

# Is factory farming making you sick?

A GUIDE TO ANIMAL DISEASES AND  
THEIR IMPACT ON HUMAN HEALTH



Animal Aid exposes and campaigns peacefully against all animal abuse, and promotes a cruelty-free lifestyle



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## INTRODUCTION

The majority of farmed animals in the UK are reared intensively, inside crowded, filthy, sheds – the perfect environment for bacteria and viruses to flourish. Stressed by their surroundings and their inability to display natural behaviours, and forced to live in their own excrement alongside sick and dying animals, it is not surprising that farmed animals are vulnerable to infection. Their immunity is further weakened by the industry breeding from just a few high-yielding breeds, which has led to genetic erosion.

of farmers who responded to a 2007 *Farmers Weekly* survey admitted to having limited or virtually non-existent on-farm biosecurity), there is an over-reliance on the use of antibiotics and other drugs. Such veterinary products are administered so frequently that dangerous pathogens have mutated and become drug-resistant. The antibiotics given to chickens to treat E. coli, for example, are reported to cause the deaths of 280 people a year in Britain<sup>3</sup> and, in 2012, scientists from Cambridge University found a superbug version of MRSA in the milk of British cows and in pigs, which was believed to have led to infection in humans.<sup>4</sup> In June 2013, the Science Minister admitted that the over-use of antibiotics could be a global problem on the scale of climate change.<sup>5</sup>

These ‘factory farming’ systems that jeopardise the wellbeing of animals also threaten the health of the people who consume animal products, and even those who don’t. Diseases can be spread from animals to people directly or via contact with contaminated water or slurry, or through eating meat, milk or eggs. Some diseases can then be passed from person to person. More than 60 per cent of the almost 1,500 known human pathogens (biological agents that cause disease) are thought to have originated in animals.<sup>1</sup>

**In recent years, animal farming has brought us outbreaks of BSE, bovine TB, foot and mouth, bird flu, swine flu, campylobacter, salmonella and many more devastating diseases. The United Nations Food and Agriculture Organization has warned that global industrial meat production poses a serious threat to human health.**<sup>2</sup>

However, instead of improving conditions on farms (eighty-two per cent

### REFERENCES

- 1 S Zack, ‘Which way will this bird fly?’, *The Huffington Post*, 15 May 2013
- 2 H Steinfeld et al, *Livestock's Long Shadow*, p. 69, 2006
- 3 T Brady, ‘Scientists call for ban on antibiotic given to chickens which “causes 280 deaths a year in Britain”’, *Daily Mail*, 5 Aug 2013
- 4 H Dixon, ‘Farmers risk creating superbugs’, *The Telegraph*, 20 Mar 2013
- 5 R Mason, ‘Antibiotics given to farm animals could pose super-bug risk, admits minister’, *The Telegraph*, 12 Jun 2013



DISCARDED VETERINARY PRODUCT CONTAINERS AT A SOMERSET PIG FARM



# AVIAN (BIRD) FLU

## What is it?

Avian influenza (bird flu) is a highly contagious viral disease affecting the respiratory, digestive and/or nervous systems of many species of birds. It is caused by a Type A influenza virus, which has many subtypes. New subtypes and strains arise when the virus undergoes genetic mutations. Some forms of the virus cause mild reactions in people. Others, such as H<sub>5</sub>N<sub>1</sub> and H<sub>7</sub>N<sub>9</sub>, can be fatal.

## History

In its natural state, the virus has existed for millions of years as a harmless, intestinal infection of aquatic birds, such as ducks. It was first discovered among farmed poultry in Italy in the 1870s. Farms provide a perfect environment for viruses to mutate and, in an overview of avian influenza, researchers wrote in a Food and Agriculture Organization paper, 'intensive rearing of poultry has played a role in the emergence of highly pathogenic avian influenza viruses in the past'. It added that the 'rigorous implementation of biosecurity' is key to preventing future outbreaks.<sup>6</sup>

The H<sub>5</sub>N<sub>1</sub> subtype first infected people in 1997 during an outbreak in Hong Kong. Since then, this highly pathogenic (disease-causing) strain of the virus has spread from Asia to Europe and Africa, resulting in millions of poultry infections, several hundred human cases, and many human deaths.

In the UK, one of the largest outbreaks occurred at a Bernard Matthews farm in 2007, when 160,000 birds were gassed to death to try to prevent the disease from spreading. More than 2,000 of the company's birds died in one week inside the

overcrowded sheds. Despite the birds' severe suffering, the first victims went unnoticed because the attrition rate in intensive poultry sheds is always so high. The industry acknowledges that some 100 viral, bacterial and musculoskeletal conditions commonly affect commercial poultry.<sup>7</sup>

## Routes of transmission

Birds shed the virus in their saliva, nasal secretions and faeces. It can enter farmed poultry units through supplies, cages, clothes, delivery vehicles, mammals and even insects; and diseased material can leave the units in the same way.<sup>8</sup>

People are most likely to pick up the bug through direct contact with secretions from infected birds, and so farmers and slaughterers are most at risk. Following slaughter, the birds' internal organs are removed, during which process the intestines are often ripped. A study found that 42 birds who followed a ripped carcass of an infected bird on the line were cross-infected.<sup>9</sup> A United States Department of Agriculture microbiologist said: 'At the end of the line, the birds are no cleaner than if they had been dipped in the toilet.'<sup>10</sup>

The avian influenza virus cannot pass easily from one human to another, although evidence suggests H<sub>7</sub>N<sub>9</sub> has infected and killed a woman who was infected by her father.<sup>11</sup> As the virus mutates, however, the potential for human-to-human transmission increases, as does the potential for a pandemic.

## Symptoms in animals

The mild form of influenza produces symptoms, including respiratory problems, so inconspicuous that the outbreak may go unnoticed. The severe form, however, may kill almost 100 per cent of infected birds within 48 hours.

