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Crossing the species barrier: A health protection perspective of the risk from animal tissues and laboratory samples

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Public Health England

PHE Centres

- Established in April 2013
 - An executive agency, sponsored by the Department of Health
- **Aim:** “We exist to protect and improve the nation's health and wellbeing, and reduce health inequalities”
- “We do this through world-leading science, knowledge and intelligence, advocacy, partnerships and providing specialist public health services”.
- **5,000 staff:** scientists, researchers, public health professionals





Role of Health Protection Teams

- Disease notifications
- Infectious Disease Surveillance
- Outbreak detection and investigation
- Incident management
- Advise on chemical, radiological, environmental hazards
- Longer-term preventive activities
- Work with partners
- Category One Agency – Civil Contingencies Act 2004



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Notifiable diseases

Acute encephalitis

Acute meningitis

Acute poliomyelitis

Acute infectious hepatitis

Anthrax

Botulism

Brucellosis

Cholera

Diphtheria

Enteric fever (typhoid or paratyphoid fever)

Food poisoning

Haemolytic uraemic syndrome (HUS)

Infectious bloody diarrhoea

Invasive group A streptococcal disease and scarlet fever

Legionnaires' Disease

Leprosy

Malaria

Measles

Meningococcal septicaemia

Mumps

Plague

Rabies

Rubella

SARS

Smallpox

Tetanus

Tuberculosis

Typhus

Viral haemorrhagic fever (VHF)

Whooping cough

Yellow fever



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Zoonotic notifiable agents

Bacillus anthracis

Borrelia spp

Brucella spp

Campylobacter spp

Chlamydophila psittaci

Corynebacterium ulcerans

Coxiella burnetii

Cryptosporidium spp

Ebola virus

Francisella tularensis

Hanta virus

Hepatitis A, B, C, delta, and E viruses

Influenza virus

Lassa virus

Leptospira interrogans

Marburg virus

Rabies virus (classical rabies and rabies-related lyssaviruses)

Rickettsia spp

Rift Valley fever virus

Salmonella spp

Shigella toxin producing Escherichia coli (E.coli O157)

West Nile Virus

Yellow fever virus

Yersinia pestis



Typical cases and incidents (UK)

- Shiga toxin (producing) *Escherichia coli* (STEC) cases linked to petting farms, animal or farmland contact (also contaminated food).
- Salmonellosis in infants linked to household reptiles
- Hantavirus due to fancy rat exposure
- Toxigenic *Corynebacterium ulcerans* (Diphtheria) infection from animal contact, including companion/pet animals
- *M. bovis* from companion/pet animal exposure – e.g. cats, dogs, camelids
- Lyssavirus (rabies) from European bats



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Example Laboratory Exposure to Brucella



Call regarding *Brucella* exposure

- Phone call from private veterinary laboratory
- *Brucella melitensis* isolated from a blood sample taken from a dog
- This finding had been duplicated at another laboratory
- 12 laboratory workers had been exposed
- 3 staff sniffed the plates of the cultured organism including 1 who is pregnant



Reservoir

- Cattle & camels (*Brucella abortus*)
- Swine (*Brucella suis*)
- Dogs (*Brucella canis*)
- Goats, sheep & camels (*Brucella melitensis*)
- Goats & sheep (*Brucella ovis*)
- Desert wood rat (*Brucella eotomae*)
- Marine species
- Infection can also occur in coyotes, bison, elk and deer

B. melitensis, *B. abortus* and *B. suis* regularly cause human infection



Incident meetings - Teleconference

Who dialled in:

- 2 Private veterinary laboratories (representatives from both)
- PHE HPT representatives, EoE and HPTs covering the dog, vets & owners
- PHE Zoonosis Team
- Field Epidemiology Service (FES)
- Brucella Reference Unit (BRU)
- Animal and Plant Health Agency (APHA)
- Department of Environmental, Food & Rural Affairs (DEFRA)
- Local Director of Public Health (DPH)
- Communications teams – PHE & Defra



Brucella melitensis?

How would a dog get it?

- Eaten contaminated dairy products ?
- Been in contact with goats, sheep, camels, Cattle?
- More likely to be *Brucella canis*?
- History of the dog?

Who is at risk?

- Vet who took the blood?
- Owner exposure to dog?



What Came to Light

- Dog - 18 month old cross breed
- Imported to the UK from Romania
- Presented to a veterinary practice with a chronic history of discospondylitis - Blood sample obtained and sent to laboratory
- Broth for x7 days prior to plating
- Automated characterisation of the plates was conducted which indicated *Brucella melitensis* – The plates were then sealed
- Laboratories involved were not equipped to handle a category 3 organism



Risk Assessment

The following criteria was used to ascertain level of risk of exposure to Brucellosis culture:

High risk exposure:

- Sniffing plates
- Working within 2 feet of a bench with open plates
- Working within a laboratory during procedures
which can aerosolise Brucella culture

Low risk exposure:

- Working more than 2 feet from an open bench (No aerosol)
- Direct contact with the dog



Health Protection Actions

High risk: 8 laboratory staff

1. Were all seen at the Hospital for Tropical Disease at University College London Hospital (UCLH) for assessment
2. Provided with prescription for post exposure prophylaxis and serological follow up at 0, 6 and 24 weeks
3. GPs of all individuals were issued with a letter & guidance in respect of their patient
4. Provided with information leaflets



Health Protection Actions

Exposure identified as Low risk:

- **Veterinary staff, owners & household contacts**
 - **Primary lab staff not filling the high risk criteria**
 - **Secondary laboratory staff where the sample was sent for confirmation**
1. Reassurance given that the dog posed a very low risk of infection
 2. Post exposure prophylaxis was not indicated
 3. Provided with information leaflets



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