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Chartered Institute of Environmental Health

Guidelines for the Investigation of Zoonotic Disease (non-foodborne) in England and Wales

v2, July 2016

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

This guidance was developed by:

- Public Health England
- Department for Environment, Food and Rural Affairs
- Animal and Plant Health Agency
- Department of Health
- Public Health Wales
- Welsh Government
- Food Standards Agency
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Contents

Executive summary

Zoonotic infections can pose a major threat to human and animal health. Robust investigation and management of potential zoonotic investigations is paramount and requires close collaboration between various governmental and non-governmental agencies and other professionals. These guidelines for investigation of Zoonotic Disease (England and Wales) have been thoroughly revised and updated, with the aims to facilitate multi-agency collaborative working arrangements and to provide overall background on the management of zoonotic incidents and outbreaks.

The guidelines describe the roles and responsibilities of a range of organisations and agencies that can become involved in an outbreak of zoonotic disease. In addition to a summary of the reporting requirements associated with notifiable, reportable and non-statutory zoonotic infections, this document also provides information on data sources and routine zoonotic surveillance systems in humans and animals.

Timely communication and liaison between the responding agencies underpins effective investigation and management of potential zoonotic incidents. It is critical that staff in the relevant agencies are aware of the communication protocols and liaison arrangements to enable appropriate risk assessment and response.

The section on incidents and outbreaks provides an overview of the strategic principles to support a coordinated and effective multi-agency risk assessment and response. A further section indicates the legal aspects of data protection and confidentiality. Individual organisations have well-tested and exercised plans for incident response. It is important that these guidelines are read in conjunction with relevant organisational response plans.

1. Introduction

Zoonoses are diseases and infections that are naturally transmissible between vertebrate animals and humans. Transmission may occur due to direct occupational, recreational or domestic contact with animals, via indirect contact or due to consumption of contaminated food products. Detailed information on specific zoonoses is available on the Public Health England (www.gov.uk/phe), Public Health Wales (www.publichealthwales.wales.nhs.uk) and Health and Safety Executive (www.hse.gov.uk) websites.

This document is intended for those likely to be involved in the management of zoonotic incidents and clarifies the roles and responsibilities of different organisations. It outlines how they should best work together in different situations through routine information reporting or formal liaison and outbreak investigations, to ensure a common approach. In England, these include Public Health England (PHE) local or national teams, local authorities (LAs), NHS England, Animal and Plant Health Agency (APHA), the Health and Safety Executive (HSE), private veterinary surgeons and, on occasion, private veterinary laboratories. In Wales, Local Health Boards (LHBs) have similar roles to NHS England. Separate arrangements exist for Scotland (www.hps.scot.nhs.uk) and Northern Ireland (www.publichealth.hscni.net). Where cross-border incidents occur these should be managed in collaboration with appropriate agencies and parties.

This document is intended to provide a broad overview of the investigation of all potential zoonotic incidents; however it does not deal with specific diseases, and where disease-specific protocols exist these should be followed (see Appendix 5).

The investigation of food-borne zoonotic incidents/outbreaks, such as salmonellosis, is well covered elsewhere and is therefore not included in these guidelines (1). However, the potential for direct transmission of enteric diseases from animals (i.e. non-foodborne) caused by organisms such as *Salmonella*, verocytotoxigenic *E.coli* (VTEC) O157 and cryptosporidiosis are included within the remit of this document.

These guidelines are consistent with and supportive of PHE's outbreak operational guidance and the Communicable Disease Outbreak Plan For Wales (2,3).

2. Structures, Roles & Responsibilities of involved agencies/organisations

2.1. Public Health England (PHE)

www.gov.uk/phe

PHE is an executive agency of the Department of Health (DH) established in 2013 to provide an integrated approach to protecting public health in England through the provision of support and advice to the NHS, LAs, APHA, emergency services, and DH. PHE does not have statutory powers to enforce legislation but works closely to support other agencies that do, such as LAs and the Food Standards Agency (FSA).

The Emerging Infections and Zoonoses (EIZ) Section in PHE's National Infections Service (NIS) undertakes a range of activities including horizon-scanning and assessment of infectious disease threats, co-ordinating zoonoses activities across PHE, and providing medical and health protection advice. The section works closely with Public Health Wales and with veterinary colleagues on the assessment, management and control of zoonoses.

There are currently nine PHE Centres covering England. PHE Centres have one or more Health Protection Teams (PHEC-HPTs) that often serve as the first contact point for zoonotic incidents within PHE and represent the local face of PHE. These are staffed by Consultants in Communicable Disease Control (CsCDC) also referred to as Consultants in Health Protection (CHP), health protection nurses and practitioners, and scientific and support staff who work directly with local stakeholders to deliver local health protection services. The contact details of key organisations can be found in Appendix 8.

PHE also includes a network of specialist microbiology laboratories, providing frontline diagnostic and reference microbiology services to NHS Trusts, APHA, PHEC-HPTs and LAs.

2.2. Public Health Wales (PHW)

www.publichealthwales.wales.nhs.uk

Public Health Wales, an NHS Trust, provides health protection services for the people of Wales. These are provided by an all-Wales Health Protection Team working from locations in North, Mid and West Wales, and South East Wales. The team is staffed by CsCDC, health protection nurses and scientific and support staff who work directly with other parts of NHS Wales, acute hospital trusts, Health Boards (HBs), APHA and LAs in their area to deliver local health protection. The HPT liaises with HBs, Welsh Government and others as appropriate.

The Communicable Disease Surveillance Centre (CDSC) is the epidemiological arm of PHW and is responsible for surveillance of infectious disease, provision of health intelligence and applied research. CDSC also provides part of the zoonoses surveillance reference function for England and Wales in collaboration with PHE NIS and works closely with twelve microbiology laboratories in Wales which provide the comprehensive laboratory, clinical and scientific support underpinning the diagnosis and management of communicable disease. HPTs take the lead in outbreak investigations, with field epidemiology support from CDSC and the microbiological services.

2.3. Department for Environment, Food and Rural Affairs (Defra) (England)

www.gov.uk/defra

Defra has a wide-ranging remit including the environment, rural economy, farming, and food provision. The focus on healthy environment and a thriving farming and food sector includes reducing the risks of animal diseases, and being ready to control notifiable diseases when they occur. Defra's animal disease surveillance and control includes zoonotic diseases when found in animals, but the level of surveillance activity and control undertaken is disease dependent. Policy on these areas is developed by the Core Department and delivered through Defra's delivery agency, the Animal and Plant Health Agency (APHA).

2.4. Welsh Government: Office of the Chief Veterinary Officer (OCVO) (Wales)

www.gov.wales

The Welsh Government, following devolution of animal health and welfare powers, has a similar remit in Wales to Defra in England in respect of animal health and welfare and zoonoses, with a few exceptions, e.g. authorising veterinary medicines. Surveillance is delivered in partnership with Defra. Welsh Ministers are responsible for implementing and delivering disease control policy in Wales and APHA is their delivery agent.

2.5. Animal and Plant Health Agency (APHA)

www.gov.uk/apha

APHA is an executive agency of Defra and provides services for Defra, the Welsh Government and the Scottish Government. It includes national and international reference laboratories for a wide range of animal diseases. Operational veterinary staff are engaged in either field services or surveillance activities.
Field services staff of APHA implement government animal health and welfare policies on farms, at animal gatherings, at locations dealing with animal products and during transport. Their zoonotic remit relates to statutorily notifiable and reportable animal diseases, and includes:

- identification and management of outbreaks of notifiable animal disease (some of which may be zoonotic)
- epidemiological investigations
- disease prevention, control and eradication
- liaison, provision of advice and assistance for the investigation of some zoonotic incidents

APHA's surveillance veterinary staff are located in APHA's Veterinary Investigation Centres (VICs). These receive animal carcases and other diagnostic material (predominantly from farm animals) submitted by private veterinary surgeons for testing, monitoring and post-mortem examination. Staff at the VICs also:

- perform a wide range of investigations into diseases of domesticated livestock and wildlife. This includes a range of non-statutory zoonoses, including new or emerging animal diseases and toxicoses (eg botulism)
- investigate and provide advice to human health agencies on human outbreaks or incidents of non-notifiable zoonoses, such as VTEC O157, cryptosporidiosis and hantavirus infection

APHA can provide laboratory, surveillance and field support for the investigation and diagnosis of a range of zoonoses. Support may be in the form of expertise (such as attending or providing advice to the OCT). For some incidents, an APHA visit and epidemiological investigation (potentially including the collection of samples) may be required, and in some circumstances, the requesting organisation will need to fund some or all aspects of visits undertaken for public health reasons.

2.6. Health and Safety Executive (HSE)

www.hse.gov.uk

The HSE has the broad remit of protecting people's health and safety by ensuring risks in the workplace are properly controlled, including protection from infectious hazards that may be encountered in workplaces such as factories, commercial farms, hospitals and schools. This includes protection both for the workforce and members of the public who may be affected by the work activity and is carried out through inspection and the use of statutory powers and the regulation of risk through risk assessment.

HSE does not have enforcement responsibility in offices, shops (including pet shops) and other parts of the service sector, such as farms open to the general public where commercial agriculture is not the main enterprise. These situations are covered by LAs (see below).

2.7. Food Standards Agency (FSA)

www.food.gov.uk

The FSA is a non-ministerial Government department responsible for protecting public health and the interests of consumers in relation to food throughout the UK. Its remit is

wide, covering the entire food chain including primary producers, manufacturers, distributors, retailers and caterers. The FSA is involved in the cross-Government response to outbreaks of animal disease and will provide advice on the possible implications for food safety. FSA involvement may extend to incidents where the risk of food-borne transmission is negligible but where there is a perception of risk by consumers.

