
<tr>
<td>2</td>
<td>Passable</td>
<td>Intervention with some beneficial effects but some difficulties to implement</td>
<td>• Prophylaxis to immediate family and close contacts in a meningococcal case where they are dispersed</td>
</tr>
<tr>
<td>3</td>
<td>Difficult</td>
<td>Some remedial intervention possible but either difficult to implement, relatively ineffectual or other significant problems</td>
<td>• National food withdrawal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Urgent mass immunisation campaign</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Response to rabid dog in the loose</td>
</tr>
<tr>
<td>4</td>
<td>Very difficult</td>
<td>Remedial intervention very difficult</td>
<td>• Response to a cluster of vCJD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MRSA on a busy high dependency unit</td>
</tr>
</tbody>
</table>
Context
The broad environment, including public concern and attitudes, expectations, pressures, strength of professional knowledge and the overall setting of external factors including politics, in which events are occurring and decisions on responses are being made.

Consideration should be given to:

- Media, parents and local concern and politics: the degree to which media, parents, local concern and politics aggravate and raise the profile of the event under consideration
- Historical problems: influence of local experience of similar incidents and previous events, the way they were handled, associated consequences and expectations arising.
- Peer group practice: extent to which an established approach or recommended best practice is tested and documented (national guidelines)
- What is happening elsewhere: extent to which other similar incidents are being managed and publicised, with resultant effect of public attitudes and expectations

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| 0     | Very easy | No raised level of interest | • Apathy. Public/media are supportive of immunisation  
• Common adverse problems are fairly well understood |
| 1     | Easy      | A small degree of increased interest with a low level of conflicting factors. Little public concern | • Misunderstanding corrected by routine information  
• Head-lice control campaign  
• Few cases of diarrhoea in a nursery school |
| 2     | Passable  | A degree of unease and anxiety on the part of the public and the media. The context could deteriorate if the incident is mishandled | • A series of gastro-enteritis cases associated with an outdoor centre to which children are sent  
• TB in a school in a low incidence area |
| 3     | Difficult | Context is sensitive with significant difficulties, press interested and local people (unaffected) involved. The incident could go very wrong unless carefully handled. The event could have re-occurred in spite of preventative actions | • Surgeon is found to have HIV  
• Widespread food poisoning affecting several schools  
• Allegation about the safety of childhood vaccines with media coverage |
| 4     | Very difficult | Significantly raised public concern and political and emotional pressure with the public and the media declaring antagonistic and unhelpful views | • BSE-like illness linked to a new source e.g. pork  
• A childhood immunisation found to have serious unsuspected side effects |
Appendix 2 - Outbreak Control Team

A1.1 Membership of the OCT
A1.2 OCT Terms of Reference
A1.3 Template Agenda of OCT Meeting
A1.4 Roles and Responsibilities of Usual Members of the OCT
A1.5 Roles and Responsibilities of Organisations

A2.1 Membership of the OCT

Membership of the OCT will vary according to the nature or circumstances of the outbreak. An HPA staff member is expected to be involved in all outbreaks. Usually an Environmental Health Practitioner, a consultant microbiologist and a Director of Public Health will also be required. Additional members will be expected to be involved dependant on the nature of the outbreak. In some circumstances it may be appropriate for the OCT to consist only of HPA staff. In these circumstances an OCT is defined as involving different parts of the Agency, for example more than one HPA division or more than one HPU.

Usual members

- Consultant in Communicable Disease Control/Health Protection or Consultant Epidemiologist
- Environmental Health Officer (where appropriate)
- Consultant Microbiologist (where appropriate)
- Director of Public Health (or nominated deputy) for localised outbreaks

Additional members (this is not an exhaustive list)

- Regional Epidemiologist
- Administrative Support
- Health Protection Surveillance/Information Officer
- Data analyst/statistician
- Health Protection Nurse/Practitioner
- Communications Officer
- Relevant HPA Director
- Other Environmental Health Staff
- Community Infection Control Nurse
- General Practitioner
- Consultant Physician
- Immunisation Co-ordinator
- Pharmaceutical Advisors
- Food Chemist (a Public Analyst appointed in accordance with the Food Safety Act 1990)
- Food Microbiologist (a food examiner in accordance with the Food Safety Act 1990)
- Virologist
- Toxicologist
- Legal adviser (HPA, PCT or LA as appropriate)

Other members: as determined by the nature of the outbreak, representatives from

- Department of Health
- Animal Health and Veterinary Laboratory Agency
- Water Company
- Health and Safety Executive
- Environment Agency
- Food Standards Agency
- Department for Environment, Food & Rural Affairs (Defra)
- Health Emergency Planning Advisors
- Care Quality Commission
- Ofsted
- Relevant institution
A2.2 OCT Terms of Reference

The terms of reference should be agreed upon at the first meeting and recorded accordingly. Suggested terms of reference:

- To review the epidemiological, microbiological and environmental evidence and verify an outbreak is occurring
- To regularly conduct a full risk assessment whilst the outbreak is ongoing
- To develop a strategy to deal with the outbreak and allocate responsibilities to members of the OCT based on the risk assessment
- To inform determination of level of outbreak according to the HPA Incident and Emergency Response Plan
- To agree appropriate further epidemiological, microbiological and environmental investigations
- To ensure that appropriate control measures are implemented to prevent further primary and secondary cases
- To communicate as required with other professionals, the media and the public providing an accurate, timely and informative source of information
- To make recommendations regarding the development of systems and procedures to prevent a future occurrence of similar incidents and where feasible enact these
- To determine when the outbreak can be considered over based on ongoing risk assessment
- To produce a report or reports at least one of which will be the final report containing lessons learnt and recommendations.
A2.3 Template Agenda for OCT Meeting

