



**Guidance for Health Protection Units on dealing with  
human health implications of avian influenza in poultry  
and wild birds**

**(Version 2)**

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## ABBREVIATIONS

ACDP	Advisory Committee on Dangerous Pathogens
AHDO	Animal Health Divisional Office
AI	Avian Influenza
CDC	Communicable Disease Control
CCDC	Consultant in Communicable Disease Control
CsCDC	Consultants in Communicable Disease Control
CEPR	Centre for Emergency Preparedness and Response
Cfi	Centre for Infections
CVO	Chief Veterinary Officer
Defra	Department for Environment, Food and Rural Affairs
DH	Department of Health
DPH	Director of Public Health
DRA	Dynamic Risk Assessment
DVM	Divisional Veterinary Manager
EA	Environment Agency
EHO	Environmental Health Officer
EOC	Emergency Operations Centre
FSA	Food Standards Agency
GPs	General Practitioners
GNN	Government News Network
HA	Haemagglutinin
HEPA	Health Emergency Planning Advisor
HM	Her Majesty
HPA	Health Protection Agency
HPAI	Highly Pathogenic Avian Influenza
HPU	Health Protection Unit
HSE	Health and Safety Executive
HQ	Headquarters
IERP	Incident and Emergency Response Plan
IMT	Incident Management Team
JCC	Joint Coordination Centre
LA	Local Authority
LDCC	Local Disease Control Centre
LP	Low Pathogenic
LPAI	Low Pathogenic Avian Influenza
MLC	Meat and Livestock Commission
NDCC	National Disease Control Centre
NHS	National Health Service
NI	Neuraminidase Inhibitor
NIBSC	National Institute for Biological Standards and Control
OIE	World Organisation for Animal Health
PCR	Polymerase Chain Reaction
PCT	Primary Care Trust
PPE	Personal Protective Equipment
RNA	Ribo Nucleic Acid
ROD	Regional Operations Director
RT	Reverse Transcriptase
UK	United Kingdom
VLA	Veterinary Laboratory Agency
VO	Veterinary Officer

## 1. SUMMARY

Over the past few years, the Health Protection Agency has been involved in responding to avian influenza (AI) incidents involving both large scale commercial poultry establishments and smaller backyard premises.

Health Protection Units have played a lead role in managing the human and public health consequences of these incidents using information and data provided by the Department for Environment, Food and Rural Affairs (Defra) and working with the local National Health Service (NHS) colleagues.

This guidance document has been developed to support Health Protection units in undertaking the risk assessment which underpins the management of avian influenza incidents, building on standard principles of outbreak management, and incorporating lessons learnt during the recent AI incidents in the UK (the H5N1 swan in Scotland and H7N3 in poultry in Norfolk in 2006; the H5N1 in poultry in Suffolk and H7N2 in poultry in Wales and Northwest England in 2007).

The document incorporates the principles from the paper recently endorsed by the Advisory Committee on Dangerous Pathogens (ACDP) describing the strict and standard approaches to responding to AI incidents. It also includes Defra's levels of suspicion and national alert levels as outlined in Defra's recently published response plan for exotic diseases.

Health Protection Units should use the document in their ongoing dialogue with local Animal Health colleagues and the local NHS in developing their own local plans for responding to avian influenza incidents.

## 2. PURPOSE

The purpose of this guidance is to assist Health Protection Units (HPUs) in planning for, and dealing with, the human health implications of suspected or confirmed avian influenza outbreaks in either live or dead wild birds or domestic poultry in their area. Using standard health protection principles, this guidance aims to ensure that a consistent approach is adopted across the Health Protection Agency (HPA) in responding to AI incidents.

## 3. INTRODUCTION

Avian influenza (AI) is a disease of animals caused by the Influenza A virus. The virus is classified according to the Haemagglutinin (H1 to H16) and the Neuraminidase (N1 to N9) proteins on its surface. The virus also causes normal seasonal human influenza. AI is hosted by birds but may infect several species of mammals, including humans. All known influenza A virus subtypes are endemic in wild birds.

Wild fowl act as natural asymptomatic carriers of Influenza A viruses. Prior to the current H5N1 epizootic, strains of Influenza A virus had been demonstrated to be transmitted from wild fowl to only birds, pigs, horses, seals, whales and humans; and only between humans and pigs, and between humans and domestic fowl; and not via other pathways such as domestic fowl to horse.

H5N1 has also been shown to be transmitted to tigers, leopards, and domestic cats which were fed uncooked infected domestic fowl (chickens) with the virus.

AI viruses that the World Organisation for Animal health (OIE) and others test for in order to control poultry disease include: H5N1, H7N2, H1N7, H7N3, H13N6, H5N9, H11N6, H3N8, H9N2, H5N2, H4N8, H10N7, H2N2, H8N4, H14N5, H6N5, H12N5, of which only H5 and H7 subtypes are notifiable.

AI viruses are categorised as being High or Low Pathogenic (HPAI or LPAI) depending on their virulence in poultry. These terms do not refer to the seriousness of disease caused in humans, although to date, LPAI viruses have only caused conjunctivitis or a mild illness in humans<sup>1,2</sup>. Only H5 and H7 have produced highly pathogenic variants (Annexe 1), but not all H5 and H7 viruses are highly pathogenic.

Since 2003, HPAI H5N1 has become endemic in poultry across many regions of the world. Tens of millions of birds are estimated to have died from H5N1, and hundreds of millions have been culled to limit the possible human health consequences. HPAI H5N1 now poses a long-term pandemic threat. So far, the disease is rare in humans, albeit with a high case-fatality rate. To date there have been two H5N1 incidents in the United Kingdom (UK), one isolated case in a single dead bird and one outbreak in a poultry flock. No human cases were associated with either incident<sup>3,4,5</sup>.

## 4. THE HPA RESPONSE

This is based on a risk assessment which depends on the following levels of suspicion as assessed by Defra<sup>6</sup> and laboratory results:

- i) **Report of suspicion:** a report to Defra/Animal Health resulting in a veterinary officer (VO) investigating a case(s) of disease which may be consistent with AI; in effect AI is one of a number of possible diagnoses under investigation.
- ii) **Disease Suspected:** an assessment by a Defra/Animal Health VO that disease/death in an avian species consistent with the diagnosis of a notifiable avian disease which may be AI requiring investigation/ control measures has been discovered; in effect AI is the main working diagnosis.

- **Disease Confirmed:** a confirmed incidence of disease where symptoms are consistent with AI and supported by laboratory isolation of an influenza virus from the Veterinary Laboratory Agency (VLA) world reference laboratory in Weybridge.

and

## ii) Laboratory results.

Until positive laboratory results are available, a risk assessment of available evidence to decide whether the event is likely to be due to HPAI or LPAI. This risk assessment will be based on advice from Defra and from HPA staff with specialist epidemiological and virological expertise in the field of influenza, most likely from the HPA Centre for Infections (CfI) in consultation with the VLA.

In the early stages of incidents with little known about the virus, a **Strict Approach** to management would be adopted on a precautionary basis which might then be downgraded to a **Standard Approach** when emerging virological and epidemiological information allows for a more informed risk assessment (Annexe 2).

The principles of the **Strict Approach** include:

- Keeping the numbers of people exposed to an absolute minimum
- Commencing prophylaxis with Neuraminidase inhibitors for people already exposed (who have been in close contact with infected birds) as soon as possible
- Advising people who are likely to be exposed as responders to commence prophylaxis in advance of commencement of duties and advising on the appropriate need for Personal Protective Equipment (PPE) use
- Follow-up of exposed people and/or their close or family contacts dependent on expert epidemiological and virological advice

The principles of the **Standard Approach** are:

- Keeping the numbers of people exposed to a reasonable minimum
- Not starting prophylaxis with Neuraminidase inhibitors (or discontinuing use if already started as part of a Strict Approach) provided there have been :
  - No human deaths
  - No serious human illness
  - No serious person-to-person transmission (as confirmed by laboratory tests) confirmed to be linked to that subtype, and
  - No large numbers of humans affected by common clinical syndrome suspected or confirmed to be linked to that subtype.