Feed and food safety and standards are devolved matters in the UK. In addition to its London headquarters, the FSA has offices in Wales and Northern Ireland. From 1 April 2015, Food Standards Scotland (FSS) adopted national Government responsibility in Scotland for food and feed safety and standards, meat inspection policy and operational delivery.

The FSA is responsible for carrying out official controls in approved fresh meat premises in England and Wales. It provides audit and inspection services in approved slaughterhouses, cutting plants, game-handling establishments, and co-located minced meat and meat products premises. It ensures, through proportionate enforcement of legislation, that the activities of the meat industry safeguard the health of the public, and the health and welfare of animals.

Official controls require specific inspections of all animals, carcases and offals, and risk-based audits to verify that Food Business Operators (FBOs) comply with EU Food Hygiene Regulations. This includes routine surveillance, reporting of post-mortem conditions to Food Business Operators (FBOs)/farmers and notifying APHA of any suspect cases of notifiable disease.

In suspected zoonotic incidents linked to animal slaughter and cutting facilities, the FSA will be involved in inspecting and recommending re-approval of potentially contaminated facilities once they have been cleansed and disinfected to the satisfaction of the official veterinarian. The FSA will also designate specific processors to receive animals from geographically identified disease control zones that have been created by APHA to help control and eradicate exotic notifiable diseases.

2.8. Local Authorities (LAs) (England and Wales)

Local authorities and port health authorities have a key role in investigating and managing outbreaks of communicable disease. Under Section 6 of the Health and Social Care Act 2012, Directors of Public Health (DsPH) in upper tier and unitary local authorities have a duty to prepare for and lead the local authority public health response to incidents that present a threat to public health. It is therefore expected that the DPH or deputy will be a member of any incident or outbreak control team.

Under the amended Public Health (Control of Disease) Act 1984 and associated Regulations, the majority of statutory responsibilities, duties and powers relevant

to the handling of an outbreak lie with the LA, including appointment of a Proper Officer whose powers include the receipt of notifications.

In addition, LAs have a wide range of other relevant powers and responsiblilities:

- licensing of animal establishments and activities, including pet vending, dog breeding, cat boarding and horse riding
- enforcing standards of food safety and hygiene
- enforcing standards for occupational health and safety at work, including shops, offices, hotels and restaurants
- ensuring a stray dog collection service is provided
- responding to pest control issues

All LAs have responsibilities under the Civil Contingencies Act 2004 to respond to local and national emergencies.

2.9. NHS England Area Teams (ATs) and Local Health Boards (LHBs) (Wales)

www.england.nhs.uk; www.wales.nhs.uk

ATs/LHBs are given primary responsibility by the NHS for the health of the local population. Although the HPT would typically lead the local response to a zoonotic incident, the AT/LHB will provide additional support ranging from information analysis and data processing to coordinating the primary care response such as issuing antiviral agents or arranging screening at GP surgeries. ATs /LHBs may also provide a spokesperson for the media.

2.10. NHS 111 or NHS Direct Wales

www.nhs.uk; www.nhsdirect.wales.nhs.uk

The NHS 111 service is staffed by a team of fully trained advisers, supported by experienced nurses and paramedics covering England. In Wales, the NHS Direct service can be accessed by calling 0845 46 47 or via the website. Calls to NHS 111 or NHS Direct Wales from members of the public are made either for general information or for advice about a specific non life-threatening medical complaint. NHS 111 or NHS Direct Wales services may also be used during zoonotic incidents to provide specific advice or links to helplines if required.

3. Suggested lines of communication for zoonotic disease in animals and humans

See flow charts on following two pages:-

Figure 1: Communication flowchart for zoonotic disease in humans

Figure 2: Communication flowchart for zoonotic disease in animals

(See Appendix 1 for acronyms).

Figure 1: Communication flowchart for zoonotic disease in humans

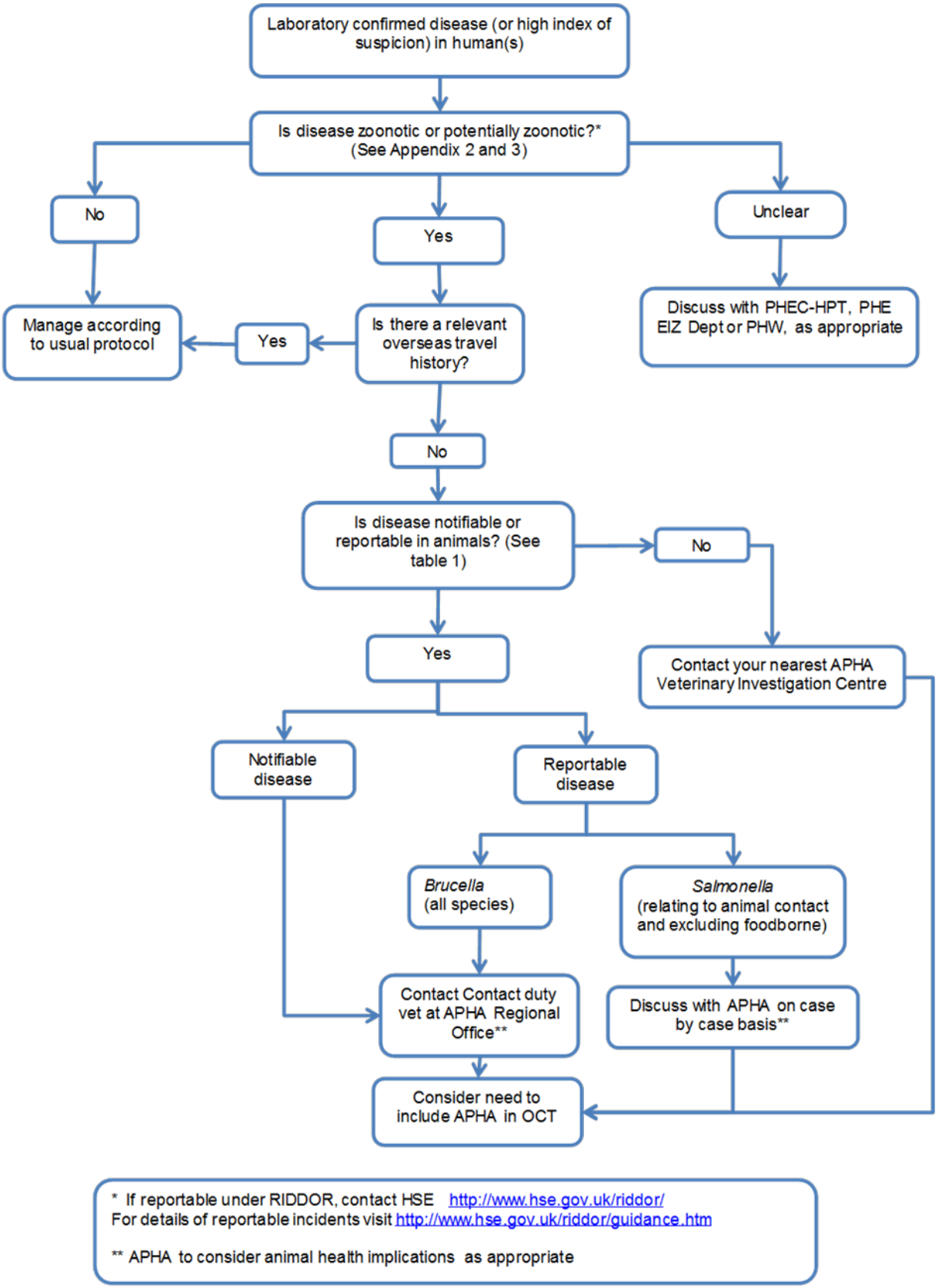
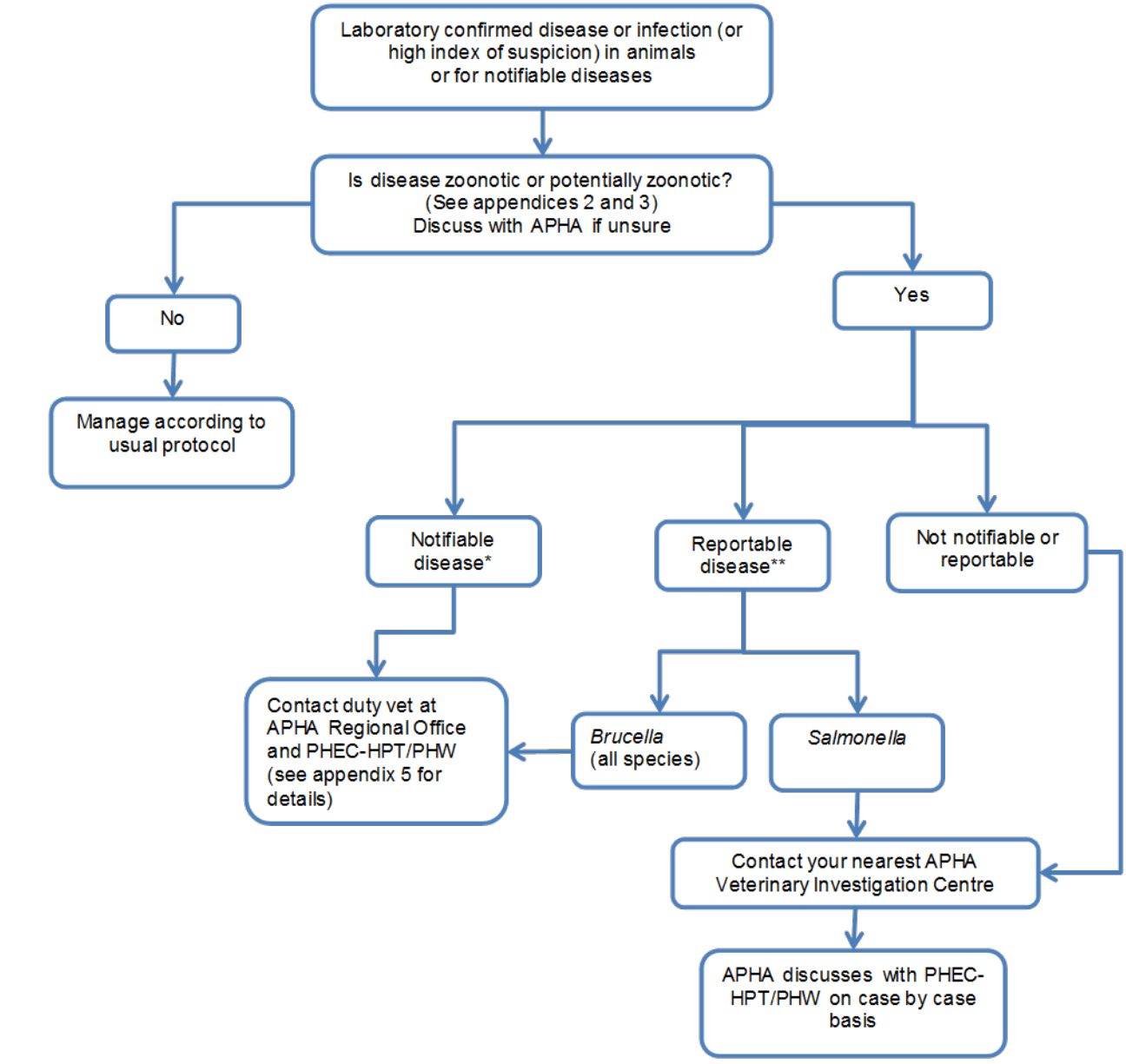