Outbreak Control Team Meeting Agenda

Title

Date, time and venue

1. Introductions
2. Apologies
3. Minutes of previous meeting (for subsequent meetings)
4. Purpose of meeting
   - At first meeting agree chair
   - Terms of Reference
5. Review of evidence
   - Epidemiological
   - Microbiological
   - Environmental
6. Current Risk Assessment
7. Control Measures
8. Further Investigations
   - Epidemiological
   - Microbiological
   - Environmental
9. Communications
   - Public
   - Media
   - Healthcare providers (e.g. GPs, A&E etc)
   - others
10. Agreed Actions
11. Any other business
12. Next Meeting
A2.4 Roles and Responsibilities of Usual Members of the OCT

Consultant in Communicable Disease Control/Health Protection / Consultant Epidemiologist

- To declare an outbreak following appropriate consultation
- To convene the OCT and ensure membership is appropriate
- To chair the OCT where this is a community associated outbreak unless a different chair has been agreed by the OCT. For hospital outbreaks the Hospital Control of Infection Doctor/Director of Infection Prevention and Control (DIPC) will normally chair the OCT
- To identify what additional resources / personnel might be needed e.g. public health practitioners or IT systems
- Depending on the nature and scale of the incident, to inform the relevant HPA director and ensure HPA Briefings are prepared as outlined in the IERP
- To ensure the initial response and investigation is begun and actions documented within 24 hours of the time the potential outbreak has been recognised
- To provide epidemiological advice relevant to the outbreak and support analysis and interpretation of data
- To ensure that an incident room is set up if required at an appropriate venue having regard to the nature of the outbreak
- To arrange, in conjunction with environmental health colleagues, for appropriate identification and follow up of any contacts
- To arrange for the provision of prophylactic treatment and immunisation for contacts and others at risk as necessary
- To identify the need for advice from relevant experts and request advice as appropriate
- Liaise with clinicians (primary or secondary care) over need for specific testing and management of cases
- To agree with the OCT who will lead the media response
- To ensure appropriate bodies and officers are kept informed and updated, including the local authority, the PCT, Strategic Health Authority, local GPs and nurses, the regional epidemiologist and HPS Colindale
- Where appropriate to liaise with colleagues in adjacent HPU where more than one HPU is involved or may be involved
To co-ordinate the written final report on the outbreak and to ensure that the outbreak recommendations are acted upon

To ensure the constructive debrief is held and lessons learned disseminated and acted upon as necessary

To ensure all documentation relating to the outbreak is correctly managed and disseminated, incorporating information governance and data protection requirements

These tasks may vary according to the nature or circumstances of the outbreak.

Environmental Health Officer (representative of Chief Environmental Health Officer)

- Attend OCT meetings, or be represented by a suitable deputy who will report directly back
- Investigate potential sources of the outbreak and secure relevant improvements as appropriate where the Local Authority is the enforcing authority e.g. for food safety, health and safety, health protection. Where the health and safety enforcement falls to the HSE the Local Authority should advise the OCT
- Provide help and advice with the epidemiological aspects of the outbreak, including the investigation of cases (and contacts where appropriate)
- Provide mechanisms for out of hours communications with the CCDC, OCT, the public and other stakeholders as appropriate
- Be responsible for arranging the collection and transport of appropriate specimens to the laboratory for screening of patients, contacts and staff
- Undertake appropriate food, water and environmental sampling and be responsible for the collection and transport of food samples, to a suitable Microbiology Laboratory
- If the Food Standards Agency decide that the food product should be withdrawn then the Chief EHO will be responsible for ensuring that the appropriate authorities are informed and any necessary local action is taken
- Be responsible for ensuring the infection control advice is implemented by the potential / suspected source of the outbreak, using relevant legal powers as necessary and working closely with the HPA staff or relevant community or acute NHS Infection Control Nurse
- Ensure the normal arrangements for the collection and disposal of clinical waste remain appropriate. If necessary, discuss with OCT and contractors as to the changes required
- Provide reports to the Local Authority and undertake any necessary enforcement action
• Monitor the progress of the investigation (e.g. sources, cases, contacts within their area) and provide updates to the OCT, including any enforcement action

• Report to and liaise with colleagues in the Environmental Health Department and those in neighbouring districts, including when the outbreak has ceased

• Ensure regular briefing of LA field staff

• Be jointly responsible for communicating the cessation of the outbreak to the general public, in collaboration with the CCDC, if appropriate

• Be clear about responsibilities and tasks during the outbreak

• To identify resources to enable tasks to be undertaken speedily and efficiently and to report on this to the OCT

• Be responsible for informing relevant food and non-food businesses of hazards when appropriate

• To arrange, as necessary, for the identification, removal and safe disposal of contaminated food

• To liaise with the office of the public analyst re: chemical analysis of samples if chemical contamination is suspected and with HPA laboratories, and possibly the public analyst office too, for microbiological testing of samples

• To ensure continuity of evidence

These tasks may vary according to the nature or circumstances of the outbreak.

**Consultant Microbiologist / Consultant Virologist**

• To present to the OCT relevant microbiological information relating to the outbreak

• To identify resources to enable microbiological testing to be undertaken speedily and efficiently and to report on this to the OCT

• To provide advice and guidance on the microbiological aspects of the investigation and control of the outbreak

• To arrange microbiological testing of relevant human and non-human samples and to arrange, as necessary, further investigations by other laboratories e.g. typing as agreed at the OCT

• To provide the results of all testing to the source of the request
• To provide advice and guidance on the microbiological investigation and control of the outbreak
• To participate, as necessary, in the inspection of premises and procurement of samples
• To liaise with microbiologists in other laboratories (HPA & NHS), including reference laboratories, which are involved in the investigation
• To advise on communications needed with microbiological colleagues and assist in briefings where necessary
• To assist clinical colleagues and the HPA consultant with treatment and prophylaxis protocols

These tasks may vary according to the nature or circumstances of the outbreak.