In 1997, a Hong Kong farmer described the severe symptoms of H<sub>5</sub>N<sub>1</sub> in chickens: 'Their bodies began shaking as if they were suffocating and thick saliva started coming out of their mouths. The faces went dark green and black and then they died.' Pathologists have found that the virus had reduced the birds' internal organs to a bloody pulp.<sup>12</sup>

## Symptoms in people

Initial symptoms include a high fever and other influenza-like symptoms. Diarrhoea, vomiting, abdominal pain, chest pain and bleeding from the nose and gums have also been reported as early symptoms in some patients. The disease can progress and cause multiple organ failure.<sup>13</sup> H<sub>5</sub>N<sub>1</sub> has now infected and killed people in 13 countries.<sup>14</sup>

## Treatment

Hundreds of millions of chickens and ducks have been killed across South East Asia in an effort to prevent the virus spreading from birds to people. However, the widespread use of Amantadine in birds has rendered that drug useless for treating people with H<sub>5</sub>N<sub>1</sub>.<sup>15</sup> Resistance to Tamiflu – another antiviral drug – has now also been detected in patients with the H<sub>7</sub>N<sub>9</sub> strain.<sup>16</sup> But antiviral medications are still administered and are more effective if given within 48 hours of the start of symptoms. Patients are advised to rest and drink plenty of fluids, as with any other form of flu.<sup>17</sup>

## REFERENCES

- 6 L Sims, C Narrod, 'Understanding avian influenza – a review of the emergence, spread, control, prevention and effects of Asian-lineage H<sub>5</sub>N<sub>1</sub> highly pathogenic viruses', Food and Agriculture Organization of the United Nations, 2008
- 7 'Quick Disease Guide', The Poultry Site
- 8 M Yousaf, 'Avian influenza outbreak hits the industry again', *World Poultry*, Vol 20, No 3, 2004
- 9 M Greger, *Bird Flu: A Virus of our own Hatching*, (Lantern Books), 2006
- 10 Gerald Kuester, cited in M Greger's *Bird Flu: A Virus of our own Hatching* (Lantern Books), 2006
- 11 'Lethal strain of avian flu that has killed 43 "transmitted between humans for first time"', *The Telegraph*, 7 Aug 2013
- 12 M Greger, *Bird Flu: A Virus of our own Hatching*, (Lantern Books), 2006
- 13 The Writing Committee of the World Health Organization (WHO) Consultation on Human Influenza A/H<sub>5</sub>, *N Engl J Med* 2005; 353:1374-1385, 29 Sept 2005
- 14 'Cumulative number of confirmed human cases for avian influenza A (H<sub>5</sub>N<sub>1</sub>) reported to WHO, 2003-2013', World Health Organization
- 15 A Sipress, 'Bird Flu Drug Rendered Useless', *Washington Post*, 18 Jun 2005
- 16 J Gallagher, 'H<sub>7</sub>N<sub>9</sub> bird flu drug resistance concern', BBC News, 28 May 2013
- 17 'Treating avian flu', [www.nhs.co.uk](http://www.nhs.co.uk)



# BOVINE TB

## What is it?

Bovine tuberculosis (bTB) is a disease arising from infection by a bacterium called *Mycobacterium bovis* (*M. bovis*). Cows, buffalo and bison are the natural hosts but nearly all warm-blooded animals are susceptible to the infection. There are around 120 species of mycobacteria. In people, the majority of tuberculosis is caused by *M. tuberculosis*, although humans can also contract *M. bovis*, also known as bovine TB.

## History

During the 1930s, at least 40 per cent of British cows were infected with bTB.<sup>18</sup> Many were kept near large cities to provide urban dwellers with fresh milk and most were closely confined in poorly ventilated sheds. Many infected cows developed TB and shed *M. bovis* in their milk. While 20-30,000 people died annually from tuberculosis at that time,<sup>19</sup> around 2,500 of these deaths were due to infection with *M. bovis*, often caused by drinking infected raw milk.<sup>20</sup> Routine pasteurisation of cows' milk and inspection of their carcasses at slaughterhouses were introduced and, by the 1980s, the government had begun a TB testing and slaughter scheme.



ZERO-GRAZED DAIRY COW

## Routes of transmission

Bovine TB is spread primarily when bacteria are released into the air through coughing and sneezing. This transmission can occur when animals are in close contact with each other. The intensification of the dairy industry and the move to permanently housed, zero-grazed cows are, therefore, real causes for concern. Wild animals may also become infected. In the UK, badgers have been blamed for hosting the disease and for passing it back to cows. Because of this, from 1997 a 9-year trial badger cull was undertaken. 11,000 badgers were killed at a cost of £50m. Tests of road kill badgers at the time revealed that just 15 per cent had TB.<sup>21</sup> The researchers concluded that 'badger culling could make no meaningful contribution to cattle TB control'.<sup>22</sup> Despite the evidence, the government licensed two pilot badger culls starting in 2013 that were widely criticised for their underlying premises and execution. There are plans to extend the culls across the country over the next 25 years. Bovine TB can infect people, too. It can be passed in droplets coughed and sneezed by animals, through drinking unpasteurised milk or through handling infected meat. Currently, less than one per cent of all confirmed cases of TB in humans is due to infection with *M. bovis*.<sup>23</sup>

## Symptoms in animals

Lesions are common in the lungs, and these can cause a hard, dry short cough, which leads to more frequent coughing and laboured, painful breathing. The animals lose condition and later cough up blood and suffer from diarrhoea. Lesions can also develop in their udders with hard lumps appearing.<sup>24</sup> However, due to the slow progression of infection and the early age at which cows are slaughtered, the clinical signs of bTB are now rarely seen in cows in Britain. Some animals show no evidence of the disease, yet may be found to be so seriously infected during slaughter inspection that their carcasses are condemned.<sup>25</sup>

Bovine TB is rarely fatal, although government policy is to kill any cow found to test positive for the disease, and those in close proximity to her. More than 28,000 cows were slaughtered in England in 2012.<sup>26</sup>

## Symptoms in people

TB in humans produces the same symptoms whether it is caused by *M. bovis* or the human pathogen *M. tuberculosis*: a persistent cough, coughing up blood, lack of appetite and weight loss, night sweats and fatigue. It can be fatal if left untreated.<sup>27</sup>

## Treatment

A long course of antibiotics is usually sufficient to treat TB in people although, in rare cases, the disease can be fatal, even with treatment.<sup>28</sup> Similarly, cows can be treated and a vaccination also exists to

protect them. However, the cost of treatment and the fact that raw milk can only be exported if it comes from a TB-free herd makes treatment uneconomic for farmers. The government policy, therefore, is to control bTB within an affected herd through testing and slaughter, and to kill badgers. However, there exist serious doubts over the accuracy of the TB skin test, and the science does not support a badger cull. Studies suggest that a more effective way of tackling bTB would be to monitor and control cow movements, given that most cases are transmitted from cow to cow. There is also a vaccine to protect badgers, and the Welsh Assembly government has chosen to utilise this rather than shoot the wild animals. However, the underlying causes of bovine TB, and numerous other diseases that kill even greater numbers of cows every year, are the intensive and stressful conditions to which the animals are subjected.