Figure 2: Communication flowchart for zoonotic disease in animals



*Notifiable diseases are those where there is a statutory requirement to report a suspect case(s) in animals.

**Reportable diseases (in animals) are those where there is a statutory requirement to report laboratory confirmed isolation of organisms of the genera Salmonella and Brucella under the Zoonoses Order 1989.

4. Multi-agency liaison arrangements

Formal liaison between human and animal health professionals, including those in other parts of the UK, is achieved via the following groups for horizon scanning, risk assessment and review of public health policy relating to zoonotic issues. Newly arising incidents or issues requiring an immediate public health response are usually managed by multi-agency Outbreak Control Team arrangements as outlined in Section 7.

4.1 The UK Zoonoses, Animal Diseases and Infections Group (UKZADI)

https://www.gov.uk/government/groups/uk-zoonoses-animal-diseases-and-infections-group

The UK Zoonoses, Animal Diseases and Infections (UKZADI) Group advises, as appropriate, the Chief Medical Officers and Chief Veterinary Officers, DH in England, Welsh Government, Scottish Government, Department of Agriculture and Rural Development (DARD) in Northern Ireland, and the FSA, on important trends and observations that impact on animal and public health. It provides a strategic overview and a means of ensuring overall co-ordination of public health action at the national and local level with regard to existing and emerging zoonotic infections and issues associated with antimicrobial resistance.

4.2 The Human Animal Infections and Risk Surveillance (HAIRS) group

https://www.gov.uk/government/collections/human-animal-infections-and-risk-surveillance-group-hairs

HAIRS is a multi-agency and cross-disciplinary horizon scanning and risk assessment group with representatives from the PHE, APHA, DH, Defra, Welsh Government, PHW, Health Protection Scotland (HPS), Scottish Government, Public Health Agency Northern Ireland, and the FSA. The group was established in 2004 and meets monthly. It acts as a forum to identify and discuss infections with potential for interspecies transfer (particularly zoonotic infections). HAIRS provides a regular summary of issues it has discussed to UKZADI and the Advisory Committee on Dangerous Pathogens. HAIRS will also raise issues of specific concern directly with UKZADI for prompt consideration.

4.3 The UK Public Health Network for Zoonoses (UKPHNZ)

The UKPHNZ was formed to strengthen links, share expertise and contribute to the effective prevention and control of zoonotic infections across the UK. Membership includes zoonoses leads from various sections of PHE and zoonoses leads representing PHW, HPS and the Public Health Agency Northern Ireland. A Zoonoses Newsletter is produced.

4.4 Zoonoses Liaison Groups (ZLGs)

ZLGs are part of a developing network variously comprising members of PHE, NHS, APHA, Defra and LAs, which meet to discuss local zoonotic issues and promote joint working, good practice and communication across agencies in the local area.

Individuals from other agencies and private organisations may also attend. ZLGs vary considerably in terms of membership, functional remit and related activities. In Wales, there is an all-Wales regional group drawing members from PHW, Local Health Boards, Welsh Government, APHA, FSA, LAs, academia, Welsh Water and Natural Resources Wales.

4.5 Other Groups

The Defra Antimicrobial Resistance Co-ordination (DARC) group

DARC is organised by the Veterinary Medicines Directorate and has members drawn from Defra, PHE, DH, FSA, APHA and the Devolved Administrations. It considers antimicrobial resistance in all zoonotic bacterial organisms, as well as potential animal reservoirs of resistance genes in commensal bacteria, and meets quarterly. Antimicrobial resistance incidents in zoonotic organisms requiring veterinary investigation will usually be co-ordinated by members of this group.

5. Statutory Notification and Reporting of Zoonotic Diseases

The primary purpose of the notification system is to identify possible outbreaks and increasing trends and initiate appropriate action as soon as possible. Accuracy of diagnosis is secondary, and generally *clinical suspicion* is all that is required. Statutory notification of clinically suspected infectious disease is supplemented by laboratory reporting of certain causative organisms.

The significance of notification differs in human and veterinary contexts. Not all zoonotic diseases in animals and humans are notifiable. However, a number of important zoonotic infections are statutorily notifiable under veterinary and/or human health legislation. APHA and PHE/PHW are the lead agencies for receiving notification and reports of zoonotic diseases in animals and humans respectively.

5.1 Zoonotic infections in humans

Under the Public Health (Control of Disease) Act 1984 and the Health Protection (Notification) Regulations 2010, and the Health Protection (Notification) (Wales) Regulations 2010, clinically diagnosed cases of notifiable disease (including zoonoses) in humans should be reported by the registered medical practitioner to the proper officer of the local authority (usually the CCDC). In addition, diagnostic laboratories also have a duty to report specified causative organisms identified in human samples to the public health authorities.

A list of zoonotic diseases in humans, their main reservoirs and usual mode of transmission to humans can be found on the PHE website (4), while the HSE website has information on occupational zoonoses (5).

The complete lists of notifiable organisms can be found here:

- England: www.legislation.gov.uk/uksi/2010/659/contents/made
- Wales: www.legislation.gov.uk/wsi/2010/1546/contents/made

Additional legislation in place for human infections requires employers and the self-employed to report work-related incidents and diseases (including certain infections) to the HSE under the Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations 2013 (RIDDOR) (6), under certain circumstances http://www.hse.gov.uk/riddor/carcinogens.htm#agents

5.2 Zoonotic infections in animals

APHA has well established procedures for dealing with statutorily notifiable or reportable zoonotic diseases of animals, such as anthrax, rabies, avian influenza, bovine

tuberculosis and brucellosis (see Table 1 below). Information on many of these diseases is available on the Gov.uk website (7). Further detail on endemic and exotic animal infections in the UK is provided in appendices 2 and 3.

Relevant animal legislation includes the Animal Health Act 1981 (as amended), the Zoonoses Order 1989 and the Specified Animal Pathogens Order 2008 (SAPO).

Under the Zoonoses Order 1989 laboratories have a statutory requirement to report the isolation of *Salmonella* and *Brucella* from animals (referred to as reportable diseases). In addition, a number of animal pathogens (as specified in SAPO 2008) must be notified to APHA. The report is to be made by the laboratory which isolated the organism from an animal derived sample.

As specified in the Defra Contingency Plan for Exotic Animal Diseases, the Welsh Government Contingency Plan for Exotic Animal Diseases and similarly in the Communicable Disease Outbreak Plan For Wales, APHA takes the lead in the operational aspects of containing and controlling an outbreak of a notifiable exotic animal disease (3, 8, 9).

Some notifiable exotic animal diseases are zoonotic, such as rabies and highly pathogenic avian influenza. APHA is also the first point of contact for non-statutory (i.e. non-notifiable/non-reportable) zoonoses and for S*almonella* in animals, but for these diseases contact should be made with a Veterinary Investigation Officer at the nearest VIC.

6. Data Sources and Routine Zoonoses Surveillance

6.1 Humans

Three main data sources are used to build a picture of the epidemiology of zoonotic infection in the human population in England and Wales. In addition, local and regional surveillance systems may exist that provide more detailed local information. The main data sources for England and Wales are:

- National surveillance schemes for any laboratory-confirmed infections, based on reporting by diagnostic laboratories
- Enhanced surveillance for specific zoonoses co-ordinated through relevant national reference laboratories.
- Notifications of infectious disease (NOIDs) (10)

Data are reported quarterly in the PHE *Health Protection Report*, (11) and annually in the *European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks* (12). Welsh data are reported here http://www.wales.nhs.uk/sites3/home.cfm?orgid=457 . The *UK Zoonoses Report* includes a summary of all zoonoses surveillance data, utilising information from all agencies (human, animal and FSA) that are involved in monitoring zoonoses. (13)

As with other infectious diseases, not all zoonotic diseases are notifiable under Public Health legislation. Recorded human cases represent only the 'tip of the iceberg' as many patients do not seek medical attention, or their doctor does not request laboratory investigation, and a positive result is either not notified or the occurrence of the disease is not notifiable. Reports may also be biased towards more clinically severe cases in high risk groups.