**\*If any of the four circumstances above occurred, this would trigger switching or reverting to a Strict Approach.**

## 5. AIMS AND OBJECTIVES OF THE HEALTH PROTECTION UNIT RESPONSE

The main aims of HPUs should be to undertake a human health risk assessment<sup>7</sup> using the Dynamic Risk Assessment model (Annexe 3) and to minimise the human and public health consequences of the incident<sup>4,8</sup> by:

- Advising and supporting Defra, NHS and others to implement actions to protect the health of those in close contact with infected birds (including close family members) e.g. Animal Health staff, cullers, poultry/farm workers, contractors, hauliers, disposal site operators, and close family and local residents
- Dealing with the wider public health consequences<sup>4,9</sup> including guarding against

the possibility of development of a new strain of virus from recombination of the avian virus and the human flu virus with the potential for easy person-to-person transmission.

The key operational objectives should include:

- Undertaking a human health risk assessment of individuals who have been in close contact with infected birds and those likely to be in close contact with infected birds as part of the response to the incident
- Providing advice on protective measures to reduce the risk of disease in exposed people
- Providing advice and measures to reduce the risk of genetic intermixing of human and avian influenza strains in exposed people
- Providing advice on human health issues relating to culling, disposal and the management of animal waste (use of seasonal flu vaccine and antivirals)
- Ensuring effective communication and co-ordination with Defra/Animal Health colleagues and within the HPA
- Ensuring the timely implementation of appropriate public health countermeasures
- Providing advice and information to people potentially exposed to avian influenza
- Ensuring that appropriate, authoritative information is available
- Initiating and co-ordinating with NHS partners, with advice from HPA staff with specialist epidemiological and virological expertise in the field of influenza, the arrangements for:
  - Prescription and administration of antiviral prophylaxis, or treatment, and follow-up including where appropriate, monitoring of health status of the exposed or their contacts (this may involve both pre- and post-exposure prophylaxis)
  - Vaccination of poultry workers, handlers/cullers, veterinarians and others (using seasonal flu vaccine)
  - Providing information to local health professionals and the public, including the provision of a helpline if appropriate
  - Other countermeasures as required.

## **6. ORGANISATIONAL ARRANGEMENTS FOR THE MANAGEMENT OF AVIAN INFLUENZA INCIDENTS**

Defra is the lead Government department for the management of AI incidents and outbreaks in poultry and wild birds and is the policy lead for outbreaks in England. In Great Britain, Animal Health are the delivery body and the lead for the operational activities. Defra has developed a plan for the response available at:

[www.defra.gov.uk/corporate/consult/animaldiseases-plan2007](http://www.defra.gov.uk/corporate/consult/animaldiseases-plan2007).

The HPU will lead the management of the human and public health consequences, using information and data provided by Defra/Animal Health. The public health response will be delivered jointly with the local Primary Care Trust (PCT) with support from Local and Regional Services (LaRS) colleagues regionally and nationally. Specialist support will be provided by the Centre for Infections (CfI) and the Centre for Emergency Preparedness and Response (CEPR).

The HPU response should be in line with the HPA Incident and Emergency response plan (IERP)<sup>10</sup>. It should be noted that whilst the HPA adopts the principle of local leadership of an AI incident (HPU led, unless escalated to a Regional or National incident as defined in IERP), Defra manages AI incidents centrally<sup>11</sup>, using a command and control structure centred on its National Disease Control Centre (NDCC) in Page Street, London (Annexe 4). Alongside this, the local operational response is managed from a Local Disease

Control Centre (LDCC) at one of Animal Health's 24 animal health divisional offices (AHDOs). The HPA needs to be represented at all levels of the Defra chain of command and all HPA personnel need to be aware that this juxtaposition of leadership requires careful handling. For example, the central risk assessment performed by Defra at the NDCC will involve input from HPA personnel deployed to Page Street. There must be clear lines of communication within the HPA and between the HPA and Defra to ensure consistency of information and messages about the incident and advice given and a coordinated Defra/HPA response.

## **6.1 Strategic Implications of an AI incident**

- Defra's response is run from the centre
- The Department of Health (DH) require information and updates regularly
- The Civil Contingencies Committee (CCC) will probably be convened to take a strategic overview and will be staffed by the Chief Executive's Office team
- A National Emergency Operations Centre (EOC) will therefore be established early at Holborn gate to coordinate information centrally
- Regular updates will be achieved through frequent telephone conferences

## **6.2 Alerting**

### **6.2.1 Alerting the local HPU**

Animal Health should contact the local HPU and discuss the situation with the duty Consultant in Communicable Disease Control (CCDC) as soon as they become aware of an AI incident at suspicion level 2 (Annexe 5). The HPU may also be alerted by:

- HPA CEPR Duty officer
- HPA Cfl (Duty Director, Duty Doctor, Pandemic Influenza Office or Respiratory Diseases Department).

### **6.2.2 Alerting within the HPA**

HPU staff should alert appropriate people as outlined in the HPA IERP depending on the level of the incident. This is likely to include the HPA Regional Director, Cfl Duty Doctor (Pandemic Influenza Office or Respiratory Diseases Department within working hours), Regional Communications Manager and the CEPR Duty Officer.

### **6.2.3 Alerting the local NHS**

For 'disease suspected' or 'disease **confirmed**' animal AI incidents, the CCDC should alert PCT partners and the duty pharmacist at local hospital(s) holding Oseltamivir and seasonal flu vaccine supplies to mobilise these supplies. For reports of reports of suspicion of 'AI incidents, the CCDC should consider alerting PCT partners and the duty pharmacist at local hospital(s).

### **6.2.4 Alerting the local Animal Health office**

HPU staff should alert the local Animal Health staff if they become aware of any reports of a febrile respiratory illness in persons who have been in contact with sick, dying or dead birds within 7 days of onset of their illness.

## **7. RESPONSE**

### **7.1 Defra/Animal Health response**

Annexe 4 outlines Defra's command structure for controlling animal disease. This is based on three levels of command. At the operational level, the Local Disease Control Centre (LDCC) will implement tactical advice from Defra's National Disease Control Centre (NDCC) in line with the response plan available at:

[www.defra.gov.uk/corporate/consult/animaldiseases-plan2007](http://www.defra.gov.uk/corporate/consult/animaldiseases-plan2007)

#### **7.1.1 The Local Disease Control Centre**

The Regional Operations Director (ROD) heads the LDCC, which comprises a number of operational teams responsible for delivering the operational disease control response. In addition to the Animal Health veterinary technical and administrative staff, a number of operational partners and stakeholders will also be invited to attend.

These include:

- Regional Resilience teams
- Local Authorities
- Police
- Defra/Animal Health Health and Safety adviser
- Environment Agency (EA)
- Incident Management Team (IMT) liaison / HPU representative

Others may be invited as appropriate for the incident.

## **7.2 Human Health Response**

### **7.2.1 Risk assessment**

The HPU will undertake a risk assessment informed by Defra's level of suspicion and available laboratory results (Annexes 5 & 6).

### **7.2.2 Convening an Incident Management Team**

The HPU may wish to convene a virtual IMT teleconference at Defra's suspicion level 2 (Annexe 5).

The HPU should convene an IMT (Annexe 7) at Defra's suspicion level 3 to co-ordinate measures for protecting the health of exposed people who have been in close contact with infected birds (including close family members), local residents and the wider public.

#### **7.2.2.1 Team membership**

The Incident Management Team (IMT) core members may include:

- Consultant in Communicable Disease Control (CCDC)
- HPU director
- PCT Director of Public Health (DPH)
- Appropriate LDCC liaison/Animal Health representative
- Regional Epidemiologist
- Information and surveillance officer
- Health Emergency Planning Advisor (HEPA)
- Communications manager
- Administrative staff/office manager

Others may be invited as appropriate.

## **7.3 Roles and responsibilities**

### **7.3.1 The Local Disease Control Centre**

The LDCC will be focused on all aspects of animal disease control such as culling and disposal of animals, movement restrictions in the immediate area of the case and welfare of staff involved in the operation. Their main responsibility is the effective control and eradication of disease during an outbreak and allowing the industry to return to normality.