## REFERENCES

- 18 C Davies, 'Bovine TB is "out of control" warn farmers', *The Guardian*, 8 Mar 2009
- 19 Table 1: Tuberculosis mortality and mortality rate, England and Wales, 1913-2012, Public Health England, 2012
- 20 'Bovine TB "can spread in humans"', BBC News, 12 Apr 2007
- 21 'The Randomised Badger Culling Trial', The Badger Trust
- 22 Ibid
- 23 'Bovine TB "can spread in humans"', BBC News, 12 Apr 2007
- 24 'Target TB: What you really need to know about TB in cattle', *Farmers Guardian*, 8 May 2009
- 25 S McGinness, 'Bovine Tuberculosis Research Paper 98/63', House of Commons, 1998
- 26 O Paterson, 'Written parliamentary statement: Achieving a bovine tuberculosis-free England', 4 Jul 2012
- 27 'Treating tuberculosis', www.NHS.uk
- 28 Ibid



# BSE

## What is it?

BSE (*Bovine Spongiform Encephalopathy*) – also known as ‘mad cow disease’ – affects the central nervous systems of cows, and is caused by an abnormal, infectious protein known as a prion. It has a long incubation period, which means that, typically, it takes four to six years for cows infected with BSE to show signs of the disease. Many cows are slaughtered or culled before signs appear.

## History

The first case of BSE was in a cow in a West Sussex farm in 1986. To date, there have been around 185,000 reported cases<sup>29</sup> and another 4.4 million cows were destroyed during the eradication programme.<sup>30</sup> BSE has now been found in at least 25 countries<sup>31</sup> and is estimated to have cost European Union taxpayers £65 billion.<sup>32</sup>

In 1996, the government announced a probable link between BSE and variant Creutzfeldt-Jakob Disease (vCJD). This disease has killed all 176 people infected with it in the UK.<sup>33</sup> The epidemic reached a peak in 2000 but new cases continued to appear until 2011.<sup>34</sup> 2012 was the first year without a reported case.<sup>35</sup>

However, scientists have warned that a second wave of vCJD could sweep Britain over the next two to three decades. Initially, only people with a specific gene type succumbed to the illness but evidence suggests that those with a different gene version may take longer to become ill.<sup>36</sup>

## Routes of transmission

BSE is transmitted between cows through the ingestion of BSE prions, not through direct contact with infected animals. It

became a huge and widespread disaster because cows, who are natural herbivores, were fed with the remains of other sick cows.<sup>37</sup> People who eat parts of infected animals can develop vCJD, a condition that is invariably fatal. The disease can also be transmitted via contaminated medical equipment and through blood transfusions.

## Symptoms in animals

BSE is a neurological condition that causes a spongy degeneration in the brains of cows. Infected animals may experience intense agitation or fear, and try to hide from other cows or people. They may startle easily, or become aggressive. They may experience abnormalities in their posture, such as stiffness or a lack of coordination, an increase in slipping and falling, and difficulty in rising. There may also be prolonged episodes of nose licking, snorting, coughing, head tossing and vigorous head rubbing that can cause lesions.<sup>38</sup>

## Symptoms in people

Anxiety and depression are often the first signs in people. Later symptoms include

confusion, memory loss, loss of coordination and balance, problems with vision and hearing, muscle paralysis, speech loss and incontinence.

## Treatment

From 1988, the UK government began introducing various restrictions on the types of foods that could be fed to farmed animals and what could go into the human food chain. There was a mass slaughter of adult cows judged to present a risk to human health, for whom farmers were compensated (Over Thirty Month Scheme). Young calves were also killed (Calf Processing Scheme) as a measure to protect the devastated trade in cows’ meat. The EU banned exports of live cows and their meat from Britain but, over the years, the various restrictions have been eliminated, with exports to Europe re-commencing in 2006. There is no treatment for cows diagnosed with BSE or for people with vCJD, although medications are given to help with the symptoms.<sup>39</sup>



VICTIMS OF THE BSE ‘CULL’

## REFERENCES

- 29 ‘Number of cases of bovine spongiform encephalopathy reported in the United Kingdom’, World Organisation for Animal Health, 11 Oct 2013
- 30 D Brown, ‘The recipe for disaster that killed 80 and left a £5bn bill’, *The Daily Telegraph*, 27 Oct 2000
- 31 ‘Annual incidence rate of bovine spongiform encephalopathy (BSE) in OIE Member Countries that have reported cases, excluding the United Kingdom’, World Organisation for Animal Health, 2012
- 32 R McKie, ‘Warning over second wave of CJD cases’, *The Observer*, 3 Aug 2008
- 33 NJ Andrews, ‘Incidence of variant Creutzfeldt-Jakob disease diagnoses and deaths in the UK January 1994 – December 2011’, 2 Jul 2012
- 34 Ibid
- 35 ‘Prion disease remains a mystery’, *The Lancet Infectious Diseases*, Vol 12, Issue 12, Dec 2012
- 36 Ibid
- 37 ‘The BSE Inquiry Report’, Defra, 4 Jun 2009
- 38 ‘Clinical signs of bovine spongiform encephalopathy in cattle’, Animal Health and Veterinary Laboratories Agency, April 2013
- 39 ‘Treating Creutzfeldt-Jakob disease’, NHS



# CAMPYLOBACTER

## What is it?

Campylobacter is a group of bacteria that are a major cause of diarrhoeal illness in humans and are generally regarded as the most common cause of bacterial food poisoning. Two species account for the majority of infections: *C. jejuni* and *C. coli*. Campylobacter is present in the intestines of farmed animals worldwide but, typically, they show no signs of illness.