6.2 Animals

Animal populations are monitored by APHA for the appearance of notifiable or novel diseases or changing trends in existing diseases, including actual and potential zoonoses. APHA undertakes scanning surveillance through the collection, collation and analysis of disease data, based on submissions to APHA VICs and delivery partners (private surveillance providers who have been contracted by APHA). These diagnoses are recorded on the Veterinary Investigation Diagnosis Analysis (VIDA) database (see appendix 4).

The reporting of *Salmonella* isolations from defined animal species, their environment and animal feeding stuffs is mandatory under the Zoonoses Order 1989. APHA is

responsible for the laboratory testing, reporting, data management, analysis and investigation of *Salmonella* incidents in animals and receives reports of isolations from other veterinary laboratories.

An important aspect of surveillance with respect to food-borne disease is carried out by the FSA who collect and make available data on conditions identified during post-mortem inspection of stock slaughtered for human consumption, and notify suspect cases of notifiable disease to APHA.

Surveillance reports produced by APHA on animal diseases, including zoonoses, covering England, Scotland and Wales are published monthly in the Veterinary Record. Quarterly and annual reports, including those specifically relating to reportable infections, such as *Salmonella*, and non-statutory zoonoses, are available on the GOV.UK website (14).

The annual *European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks* contains information on a list of zoonoses that are important for public health in the whole European Union, as well as specific zoonoses that are relevant on the basis of the national epidemiological situation in the UK (12).

As noted previously, the *UK Zoonoses Report* includes a summary of all zoonoses surveillance data from relevant agencies. (13)

7. Zoonotic Incidents and Outbreaks

7.1 Settings where exposure can occur

The main settings in which zoonotic incidents are likely to be encountered by human and/or veterinary health professionals are outlined below. Diagnoses may be based on clinical suspicion or follow laboratory testing and confirmation by either medical or veterinary laboratories.

7.1.1 Amenity premises and activities open to the general public

These include a range of settings where members of the public come into contact with animals or their products: for example farm open days, open farms (including school and city farms), animal parks, zoological gardens, agricultural shows, music festivals on agricultural land, camping sites on farm land and public parkland with deer or other wildlife. In these situations the potential impact of any zoonotic hazard is increased because of the size of the population potentially at risk. Under the Health & Safety at Work etc. Act 1974, the owners or organisers have a duty of care. The main zoonotic organisms commonly encountered in these situations are VTEC O157, cryptosporidiosis and *Salmonella* but may also include other diseases such as Q fever. Under the Health and Safety (Enforcing Authority) Regulations 1998, enforcement of the Health & Safety at Work etc. Act 1974 comes under the remit of either HSE and/or LAs depending on the specific situation. The industry Code of Practice (updated in 2015) will be relevant to many types of premises (7)(15.). Specific guidelines for members of the public attending such sites has also been produced and published on the Gov.uk website.(16)

7.1.2. Pet shops and similar animal retail outlets

The potential impact of any zoonotic hazard is similar to that outlined in 6.1.1 because of the likelihood of exposure to the general public as well as employees. In addition there may be a greater risk of exposure to exotic or unusual pathogens because of the wide variety of animals kept in some of these premises, and their origin. Enforcement comes under the general remit of LAs because of their role in licensing premises and enforcing the Health and Safety at Work etc. Act 1974. Various guidance documents are available, including information on infections acquired from rodents and reptiles (17,18). A range of model licence conditions and guidance on animal health issues including pet vending, dog breeding, cat boarding, horse riding and livery yards has been produced by the Chartered Institute of Environmental Health (CIEH).(19)

7.1.3 Primary agricultural premises, commercial farms, abattoirs, cutting plants, feed mills, and other commercial premises

Where zoonoses are acquired because of work-related activities, HSE is the enforcing authority as it has responsibility for these workplaces under the Health & Safety (Enforcing Authority) Regulations 1998. Risks to the wider public are usually via food such as through the sale of unpasteurised milk, farm gate sales or from presence of on-site Bed & Breakfast accommodation. However, commercial farms may open to the public for events such as 'Open Farm Sunday' or for lambing weekends. The public could be at significant risk if they are allowed access to animals without the appropriate hygiene precautions being in place. For those working on such sites, the HSE has a range of guidance material.(5)

7.1.4 Miscellaneous occupational and leisure exposure to zoonoses

These include occupational or recreational exposure to zoonoses that mainly affect people who work in or engage with animal environments. For example, sewage workers may be at increased risk of infection with leptospirosis, or bat rehabilitators may be exposed to European Bat Lyssavirus. In addition, exposure to a variety of zoonoses can be through leisure pursuits such as canoeing, open water swimming, or walking in tick-infested habitats. Responsibility for these is within the remit of the Field Operations Directorate of HSE and/or LAs. Guidance mentioned above under 6.1.1 and 6.1.3 may also be pertinent.

7.1.5 Domestic settings

Within the domestic setting, zoonotic infection can be acquired from food, pets, pests or infected people. People live in close contact with a wide range of animal species as pets and therefore zoonotic infections in domestic households can arise from various sources. Infections range from the more common (*Campylobacter* or *Salmonella* infections), to the rarer (hantavirus, *Corynebacterium ulcerans* and meticillin-resistant *Staphylococcus aureus* [MRSA]).

The likelihood of transmission to the wider public is generally very limited, but secondary person-to-person spread within the extended family can be significant. Guidance for pet keepers described under 6.1.2 may be relevant depending on the types of pet being kept (17, 18). Further information is provided in Appendix 9. The investigation and management of food-borne zoonotic incidents/outbreaks, such as salmonellosis, is well covered elsewhere (1).

7.2 Assessment of risk and response

Early liaison between public health and animal health professionals and agencies is essential to enable appropriate risk assessment and response to potential zoonotic

incidents. Veterinary and public health professionals have a duty to share information, as appropriate, with relevant agencies in order to consider and implement the necessary responses to protect animal and human health. Section 8 deals with the confidentiality issues raised by zoonotic incidents involving humans and animals.

7.2.1 Incidents and disease in animals with zoonotic potential

Diseases and incidents in animals with zoonotic potential should be discussed with the local PHEC-HPT in England and PHW HPT in Wales on a case-by case-basis at the discretion of the veterinary surgeon involved (most commonly from APHA). A report should always be made where there is a possible associated human case, since the PHEC-HPT may not be aware of this. Most veterinary diagnoses of non-significant zoonoses can be simply dealt with by including a comment about the potential zoonotic hazard in the laboratory report to the submitting veterinary surgeon or farmer, and do not require direct contact with the CCDC. However, for some zoonotic infections there may be a greater risk to the wider public, eg an outbreak of Q fever abortion in animals. Risk assessment should include consideration of factors such as disease severity and spread, possible interventions, and the context in which the case or incident has occurred.

Many non-statutory zoonotic incidents can be dealt with by telephone or email contact or by routine reporting such as is adopted (by APHA) for *Salmonella* isolations (see Figures 1 and 2 on pages 9, 10).

For certain notifiable exotic zoonoses such as rabies or anthrax in animals, APHA will lead on the incident management from an animal perspective and public health representation in their ICT/OCT may be appropriate in such cases. It may be that for these type of events, two separate IMT/OCT may need to be run for public and animal health respectively. This would be determined based on the circumstances and need in specific situations.

There may be human health implications of antimicrobial resistance (AMR) in animal species. Further information is provided in Appendix 10.

7.2.2 Zoonotic incidents and disease in humans

Where cases of a suspected notifiable in animals (see table 1) zoonotic disease first come to the attention of human health professionals, and the disease is considered to have been acquired in the UK, immediate contact with the duty vet at the local APHA Regional Office is essential. For *Salmonella* and non-notifiable zoonoses such as Q fever, cryptosporidiosis or VTEC O157, the local APHA Veterinary Investigation Centre can still be informed, but the degree of urgency and necessary level of detail will depend on the potential impact on public health.

In the case of the isolation of certain *Salmonella* serotypes considered to be of particular public health significance, such as *S*. Enteritidis or *S*. Typhimurium, and where there is a link to a specific premises, a farm investigation and advisory visit would usually be carried out by staff from APHA. APHA should also be informed in the case of *Chlamydophila psittaci* diagnoses (see Appendix 3), if there is a link with a specific premises.

In England and Wales, investigation and advice relating to incidents and outbreaks involving the wider range of non-statutory zoonoses such as VTEC O157, cryptosporidiosis, and Q fever fall within the remit of APHA, and assistance can be given to PHE (or PHW) on request. This assistance is usually provided by staff based at the nearest APHA VIC.

7.2.3 Immediate risk assessment and response arrangements

For incidents requiring urgent risk assessment and follow-up, communications will usually involve an initial telephone call or email (initiated either way) between the local APHA VIC, the CCDC of the local PHEC-HPT, and/or the Chief Environmental Health Officer/Environmental Health Officer (CEHO/EHO) of the LA in which the incident occurred. The contact details for all key organisations can be found in Appendix 8. Secure email is available for use in cross-government communications and should always be used for any communications including personal information (about patients or possibly affected farms or other premises). For PHE staff this involves using NHS.net email accounts.

Major zoonotic incidents or outbreaks within any of the scenarios outlined above should be dealt with through a multi-disciplinary incident or outbreak control team (ICT/ OCT) usually under the chairmanship of the CCDC or zoonoses lead of the PHEC-HPT (see section 7.3). Guidance for a range of specific zoonotic infections is available on the GOV.UK website (20).