This will include:

- Identification of the source and possible spread of infection and co-ordinating disease control measures on the infected premises
- Identification and tracing of poultry, people and vehicles/equipment which may

- have been in direct contact with infected poultry
- Identification and surveillance of poultry in the vicinity of the infected premises
- Licensing the movements of poultry and poultry products within the restricted zones
- Implementation of any changes in policy or controls
- Provision of regular feedback to inform strategic decisions
- Maintenance of satisfactory communications with external agencies with legitimate interest in the incident
- Provision of an accurate and reliable source of information for other professionals, the media and the public and designating a press spokesperson
- The LDCC will also receive advice from the IMT on human health control/counter measures and will provide input to lessons to be learned and incident/outbreak reports.

### 7.3.2 The Incident Management Team

The role of the IMT is to manage the public health impact of the incident ensuring that the potential consequences of AI on public health and the health of staff involved in disease control operations are minimised. In the earliest stages of incident management, the IMT will adopt a “Strict approach” which could be downgraded to a “Standard approach” as a more informed risk assessment is undertaken in the light of emerging virological and epidemiological information (refer to section 3 above).

The role of the IMT will include:

- Identifying and managing all those already exposed
  - Undertaking a human health risk assessment
  - Agreeing exposure criteria
  - Agreeing and coordinating human health interventions
    - Referral to relevant management algorithm available at: [www.hpa.org.uk/infections/topics\\_az/influenza/avian/guidelines.htm](http://www.hpa.org.uk/infections/topics_az/influenza/avian/guidelines.htm)
    - Liaison with specialist colleagues at HPA CfI
    - Prescription and administration of post exposure antiviral prophylaxis
    - Need for administration of seasonal influenza vaccination
    - Information
  - Agreeing criteria for possible/probable human cases
  - Agreeing and coordinating follow-up (clinical and serological) investigations and management with specialist support from CfI
  - Agreeing and coordinating implementation
- Advising on minimising further exposure and reducing the likelihood of infection
- Agreeing and coordinating (in consultation with others such as the HSE, and Defra/Animal Health, health and safety professionals) the arrangements for protecting those who will potentially be exposed
  - Personal Protective Equipment (PPE) as appropriate
  - Prescription and administration of pre-exposure antivirals
  - Need for administration of seasonal influenza vaccination
  - Arrangements for delivery of antivirals
  - Arrangements for follow up of exposed people
  - Agreeing and coordinating implementation
- Communication: provision of information on health related matters as required to:
  - LDCC

- Government News Network
  - Other divisions of HPA (including national teleconferences)
  - Individuals potentially exposed
  - Local partner organisations
  - General practitioners (GPs) and other local health services
  - Media/general public (including a spokesperson)
- Declaring the end of the human health aspects of the incident
  - Writing an incident report to include lessons identified and how these will be taken forward.

### 7.3.3 Important roles within an IMT

These include:

**Chair:** Strategic overview of local health response, appropriate delegation of tasks, receiving progress reports, briefing others (e.g. Strategic Health Authority, Government Office, HPA teleconference). The chair should clarify liaison arrangements with the LDCC to ensure appropriate timely briefings. The chair should also ensure access to appropriate epidemiological and data management support at an early stage of an incident. The chair may be the HPU Director, CCDC or the PCT DPH.

**PCT DPH:** Ensuring access to resources for protection of human health e.g. implementation of flu vaccination, antiviral prophylaxis and treatment, follow up of exposed people, communication with the public and supporting appropriate epidemiological investigation to determine risk factors for infection, and establishing extent of human-to-human transmission.

**CCDC/Consultant in Health Protection:** responsible for leading the local human health risk assessment, and for advising the IMT on the most appropriate response measures, taking account of all the circumstances of the current incident and advice from HPA staff with specialist epidemiological and virological expertise in the field of influenza.

**Office manager and administrative staff:** Record keeping, call handling, staff welfare, information for staff unfamiliar with local office systems, maintenance of rotas.

**Health Emergency Planning Advisor (HEPA):** Staffing support and forward planning.

**LDCC liaison:** Liaison between the LDCC and the IMT. Defra's Health and Safety Team have oversight of the Department's occupational health provider during an outbreak. HPA must ensure that the nominated occupational health representative at the LDCC and NDCC is kept apprised of key decisions, to enable appropriate advice and actions to be taken in terms of occupational health management.

**Communication Managers:** PCT and HPA communication managers are responsible for appropriate liaison with their colleagues from partner agencies to ensure consistent public health messages and agreeing multi-agency media statements.

## 7.4 Communication

It is important to note that on confirmation of an outbreak of AI, Defra/Animal Health will establish an LDCC and invite representatives from key local stakeholders. Defra/Animal Health communications will produce initial communication messages and top line briefs (including lines from Food Standards Agency (FSA) and HPA as appropriate) and will pass

these to regional teams for cascade locally. The Government News Network (GNN) will liaise with local stakeholders to ensure local issues and wider impacts are reflected in the communications briefings. Regular feedback/briefings are also required by the IMT and in all the EOCs.

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## Annexe 1. Known outbreaks of HPAI in birds between 1959 and 2007

<b>Year</b>	<b>Area</b>	<b>Affected</b>	<b>Subtype</b>
1959	Scotland	chicken	H5N1
1963	England	turkey	H7N3
1966	Canada (Ontario)	turkey	H5N9
1976	Australia (Victoria)	chicken	H7N7
1979	Germany	chicken	H7N7
1979	England	turkey	H7N7
1983	USA (Pennsylvania)*	chicken, turkey	H5N2
1983	Ireland	turkey	H5N8
1985	Australia (Victoria)	chicken	H7N7
1991	England	turkey	H5N1
1992	Australia (Victoria)	chicken	H7N3
1994	Australia (Queensland)	chicken	H7N3
1994	Pakistan*	chicken	H7N3
1997	Australia (New South Wales)	chicken	H7N4
1997	China (Hong Kong)*	chicken	H5N1
1997	Italy	chicken	H5N2
1999	Italy*	turkey	H7N1
2002	China (Hong Kong)	chicken	H5N1
2002	Chile	chicken	H7N3
2003	Netherlands*	chicken	H7N7
2006	Scotland	swan	H5N1
2006	England (Norfolk)	turkey	H7N3
2007	England (Suffolk)	turkey	H5N1
2007	England (North West) and Wales	turkey	H7N2

\* indicates spread occurred widely to other nearby premises

## **Annexe 2. Advisory Committee on Dangerous Pathogens (ACDP) HPA OPERATIONAL APPROACHES TO AVIAN INFLUENZA INCIDENTS**

### **BACKGROUND**

A qualitative microbiological risk assessment of avian influenza viruses (low pathogenic and high pathogenic) was carried out by the HPA in October 2005, it was assisted by expert virology input from Veterinary Laboratory Agency (VLA) and National Institute for Biological Standards and Control (NIBSC).

In that assessment it was concluded that the transmission risk of low pathogenicity AI viruses to poultry handlers is the same as the risk of high pathogenicity virus transmission and that there is no evidence that virulence correlates in poultry are the same in humans. Low pathogenicity in poultry does not indicate a reduced tendency to transmit to humans, and the virus could develop the ability to spread effectively between humans. However the clinical evidence to date indicated that low pathogenicity AI viruses cause conjunctivitis or at worst only mild illness when transmitted to humans.

A quantitative microbiological risk assessment was carried out by the HPA and reported to the Department of Health (DH) Scientific Advisory Group in May 2006 at its joint meeting with the Defra Scientific Advisory Group. That risk assessment only considered H5N1 AI strains.

In April 2006, an outbreak of low pathogenicity H7N3 occurred at a poultry farm in Dereham in Norfolk. A sustained public health response was delivered by the HPA and NHS to support the Animal Health actions and protect those involved in the assessment and culling operations.