## History

Campylobacter was first observed in stool samples taken from children with diarrhoea in 1886. By 1986, it was the most commonly reported gastrointestinal pathogen in the UK.<sup>40</sup> A 2008 report found that the UK had the sixth highest prevalence of contaminated chicken carcasses in the EU – 86.3 per cent.<sup>41</sup>

Campylobacter is linked to about 460,000 poisoning cases in Britain, 22,000 hospital admissions and 110 deaths each year.<sup>42</sup> In 2013, the Food Standards Agency admitted: 'Despite significant effort and investment by both industry and government, monitoring data shows that no progress has yet been made in reducing levels of campylobacter in chicken.'<sup>43</sup>

## Routes of transmission

Campylobacter is easily transmitted between farmed birds via a shared water source or through infected faeces.<sup>44</sup> When an infected animal is slaughtered, the

organisms can be transferred from the intestines to the meat.<sup>45</sup> In 2000, a survey at British 'red meat' slaughterhouses revealed that 24 per cent of cows, 17 per cent of sheep and 94 per cent of pigs had Campylobacter of public health significance in their faeces.<sup>46</sup> In 2013, more than two-thirds of shop-bought chicken in the UK was contaminated with the bug.<sup>47</sup> It is not surprising, then, that between 60 and 80 per cent of campylobacteriosis can be attributed to chicken.<sup>48</sup> Eating undercooked meat (especially



AN AILING TURKEY AT A DEVON FARM

poultry) is the main cause of illness. Other sources include contact with live poultry, and drinking unpasteurised milk or untreated water.

## Symptoms in animals

The types most commonly found in people (*C. jejuni* and *C. coli*) are not generally associated with illness in animals, although *C. jejuni* can cause miscarriage in cows.<sup>49</sup>

## Symptoms in people

Infection can cause a severe form of food poisoning marked by bloody diarrhoea, abdominal pain, fever, headache and vomiting. The symptoms typically last three to six days. Fatal outcomes usually occur only in the very young or elderly, or those with another serious disease. Long-term consequences can include paralysis, arthritis, heart infection and septicaemia.<sup>50</sup>

## Treatment

Improved biosecurity can reduce the incidence in intensively farmed birds, although, in 2013, the Food Standards Agency (FSA) expressed concern that farmers did not abide by new biosecurity requirements intended to reduce campylobacter in chickens 'with sufficient consistency to be effective'.<sup>51</sup>

Hygiene practices at slaughterhouses may reduce contamination of carcasses by faeces.<sup>52</sup> The only method presumed to eliminate Campylobacter from contaminated foods is heat treatment (cooking or pasteurisation) or irradiation. Other

countries have reduced contamination by disinfecting chicken meat with chlorine washes – a method currently unapproved in the EU.<sup>53</sup>

In people, treatment is based on oral or intravenous rehydration.<sup>54</sup> The FSA reported that the number of Campylobacter strains resistant to antibiotics has risen from 48 per cent in 2001 to 87 per cent in 2009.<sup>55</sup>

## REFERENCES

- 40 'Zoonoses Report', Defra, 2007
- 41 S Wearne, 'A refreshed strategy to reduce campylobacteriosis from poultry', Food Standards Agency, 13 Sept 2013
- 42 'Common food poisoning cause targeted', BBC News, 11 Sept 2013
- 43 S Wearne, 'A refreshed strategy to reduce campylobacteriosis from poultry', Food Standards Agency, 13 Sept 2013
- 44 'Campylobacter', National Center for Emerging and Zoonotic Infectious Diseases, 18 Apr 2013
- 45 Ibid
- 46 'Summary profile for Campylobacter', Defra
- 47 K Takakuski, 'Poultry industry "must act" over food poisoning bug', BBC News, 16 Jan 2013
- 48 'The joint government and industry target to reduce campylobacter in UK produced chickens by 2015', Food Standards Agency, Dec 2010
- 49 JA Wagenaar et al, 'Campylobacter in primary animal production and control strategies to reduce the burden of human campylobacteriosis', *Rev. sci. tech. Off. int. Epiz.*, 2006, 25 (2), 581-594
- 50 T Roberts et al. 'The Long-Term Health Outcomes of Selected Foodborne Pathogens', Center for Foodborne Illness Research and Prevention, 2009
- 51 S Wearne, 'A refreshed strategy to reduce campylobacteriosis from poultry', Food Standards Agency, 13 Sept 2013
- 52 'Campylobacter', World Health Organization, 2000
- 53 S Wearne, 'A refreshed strategy to reduce campylobacteriosis from poultry', Food Standards Agency, 13 Sept 2013
- 54 'Campylobacter Enteritis', www.patient.co.uk
- 55 S Poulter, 'Food poisoning bug is found in two thirds of supermarket chicken', *Daily Mail*, 27 Jan 2010



# E.COLI (O157:H7)

## What is it?

*Escherichia coli* (*E.coli*) is a large and diverse group of bacteria – more than 700 types have been identified. They are mainly harmless and inhabit the intestinal tracts of people and other warm-blooded animals but a few strains, including the notorious O157:H7, can be deadly. The increased number of human cases has been attributed to the intensification of farming practices and the consequent widespread use of antibiotics. Studies in France,<sup>56</sup> Sweden<sup>57</sup> and Canada<sup>58</sup> have identified a positive correlation between the number of cows in an area and rates of human infection.