Specific procedures are in place relating to outbreaks of notifiable zoonotic disease such as highly pathogenic avian influenza (HPAI), rabies and other exotic diseases (see section 7.3.1).

7.3 Investigation and management of incidents/ outbreaks

7.3.1 Formation of an Incident or Outbreak Control Team (ICT/ OCT)

PHE or PHW, in conjunction with LAs, usually take the lead for investigating incidents involving human infections in which a zoonotic source is possible, or where there is an outbreak of zoonotic disease in animals with potential for significant human infection.

An Incident or Outbreak Control Team (ICT/OCT) should be formed for significant outbreaks of zoonotic disease. The scale of the response will be determined by the nature of the incident, which will also dictate the resources required, responsibility for the management of the incident, and the communications pathways. Standard principles for managing incidents/outbreaks apply, and reference should be made to local and/or national incident management plans.

The Communicable Disease Outbreak Management - Operational Guidance document in England and the Communicable Disease Outbreak Plan for Wales define the strategic and operational arrangements relating to incidents with public health risk assessment and response (2, 3). In general terms smaller local incidents will be led by HPTs and larger national incidents by the PHE NIS in England and CDSC in Wales.

Defra's Framework Response Plan for Exotic Animal Diseases covers six zoonotic infections (rabies, avian influenza, Newcastle disease, glanders, equine viral encephalomyelitis and West Nile virus) and ranks incidents from zero to four, with four being the most serious. (8) In the case of these infections, disease control operations are centrally co-ordinated by Defra's National Disease Control Centre (NDCC) in London, with the local response being managed by one or more Local Disease Control Centres (LDCCs). Other agencies, organisations and operational partners are involved as appropriate for the incident.

If an incident occurs in Wales, the Welsh Government Contingency Plan for Exotic Animal Disease 2014 would be invoked and the Emergency Co-ordination Centre (Wales) (ECC (W)) would normally be established. (9) The ECC (W) is responsible for co-ordinating advice and determining policy on disease control affecting Wales in consultation with the NDCC, and the management of the wider impact of an outbreak again with other agencies, stakeholders and operational partners involved in Wales as appropriate.

7.3.2 Membership of OCT

Depending on the individual situation and disease, membership of the OCT might include representatives from

- PHE local HPT (CCDC-chair and other staff)
- PHE national specialist
- APHA
- LA (DPH, EHO)
- NHS (NHE England, local acute Trust Microbiologist or Virologist)
- HSE
- FSA
- DH
- Communications team

APHA involvement should be sought as early as possible (Figure 1), particularly if field investigation and laboratory assistance is likely to be required (eg VTEC O157 investigations, notifiable zoonoses, non-statutory zoonoses and *Salmonella*). APHA represents Defra and/or the Welsh Government unless the scale or nature of the incident dictates the direct involvement of Defra or the Office of the Chief Veterinary Officer for Wales.

The OCT can co-opt other members (such as the veterinary practitioner or the farmer or business representative for a farm-associated incident), as and when necessary. The decision to do so is ultimately at the discretion of the OCT chair. In the event that an outbreak crosses administrative boundaries, the CCDC and an EHO from the district where the outbreak originated will usually take the lead roles. The relevant officers from other affected districts will be involved in meetings and decision taking.

7.3.3 Suggested terms of reference for the Incident or Outbreak Control Team (ICT / OCT)

- to review the evidence for an outbreak and the results of epidemiological, microbiological and other analytical investigations
- to identify the population at risk and to institute additional information gathering measures
- to decide on measures to control the outbreak and protect the other members of the community, including arrangements for the commitment of personnel and resources considered necessary
- to monitor the implementation and effectiveness of the measures
- to make on-going arrangements for informing colleagues in the participating organisations, the public and media as appropriate
- to consider communications across Government (eg DH, Defra, ministers) if appropriate
- to liaise with other agencies and stakeholders as necessary
- to decide when an outbreak has finished
- to prepare a report of the outbreak containing recommendations for further action
- to carry out a formal debrief and publish a report of the outbreak together with any lessons identified

7.3.4 Investigations

Depending on the nature of the incident, a number of investigations may need to be pursued by the ICT/OCT.

Epidemiological investigations include enhanced surveillance and case finding, descriptive epidemiology and analytical studies as appropriate.

Laboratory investigation, such as microbiological investigation of cases and contacts, animal sampling, food, water and environmental samples should be considered if they are likely to identify the source and lead to an appropriate intervention.

Testing and sampling should not be undertaken without assessing the implications of positive and negative results. Prior discussion and a systematic multidisciplinary approach are vital to ensure thorough investigation which will inform public health action. Human samples should be discussed and agreed with the Consultant Microbiologist. Veterinary investigations and liaison must be coordinated by APHA unless a food source is the only suspected animal association in which case the FSA and/or EHOs will lead on aspects of the investigation and management.

Sample collection may be undertaken by the EHO, APHA, a private vet or other professionals, as agreed by the OCT or by agreement between agencies involved, bearing in mind the likely costs and benefits. The Zoonoses Monitoring (England) Regulations 2007 and the Zoonoses Monitoring Regulations (Wales) 2007 provide powers to undertake investigation of zoonoses in animals that pose a threat to public health. (21, 22)

Funding for short-term investigations undertaken by APHA on request by the PHE is, in most situations, provided by Defra. An algorithm has been agreed between PHE and APHA such that for VTEC investigations, a tiered level of response has been agreed and if the OCT wishes to pursue a greater level of APHA involvement then this must be funded directly. Whilst APHA endeavours to support public health investigations, in some circumstances laboratory examinations for other zoonoses in addition to VTEC, particularly for general screening purposes, may need to be charged to the requesting organisation. In Wales, arrangements would depend on local circumstances but measures to ensure outbreak control take precedence.

7.3.5 Control measures

The OCT or involved agencies should agree on the response required and what, if any, control measures should be put in place, with enforcement by the appropriate organisation (usually LA or HSE).

It is essential that wider implications and impact are fully considered. On occasion it may be necessary to implement control measures before a definitive diagnosis is made.

The implementation and effectiveness of control measures should be monitored and a decision made by the OCT when the outbreak has ended and control measures can be lifted.

Control measures may include increased education and awareness, specific measures such as human vaccination, or changes in farming practices or management approach. It is important that potential control measures are practicable, worthwhile, achievable and ideally enforceable where appropriate. HSE and LAs have legal powers to either require improvement or prohibit activities that may pose a risk to public health, e.g. a lambing attraction with no hand-washing facilities.

7.3.6 Communications

The OCT is responsible for ensuring that consistent information is provided to the media, general public and other stakeholders. *The Communicable Disease Outbreak Management - Operational Guidance* document in England and the *Communicable Disease Outbreak Plan for Wales* provide further detail on the communications arrangements during an incident (2,3).

Key principles include:

- as part of the incident response, the OCT should agree on a strategy for handling communications. This must include agreement on the media to be used: for example, websites, local or national press, local or national TV or radio, direct communications in writing with affected individuals or locations or direct face-to-face communications
- the OCT will discuss, prepare and agree interim and/or final briefing statements and press releases as required and appoint a suitable spokesperson where needed
- individual members of the OCT should not respond to requests for information. This should also apply to staff from agencies involved in the outbreak control activities
- briefing should provide early and clear information on the nature and scale of the problem and any recommended actions
- ensure that communications teams of involved agencies and government departments liaise with each other during incidents to identify the lead and ensure consistent messages are being given
- before advice is given to the public, the team will identify the target population and formulate and distribute special advice for those with particular needs or at specific risk
- information will be updated and reinforced as long as the incident lasts
- when the outbreak has been controlled, those at risk must be informed, and the public must be informed when the outbreak is over. Again, the appropriate communication route should be identified and used
- communication of OCT discussions by members to other colleagues in their respective organisations must be handled with care. Where possible, encrypted electronic communications routes should be used
- a final report about the outbreak should be produced in a timely manner

8 Confidentiality and Data Protection

8.2 Confidentiality

Confidential or identifiable information may be exchanged between those who have a legitimate need if the situation requires this. The decision to exchange such information is a professional responsibility and will depend on the nature and risk of disease to the public. The exchange of human and animal data has been addressed respectively by the Caldicott review and the subsequent Government response, the Caldicott Committee (Report 1997) and the Royal College of Veterinary Surgeons. All indicate that if there is an immediate and serious danger to public health by a particular incident, the need to share information with other agencies on a 'need to know' basis overrides the confidentiality principle (23, 24). Indeed, failure to share confidential or identifiable information in such circumstances could be interpreted as negligence. As in all matters, a balance has to be reached and the decision to share patient or client information should be made in good faith only when absolutely necessary and in the public interest.

All parties involved should:

- Be aware of their responsibilities (including ensuring all emails containing personal or sensitive information are marked 'Official Sensitive')
- Understand and comply with the law
- Be able to justify any exchange of confidential or identifiable information
- Have secure procedures in place for the exchange and storage of confidential or identifiable information, and confirm that other agencies have secure systems for email

8.3 Data Protection Act 1998

The Data Protection Act 1998 requires the registration of data relating to individuals that is held on computer and manual systems. Provision is made in Section 34(8) of the Act for the non-consensual disclosure of personal data when there are reasonable grounds to believe that disclosure is urgently required to prevent injury or damage to the health of any person or persons. The decision to exchange personal data, as with confidential or identifiable information must be made in good faith and in the interest of public health protection.

8.4 Record keeping

A log should be maintained from the beginning of the outbreak to collect all data for future reference, and for all correspondence, minutes of meetings and other documents. A nominated person will be responsible for documentation of all the events and information related to the outbreak plan. Interim reports will be produced as necessary.