Director of Public Health

The roles of the Director of Public Health and local HPU in relation to outbreak management and control is still under discussion as part of the transition into Public Health England. This section will be updated accordingly when the roles have been clarified

• To have overall executive responsibility for reviewing the health of the population including the surveillance, prevention and control of communicable diseases and infections
• To represent the PCT on the Outbreak Control Team either in person or through an appropriate deputy
• To ensure, in liaison with the provider function of the PCT that appropriate resources are available to support the investigation and control of outbreaks, including human, financial and other resources e.g. the assistance of community staff, funding and delivery of vaccinations and prophylaxis
• To ensure 24-hour PCT emergency management availability
• To ensure that hospitals are alerted and able to cope with a potential influx of patients
• To ensure that the Strategic Health Authority Chief Executive is informed
• To ensure PCT Chief Executive and Chairman are informed as appropriate
• To liaise with other PCTs as appropriate
• To agree with the HPU Consultant who will lead the media response.
A2.5 Roles and Responsibilities of Organisations

Local Authorities
Local authorities and port health authorities play a key role in managing outbreaks of foodborne illness. The Food Safety Act (1990) and the Food Hygiene Regulations (2006), or their equivalent in devolved administrations, place responsibilities and powers of control with local authorities. The investigation of outbreaks of foodborne disease is carried out by Environmental Health Professionals and others employed by the local authority. Local authorities have powers to assist both investigation and control of outbreaks, including powers of entry, sampling powers and powers to exclude food handlers, seize and detain food and close premises.

Primary Care Trusts (PCTs)
As at April 2011 PCTs have a statutory duty to protect the health of the population and Directors of Public Health are the individuals in PCTs who take the lead public health role for the organisation during outbreaks. PCTs are also the gateway to influence primary care resources that may be needed during the management of an outbreak. Collaborative arrangements exist between PCTs and local authorities as defined in HSG (93)56 Public Health: responsibilities of the NHS and the roles of others.

Health Protection Agency
The HPA was created in 2003 and subsumed most of the communicable disease surveillance and investigation roles of the then Health Authorities as well as those of the Public Health Laboratory Service in England. The management of outbreaks of communicable disease generally involves the Health Protection Services Division (HPSD), and the Microbiology Services.

Local Health Protection Units (HPUs) are part of the HPSD and investigate and manage outbreaks of communicable disease, provide surveillance of communicable diseases and infections and support local authorities (including port health authorities) in their responsibilities under the Public Health (Control of Disease) Act 1984 and associated regulations. Local HPUs are staffed by CCDC/CHPs, nurses, health protection practitioners and other staff with specialist health protection skills and have access to expert advice on health emergency planning and communications.

HPSD Colindale is responsible for the collection and collation of data on outbreaks of communicable disease and is involved in prevention and control at a national level in England. Where appropriate, HPSD Colindale can provide experts to assist in local outbreak investigations or, in the case of outbreaks with a national distribution, its experts may themselves design and carry out outbreak investigations.
The HPA, usually through regional epidemiology units, coordinates the surveillance of communicable diseases at regional level. The HPA Regional Director, or his/her representatives, may also coordinate the work of HPUs in providing the input of the HPA to major incidents which cross two or more HPUs in the region.

The Microbiology Services comprise the reference laboratories at Colindale which assist in the identification and investigation of outbreaks by subtyping isolates and the Regional Microbiology Network (RMN). The RMN includes the Food, Water and Environment (FW&E) laboratories and also has Regional Microbiologists who manage or commission regional public health microbiology services (including food, water and environmental microbiology). The HPA’s regional laboratories undertake specialist tests and provide support for NHS microbiology laboratories.

**Food Standards Agency**

The Food Standards Agency (FSA) is a UK-wide non-ministerial Government department, established under the Food Standards Act 1999 with responsibility for the protection of public health in relation to food. This guidance is issued under section 20 of the Act, which confers powers to issue guidance upon the FSA.

Local authorities have a responsibility under Codes of Practice (Food Law Code of Practice 2006 section 1.7.6) to inform FSA of all national or serious localised outbreaks. The FSA Incidents Branch is the point of contact for LAs in relation to outbreaks and incidents. The FSA will normally participate in national OCTs and will assist in the investigation of implicated foods.

Where investigations implicate a food distributed in the UK, the FSA will carry out a risk assessment and work with LAs to advise the food business operator (FBO) on steps that ought to be taken in relation to the affected product(s). Those steps may include the withdrawal or recall of food pursuant to EC Regulation 178/2002.

The FSA is the national contact point for the European Commission’s Rapid Alert System for Food and Feed (RASFF) and will use the system to inform the EU and member states if foods implicated in outbreaks of foodborne disease have been distributed outside the UK. This system is also used to inform the Commission and originating third countries of serious incidents or outbreaks caused by a food whose origin is beyond the UK’s national borders.
In April 2011, the Veterinary Laboratories Agency merged with Animal Health to form the Animal Health and Veterinary Laboratories Agency (AHVLA). AHVLA is funded by Defra to give assistance to outbreak control teams as appropriate where a direct or indirect animal source is implicated in outbreaks of enteric (or other zoonotic) illness and where veterinary investigation (including collection of appropriate animal samples) or intervention could help reduce risks to the public. Veterinary involvement may be initiated centrally by Defra or locally following contact between the CCDC or the LA and the local AHVLA regional laboratory.
Appendix 3 - Outbreak Investigation and Control

Whilst the approach to the investigation and control of an outbreak is likely to vary dependent on the circumstances, the following “aide memoire” is designed to assist in systematically addressing the issues. A written protocol for the investigation must be drawn up at the earliest possible point, usually after confirmation of the outbreak.

Some of the steps below may be completed before the outbreak is declared. It is not intended to imply that each action must automatically follow the one preceding it, or that all steps are needed on every occasion. In practice some steps will be carried out simultaneously whilst others, for example, communication and collation of data, will be required throughout the whole process.