## History

*E.coli* O157:H7 was first described as an 'emerging foodborne zoonotic pathogen' (an illness that can be transmitted from animals to humans) in 1982 during an investigation into an outbreak of haemorrhagic colitis (bloody diarrhoea), associated with the consumption of contaminated beef burgers in the US.<sup>59</sup> There are around 20,000 reports of *E. coli* infections in the UK each year, with 800 being of the O157 strain.<sup>60</sup> Scotland has had the highest incidence of *E. coli* O157:H7 in the world, with about 250 people falling ill each year.<sup>61</sup> Britain's deadliest human *E.coli* O157:H7 outbreak occurred in Scotland in 1996 when

21 people died after eating infected meat from a butcher in Lanarkshire. Another 400 were infected. An inquiry found that there had been contamination between raw and cooked meat.<sup>62</sup> In a 2005 outbreak in Wales, 157 cases were reported, with 31 people being hospitalised. Most of those affected were children,<sup>63</sup> and one five-year-old died.<sup>64</sup> In 2009, another major *E.coli* O157:H7 outbreak occurred, this time as a result of children visiting a petting farm in Surrey. Thirty-six cases were confirmed, with 12 children under the age of 10 being hospitalised.<sup>65</sup>

## Routes of transmission

Since the bacteria are excreted in faeces, there is a potential risk to anyone working with or visiting farmed animals and their environment. However, the main risk comes from handling and eating infected foods. Raw or undercooked beef products are the most common source of infection for people, but raw milk, sausages, venison and cold sliced meat are also sources of infection.<sup>66</sup> In fact,

any foodstuff that has been contaminated with faeces containing the bacteria can cause disease. On farms, this is most likely to be via contaminated water or animal (especially cow) manure but cross-contamination during food preparation can also lead to infection. Infected people can pass the disease to others through the same oral-faecal route.

## Symptoms in animals

While certain strains of *E. coli* bacteria can be responsible for acute, painful and potentially fatal forms of mastitis<sup>67</sup>, the most dangerous strain to people – *E.coli* O157:H7 – does not adversely affect cows.

## Symptoms in people

*E.coli* O157:H7 can cause severe stomach cramps, vomiting, bloody diarrhoea and fever, although some infected people may have mild diarrhoea or no symptoms at all. In 5 to 10 per cent of patients, it can cause a kidney-related complication that can lead to renal failure, particularly in children.<sup>68</sup>

## Treatment

A move away from intensive dairy cow farming<sup>69</sup> plus the implementation of controls from farm through to processing is likely to reduce *E.coli* spreading. Slaughterhouses are an obvious place for contamination of meat. Operators are urged to ensure that the animals' skins are not covered in faeces, and prevent the spillage of the digestive tract contents during and after evisceration (organ removal). Vaccines are available for use in cows and

research suggests they would reduce the number of human cases by 85 per cent.<sup>70</sup> Since the cows do not get sick with O157, however, farmers are unlikely to pay for it.<sup>71</sup> Most people recover without specific treatment, although rehydration is essential. Use of antibiotics may increase the risk of complications. In serious cases, transfusions of blood or blood clotting factors as well as kidney dialysis may be necessary.

## REFERENCES

- 56 R Haus-Cheymol et al. 'Association between indicators of cattle density and incidence of paediatric haemolytic-uraemic syndrome (HUS) in children under 15 years of age in France between 1996 and 2001: An ecological study', *Epidemiol. Infect.* 134, 1-7, 2005
- 57 T Kistemann et al. 'GIS-supported investigation of human EHEC and cattle VTEC o157 infections in Sweden: Geographical distribution, spatial variation and possible risk factors', *Epidemiol. Infect.* 132, 495-505, 2004
- 58 JE Valcour, 'Associations between indicators of livestock farming intensity and incidence of human Shiga toxin-producing *Escherichia coli* infection', *Emerg. Infect. Dis.* 8, 252-257, 2002
- 59 LW Riley, et al, 'Hemorrhagic colitis associated with a rare *Escherichia coli* serotype', *N. Engl. J. Med.* 30 8, 681-685, 1983
- 60 'Q&A: *E.coli* o157', BBC News, 15 Jun 2010
- 61 V Elliott and M Reid, 'Deadly outbreak at butcher highlights dangers of delay,' *The Times*, 14 Sept 2009
- 62 Ibid
- 63 'E. coli outbreak butcher "sold rotten meat for years"', BBC News, 23 Nov 2010
- 64 H Pennington, 'The Public Inquiry into the September 2005 Outbreak of *E.coli* O157 in South Wales', Mar 2009
- 65 V Elliott, '20,000 children put at risk by dithering at *E. coli* farm', *The Times*, 14 Sept 2009
- 66 *Escherichia coli* o157, www.patient.co.uk
- 67 'Types of Pathogens', 'DairyCo Technical Information', www.dairyco.org.uk
- 68 '*Escherichia coli* o157', www.patient.co.uk
- 69 'Types of Pathogens', 'DairyCo Technical Information', www.dairyco.org.uk
- 70 J Gallagher, 'E. coli cases would be cut by cow jabs, scientists say', BBC News, 16 Sept 2013
- 71 Ibid



A YOUNG CASUALTY OF 'ZERO-GRAZE' FARMING



# FOOT & MOUTH DISEASE

## What is it?

Foot and Mouth Disease (FMD) is caused by a picornavirus, of which there are seven main types, each producing the same symptoms and being distinguishable only in the laboratory.<sup>72</sup> It affects cloven-hoofed animals, such as cows, sheep, pigs, goats, camels and deer. According to the Department for Environment, Food and Rural Affairs (Defra), 'FMD is probably more infectious than any other disease affecting man or animals and spreads rapidly if uncontrolled.'<sup>73</sup>

## History

FMD was first shown to be viral in 1897 by Friedrich Loeffler, and the disease is now widespread throughout the world. In 1966-7, there were 2,228 outbreaks in Britain, resulting in the slaughter of almost 450,000 animals. The epidemic was attributed to pig swill, which contained infected lamb.<sup>74</sup> In 2001, there was another devastating UK outbreak, which was first found in an Essex slaughterhouse. The virus was traced back to a swill farm in Northumberland, where pigs were fed plate scrapings and other foods of animal origin (including pigmeat), that were considered unfit for human consumption. Around 6.5 million animals were slaughtered on 10,000 farms.<sup>75</sup> Most European countries, including Britain, have now been formally recognised as disease-free but its potential to spread rapidly causes international concern.

## Routes of transmission

Infected animals secrete numerous viral particles – capable of becoming airborne – before clinical signs appear. Transmission can take place on the wind and by the movement of animals, people and vehicles

that have been contaminated with the virus. Long-distance animal trading and dense populations of animals – typical of modern farming practices – help to facilitate the spread.

The virus can spread to people through open skin wounds that have come into contact with diseased animals but not through eating infected meat.<sup>76</sup>

## Symptoms in animals

Fever is followed by the development of blisters, chiefly in the mouth or on the feet. FMD is rarely fatal, except in very young animals who may die without showing any symptoms. In dairy cows, there is a high incidence of miscarriage, chronic mastitis and lameness – conditions that are already endemic in dairy herds.