9 Training and review

Agencies involved in zoonotic incidents should organise joint exercises to test their plans. These exercises may be desk top, communication-only or based on a simulated incident. It is the responsibility of the PHE/PHW and partner organisations to review their plans on an on-going basis. Any proposed changes or amendments to plans will be formally notified in writing to the key participants of the team immediately.

Appendix 1. Glossary

AHO	Animal Health Officer (member of technical staff of APHA)
APHA	Animal and Plant Health Agency
CCDC	Consultant in Communicable Disease Control
CEHO	Chief Environmental Health Officer
CMO	Chief Medical Officer
CHP	Consultant in Health Protection
CPH number	County, Parish, Holding number: system used by APHA to refer to farms which may appear on documents sent to public health colleagues
CVO	Chief Veterinary Officer
Defra	Department for Environment Food and Rural Affairs
DARD NI	Department of Agriculture and Rural Development, Northern Ireland
DH	Department of Health
DPH	Director of Public Health
Duty vet	APHA contact for notifiable diseases, based at APHA regional offices
EIZ	Emerging Infections and Zoonoses section (of PHE)
EHO	Environmental Health Officer
FSA	Food Standards Agency
HAIRS	Human Animal Infections and Risk Surveillance group
HPS	Health Protection Scotland
HPT	Health Protection Team (in Wales)
HSE	Health and Safety Executive
LA	Local Authority
LHB	Local Health Board (in Wales)
NHS	National Health Service
NIS	National Infections Service (PHE)
NOIDS	Notifications of Infectious Disease
OCT/ICT	Outbreak control team/Incident control team
OCVO	Office of the Chief Veterinary Officer (Wales)
PHE	Public Health England
PHEC-HPT	Public Health England Centre - Health Protection Team (in England)
PHW	Public Health Wales
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
UKZADI	UK Zoonoses Animal Diseases and Infections group
VA	Veterinary Advisor (Defra, Welsh Government or APHA)
VIDA	Veterinary Investigation Diagnosis Analysis
VIO	Veterinary Investigation Officer (based at APHA Veterinary Investigation Centres)
ZLG	Zoonoses Liaison Group

Appendix 2. Notifiable diseases and causative agents in humans

Zoonotic diseases notifiable to local authority proper officers under the Health Protection (Notification) Regulations 2010:

Acute infectious hepatitis	Plague
Anthrax	Rabies
Brucellosis	Tetanus
Diphtheria	Tuberculosis
Haemolytic uraemic syndrome (HUS)	Viral haemorrhagic fever (VHF)
Infectious bloody diarrhoea	Yellow fever

Zoonotic causative agents notifiable to PHE under the Health Protection (Notification) Regulations 2010:

Bacillus anthracis	
Borrelia spp	*Machupo virus*
Brucella spp	*Marburg virus*
Burkholderia mallei	*Mycobacterium tuberculosis complex*
Burkholderia pseudomallei	*Omsk haemorrhagic fever virus*
Campylobacter spp	*Plasmodium knowlesi*
Chlamydophila psittaci	*Rabies virus (classical rabies and rabies related lyssaviruses)*
Clostridium tetani	*Rickettsia spp*
Corynebacterium diphtheriae	*Rift Valley fever virus*
Corynebacterium ulcerans	*Sabia virus*
Coxiella burnetii	*Salmonella spp*
Crimean Congo haemorrhagic fever virus	*Verocytotoxigenic Escherichia coli (including E.coli O157)*
Cryptosporidium spp	*West Nile Virus*
Ebola virus	*Yellow fever virus*
Francisella tularensis	*Yersinia pestis*
Giardia lamblia	
Guanarito virus	
Hantavirus	
Hepatitis E virus	
Influenza virus	
Junin virus	
Kyasanur Forest disease virus	
Lassa virus	
Leptospira interrogans	
Listeria monocytogenes	

For more information, see https://www.gov.uk/guidance/notifiable-diseases-and-causative-organisms-how-to-report

Appendix 3. Notifiable[1] and reportable[2] diseases in animals which are potential zoonoses in GB

Disease	Main animal reservoir	Last occurred in GB[3]	Notifiable to APHA in GB	Reportable
Anthrax (*Bacillus anthracis*)	Cattle/other mammals	2015	✓	
Avian Influenza (HPAI)	Poultry/ waterfowl	2015	✓	
Bovine Spongiform Encephalopathy	Cattle	Present	✓	
Brucellosis (*Brucella abortus*)	Cattle[4]	2004	✓	✓
Brucellosis (*Brucella melitensis*)	Sheep and goats	Never	✓	✓
Brucellosis (*Brucella suis)*	Pigs	Never	✓	✓
Equine viral encephalomyelitis	Horses	Never	✓	
Glanders & farcy (*Burkholderia mallei*)	Horses	1928	✓	
Newcastle disease (ND) and paramyxovirus infection in pigeons	Poultry and pigeons	2006 (ND) PMV (present)	✓	
Rabies (Terrestrial)	Dogs and other mammals	1970[5]	✓	
Rabies (EBLV)	Bats	2015	✓	
Rift Valley Fever	Cattle, sheep and goats	Never	✓	
Salmonella	All species	Present		✓
Tuberculosis (*Mycobacterium bovis*)	Domestic cattle, buffalo, bison and deer	Present[6]	✓[7]	

[1] Legal requirement to notify disease made on the basis of clinical suspicion of disease in human or animal in order to carry out disease control or eradication measures.
[2] A statutory requirement to report the laboratory isolation of organisms of the genera *Salmonella* and *Brucella* under the Zoonoses Order 1989. In addition further diseases are included in the schedule of the Specified Animal Pathogens Order 2008 (denoted by 'S'). The report is to be made by the laboratory which isolated the organism from an animal derived sample.
[3] Figures taken are correct as at 1st December 2015.
[4] In the Zoonoses Order 1989 Brucella reporting relates to (a) "animal" meaning cattle (bull, cow, steer, heifer, calf), horse, deer, sheep, goat, pig or rabbit; and (b) "bird" meaning a domestic fowl, turkey, goose, duck, guinea-fowl, pheasant, partridge, quail or pigeon.
[5] A quarantine case was confirmed in 2008, however this does not affect the national disease status.
[6] Scotland has been officially free since October 2009, although sporadic incidents continue to be identified in cattle herds.
[7] In addition to any bovines and deer with suspect clinical signs of tuberculosis, under the Tuberculosis (England) Order 2007, the Tuberculosis (Wales) Order 2011, and the Tuberculosis (Scotland) Order 2007 (as amended), there is a statutory requirement in Great Britain to notify to the local APHA office of the

Disease	Main animal reservoir	Last occurred in GB[3]	Notifiable to APHA in GB	Reportable
Vesicular stomatitis virus (VSV)	Cattle/ other mammals	Never	✓	✓
West Nile Virus	Horses	Never	✓	✓

presence of suspect TB legions in the carcases of any bovine animals or other farmed or companion (pet) mammals. Furthermore, identification of *Mycobacterium bovis* in samples taken from any mammal (other than man) must also be reported to APHA Weybridge unless the organism was present in the sample as a result of an agreed research procedure. Notifying the suspicion of TB in a living domestic animal in the course of clinical examination, surgery, by radiography or in biopsy material is not mandatory (except for cattle or deer), but submission of clinical samples from such cases to APHA is encouraged.

Appendix 4. Zoonotic Diseases reported on by APHA under Veterinary Investigation Diagnosis Analysis (VIDA)

Babesiosis	Listeriosis (all categories)
Brachyspira pilosicoli	Louping ill
Brucella in marine mammals	Orf (parapoxvirus)
Campylobacter fetopathy	*Pasteurella multocida*/ Pasteurellosis
Chlamydiosis (*C. psittaci*)	Pseudocowpox (parapoxvirus)
Chlamydophila abortus fetopathy	Q Fever (*Coxiella burnetii*)
Corynebacterium pseudotuberculosis (CLA)	Red Mite (*Dermanyssus galinae*)
Cryptosporidiosis	Ringworm
Cysticercosis	*Salmonella*
Dermatophilus infection	*Sarcoptes scabei* infection
Erysipelas	Streptococcal infection (excl. mastitis)
Fasciolosis	Swine influenza
Hydatidosis	Toxoplasmosis (incl. fetopathy)
Leptospirosis (all categories)	

The Veterinary Investigation Diagnosis Analysis database contains a record of every submission made to APHA Veterinary Investigation Centres and to the Scottish Agricultural College Consulting, Veterinary Services (SACCVS, operating within Scotland's Rural College – SRUC) in Great Britain.