Initial response

- Confirm the validity of the initial information upon which the potential outbreak is based (including ascertainment bias; laboratory false positive etc)
- Confirm the diagnosis of the cases or establish a tentative diagnosis if not obvious and collect relevant clinical and demographic information including onset date
- Conduct preliminary interviews with initial cases to gather basic information including any common exposure factors e.g. consumption of a particular food, attendance at a specific event, visit to a particular premises, direct or indirect contact with animals (on a particular public amenity premises for example) etc
- Identify the population at risk
- Agree a case definition
- Agree arrangements for case finding
- In the case of significant outbreaks inform the HPS Colindale and if a food source is suspected, the FSA Incidents Branch

Descriptive epidemiology

- Review initial information and establish the number of cases – confirmed, probable, based on the agreed case definition
- Describe the outbreak in terms of person (describe cases by age, sex or other factors), time (epidemic curve: plot the cases by date of onset of symptoms or, if not available another variable such as date of diagnosis or date of report) and place (describe the geographical distribution of cases and, if relevant, map them)
- Conduct in-depth interviews with initial cases to establish any common factors
- Form preliminary hypothesis based on descriptive epidemiology and exploratory interviews with cases
Other Actions

- Consider the likelihood of a continuing public health risk
- Carry out an initial risk assessment to guide the decision-making process and implement any immediate control measures required
- Agree any immediate additional investigations required such as microbiological testing of people and environmental sampling
- Conduct on site investigations at implicated premises
- Identify the need to convene a formal OCT and the activation of the outbreak control plan
- Review the information gathered, assess the need for further investigation and identify the roles and responsibilities of the relevant partners

Communication

- Agree who will have lead media responsibility
- Identify all parties that need to receive outbreak information e.g. those dealing with the incident, wider support services, national and regional agencies, those affected by the outbreak, the local community as well as the outside world
- Identify the most effective routes of communication with all those involved
- Ensure accuracy and timeliness of communication, while also complying with relevant legislation e.g. Data Protection Act etc
- Use the media constructively
- Ensure HPA alerting as outlined in the IERP
- Ensure relevant material is collected to inform a final written report for local and, where appropriate, wider distribution

Analytical epidemiology and further investigation

- Confirm factors common to all or most cases
- Calculate attack rates
- Review preliminary hypotheses and consider whether further epidemiological or microbiological investigations are required
- Collect any necessary further clinical and food specimens for laboratory tests
- Conduct further analytical epidemiological studies (case control or cohort studies). See Appendix 4
- Conduct further microbiological studies (e.g. specialised typing)
- Ascertain source and mode of spread
Control measures

- Control the source (animal, human or environmental)
- Control the mode of spread
- Protect persons at risk
- Monitor effectiveness of control measures / maintain disease surveillance

Final phase

- Identify the end of the outbreak (usually when the number of new cases has returned to background levels)
- Produce outbreak report and lessons learnt.
Appendix 4 – Analytical Studies

In order to test a hypothesis for likely causation generated by descriptive epidemiology, an analytical study can be carried out. Analytical studies are resource intensive but they are necessary to support or to refute the hypotheses identified. They enable the investigator to generate convincing evidence and establish with a greater degree of confidence the suspected source of infection. This may be important to enable appropriate action to protect public health and to justify sometimes costly interventions. The key considerations for conducting an analytical study include:

- A disease with unknown source, or unknown mode of transmission
- Large number of affected persons and source or mechanism of transmission unclear or needing confirmation
- Where new risk factors for a disease may have been recognised
- A new or unknown pathogen or hazard
- To meet the need for new knowledge to inform future public health action
- An outbreak of a rare disease not normally occurring in the UK

Other factors to consider include:

- An outbreak linked to an event of national or international significance
- An outbreak of particular national interest where evidence to support or justify an intervention may be needed
- An outbreak of disease with significant morbidity or mortality
- A high level of public or media concern
- An absence of known effective control measures
- An outbreak potentially linked to a nationally distributed product
- An outbreak which may be related to poor standards of institutional care
- Expectations for strong underpinning evidence are high
- Training experience can be gained
Cohort and case control studies are the traditional study designs and provide a scientifically sound framework to assess the relationship between exposure to a risk factor and the incidence of illness. The type of design that is appropriate will depend on the nature of the outbreak. Other novel methods have been described and may be appropriate and the Regional Epidemiology team or HPS Colindale are able to provide expert advice and support.

**Cohort studies**

Cohort studies are the gold standard for outbreak investigations because they enable the relative risk to be estimated and often fit the circumstances of a group of people, who have eaten or been exposed to an agent together, with illness becoming recognised relatively soon afterwards. The “cohort” is the complete group of people who attended the event or had the exposure (e.g. food, surgical intervention or other medical procedure, or environmental hazard). The amount of exposure (food consumed or level of environmental exposure e.g. measured in helpings or hours of exposure) by each member of the group can be determined and recorded. The outcome [illness/adverse health effect] can then be measured and compared among those exposed and those not exposed, or among those exposed to high versus low ‘doses’.

The cohort method has the advantage over case-control studies that there is no need to identify and select controls, so the possibility of bias is reduced.

**Case-control studies**

A case-control study may be employed when it is not possible to identify and investigate a defined population at risk, or when that population is so large in proportion to the numbers who are ill that it is not cost effective to include them all in the study. An example would be when there is a sudden rise in the incidence of an uncommon serotype of Salmonella with cases spread over a wide area. Although it may be clear that there is an outbreak, there may not be a single food in common. Interviews with known cases may suggest several foods, distributed throughout the affected area that could be contaminated. By showing that cases are significantly more likely than other people to have eaten one of the foods under investigation, the most likely food can be determined.

In a case-control study, there should be a specific hypothesis to test. This might include that consumption of certain foods is/are associated with disease or that people who were ill were more likely to have had a certain medical procedure or be cared for in a certain ward/theatre. Controls should be people who have had similar opportunities to be exposed and to be diagnosed as cases. Consideration needs to be given to whether or not controls should be matched. For instance, if the suspect food is a confectionery bar and most of the cases are children, matched controls would be children of similar age, living in the same area; this might be a good thing to improve efficiency but
it might introduce the possibility of over-matching as controls would be too like the cases and no association with the suspected food item might be found. Controls can be chosen from neighbours and friends of the cases or from various registers and lists, such as people who are registered with the same general practitioner. Each case will usually have one, or preferably more, controls. When the data for a case-control study have been collected, they are analysed by standard statistical methods to find the ratio of the odds of exposure in the cases to the odds of exposure in the controls (the odds ratio).