## Symptoms in people

FMD crosses the species barrier with difficulty but a few cases of humans getting sick have been recorded.<sup>77</sup> Human symptoms are flu-like with a fever and sore throat, although tingling blisters on the hands and feet and in the mouth have also been recorded.<sup>78</sup>

## Treatment

There is no 'cure' but affected animals will usually recover naturally in two to three weeks.<sup>79</sup> However, since those animals may lose productivity and the farmers, therefore, lose profit, it is policy in the UK to slaughter all affected animals and any others who have been exposed to the infection.<sup>80</sup> During the 2001 UK outbreak, the animals were shot with a captive bolt gun – a retractable metal bolt used to stun animals in slaughterhouses. Following this, their main arteries should have been cut or a metal rod inserted into the gun hole to destroy the brain stem (use of this rod is now illegal). However, there is evidence that for many during the cull, this wasn't the case. They recovered consciousness and experienced their own slow death piled up with their fellows.<sup>81</sup> Younger animals were killed by a painful and traumatic injection directly into the heart.

Vaccination is an alternative to culling. However, vaccination programmes can

affect the ability to trade freely in animals and meat products and so they are often resisted.

The last recorded case of FMD in people was in 1966. The disease is short-lived and patients recover naturally in a few days.<sup>82</sup>

## REFERENCES

- 72 'Foot and mouth', Defra, 8 Feb 2013
- 73 'Foot-and-mouth disease', Defra, 1 Nov 2008
- 74 'Foot and Mouth Disease: the 1967 outbreak and its aftermath', The History of Modern Biomedicine Research Group, Queen Mary University of London
- 75 A Donaldson et al, 'Foot and Mouth – Five Years On: The Legacy of the 2001 Foot and Mouth Disease Crisis for Farming and the British Countryside', Feb 2006
- 76 'How does foot and mouth spread?', The Royal Society
- 77 R Armstrong et al, 'Foot-and-mouth disease in man', *BMJ*, 4: 529-530, 1967
- 78 K Bauer, 'Foot-and-mouth disease as zoonosis', *Arch Virol*, 13 (suppl): 95-97, 1997
- 79 'Q&A: Foot-and-mouth disease', BBC News, 14 Sept 2007
- 80 'Foot and mouth', Defra, 8 Feb 2013
- 81 T Branigan, 'Stunned livestock "left to die"', *The Guardian*, 24 March 2001
- 82 'Foot and Mouth disease: general information', Public Health Agency



CULLED SHEEP ARE DISINFECTED



# JOHNE'S DISEASE

## What is it?

Johne's disease is an infectious wasting condition caused by *Mycobacterium avium subspecies paratuberculosis* (MAP). The bacterium causes a chronic and sometimes fatal infection in cows, sheep, goats and other ruminants. In infected flocks of sheep, the annual ewe mortality rate is estimated to be between 5 and 10 per cent.<sup>83</sup> In 2013, a *Farmers Weekly* article stated that 'in the UK it is estimated more than half of dairy herds are infected with the disease'.<sup>84</sup>

## History

Johne's disease was first noted in 1826 but not officially recognised as an infectious disease until 1894.<sup>85</sup> The last 100 years have seen a steady increase in the number of infected animals within a species, the number of different species infected, and the number of countries in which it has taken root.<sup>86</sup>

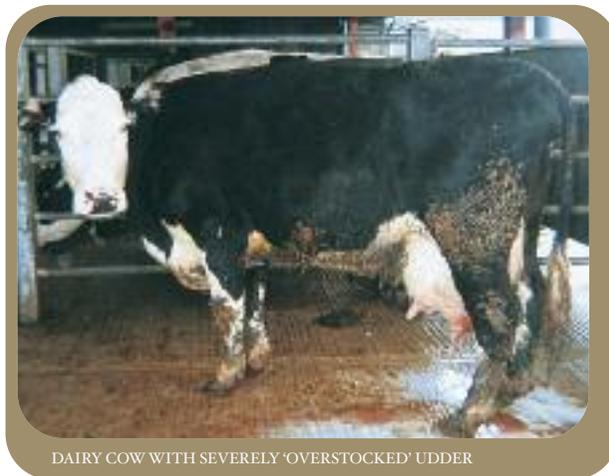
## Routes of transmission

Infected animals shed the bacterium in manure, colostrum and milk. Infection is most commonly acquired in young animals through ingestion of contaminated milk from an infected cow or through the environment,<sup>87</sup> as just one cow with diarrhoea could potentially thoroughly contaminate her surroundings.<sup>88</sup> It can also be transmitted from an infected pregnant animal to her foetus. Confining large numbers of animals in small areas helps to spread the disease and is one reason that it is

such a growing threat.<sup>89</sup>

Sub-clinically infected animals display no symptoms but they can still shed the bacteria into the environment, giving MAP the opportunity to become entrenched in a herd before it is apparent that a problem even exists.<sup>90</sup> Every time animals are transported between farms, new herds may be infected.

There are clinical similarities between Johne's disease and Crohn's – an inflammatory bowel disease in humans,<sup>91</sup> leading some researchers to argue that the



DAIRY COW WITH SEVERELY 'OVERSTOCKED' UDDER

same organism is a cause of both.<sup>92</sup> According to research published in 2013, 'There is an increasingly convincing link between MAP infection and Crohn's disease in humans, MAP has been detected in up to half of normal human intestinal samples and nearly all of Crohn's disease samples.'<sup>93</sup> However, if MAP is linked to Crohn's, transmission routes have not been established.

## Symptoms in animals

In cows, the main signs are diarrhoea and wasting. MAP symptoms are progressive, and so affected animals become increasingly emaciated and usually die as a result of dehydration and muscle loss. Sheep become emaciated but do not suffer diarrhoea. Signs are rarely evident until two or more years after the initial infection.