For more information, see https://www.gov.uk/government/publications/non-statutory-zoonoses-disease-surveillance-reports-2014

Appendix 5. General guidance for zoonotic disease

PHE:

- Zoonotic diseases (zoonoses) - guidance, data and analysis https://www.gov.uk/government/collections/zoonotic-diseases-zoonoses-guidance-data-and-analysis
- Health Protection: Infectious diseases https://www.gov.uk/health-protection/infectious-diseases

APHA/Defra:

- United Kingdom contingency plan for exotic notifiable diseases of animals https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/411162/pb14239-animal-disease-plan-2015.pdf
- England Contingency Plan for Exotic Animal Diseases https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288901/pb14115-animal-disease-plan-140312.pdf
- UK Zoonoses reports https://www.gov.uk/government/collections/zoonoses-reports
- Non-statutory zoonoses reports https://www.gov.uk/government/publications/non-statutory-zoonoses-disease-surveillance-reports-2014
- Welsh Government Contingency Plan for Exotic Animal Diseases: http://gov.wales/docs/drah/publications/141016contingencyplan2014.pdf

HSE:

- Occupational zoonoses pages http://www.hse.gov.uk/agriculture/topics/zoonoses.htm

Farming and Countryside Education:

- Industry Code of Practice Code http://www.visitmyfarm.org/component/k2/item/339-industry-code-of-practice

Appendix 6. Table of Endemic Zoonotic Diseases and Organisms in England and Wales

Key for frequency of human cases: Very rare < 1 case/year; Rare <10 cases/year; Uncommon <100 cases/year; Moderate 100<500 cases/year; Common 500+ cases/year

See UK Zoonoses reports for details https://www.gov.uk/government/collections/zoonoses-reports

Disease	Organism	Main reservoirs	Usual mode of zoonotic transmission to humans	Animal-associated diagnosed cases in humans	Occurrence in animals/ endemic in E&W
Anthrax	*Bacillus anthracis*	Environment, animal products	Direct contact, ingestion, inhalation	Very rare	Yes, but very sporadic. One incident with 2 bovine cases in 2015.
Babesiosis	*Babesia divergens*	Cattle/ticks (but not infectious to humans via animal, only via tick)	Tick bite	Very rare - not seen in UK	Relatively common in endemic areas
Bovine tuberculosis	*Mycobacterium bovis*	Cattle	Unpasteurised milk, infected animals or animal products	Uncommon	Yes, endemic in many areas
Brucellosis	*Brucella ceti* and *B. pinipedalis*	Marine mammals	Direct contact with foetal membranes	Very rare	*Brucella* spp are not seen in terrestrial animals in GB, but marine mammal *Brucella* spp are isolated in GB.
BSE (vCJD)	BSE prions	Cattle	Ingestion of BSE contaminated beef products	Very rare. Most recent new diagnosis in 2013 (Total to 7/12/2015 = 177)	Has been in steady decline since 1992
Cat scratch fever	*Bartonella henselae*	Cats	Bite, scratch	Moderate	Yes; unknown prevalence
Campylobacteriosis	*C. fetus fetus, C. jejuni, C.coli (C. venerealis* fetopathy in cattle*)*	Sheep, goats, cattle, dogs/cats/poultry etc	Foodborne (direct contact)	Common foodborne illness	Common in birds (C.j), *C. fetus fetus* common cause of abortion in sheep and infertility/abortions in cattle
Cowpox	*Cowpox virus*	Cats, cattle (reservoir host is wild rodents)	Direct contact	Very rare	Cats are the main source for human cases. Extremely rare in cattle

Disease	Organism	Main reservoirs	Usual mode of zoonotic transmission to humans	Animal-associated diagnosed cases in humans	Occurrence in animals/ endemic in E&W
Enzootic abortion	*Chlamydophila abortus*	Ruminants, principally sheep	Direct contact, aerosol	Probably rare	Common cause of abortion in sheep (goats), rarely cattle.
Caseous lymphadenitis, pseudotuberculosis	*Corynebacterium. Pseudotuberculosis*	Sheep and goats	Direct to skin wounds	Rare	Common and endemic in sheep and goats-abscesses on skin and internally
Cryptosporidiosis	*C. parvum*	All species especially sheep and cattle	Faecal-oral	Common	Common and endemic in young animals, especially lambs and calves
Cysticercosis	*Taenia* saginata *Taenia* solium	Cattle Pigs	Meat	Uncommon	Endemic, but uncommon in cattle and rare in pigs
Dermatophilosis (mycotic dermatitis)	*Dermatophilus congolensis*	Dermatitis in sheep and cattle	Direct contact	Unknown	Endemic
E. coli (verocytotoxigenic)	Serogroup O157 and other serogroups such as O26	Most species especially cattle and sheep	Direct contact and faecal-oral/food etc	Common	O157 is an endemic commensal in cattle, sheep and many other animal species, not causing clinical disease. Other serogroups can cause animal and human illness
Erysipeloid (humans), erysipelas (animals)	*Erysipelothrix rhusiopathiae*	Pigs, fish, birds, environment	Direct contact	Rare	Endemic; fairly common in pigs, and turkeys; also in sheep. Various disease manifestations
Fasciolosis	*Fasciola hepatica*	Cattle, sheep, goats, deer etc	Watercress, leisure pursuits around water; not via consumption of affected liver	Rare	Endemic, common in many areas of England and Wales
“Fish tank granuloma”	*Mycobacterium marinum*	(Fish)	Direct contact, water	Uncommon	Rarely reported
“Food poisoning”	Many aetiologies; bacterial, viral, protozoan Often zoonotic	Food producing animals.	Ingestion	Common	Endemic, various aetiologies, depends on definition
Hantavirus syndromes	Hantaviruses	Rodents	Aerosol	Rare	Present

Disease	Organism	Main reservoirs	Usual mode of zoonotic transmission to humans	Animal-associated diagnosed cases in humans	Occurrence in animals/ endemic in E&W
Hepatitis E	Hepatitis E virus	Pigs	Food	Moderate	Yes, endemic in pigs but animal strains not predominantly associated with human disease
Hydatid disease	*Echinococcus granulosus*	Dog-sheep lifecyle (foxes limited)	Ingestion of eggs excreted by dog	Rare	Yes
Leptospirosis	*Leptospira* species, (many serotypes)	Rodents, ruminants, horses	Infected urine, water	Uncommon	Endemic in cattle (serotype *Hardjo*) – Serotype *Icterohaemorrhagiae* occurs in many species, and other serotypes also found in GB
Listeriosis	*L. monocytogenes, L. ivanovii*	Sheep, cattle etc	Food, direct contact unlikely	Moderate	Endemic in ruminants (cattle/sheep and goats).
Louping ill	Louping ill virus	Sheep, grouse	Direct contact, tick bite	V rare	Yes, endemic in many tick areas
Lyme disease	*Borrelia burgdorferi*	Ticks, rodents, sheep, deer, small mammals	Tick bite	Common	Yes, endemic in many tick areas
Lymphocytic choriomeningitis	Lymphocytic choriomeningitis virus	Rodents	Direct contact, contaminated fomites	V rare	Unknown
Orf	Orf virus	Sheep	Direct contact	Rarely reported	Very common in sheep and goats (mouth, teats, feet) but rarely reported
Ornithosis / Psittacosis	*Chlamydophila psittaci*	Birds, especially psittacines and poultry. *Chlamydophila* infections rarely diagnosed in poultry	Mainly aerosol, dust	Uncommon	Parrots, pigeons, poultry processing (ducks). Endemic in some wildfowl and some garden birds. Often does cause clinical disease in animals.
Pasteurellosis	*Pasteurella multocida*	Dogs, cats, many mammals	Bite/scratch, direct contact infected tissues	Common	Common
Q fever	*Coxiella burnetii*	Cattle, sheep, goats, cats	Aerosol, parturition products	Uncommon	Endemic in domesticated ruminants and wildlife. Mainly subclinical but abortion outbreaks can occur

Disease	Organism	Main reservoirs	Usual mode of zoonotic transmission to humans	Animal-associated diagnosed cases in humans	Occurrence in animals/ endemic in E&W
Rabies	European bat lyssavirus EBLV2	Some bats in UK and Europe	Bat bite	Very rare	Present in some UK bats
Rat bite fever (Haverhill fever)	*Streptobacillus moniliformis*	Rats	Bite/scratch,	Very rare	Yes, in rodents
Red Mite	*Dermanyssus galinae*	Poultry, wild birds	Contact	Not reported	Endemic
Ringworm	Dermatophyte fungi	Cats, dogs, cattle, many animal species	Direct contact	Rarely reported	Endemic and very common/under-reported. Very common in calves (skin)
Salmonella	Numerous serotypes	Wide species range. Mainly *S*. Typhimurium (and *S*. Dublin)	Direct contact and foodborne	Common	*S.* Dublin endemic in cattle. *S*. Typhimurium common in pigs & cattle, less common in sheep. No clinical signs usually in poultry.
Scabies	*Sarcoptes scabei*, species adapted strains	Various species	Direct contact	Uncommon as a zoonosis	Endemic, sporadic diagnoses.
Streptococcal sepsis	*Streptococcus suis*	Pigs	Direct contact, meat, aerosol	Rare	Yes, fairly common in pigs (mainly *S.suis* type 2 but other serotypes also occur).
Streptococcal sepsis	*Streptococcus zooepidemicus*	Horses, cattle	Direct contact, milk	Very rare	Sporadic
Swine influenza	*Porcine strains of influenza A virus*	pigs	Direct contact	Very rare	Endemic
Toxocariasis	*Toxocara canis/cati*	Dogs, cats	Direct contact	Rare	Endemic and common depending on use of worming
Toxoplasmosis	*Toxoplasma gondii*	Cats, ruminants	Ingestion of faecal oocysts, meat, cat litter	Moderate	Common cause of abortion in sheep and goats. Common in young cats
Yersiniosis	*Y. pseudotuberculosis*	Many mammalian and wildlife spp, birds, reptiles	Direct contact, foodborne	Uncommon, mostly *Y. enterocolitica*)	Endemic in many species
	Y. enterocolitica	Livestock and wildlife spp.	Faecal-oral, foodborne		

Disease	Organism	Main reservoirs	Usual mode of zoonotic transmission to humans	Animal-associated diagnosed cases in humans	Occurrence in animals/ endemic in E&W
Zoonotic diphtheria	*Corynebacterium ulcerans*	Cattle, farm animals, dogs, cats	Direct contact, milk	Rare	Probably endemic in cats and dogs.