Two of the main lessons identified from the Dereham H7N3 poultry outbreak were:

1. A realisation that a one-size fits all approach to the public health response did not work. In particular, that an algorithm designed for a highly dangerous human pathogen (high-pathogenicity influenza A/H5N1) was resource intensive and not necessarily an appropriate level of response to an outbreak involving a less dangerous pathogen, eg low-pathogenicity influenza A/H7N3.
2. A realisation that there needs to be clarity about the necessity for vaccination of exposed persons with seasonal influenza vaccine if the avian influenza virus which caused the poultry outbreak is considered to be of low pathogenicity.

This paper sets out the operational principles agreed by a cross-HPA group to clarify the above issues.

### **PARTICIPANTS**

Nigel Lightfoot, Nick Gent, John Watson, Maria Zambon, Pat Nair, Oliver Morgan, Ruth Gelletlie, Jonathan Van-Tam (chair).

### **PRINCIPLES ESTABLISHED**

1. That the HPA approach will be based upon the concept of "Dynamic Risk Assessment"<sup>1</sup> (DRA), accepting fully that, at the point when an incident comes to the attention of the HPA, it is highly likely that virological and human epidemiological information will either be unavailable or incomplete.
2. That a precautionary approach ("Strict Approach") will need to be followed in the first instance until further information becomes available with which to further refine the risk assessment.
3. That a Strict Approach encompassing the principle of maximum precautions will remain appropriate for certain situations and subtypes of influenza A based upon what is already known about the hazard posed to humans or human pandemic potential.

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<sup>1</sup> Dynamic Risk Assessment (DRA) is the process by which the risk in an incident is assessed and reassessed as new information becomes available, so that the incident management can be tailored to the prevailing risk. The risk assessment model developed in Yorkshire and incorporated into HPZone is an example of a tool which supports DRA.

4. That a Strict Approach adopted in the early stages of an incident (when little is known about the virus) might be modified to a less intensive “Standard Approach” later in the incident, where emerging virological and epidemiological information, and expert virology advice through the DRA process indicates a reduced risk.
5. That as a default position, most avian influenza viruses (once the subtype is known) would be amenable to a Standard Approach, unless expert virological advice or emerging epidemiological/virological data suggested otherwise.
6. That a Standard Approach might well need to be modified/upgraded to a Strict Approach in the light of emerging epidemiological, clinical or virological information and expert advice through the DRA process.
7. That the DRA and the subsequent public health response enacted by the HPA and the subsequent DRA process depend upon the earliest possible HPA access to animal virological information generated by VLA and Defra.
8. That the risk assessment process through which it is decided whether a Strict or Standard approach is followed in any given incident, is based on advice received from epidemiology and virology specialists in the field of influenza.

### **PRINCIPLES OF THE STRICT APPROACH**

1. Keep numbers of persons likely to be exposed during the response, to an absolute workable minimum (balanced against veterinary requirement to bring about control and containment of source problem in poultry).
2. Significant effort should be made to ensure that prophylaxis for persons already exposed when the incident is reported is started with minimum avoidable delay; starting later than 48h after first exposure is still appropriate for persons whose exposure began several days earlier however persons whose last exposure was >7 days earlier and who remain well have ‘worked out’ their incubation period and would not require prophylaxis unless re-exposed.
3. Prophylaxis for persons who are going to be exposed as ‘responders’, through the processes of catching, culling, veterinary examinations or clean-up etc., **must** be started in advance of the commencement of such duties where appropriate PPE and instruction is unavailable or there are doubts/concerns about full compliance/understanding. Where appropriate PPE and instruction is available in advance and local HPA staff are fully satisfied about compliance and understanding, prophylaxis may be given within 12 hours following commencement of duties.
4. Follow-up may not be confined just to persons directly exposed (defined as those to whom oseltamivir prophylaxis is offered) but (dependent on expert epidemiological and virological advice) may also include the close/family contacts of persons directly exposed. Follow-up arrangements should be comprehensive, consistent with a) being able to rapidly identify cases of clinically apparent disease in persons exposed and their close contacts; and b) rule out person-person transmission.

### **PRINCIPLES OF THE STANDARD APPROACH**

1. Keep numbers of persons likely to be exposed during the response to a reasonable minimum (balanced against veterinary requirement to bring about control and containment of source problem in poultry).
2. Prophylaxis with neuraminidase inhibitors need not be started (or may be stopped if already started as part of an initial ‘strict approach’ – see below) provided that, in the current incident and in the worldwide literature, there have been\*:
  - no human deaths
  - no serious human illnesses
  - no person-to-person transmission (as confirmed by laboratory tests) confirmed to be linked to that subtype, and:
  - no large numbers of humans affected by common clinical syndrome suspected or confirmed to be linked to that subtype.

*\*If any of the four circumstances above occurred, this would trigger switching or reversion to a ‘strict approach’ –see below*

3. Follow-up of persons exposed (defined as those to whom oseltamivir prophylaxis is offered) should be ‘passive’ through the provision of information and advice (preferably written) to comply with oseltamivir treatment and report any suspicious illnesses without delay.

## **CIRCUMSTANCES WHICH QUALIFY FOR A STRICT APPROACH**

1. The initial period in any incident when Defra have issued an Amber Alert Level 3 (culling will be undertaken on the grounds of strong suspicion of or confirmed avian influenza) where the specific influenza subtype is completely unknown.
2. Any period during an incident when the only information available at the time relates to the H subtype (N is unknown, high path/low path is unknown) and that H subtype is confirmed by Defra/VLA to be H5, H7 or H9.
3. Any period during an incident when the H subtype is confirmed by Defra/VLA to be H5, H7 and in addition Defra/VLA have made a provisional identification of a high-pathogenicity virus.
4. Any incident in which associated human deaths are already apparent.
5. Any incident in which AI-associated serious human illness is already apparent or strongly suspected.
6. Any incident in which person-to-person transmission of a relevant influenza subtype is already confirmed by laboratory tests.
7. Any incident in which widespread person-to-person transmission of a relevant AI-associated clinical illness is already suspected.
8. Any incident (in addition to 1-7 above) in which the expert virological/epidemiological view is that the currently identified virus has significant pandemic potential.

## **CIRCUMSTANCES WHICH MAY ALSO QUALIFY FOR A STRICT APPROACH\***

1. An incident in which the influenza subtype is confirmed by Defra/VLA to be H2 (H2 caused a previous human pandemic and is not a currently circulating human subtype).
2. An incident in which the influenza subtype is confirmed by Defra/VLA to be H10 (documented evidence of cases of human disease).
3. \*N.B. 1 and 2 above dependent on expert virological/epidemiological advice on an incident-by-incident basis.

All other incidents or periods within incidents lend themselves to a Standard Approach, but will be assessed and re-assessed on an incident-by-incident basis through the DRA process, taking particular account of emerging virological and epidemiological information and expert advice.

## **OTHER AGREED TRIGGERS FOR UPGRADING FROM A STANDARD APPROACH TO A STRICT APPROACH**

1. Any incident in which AI-associated human death(s) are discovered.
2. Any incident in which AI-associated serious human illness becomes apparent or strongly suspected.
3. Any incident in which person-to-person transmission of a relevant influenza subtype is discovered by confirmed by laboratory tests.
4. Any incident in which widespread person-to-person transmission of a relevant AI-associated clinical illness is discovered.
5. Any incident in which the expert virological/epidemiological evidence-based advice is that the currently identified virus has significant pandemic potential.