**Tests for statistical significance**

Data showing the differences between the proportions of those who are ill that ate a suspect food and of those who are ill but did not eat it (and of any groups for which incidence rates or means were calculated) should be tested for statistical significance. If the calculation shows that there is a statistically significant difference between those eating and those not eating the suspect food this gives support to the theory that the food was contaminated. The chi-square ($\chi^2$) and Fisher’s Exact tests are the most commonly used in this calculation. The level of significance required to demonstrate that a difference is not merely a result of chance (i.e. not due to any cause) is specified beforehand. The commonest significance level used is 95%; that is, there is a one in 20 (5%) likelihood that chance alone would account for the statistical difference between the two groups.
Appendix 5 – Investigation Protocol

The following are guidelines for the structure of an outbreak investigation protocol. The level of detail should be appropriate to the nature of the outbreak, and will reflect the resources available the OCT. The preparation of a detailed investigation protocol should not detract from management of the outbreak.

Title
The title should contain, at a minimum, the type of outbreak, suspected pathogen, location and date.

Background
This section would include, for example:

- Information on the organism
- Outbreak details (e.g. number affected, date first cases reported, date and time of onset of first cases and any laboratory confirmation, symptoms, geographical distribution, gender distribution)
- Setting details and implicated premises (if known)
- How the outbreak was identified
- The initial response to the outbreak.

Aim and Objectives of Investigation

Epidemiological Investigations
This section would describe the methods and timescales for the:

- Descriptive epidemiological study (e.g. case definition, case finding, questionnaires).
- Analytical epidemiological study, if necessary

Microbiological Investigations
This section would describe the laboratory methods for the characterisation of isolates (clinical, environmental, veterinary) to distinguish the outbreak strain.

Environmental Investigations
This section would describe the methods for the microbiological sampling and analysis of food, water and environmental samples taken from implicated premises as part of the outbreak investigation.
If the outbreak is foodborne, this section would also describe methods for source tracing of food products.

**Veterinary Investigations**
This section would describe the methods for the microbiological sampling and analysis of animal samples taken as part of the outbreak investigation.

**Management and Communications**
This section will set out how the requirements of the protocol are met through the provision of adequate coordination, resources and through the timely communication of information.

It will also outline roles and responsibilities for local / regional / national authorities or agencies (depending on the nature of the outbreak) in responding to gastrointestinal outbreaks.

**Appendix**
This section would include, for example:
- Questionnaires used as part of the outbreak investigation
- Schematic overview of protocol.
Appendix 6 – Media Relations

As outlined in Appendix two, part of the membership of the OCT is a communications officer. The role of the communications officer in the OCT is to ensure that any media implications are considered and planned for. Depending on the incident it may be necessary to keep the public fully informed via the media, especially if there is a wider public health risk. This would need to happen without prejudicing the investigation and without compromising any statutory responsibilities or legal requirements and without revealing the identity of any case.

At the first meeting of the OCT, arrangements for dealing with the media should be discussed and agreed with the lead communications officer. This should include a nominated spokesperson(s) and a process for arranging press conferences and releasing press statements. The lead organisation for the incident is usually the lead organisation for any media response, however, sometimes it is necessary for the media response to be joint.

All media material will be prepared by the OCT communications officer and signed off by relevant OCT members, usually the epidemiologist as well as the OCT director. In incidents where it is appropriate for the media response to be joint media material would then also need to be shared and agreed with lead members of the OCT from associated organisations.

Once all the media materials have been signed off by all relevant OCT members the communications officer will be responsible for all the external communication, except with professional stakeholders. Again depending on the nature of the incident and the media response agreed on, this will include uploading a tweet, a facebook update, a web statement and all the other public communications the HPA makes aside from with stakeholders. The communications officer will also be responsible for sharing relevant information with the relevant national press office – Colindale or Chilton and if necessary information will be placed into the HPA comm plan. The national press office will also determine what will need to be shared with DH.

No other member of the OCT or the participating agencies will release information to the press or arrange press conferences - this will be solely the role of the communications officer. The communications officer will also share any media material with the communications officers at the relevant stakeholder organisations.
Appendix 7 – Final Outbreak Investigation Report

A7.1 Standard Structure
A7.2 Legal and Confidentiality Issues Related to Final Outbreak Reports
A7.3 Disclosure of Outbreak Report

A7.1 Standard Structure
A written final report should be prepared ideally within 6 weeks of the end of the outbreak investigation, and definitely within 12 weeks. This report should ideally be agreed by all members of the OCT.

The final report should be comprehensive, protect confidentiality and be circulated to appropriate individuals and authorities. Publication in a peer-reviewed journal should be considered. The STROBE Statement provides guidance on what should be included reports of observational studies submitted to peer-reviewed journals. The report should follow the usual scientific format of an outbreak investigation report and include a statement about the effectiveness of the investigation, the control measures taken and recommendations for the future.

A searchable database of outbreak reports from across the agency is currently in development which will enable staff working in the HPA to retrieve outbreak reports in a timely manner. The database will be developed in line with the structure set out in the Communicable Disease Outbreak Plan: Operational Guidance and may require the inclusion of a number of key fields such as author, publisher (investigating unit), organism, and outbreak setting, in the final report.

Standard Structure:

Title Page
The title should contain, at a minimum, the type of outbreak, pathogen, location and date.

Name of author(s) and investigators with affiliations, including members of the OCT should be listed.

Executive Summary
This section should be concise and contain all of the key facts that describe what happened.

The summary should provide an overview of the background (e.g. how many people were affected, severity of disease, what pathogen caused the outbreak, setting, etc.), outbreak investigation
methods, results, how the outbreak was controlled, and any recommendations for preventing future outbreaks.