## Symptoms in people

Sufferers of Crohn's experience profuse, urgent diarrhoea, nausea, vomiting, fevers, severe joint pains, lack of energy and weight loss.<sup>94</sup> The immune system starts attacking the lining of the gut, which becomes swollen and inflamed.<sup>95</sup> This painful, embarrassing condition can affect any part of the digestive system from the mouth to the anus.<sup>96</sup>

## Treatment

Traditional control methods for treating Johne's disease in farmed animals have involved culling, segregating infected animals and stricter hygiene. There is a vaccine but it does not prevent the bacterium being shed, and it may interfere

both with 'eradication programmes' and the test for bovine TB.<sup>97</sup>

There is no cure for Crohn's disease, only treatment that can aim to lower the number of times a person experiences a recurrence of symptoms. Treatment may include drugs, nutrition supplements, surgery or a combination.

## REFERENCES

- 83 'Johne's and other Wasting Diseases in Sheep', National Animal Disease Information Service
- 84 R Price, 'Journey to eradicating Johne's disease in cattle', *Farmers Weekly*, 11 Jan 2013
- 85 'Crohn's Disease', BBC News, 21 Apr 1999
- 86 'Zoonotic Potential', Johne's Information Center, University of Wisconsin, Mar 2010
- 87 'Johne's Disease', DairyCo Technical Information, www.dairyco.org.uk
- 88 Proceedings of the 1999 Cornell Nutrition Conference for Feed Manufacturers Ithaca, NY: Dept. of Animal Science:130
- 89 'Johne's Disease – a Growing Threat to Dairymen', *Hoard's Dairyman*, 25 Mar 1981:456-60
- 90 AN Pell, 'Manure and Microbes', *Journal of Dairy Science*, 80, 2673-81, 1997
- 91 RA Juste et al, 'On the prevalence of *M. avium* subspecies paratuberculosis DNA in the blood of healthy individuals and patients with inflammatory bowel disease', *PLoS ONE* 3 (7): e2537, 2008
- 92 JC Uzoigwe et al, 'Epidemiological evidence for *Mycobacterium avium* subspecies paratuberculosis as a cause of Crohn's disease', *Epidemiol. Infect.* 135 (7): 1057-68, Oct 2007
- 93 Award details: Reef BB/Ho10556/1", Biotechnology and Biological Sciences Research Council
- 94 KJ Isselbacher et al, 'Harrison's Principles of Internal Medicine', 13th edition, New York: McGraw Hill, 1994
- 95 RJ Chiodini, 'M paratuberculosis in Foods and the Public Health Implications', Proceedings of the Fifth International Colloquium on Paratuberculosis, Madison, WI: International Association for Paratuberculosis, 353-365, 1996
- 96 RJ Chiodini, et al, 'Paratuberculosis: A Potential Zoonosis?', *Veterinary Clinics of North America* 12, 457-67, 1996
- 97 'Johne's Disease', DairyCo Technical Information, www.dairyco.org.uk



# MENINGITIS

## What is it?

The bacterium *Streptococcus suis* (*S. suis*) is the most common cause of meningitis in pigs, and is endemic in the UK and beyond.<sup>98</sup> It is carried in the tonsils and nasal cavities of apparently healthy pigs allowing infection to spread before symptoms are spotted.<sup>99</sup> It is most commonly found in 4-8 week-old piglets,<sup>100</sup> and particularly in intensive, indoor units.<sup>101</sup> The bacteria can be passed to people in whom meningitis can develop. There are at least 35 different types of *S. suis*, two of which have been implicated in human infections.<sup>102</sup>

## History

*Streptococcus suis* has been a recognised zoonosis (infectious disease that can be transmitted from animals to humans) since 1968. An editorial in the *Journal of Infectious Diseases* described it as 'emerging as an important threat to human health'.<sup>103</sup> The largest outbreak was in China in 2005, where 215 people were infected and 39 died.<sup>104</sup> In 2012 there were just three reported cases in the UK<sup>105</sup> but it is a recognised occupational hazard to veterinary surgeons, farmers and meat industry workers.<sup>106</sup>

## Routes of transmission

Among pigs, the bacteria can be spread by direct and indirect contact. It is present in the faeces and nasal secretions of carriers, and transmission may be through ingestion, inhalation or through nose-to-nose contact. The bacteria can survive on flies for at least five days<sup>107</sup> and, unsurprisingly, are more prevalent when pigs are crowded together.<sup>108</sup> Human infection is usually through close contact with infected pigs or with raw or undercooked pig meat, and is thought to occur through cuts or abrasions on the skin when handling infected pig carcasses.<sup>109</sup>

## Symptoms in animals

Typical symptoms include involuntary eye movement, convulsions, paddling, shivering, signs of pain or discomfort, raised hair and grinding teeth.<sup>110</sup> In untreated pigs, the mortality rate is 20 per cent.<sup>111</sup>

## Symptoms in people

*S. suis* infection can cause meningitis, the symptoms of which include headache, fever and vomiting.<sup>112</sup> In serious cases, it can also lead to haemorrhages under the skin, gangrene, inflammation of the heart's inner lining, inflammation in the eyes and pyogenic (pus-producing) arthritis.<sup>113</sup> Long-term deafness and loss of balance may occur in some patients. Sixty per cent of people who recover have permanent hearing loss.<sup>114</sup>

## Treatment

Antibiotics are the preferred treatment for meningitis in animals and people, although penicillin resistance has been reported.<sup>115</sup> Vaccines are administered to pigs even though they are not considered fully effective. Those who work with pigs are encouraged to take appropriate hygiene precautions and keep wounds covered.