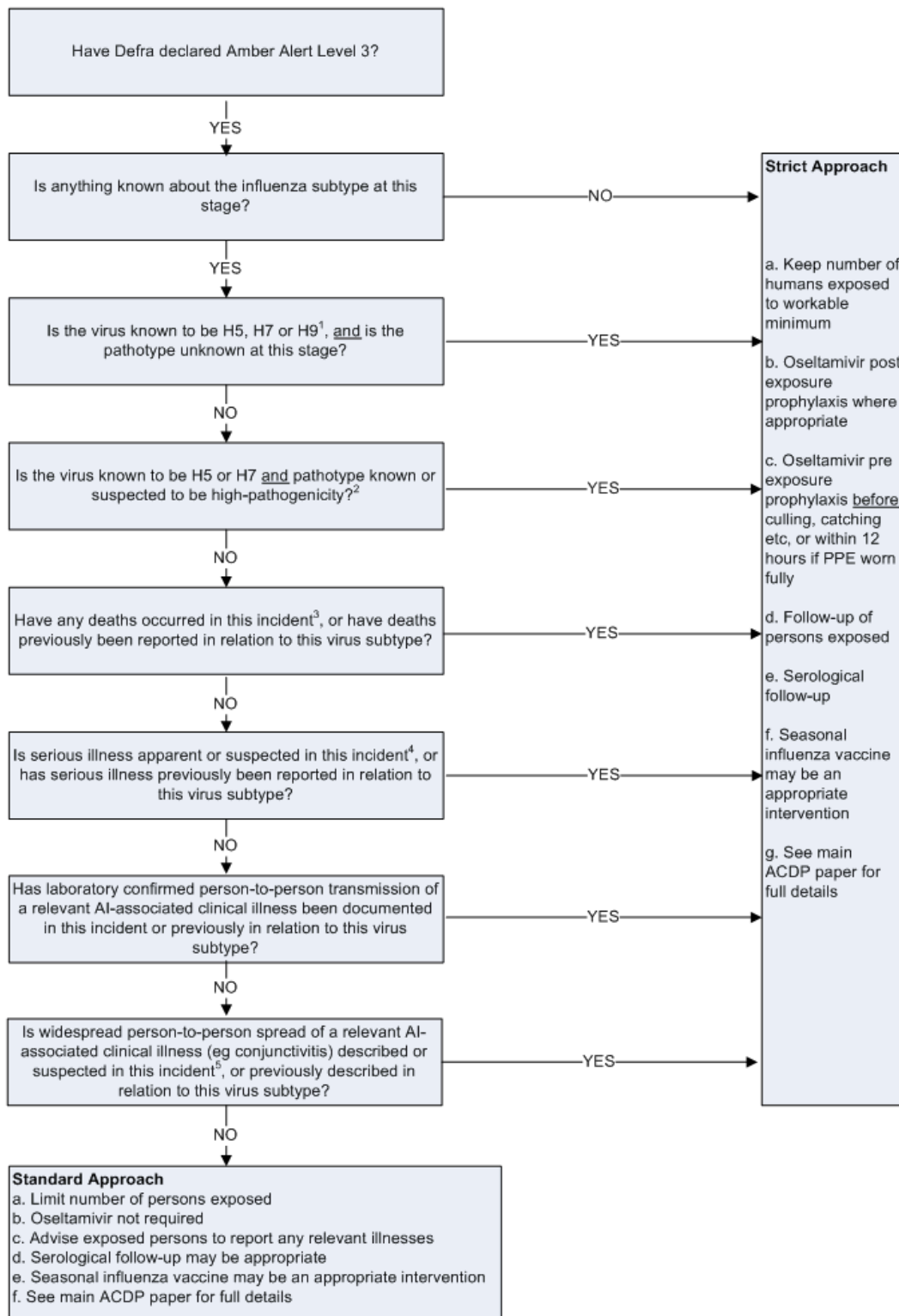
## **USE OF SEASONAL INFLUENZA VACCINE TO REDUCE RISK OF REASSORTMENT**

1. Expert internal HPA virological advice is that the risk of reassortment (however small) is no different with a low-pathogenicity versus a high-pathogenicity virus.
2. The Advisory Committee on Dangerous Pathogens (ACDP), including a number of HPA members has formally advised Her Majesty's (HM) Government that it draws no distinction between high and low-pathogenicity viruses in terms of their potential for reassortment with a human influenza virus.
3. Vaccination of exposed persons with seasonal influenza is therefore a relevant and reasonable public health response in all confirmed avian influenza incidents, regardless of whether a high or low-pathogenicity virus is implicated. Expert internal HPA advice can be sought to inform the decision whether vaccination is appropriate.
4. Although the default position ('driven' by 1-3 above) points broadly towards the fact that vaccination should be recommended for all incidents, it is important to emphasise that other public health measures in managing the incident and are of equal if not greater importance.

These include preventing unnecessary exposure, use of PPE, use of Neuraminidase Inhibitors (NI) prophylaxis, and health status follow up.

5. During the summer, the risk of circulating human influenza is much lower than in the winter. Additionally it may not be possible to source the appropriate northern hemisphere vaccine outside the normal flu season. Southern hemisphere vaccine can be obtained out of season and should therefore be considered, although the effort taken to obtain such vaccine must be balanced against expert advice regarding knowledge of circulating flu, the potential or known hazard of the avian virus involved in the incident, and the extent to which other public health measures have been successfully implemented.

## Algorithm for Management of Public Health Consequences of Avian Influenza in Poultry/Wild Birds: Strict vs Standard Approach



1. On a case by case basis, expert advice may be given to respond to other subtypes using the strict approach, eg H2-previous cause of human pandemic  
 2. Pathotype result from VLA-Weybridge is always provisional in the early stages of an incident but should be taken into account along with expert veterinary view about the likelihood of the virus being of high pathogenicity.  
 3. Death(s) due to causes compatible with an AI aetiology. One or more deaths qualifies.  
 4. Serious illness due to causes compatible with an AI aetiology.  
 5. If large numbers of persons affected with a common clinical syndrome which is compatible with an AI aetiology (eg conjunctivitis) lab confirmation is desirable but not a pre-requisite for adopting the strict approach.

### Annexe 3. Dynamic Risk Assessment (DRA) model

## 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.

### Severity and prognosis of known cases

The degree of harm already incurred, or likely to be incurred by those already affected including, course, complications, death and morbidity rates as obtained from established knowledge, and the speed of onset and duration of illness.

Grade	Qualifier	Description	Examples
<b>0</b>	<u><i>Very Low</i></u>	Seldom causing severe illness.	<ul style="list-style-type: none"> <li>• Hand, foot and mouth disease in a nursery.</li> <li>• MRSA in a domestic setting.</li> <li>• Head lice.</li> </ul>
<b>1</b>	<u><i>Low</i></u>	Occasional serious illness rarely with long term effects or death.	<ul style="list-style-type: none"> <li>• Hepatitis A in a primary school.</li> </ul>
<b>2</b>	<u><i>Moderate</i></u>	Often severe illness occasionally with long term effects or death.	<ul style="list-style-type: none"> <li>• Toxigenic E. Coli 0157.</li> <li>• Pulmonary Tuberculosis.</li> <li>• MRSA infection in a high dependency unit.</li> <li>• Hepatitis B or C infection.</li> <li>• Legionnaires' Disease.</li> </ul>
<b>3</b>	<u><i>High</i></u>	Usually severe illness often with long term effects or death.	<ul style="list-style-type: none"> <li>• Meningococcal disease.</li> <li>• MDRTB.</li> </ul>
<b>4</b>	<u><i>Very High</i></u>	Severe illness almost invariably fatal.	<ul style="list-style-type: none"> <li>• Rabies.</li> <li>• Ebola.</li> <li>• VCJD</li> </ul>

# Confidence

The level of confidence, epidemiologically, clinically, statistically and from laboratory evidence, that the diagnosis is correct in the set of circumstances.

## Confidence in the hypothesis

Extent of confidence in and consistency of the clinical picture in terms of available laboratory diagnostic results and associated confounding factors including ambiguity and uncertainty.

Grade	Qualifier	Description	Examples
0	<u>Very Low</u>	Available evidence suggests that the hypothesis is correct with an empirical probability of less than 10%.	<ul style="list-style-type: none"> <li>• Hunch.</li> </ul>
1	<u>Low</u>	Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 10% to 25%.	<ul style="list-style-type: none"> <li>• Alternative hypothesis more likely but cannot exclude the working hypothesis.</li> </ul>
2	<u>Moderate</u>	Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 25% to 50%.	<ul style="list-style-type: none"> <li>• Alternative hypotheses equally likely.</li> </ul>
3	<u>High</u>	Available evidence suggests that the hypothesis is correct with an empirical probability in the range of 50% to 85%.	<ul style="list-style-type: none"> <li>• Typical incident picture without conflicting information.</li> </ul>
4	<u>Very High</u>	Available evidence suggests that the hypothesis is correct with an empirical probability higher than 85%.	<ul style="list-style-type: none"> <li>• Typical incident picture with increasing confirmation.</li> </ul>

## Spread

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

### Potential of the organism to spread given the circumstances

The transmissibility of the organism, its characteristics (virulence and infective dose), its mode(s) of transmission and the availability of the routes of infection.