**Introduction**

This should contain a brief introduction to the outbreak, including details of outbreak recognition, initial investigations, immediate control measures, other contacted, timeline and objectives of the investigation.

**Background**

The background to the outbreak and implicated organism should include a brief description of clinical features, incubation period, infectious dose, recognised sources and modes of spread, and diagnosis etc. Also provide the background prevalence of the disease locally, nationally and globally if relevant.

**Incident Co-ordination**

This should include a statement about HPA incident response level and command structure, HPA incident commander and lead organisation. If relevant, multi-agency or NHS incident response level should be stated.

**Outbreak Investigation Methods**

- **Epidemiological**, e.g.:
  - **Descriptive**:
    - Description of initial cases, case definition, case finding, epidemic curve, data collection, and hypothesis generation
  - **Analytical**:
    - Case control study (control definitions and selection of controls, data collection, statistical analysis outline) and/or cohort studies

- **Microbiological**
  - Front line laboratories, reference laboratories and examination of clinical, food/water, animal and environmental samples and characterisation of isolates.

- **Environmental**, e.g.:
  - Food, water, risk assessment of production and distribution including food chain etc., staff interviews

- **Veterinary**, e.g.:
  - Animals, risk assessment of open farms etc.
Results
The Results section should present all of the results from all of the methods used, with analysis and interpretation of the data, e.g.:

- Epidemiological – essential time, place, person
- Microbiological
- Environmental
- Veterinary

Control Measures
This section should describe the outcome of measures taken to control the outbreak, and how effective they were, for example:

- Overall co-ordination and management of the outbreak
- Care of cases
- Prevention of further cases (primary and secondary spread)
- Public information
- Information to professionals/businesses, etc.
- Outline of food safety, infection control, health and safety, enforcement action
- Media response

Discussion and Conclusions
This section should describe:

- The summary of the main findings
- The validity of the data and possible sources of bias
- Interpretation of epidemiological and microbiological findings
- Justification for conclusions drawn and actions taken
- Assessment of the control measures implemented
- Explanation of action to protect public health
- Problems encountered

Lessons Learned and Recommendations
Lessons learned and recommendations should be specific and directed at the appropriate department / organisation(s) and be realistic (feasible actions).

Lessons learned could cover:

- Areas of good practice
• Shortcomings and areas for improvement
• Key learning points

Recommendations are provided to propose changes in polices, procedures and/or guidance in order to:
• Prevent future outbreaks
• Improve surveillance and detection of outbreaks
• Improve the process of outbreak investigation and control

References

Appendices
Appendices may include:
• Chronology of events
• Details of risk assessments undertaken including date and time
• General background
• OCT (members, terms of reference, roles and responsibilities, meeting dates)
• Detailed results
• Maps
• Epidemiological questionnaire
• Environmental questionnaire
• Letters to patients/physicians
• Press releases
• Costs of the outbreak
• Acknowledgements

Circulation List
A7.2 Legal and Confidentiality Issues Related to Final Outbreak Reports

In recent years there has been an increase in the number of requests from solicitors for outbreak reports. In these instances, there is a possibility that the reports will be used in litigation, so it is important that they are written with this in mind. Traditionally outbreak reports have been written for the use of OCTs and may explore hypotheses and learning points. However, these may contain elements that are fundamental to the outbreak but inappropriate to make publicly available for individual litigation cases. This may be through the inclusion of named premises (and the potential for defamation if critical); case histories that may be deductively identifiable (even if anonymised); or lessons learned that may be interpreted as admissions of errors by external parties and misused. In light of this there are a number of issues that should be considered by the OCT and authors when preparing the report.

To be considered by OCT:

- Purpose of report and who it is for. If there will be lessons identified relating to the response of individual organisations to the outbreak, consideration should be given to including these in a separate report for internal circulation only.
- Ownership of the report. If multi-agency sign-off procedure, ownership of copyright and responsibility for formal disclosures needs to be agreed.
- Disclosure and publication. Clear arrangements for formal and informal disclosure are needed. Agreement is required regarding where the report will be published and whether this will be in full. It is normal good practice to allow those affected by the report see it in advance of publication.
- The identification of individuals, organisations and business. If to be identified, consideration should be given to whether they are content for disclosure.
- Legal and reputational risks around the report. If these are high, consideration should be given to increasing the scrutiny of the report and getting a legal opinion before publication.

To be considered by authors:

- Proof read the document, use a date and version number and remember to take the word “draft” off the final document.
- Is further assurance through independent professional/expert scrutiny or peer review needed? Are the conclusions supported by evidence and would the conclusions and opinions stand up to independent scrutiny.
- State who contributed what to the report and who signed the report off.
- Clarify where the evidence came from and who acted on this evidence. Organisations sometimes have overlapping roles and responsibilities, e.g. those related to infection.
control in community settings shared between PCTs and HPUs. A report, mainly written by one author on behalf of a multi-agency group, may confuse the reader regarding the legal and professional responsibilities of individual incident responders. To promote a consistent understanding and avoid the HPA being unnecessarily associated with an inappropriate or inadequate response, it is therefore important to document this.

Legal considerations:

- Is legal advice required prior to signing off? This may be appropriate if it is known or suspected that the outbreak may be the subject of a civil or criminal prosecution, or if it is a high profile or high impact outbreak.
- Does the report include any material:
  - gained during the investigation which was NOT intended for disclosure/inclusion in a report? (e.g. information from emails)
  - which should be withheld or redacted? (e.g. because it is personal, confidential or commercially sensitive)
  - whether statements of fact or opinion, that is defamatory?
- Has any material relevant to the subject of the document been omitted?
- Are there any active legal proceedings which could be affected by publication or disclosure of the report?
- Is there clarity about what can be disclosed, when and under what systems (e.g., request from individual/solicitor; FOI or other statutory request)? Does any legislation preclude disclosure of any of the information in the report?
A7.3 Disclosure of Outbreak Reports

If the insurer/claimant asks for a report to be written, does the HPA have a duty to do so?
If the HPA would not otherwise write an OCT report, then the HPA is under no obligation to do so simply because an insurer or claimant requests one. If the insurer or claimant wishes to instruct the HPA to prepare an independent expert report (and potentially give such evidence at trial) and pay the HPA an appropriate fee, then subject to any policy the HPA may have in respect of such expert witness work, it is a matter for the HPA whether it accepts or declines such instructions.