NB this table includes those zoonotic diseases/ organisms considered to be of greatest significance and is not intended to be exhaustive

Appendix 7. Exotic Zoonotic Diseases and Organisms

Disease	**Organism**	**Main reservoirs**	**Usual mode of zoonotic transmission to humans**	**Animal-associated diagnosed cases in humans**	**Occurrence in animals**
Alveolar hydatid	*Echinococcus multilocularis*	Small rodents, foxes, dogs, cats	Ingestion of eggs excreted by carnivore	No human cases in UK.	Not known in domesticated species in UK, rarely diagnosed in UK zoo animals. Dogs entering the UK must be treated to prevent its arrival
Avian influenza	HP strains of Influenza A viruses H5 & H7	Poultry, ducks, wild birds	Direct contact	Very rare	Rare and sporadic
Brucellosis	*Brucella* species (*B. abortus, melitensis, suis,* and others)	Cattle, goats, sheep, pigs	Dairy products, milk, direct contact with foetal membranes	Uncommon, usually imported	*Brucella* spp are not seen in terrestrial animals in GB, although marine mammal *Brucella* spp are isolated in GB (see Appendix 2)
Equine viral encephalomyelitis	Western, Eastern and Venezuelan Equine Encephalitis viruses	Horses	Biting arthropods	Not known in UK. Very rare imported cases	Not known in UK
Equine morbillivirus (Hendra)	Hendravirus	Fruit bats	Direct contact with body fluids of infected horses	Not known in UK	Not known in UK
Glanders	*Burkholderia mallei*	Horse, donkey, mule	Direct contact	Not known in UK	Not known in UK
Newcastle disease	ND virus	Poultry	Inhalation, aerosols	V rare	Rare
Plague	*Yersinia pestis*	Rats and their fleas	Flea bite	Not known in UK	Not known in UK
Rabies	Rabies viruses - 'classical' (genotype 1)	Dogs, foxes, bats and other mammals	Animal bite/scratch/lick	Very rare imported cases	No classical (canine) terrestrial rabies in UK

Disease	**Organism**	**Main reservoirs**	**Usual mode of zoonotic transmission to humans**	**Animal-associated diagnosed cases in humans**	**Occurrence in animals**
Relapsing fever (only tick-borne form is possibly zoonotic)	*Borrelia* spp	Small mammals	Tick bite (soft ticks)	Not known in UK	Not known in UK
Rift valley fever	Rift Valley fever virus	Cattle, sheep, camels and goats	Direct contact, ingestion, mosquito bites	Not known in UK	Not known in UK
Trichinellosis	*Trichinella spiralis* and other species	Pigs, wild boar	Pork products	Very rare imported cases	*T. spiralis* not known in GB. *T. pseudospiralis* idenitified in a fox in 2013.
Tularemia	*Francisella tularensis*	Rabbits, wild animals, environment, ticks	Direct contact, aerosol, ticks, inoculation	Not known in UK	Not known in UK
Vesicular stomatitis	Vesicular stomatitis virus (2 distinct serotypes, Indiana & New Jersey)	Cattle, pigs and horses	Direct contact (low level zoonosis)	Very rare	Not known in UK
Viral haemorrhagic fevers	Various including Lassa, Ebola, Marburg, and Crimean-Congo viruses	Various including multi-mammate rats, primates, bats, ostriches, livestock, rabbits/hares	Various, including direct contact, rodent urine, tick bites	Very rare imported cases	Not known in UK
West Nile fever	West Nile virus	Wild birds, mosquitoes	Mosquito bite	Very rare imported cases	Not known in UK

NB This table highlights some potential exotic threats and is not considered to be exhaustive

Appendix 8. Contact details of key organisations

Public Health England (PHE)

Website: www.gov.uk/phe
☎ 020 8200 4400 (24 hours), Zoonoses section: 020 8327 7771
PHE Zoonoses Section email: zoonoses@phe.gov.uk
Postcode lookup for health protection teams in England
https://www.gov.uk/health-protection-team

Public Health Wales (PHW)

Website: www.publichealthwales.wales.nhs.uk
☎: 02920 402471
Email: surveillance.data@wales.nhs.uk; zoonoses@wales.nhs.uk

Local Authorities

Find your LA**:** http://local.direct.gov.uk/LDGRedirect/Start.do?mode=1
Map of all LAs**:** http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/maps/index.html

Animal and Plant Health Agency

Website: www.gov.uk/apha
☎ 01932 341111 (Weybridge Head Office)

All enquiries concerning notifiable zoonoses and incidents should be made to the relevant Regional Field Services Office. For the current contact details, visit https://www.gov.uk/government/organisations/animal-and-plant-health-agency/about/access-and-opening

Use the search tool below to find your nearest Veterinary Investigation Centre (look for the local APHA entry under the title ‘For queries about post-mortems and laboratory tests’ in this tool)
http://ahvla.defra.gov.uk/postcode/index.asp

Department for Environment Food and Rural Affairs (Defra)

Website: www.gov.uk/defra
☎ Defra Helpline 0845 933 5577
Defra Helpline Email: helpline@defra.gsi.gov.uk
Defra zoonoses team email: zdri@defra.gsi.gov.uk (please Email FAO Zoonoses VA)

Office of the Chief Veterinary Officer, Welsh Government

Website: www.wales.gov.uk then search for “animal health”
☎ 01267 245001
email: Endemics@Wales.GSI.Gov.UK (please mark “FAO zoonoses VA”)

Health and Safety Executive (HSE)

Website: www.hse.gov.uk
☎ Contact number: 0845 300 9923
To find local offices: http://www.hse.gov.uk/contact/maps/

Food Standards Agency (England)

Website: www.food.gov.uk
☎ 020 7276 8448000. Out of hours: 0845 051 8486
Email: foodincidents@foodstandards.gsi.gov.uk

Food Standards Agency (Wales)

Website: http://www.food.gov.uk/wales/
☎ 02920 678961. Out of Hours: 07789 926573
Email: Wales.FoodIncidents@foodstandards.gsi.gov.uk

Public health bodies in Scotland and Northern Ireland

Scotland

Health Protection Scotland (HPS)
Website: http://www.hps.scot.nhs.uk/index.aspx
☎ 0141 300 1100
Email: hpsenquiries@hps.scot.nhs.uk

Link to the Scottish Zoonoses Guidelines:
http://www.documents.hps.scot.nhs.uk/about-hps/hpn/zoonoses-guidelines.pdf

Scotland's Rural College, Veterinary Services Website
http://www.sruc.ac.uk/info/120107/veterinary_services
☎ 0131 535 3139

Northern Ireland

Public Health Agency
Website: http://www.publichealth.hscni.net/
☎ 0300 555 0119
E-mail: PHA.DutyRoom@hscni.net

Department of Agriculture and Rural Development Northern Ireland (DARD NI)
Website: http://www.dardni.gov.uk/index/contact-us.htm
☎ Helpline 0300 200 7852
Email: dardhelpline@dardni.gov.uk

Appendix 9. Exotic pets and their pathogens

The range of exotic animal species available for purchase in the UK is surprising, encompassing reptiles, amphibians, rodents, mammals, birds, fish and invertebrates.

All animals naturally carry micro-organisms, but these micro-organisms may be carried asymptomatically as part of their normal flora and not cause disease in the animal. Some may not be pathogenic to humans, but some can cause subclinical or overt disease. There are many factors which influence whether or not the organism will cause disease, including the pathogenicity of the organism, its route of transmission, exposure time, hygiene practices and the person's immune status.

The infection risk for humans from pets is well recognised, but the range of potential pathogens is extensive when exotic animal species are considered – see table below for some examples.

Summary of worldwide case reports of zoonotic disease from exotic pets

Animal group	**Animal type**	**Main infections/organisms**
Amphibians	Frog	*Salmonella* Typhimurium
Reptiles	Alligator, turtle, terrapin, bearded dragon, iguana, snake, gecko, tortoise	Mixed flora from bite wounds *Salmonella* serovars e.g. Pomona, Houtenae, Arizonae, Marina, Montevideo and others *Salmonella* infections associated with feeder mice
Rodents	Rat, guinea pig, hamster, mouse	Cowpox virus, Lymphocytic choriomeningitis virus leptospirosis, rat bite fever, hantavirus *Salmonella* Typhimurium
Mammals	Raccoon	*Baylisascaris procyonis*
	Skunk/polecat	Rabies
	African pygmy hedgehog	*Salmonella* Tilene, *Trichophyton erinacei* (ringworm)
	Prairie dog	Tularaemia, monkeypox
	Primates	Cercopithecine herpesvirus 1 (herpes B virus), hepatitis, rabies, *Salmonella*, *Shigella flexneri*, Simian foamy virus, mixed flora from bite wounds
Birds	Cockatoo, cockatiel, parrot, macaw, love bird	*Cryptococcus* spp., psittacosis
Invertebrates	Scorpion, spider, millipede etc	No case reports (but non-infectious incidents possible following stings or contact)
Fish	Tropical fish	*Salmonella* Java, *Mycobacterium marinum*

Appendix 10. Antimicrobial resistance in animal species and possible zoonotic implications

The Veterinary Medicines Directorate (VMD) has responsibility for advice and implementation of policy on antimicrobial resistance (AMR) aimed at mitigation or limitation of a number of key risks. These include the emergence of a significant public health risk, from the spread of an AMR infectious agent from animals to people and/or the environment.

A contingency plan has been compiled by VMD to outline the actions to be taken, and to identify the organisation responsible for these actions, when a resistant bacterial isolate considered of high risk is detected from an animal or group of animals.

An assessment of potential risk to human health (eg through direct contact, environmental exposure, food borne exposure) will be undertaken early when such an isolate is detected.

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