The susceptibility of population at risk i.e. the state of immunity, general health and nutrition of population under consideration and the extent to which normal defence mechanisms will protect that population.

Grade	Qualifier	Description	Examples
<b>0</b>	<u><i>Very Low</i></u>	Very low likelihood of spread with very few new cases.	<ul style="list-style-type: none"> <li>• A single case of Campylobacter.</li> </ul>
<b>1</b>	<u><i>Low</i></u>	Low likelihood of spread with few new cases.	<ul style="list-style-type: none"> <li>• A single case of meningococcal disease.</li> <li>• A smear negative culture positive case of TB.</li> </ul>
<b>2</b>	<u><i>Moderate</i></u>	Moderate likelihood of spread with new cases. May develop into a limited outbreak.	<ul style="list-style-type: none"> <li>• Viral gastro-enteritis in a nursing home.</li> <li>• A handful of cases of Hepatitis A occurring over a prolonged period of time in a large community.</li> <li>• A smear positive case of TB.</li> </ul>
<b>3</b>	<u><i>High</i></u>	High likelihood of spread with many new cases. May develop into a large outbreak	<ul style="list-style-type: none"> <li>• Multiple cases of Dysentery in a deprived population of children under 8 years old.</li> <li>• Epidemic of influenza in an army camp.</li> </ul>
<b>4</b>	<u><i>Very High</i></u>	Spread almost inevitable.	<ul style="list-style-type: none"> <li>• Measles in an non-immune sub-population.</li> </ul>

## 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.

Grade	Qualifier	Description	Examples
<b>0</b>	<u>Very easy</u>	Intervention well established with clear benefits and no anticipated difficulties to implement.	<ul style="list-style-type: none"> <li>• Hand washing advice.</li> </ul>
<b>1</b>	<u>Easy</u>	Intervention with clear beneficial effects and few difficulties to implement.	<ul style="list-style-type: none"> <li>• Withdrawal of contaminated food in a closed institution.</li> <li>• Measles or Hepatitis A immunisation to a small group of vulnerable contacts of a case.</li> <li>• A case of meningococcal infection in a child with contacts confined to the household.</li> </ul>
<b>2</b>	<u>Passable</u>	Intervention with some beneficial effects and some difficulties to implement.	<ul style="list-style-type: none"> <li>• Prophylaxis to immediate family and close contacts in a meningococcal case where they are dispersed.</li> </ul>
<b>3</b>	<u>Difficult</u>	Some remedial intervention possible but either difficult to implement, relatively ineffectual or other significant problems.	<ul style="list-style-type: none"> <li>• National food withdrawal.</li> <li>• Urgent mass immunisation campaign.</li> <li>• Response to rabid dog on the loose.</li> </ul>
<b>4</b>	<u>Very difficult</u>	Remedial intervention very difficult.	<ul style="list-style-type: none"> <li>• Response to a cluster of vCJD.</li> <li>• MRSA in a busy high dependency unit.</li> </ul>

## 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.

### 5.1. Media, parents and local concern

The degree to which media, parents, local concern, politics aggravate and raise the profile of the event under consideration.

### 5.2. Historical problems

Influence of local experience of similar interests and previous events, the way they were handled, associated consequences and expectations arising.

### 5.3. Peer group practice

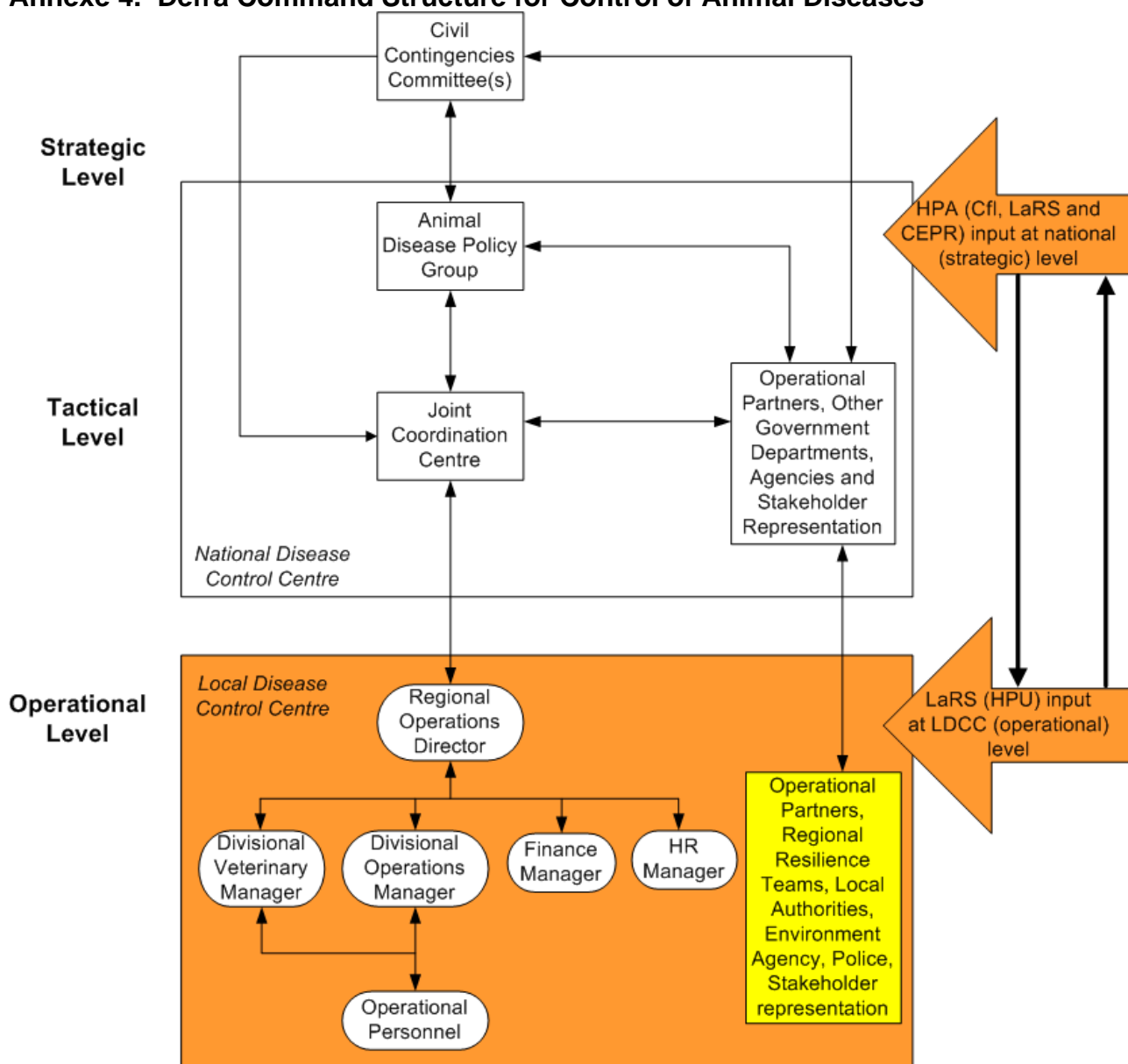
Extent to which an established approach or recommended best practice is tested and documented (national guidelines).

### 5.4. What is happening elsewhere

Extent to which other similar incidents are being managed and publicised, with resultant effect on public attitudes and expectations.