Similarly if the insurer or claimant wants the HPA to undertake further diagnostic tests or additional analyses which were not necessary for outbreak management purposes, the HPA is under no obligation to do so. Subject to any policy the HPA may have in relation to such tests/analyses, it is a matter for the HPA whether it undertakes them and if so, on what basis eg payment of an appropriate fee.

Do members of the public have a right to request all outbreak reports under the Freedom of Information Act?
The FOI Act gives the public the right to request any information held by any type of public authority or by persons/organisations providing services for them. The public can request information held within things like minutes of meetings, work emails, work diaries, corporate reports and other work documents. Exemptions may apply for certain information, which therefore would not be disclosed.

The exemptions are where:
  - the applicant could easily obtain the requested information from elsewhere
  - the organisation already has published or has firm plans to publish the information

or where the information:
  - relates to confidential business information
  - is personal information about the applicant
  - is personal information about someone other than the applicant and disclosure of it would breach either the Principles or section 10 of the Data Protection Act 1998, e.g. it is confidential to a third party.

Do the HPA have to respond to all requests for clarifications relating to reports under the Freedom of Information Act?
Yes. Either pursuant to S.1(1) FOIA (complex clarification) or S.16 (1) FOIA (straightforward clarification).

If the HPA’s involvement in the management of the outbreak is over and a report has already been prepared by the HPA, then generally no additional work will be required beyond disclosing the report and any documents referred to in the report. FOI does not require the HPA to generate new information in response to requests.

If the HPA receives requests for copies of questionnaires for example, then provided the patients have consented these are disclosed in accordance with the Data Protection Act 1998.

If the HPA does not respond to the request for clarification, then the requester can initially appeal against the refusal internally and subsequently to the Information Commissioner.

Once a report has been shared with a member of the public or premises owner any requests should be passed to the HPA communications information access team via george.stafford@hpa.org.uk

What is ‘deductively identifiable’ patient identifiable information and can this be included in a report?

It is generally accepted that information provided by patients to the health service is provided in confidence and must be treated as such so long as it remains capable of identifying the individual it relates to. This is an important point, as once information is effectively anonymised it is no longer confidential.

Effective anonymisation generally requires more than just the removal of name and address. Full postcode can identify individuals, NHS Number can be a strong identifier and other information, e.g. date of birth, can also serve as an identifier, particularly if looked at in combination with other data items.

What do I need to know about copyright?

- UK copyright law is set out in the Copyright, Designs and Patents Act 1988 (CDPA).
- Copyright extends to literary works which will include reports.
- The first owner of copyright will be the author (section 11(1), CDPA).
- Where a work is made by an employee in the course of his employment, the employer will be the first owner of copyright in the work, subject to any agreement to the contrary (section
11(2), CDPA). The critical elements here are "employee" and work made "in the course of his employment".

- Where more than one person has created a work, the work may be classed as a work of joint authorship if the contribution of each author is not distinct from that of the other authors (section 10(1), CDPA). If it is distinct, two or more separate works will exist.

- Each person claiming authorship must have expended sufficient skill and labour to be classed as an author under the CDPA. In general, each joint author has the same rights as a sole author (except that licensing or assignment requires the consent of all joint authors).

- In the case of a normal report, the copyright will belong to the organisation(s) who employ(s) the author(s).

- If it is important for the HPA to exercise sole rights (i.e. to the exclusion of others) it needs to be the sole author or the copyright of the other authors should be assigned or exclusively licensed to the HPA.

- If it is sufficient for the HPA to be able to publish the report (alongside other organisations), it is sufficient for the HPA to be a joint author to the entire report or to have a non-exclusive license to such parts of the report which are distinct from those written by the HPA.
Appendix 8 – Audit Tool for Outbreak Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Data Source</th>
<th>Suggested compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outbreak Recognition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial investigation to clarify the nature of the outbreak begun within 24 hours</td>
<td>HPZone or log</td>
<td>100% Level 2 and above 90% level 1</td>
</tr>
<tr>
<td>Immediate risk assessment undertaken and recorded following receipt of initial information</td>
<td>HPZone or log</td>
<td>100% Level 2 and above 75% level 1</td>
</tr>
<tr>
<td><strong>Outbreak Declaration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision made and recorded at the end of the initial investigation regarding outbreak declaration and convening of outbreak control team</td>
<td>HPZone or log</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Outbreak Control Team</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCT held within three working days of decision to convene**</td>
<td>Minutes* and report</td>
<td>95%</td>
</tr>
<tr>
<td>All agencies/disciplines involved in investigation and control represented at OCT meetings</td>
<td>Minutes* and report</td>
<td>95%</td>
</tr>
<tr>
<td>Roles and responsibilities of OCT members agreed and recorded</td>
<td>Minutes* and report</td>
<td>95%</td>
</tr>
<tr>
<td>Lead organisation with accountability for outbreak management agreed and recorded</td>
<td>Minutes* and report</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Outbreak Investigation and Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control measures documented with clear timescales for implementation and responsibility</td>
<td>Minutes* and report</td>
<td>100%</td>
</tr>
<tr>
<td>Case definition agreed and recorded</td>
<td>Minutes* and report</td>
<td>95%</td>
</tr>
<tr>
<td>Descriptive epidemiology undertaken and reviewed at OCT. To include: number of cases in line with case definition; epidemic curve; description of key characteristics including gender, geographic spread, pertinent risk factors; hypothesis generated.</td>
<td>Minutes* and report</td>
<td>95%</td>
</tr>
<tr>
<td>Area</td>
<td>Requirement</td>
<td>Evidence</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Analytical study</td>
<td>Considered and rationale for decision recorded</td>
<td>Minutes* and report</td>
</tr>
<tr>
<td>Investigation protocol</td>
<td>Prepared if an analytical study is undertaken</td>
<td>Minutes* and report</td>
</tr>
<tr>
<td>Communications</td>
<td>Communications strategy agreed at first OCT meeting</td>
<td>Minutes</td>
</tr>
<tr>
<td></td>
<td>Absolute clarity about HPA lead at all times with appropriate handover</td>
<td>HPZONE or log</td>
</tr>
<tr>
<td></td>
<td>consistent with handover standards</td>
<td></td>
</tr>
<tr>
<td>End of Outbreak</td>
<td>Final outbreak report completed within 12 weeks of the formal closure of the</td>
<td>Report</td>
</tr>
<tr>
<td></td>
<td>outbreak</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Report recommendations and lessons learnt reviewed within 12 months of formal</td>
<td>Currently dependent on local arrangements for reviewing recommendations and lessons learnt.</td>
</tr>
<tr>
<td></td>
<td>closure of the outbreak</td>
<td></td>
</tr>
</tbody>
</table>