Grade	Qualifier	Description	Examples
0	<u>Very Calm</u>	No raised level of interest.	<ul style="list-style-type: none"> <li>• Apathy. Public / media are supportive of immunisation.</li> <li>• Common adverse problems are fairly well understood.</li> </ul>
1	<u>Calm</u>	A small degree of increased interest with a low level of conflicting factors. Little public concern.	<ul style="list-style-type: none"> <li>• Misunderstanding corrected by routine information.</li> <li>• Head-lice control campaign.</li> <li>• A few cases of diarrhoea in a nursery school.</li> </ul>
2	<u>Passable</u>	A degree of unease and anxiety on the part of the public and the media. The context could deteriorate if the event is mis-handled.	<ul style="list-style-type: none"> <li>• A series of gastro-enteritis cases associated with an outdoor centre to which school children are sent.</li> <li>• TB in a school in a low incidence area.</li> </ul>
3	<u>Difficult</u>	Context is sensitive with significant difficulties, press interest and local people (unaffected) involved. The incident could go very wrong unless carefully handled. The event could have re-occurred in spite of preventive actions.	<ul style="list-style-type: none"> <li>• Surgeon is found to have HIV / AIDS.</li> <li>• Wide spread food poisoning affecting several schools.</li> <li>• Unjustified allegation about the safety of childhood vaccines with media coverage.</li> </ul>
4	<u>Very Difficult</u>	Significantly raised public concern and political and emotional pressure with the public and the media declaring antagonistic and unhelpful views.	<ul style="list-style-type: none"> <li>• If BSE-like illness linked to new source e.g. pork.</li> <li>• If MMR immunisation was shown to have serious unsuspected side effects.</li> </ul>

## Annexe 4. Defra Command Structure for Control of Animal Diseases<sup>8</sup>



**Strategic** – Key officials will make decisions concerning the policies upon which the disease control operation will be based (e.g. Chief Veterinary Officer).

**Tactical** – Officials are responsible for ensuring that strategic advice is translated into practical instructions to those carrying out the operational response. The tactical response will be coordinated by the Joint Coordination Centre (JCC), which is part of the National Disease Control centre (NDCC). This is both an advisory and coordination function for those controlling the disease at local level (e.g. Head of Response Coordination).

**Operational** – Activity will centre around the work of the Local Disease Control Centre (LDCC). The LDCC will implement tactical level advice in line with guidance set in the Defra contingency plan and operational instructions (e.g. Regional Operations Director (ROD)).

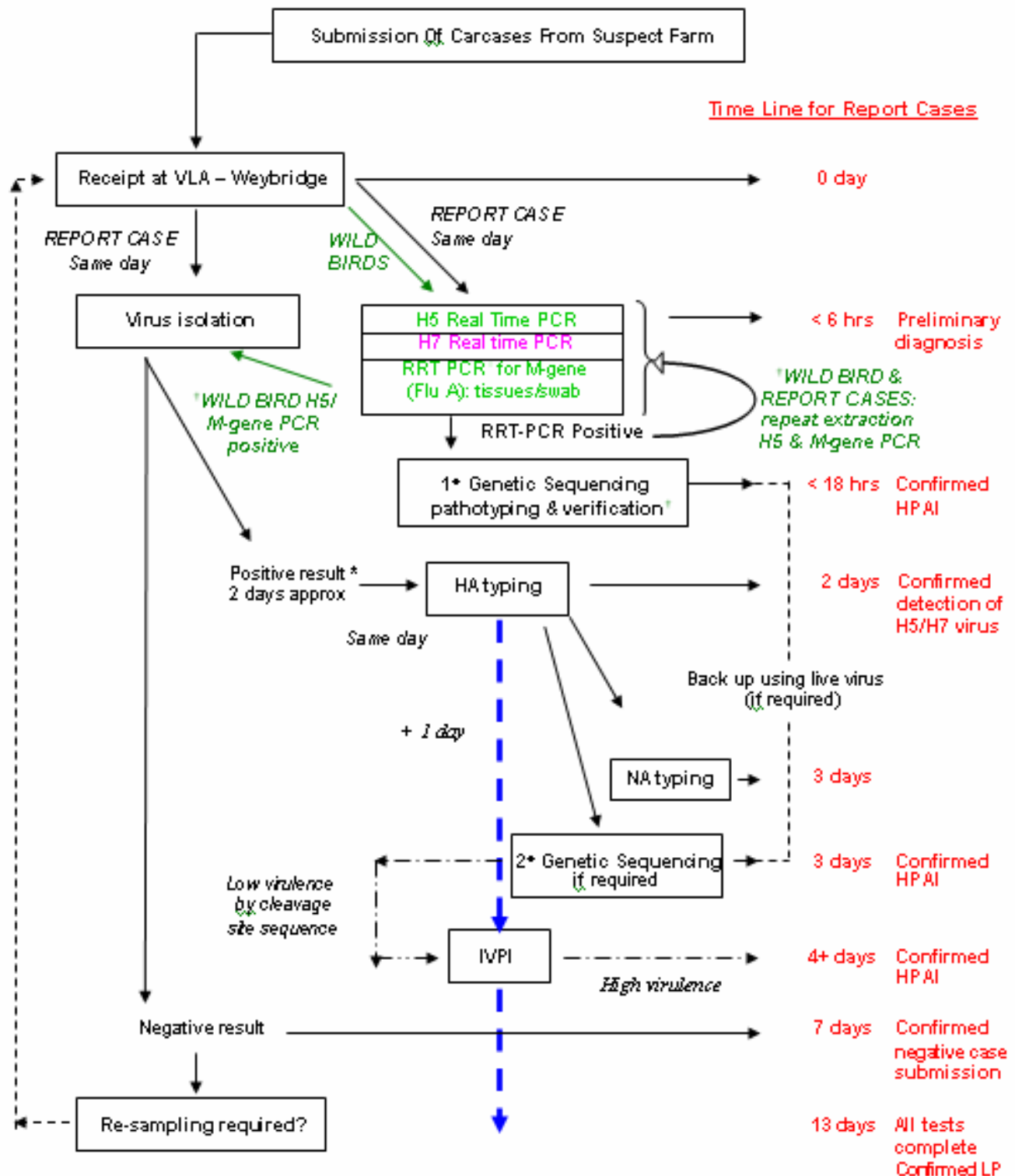
At the operational level the Defra/Animal Health activity will centre around the work of the local Disease Control centre (LDCC). The LDCC will implement tactical level advice from the Defra National Disease Control Centre (NDCC) in line with guidance set out in their contingency plans and operational instructions. [www.defra.gov.uk/corporate/consult/animaldisease-plan2007](http://www.defra.gov.uk/corporate/consult/animaldisease-plan2007)

**Annexe 5. Defra’s Level of Suspicion and National Alert levels, initial actions and associated HPU response to a suspect case of AI**

<b>Level of suspicion (Alert level)</b>	<b>Generic level of suspicion</b>	<b>Initial actions (Defra/Animal Health)</b>	<b>HPU response</b>
<b>0 (WHITE)</b>	Disease not suspected following veterinary enquiry	All restrictions on premises lifted – no further action	No HPU action required. <b>The HPU will not normally be contacted at this level</b>
<b>1 (WHITE)</b>	Lesions and clinical disease not typical – but disease cannot be ruled out entirely on clinical grounds	Suspect birds left alive and observed. Samples taken and submitted for laboratory diagnosis. Premises restrictions imposed. Local authority will be notified.	HPU action not usually required. HPA Emergency Response Officer may be contacted at this stage. If local HPU contacted by local Animal Health, then notify Regional Director and HPA CfI duty doctor <b>Regional Director will notify the HPA Emergency Response duty officer and the Regional Director of Public Health</b>
<b>2 (AMBER)</b>	Lesions and clinical disease suggestive of disease. Poultry showing typical lesions may be killed	Sick birds may be killed. Suspect flock left alive and observed. Samples taken and submitted for laboratory diagnosis. Premises restrictions imposed.  Animal Health should notify direct to the local HPU (normally the CCDC).	Notifications as for Level 1  And alert PCT partners that flu immunisation and Oseltamivir prophylaxis may be needed. <b>Contact local Hospital Pharmacy to ensure Oseltamivir and seasonal flu vaccine stocks are available.</b>
<b>3 (AMBER)</b>	Lesions and clinical disease highly suggestive of disease.  Entire flock of birds may be pre-emptively killed	An amber teleconference will be called to discuss the incident and agree next steps.  All poultry on the premises may be pre-emptively killed (slaughtered on suspicion). Samples submitted for laboratory diagnosis. Premises restrictions imposed.  Animal Health/Defra will contact Public Health partners at local and national level.  A NDCC and LDCC will be established.	Notifications as for level 2 <b>Participate in Amber teleconference.</b>  <b>Convene Incident Management Team and send HPU liaison to local Defra/Animal Health LDCC</b>  <b>Mobilise Oseltamivir and vaccine supplies</b>
<b>4 (RED)</b>	As a level 3 plus disease already confirmed or a decision to slaughter on suspicion has been taken	All poultry on the premises slaughtered on suspicion and disease confirmed on clinical grounds only without awaiting laboratory results. Samples will be submitted for laboratory diagnosis. Area restrictions imposed.  Animal Health/Defra will contact Public Health partners at local and national level.  A NDCC and LDCC will be established	Same as for level 3