*If a report has not been written (e.g. for level 1 incidents) minutes should be used to assess compliance

** Dependant on the immediate risk assessment, and that this will determine the appropriate urgency according to the severity and potential risks of the illness concerned. Specific infection protocols should be followed
Appendix 9 – Outbreak Specific Guidance

A9.1 Hospitals and other Health Care Premises
A9.2 Water Specific
A9.3 Food Specific Outbreaks
A9.4 Other Specific Outbreaks

A9.1 Hospitals and other Health Care Premises

In premises such as hospitals and other health care institutions, the staff responsible for routine infection control will usually be the first people to be aware of the problem. Most hospital outbreaks have minimal or no public health implications and will be dealt with using the hospital’s own internal outbreak plan. It is expected that all hospital outbreak policies will stipulate that the local CCDC will be informed whenever a hospital OCT is convened regardless of the circumstances. However, if the outbreak has any potentially serious public health implications, then this plan takes precedence in control of the outbreak. Whilst it is difficult to be prescriptive as to what constitutes a potentially serious public health implication, the following are suggestive features:

- the outbreak has significant implications for the community
- involves many cases of notifiable disease
- involves even small numbers of a disease which constitutes a serious public health hazard
- Involves suspected food or water borne transmission of infection
A9.2 Water Specific

The UK Cryptosporidium Reference Unit is developing guidance for public health professionals in collaboration with partners across the UK. Guidance relating to swimming pools is available and can be accessed from

http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Cryptosporidium/Guidelines/

The HPA and Drinking Water Inspectorate have jointly developed guidance for health and water professionals to support drinking water quality risk assessments and the issuing of consumer protection advice. Drinking Water Safely: Guidance to health and water professionals is available at:

http://www.hpa.org.uk/Publications/InfectiousDiseases/InfectionControl/0910DrinkingWaterSafety/
A9.3 Food Specific Outbreaks

Relevant Legislation
The specific statutory responsibilities, duties and powers which are significant in the handling of an outbreak of food poisoning are set out in the:

- Public Health (Control of Disease) Act 1984
- Health Protection (Notification) Regulations 2010
- Health Protection (Local Authority Powers) Regulations 2010
- Health Protection (Part 2A Orders) Regulations 2010
- Food Safety Act 1990
- Food Law Code Of Practice (England)
- International Health Regulations 2005
- Public Health (Ships) Regulations 1979
- Public Health (Aircraft) Regulations 1979

Foodborne Outbreak Guidance
The guidance listed below will assist in the management and control of a food poisoning outbreak.


This guidance is directed at doctors and EHOs for the purpose of controlling infection in general populations. It covers advice for enteric precautions, specifies ‘at risk’ groups and gives guidance on exclusions in specified cases.


This guidance provides a framework for health professionals to assist them in the management of outbreaks of infectious disease caused by ingestion of microbiologically contaminated food. It is designed to assist the OCT in dealing with an outbreak and provides an aide memoir for medical and nursing staff, environmental health professionals, scientists and others involved in the investigation.
This guidance helps managers and staff to prevent infected food handlers spreading illness through food that they work with.
A9.4 Other Specific Outbreaks

For guidance on dealing with other disease specific outbreaks please refer to the HPA website, links to some are given below:

Cryptosporidium
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Cryptosporidium/Guidelines/

Legionnaires’ Disease
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/LegionnairesDisease/Guidelines/

Vero cytotoxin-producing *Escherichia coli*
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/EscherichiaColiO157/VTECOperatio nalManual/

Zoonotic Disease
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Zoonoses/Guidelines/

Bioterrorism and other particular infectious disease threats
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/DeliberateReleases/
Appendix 10 - Bibliography

Existing Plans

The Draft Communicable Disease Outbreak Plan for Wales: The Wales Outbreak Plan, July 2010


Incidence and Emergency Response Plan, Health Protection Agency, October 2010
http://hpanet/webc/HPAnetFile/HPAnet_C/1287142611550

Joint Infectious Disease Outbreak Plan, Health Protection Agency North West, October 2010

Joint Communicable Disease Outbreak Management Plan, Cambridge and Peterborough Health Protection Team, March 2011

London Infectious Disease Outbreak Management Plan V3.7, Sept 2011

Major Community Outbreak Plan for London Boroughs, Health Protection Units and Primary Care Trusts, South East London HPU, August 2010

Management of outbreaks of foodborne illness in England and Wales, Food Standards Agency, 2008

Policy for the investigation and control of community outbreaks of infectious disease in the North East, North East HPU, November 2007

Response to Community Outbreaks (including water) Incidents: Incident and Emergency Response Plan, West Midlands East HPU, February 2008

Other

Field Epidemiology Toolkit. Health Protection Agency, Local and Regional Services, July 2010
http://www.hpa.org.uk/Publications/InfectiousDiseases/InfectionControl/1008Fieldepidemiologykit/


STROBE statement