**Source:** Defra's Framework Response Plan for Exotic Animal Diseases<sup>6</sup>

## Annexe 6. Statutory diagnosis of avian influenza



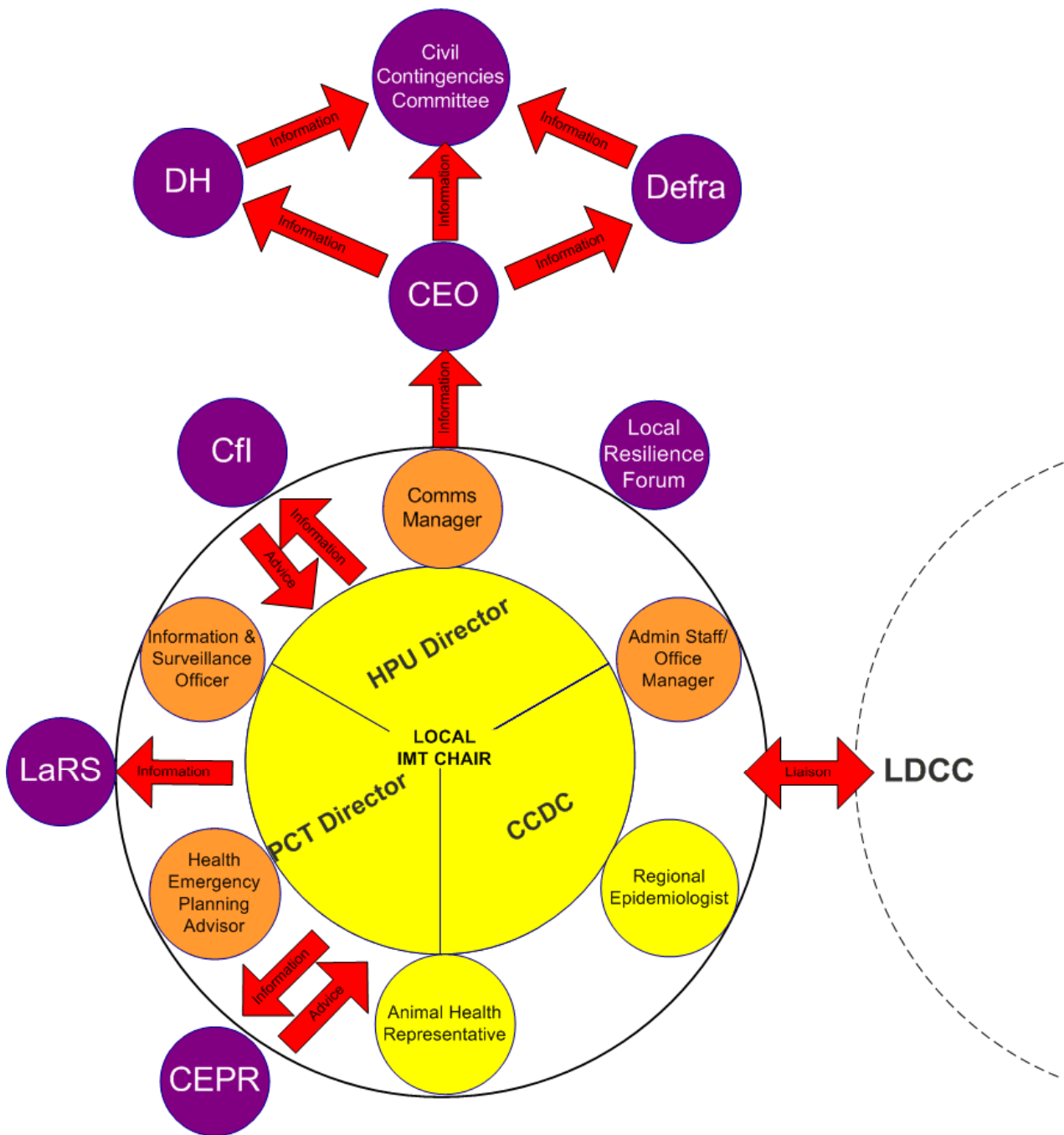
KEY:

- ⊠ Typeface in red indicates reporting level
- ⊠ Haemagglutinating agent
- ➡ Mandatory for index case and wild birds in new areas; thereafter solely genetic sequencing for HPAI
- ⊠ Positive PCR should provide material suitable for sequencing
- ⊠ Wild bird or Report Case H5 & M-gene RRT-PCR screening test positives subject to 3-phase Confirmatory testing

### TEST VALIDATION

- ⊠ International standard (EU directive 92/40 and OIE Manual of diagnostic tests/vaccines for Terrestrial animals)
- ⊠ Validation complete to OIE standard (included in draft Diagnostic Manual for new EU Directive)
- ⊠ Under development to include validation (target March 06)

## Annexe 7. Interactions of the Local Incident Management Team with the wider Health Protection Agency and others



- Potential LDCC liaison role
- External interactions with Local IMT
- Incident Management Team (IMT)
- Local Disease Control Centre (LDCC)



## Annexe 8. Avian influenza – health questionnaire

# Avian Influenza - Health Questionnaire

**Consent to collect information concerning your current health; for this information to be reviewed by animal health; and for this information to be passed to your local public health authority:**

Avian influenza is primarily a disease of birds. It can, very rarely, be passed from birds to humans. You are being asked to provide the clinical information set out in the questionnaire, to assess whether there is any possibility that you, or any other people that you know of, are suffering from any symptoms of influenza.

The answers that you give will be checked by the official from Animal Health who has come to your premises today. If you have answered 'yes' to any of these questions they will contact your local public health authority for further advice.

The completed form will be passed to your local public health authority and will become part of their records of this incident.

By completing this form you give consent to the information you provide being checked by Animal Health, and for Animal Health to pass this information, and information to enable them to contact you, to your local public health authority.

By providing the information requested on this form to the official from Animal Health you are helping your local public health authority to respond to any problems that you, your family, friends and contacts might have as quickly as possible.

Should you not wish to give this information to the official from Animal Health, please ask them to arrange for your local public health authority to contact you directly.

Please complete the details overleaf and immediately hand back to one of the Animal Health team who has issued this form



## Contact Details & Health Information

Name & Phone No. of the individual for whom the questionnaire is being completed (Please print)

First name

Second name (Surname)

Contact phone Number

Date / /   
Day/ Month/ Year

**‘Contact’ is defined below as anyone who has been in contact with poultry, eggs, poultry litter/manure on this premises or have entered any building containing them, within the last 7 days.**

Questions	Yes	No
1. Have you developed a flu like illness (e.g. high temperature, cough, sore throat, runny nose headache, aching muscles) since your contact?		
2. Have you developed shortness of breath since your contact?		
3. Have you developed sticky eyes(s)/conjunctivitis since your contact?		
4. Are you aware of <b>anyone else</b> associated with this incident who has developed any of these symptoms? If yes provide name and contact number if known, in the space below		

Details of any Additional Contacts  
.....  
.....  
.....  
.....

Signed:..... Dated:.....

**ANIMAL HEALTH STAFF MUST IMMEDIATELY PHONE THE RELEVANT NHS BOARD or HEALTH PROTECTION TEAM IF ANY ANSWERS ARE YES to the ABOVE QUESTIONS.**