## REFERENCES

- 98 'Streptococcus suis: general information', Public Health Agency
- 99 Ibid
- 100 Ibid
- 101 'Streptococcus Disease in Pigs', The Pig Site, 10 Jul 2013
- 102 'Streptococcus suis: general information', Public Health Agency
- 103 M Segura, 'Streptococcus suis: An Emerging Human Threat', *Journal of Infectious Diseases*, Vol 199, Issue 1, Pp4-6
- 104 JA Escudero et al, 'First Characterization of Fluoroquinolone Resistance in *Streptococcus suis*', *Antimicrob Agents Chemother*, 51(2): 777-782, 2007
- 105 'Zoonoses Report UK 2012', Defra, Sept 2013
- 106 'Zoonoses Report', Defra, 2007
- 107 'Streptococcal Infections', College of Veterinary Medicine, Iowa State University
- 108 'Pig disease may have mutated, Canadian suspects', *The Globe and Mail*, 3 Aug 2005
- 109 'Streptococcus suis: general information', Public Health Agency
- 110 'Meningitis', The Pig Site, 2010
- 111 M Segura, 'Streptococcus suis: An Emerging Human Threat', *Journal of Infectious Diseases*, Vol 199, Issue 1, Pp4-6
- 112 HFL Wertheim et al, 'Streptococcus suis: An Emerging Human Pathogen', *Clinical Infectious Diseases*, Vol 48, Issue 5, Pp 617-625
- 113 Ibid
- 114 'Streptococcus Disease in Pigs', The Pig Site, 10 Jul 2013
- 115 'Streptococcus suis: general information', Public Health Agency



THESE FACTORY FARMED PIGS DIED BEFORE THEY COULD BE SLAUGHTERED



# MRSA

## What is it?

MRSA (methicillin resistant *Staphylococcus aureus*) is any strain of the *Staphylococcus aureus* bacterium that has become resistant to a range of antibiotics. Healthy people may carry the bacterium without developing any symptoms at all but children, the elderly and those with weakened immune systems are all at a greater risk. One new variant – ST398 – has emerged in farmed animals and this can also spread to people. It is commonplace in Europe and has now been found in the UK.<sup>116</sup>

## History

MRSA was discovered in the UK in 1961. In the late '90s it became clear that community-acquired MRSA infections were caused by strains of MRSA that differed from the older and better studied hospital-associated strains. In 2003, ST398 was found in pigs in the Netherlands. Since then this strain has become epidemic in European and North American pigs, and has also spread to cows and poultry.<sup>117</sup> However, it wasn't until 2011 that it was found in British farmed animals. It was discovered in cows, their milk and also a number of people who, it is thought, were infected by contact with infected animals or by people who work with infected animals.<sup>118</sup> The researchers said that the idea it may have arisen due to overuse of antibiotics on farms was 'a credible hypothesis'.<sup>119</sup> In 2002, there was just one human case in England and Scotland; in 2009, there were nine; and in 2010, there were 12.<sup>120</sup> In 2007, it was reported that almost half of all Dutch pig farmers were infected with MRSA,<sup>121</sup> while in 2013, research suggested that just living close to an intensive pig or poultry farm can lead to greater exposure to the bacteria.<sup>122</sup>

## Routes of transmission

The bacteria are carried on the skin and in the nasal passages of healthy people and animals, and can be passed between species simply through direct contact or through sneezing, coughing or breathing. Infections can develop when the bacteria enter the body through a wound.

ST398 has been found in pigs, chickens, sheep and their meat – and in cows, their meat and milk. One fifth of pork products on sale in the Netherlands – from where Britain obtains the majority of its pork imports – is infected.<sup>123</sup> In the Netherlands, ST398 now accounts for 39 per cent of human MRSA cases.<sup>124</sup>

Pasteurising milk should kill it, as should properly cooking meat. But just handling raw meat with a minor wound could allow the infection to take hold.<sup>125</sup>

## Symptoms in animals

MRSA-infected farmed animals often show no symptoms.

## Symptoms in people

Infection can cause symptoms such as boils, abscesses, styes, carbuncles (large pus-filled



PIGS REARED IN SQUALOR AT A CORNISH FARM

lumps under the skin), cellulitis (infection of the deep layer of the skin, fat and tissues) or impetigo (highly contagious skin infection that causes blisters). If the bacteria get into the bloodstream, they can cause blood poisoning, septic shock (infection of blood that can lead to organ failure), septic arthritis (severe joint inflammation), osteomyelitis (bone infection), meningitis, pneumonia or endocarditis (infection of the heart lining).<sup>126</sup>

## Treatment

While some MRSA strains are resistant to many important antibiotics, most are said to respond to an intensive course of antibiotics. People with invasive infections may be hospitalised and isolated to prevent spread, and treated with a long course of antibiotics.<sup>127</sup>

## REFERENCES

- 116 'Superbug MRSA ST398 found in British cattle', Soil Association media release, 21 Dec 2012
- 117 Ibid
- 118 I Sample, 'New strain of MRSA superbug may have spread from cattle to humans', *The Guardian*, 3 Jun 2011
- 119 P Ghosh, 'MRSA: New strain of superbug found in cows', BBC News, 3 Jun 2011
- 120 I Sample, 'New strain of MRSA superbug may have spread from cattle to humans', *The Guardian*, 3 Jun 2011
- 121 H Wallop, 'Supermarket meat "could be MRSA infected"', *The Telegraph*, 25 Jun 2007
- 122 'Research finds public health risk of living near industrial scale farms', Soil Association media release, 27 Mar 2013
- 123 H Wallop, 'Supermarket meat "could be MRSA infected"', *The Telegraph*, 25 Jun 2007
- 124 'Superbug MRSA ST398 found in British cattle', Soil Association media release, 21 Dec 2012
- 125 H Wallop, 'Supermarket meat "could be MRSA infected"', *The Telegraph*, 25 Jun 2007
- 126 'Methicillin-resistant staphylococcus aureas – Symptoms of MRSA infection', Boots WebMD, 21 Sept 2011
- 127 'MRSA infection – Treatment', NHS website, 13 Jun 2013



# Q FEVER

## What is it?

Q (Query) fever – so-called because for many years its cause was unknown – is a highly infectious zoonosis (a disease that can be transmitted from animals to humans) caused by *Coxiella burnetii*, a bacterium affecting humans and other animals, such as sheep, cows and goats. The low bacterial load required, the ease of its dispersal and ability to incapacitate people, has led several countries to develop *C. burnetii* for use as a biological weapon.<sup>128</sup>

## History

Q fever was first recognised in abattoir workers in Brisbane, Australia in 1937 and is now global.<sup>129</sup> While human cases of Q fever are rare in the UK, there was an outbreak in 2006, which affected 138 people and was associated with a slaughterhouse in Scotland.<sup>130</sup> Around 50 cases of Q fever are reported in the UK each year although, as many people develop only mild or no symptoms at all, the true incidence is unknown.<sup>131</sup>

## Routes of transmission

Infection results from inhalation of contaminated particles in the air, and from contact with the milk, urine, faeces, afterbirth and birth fluids of infected animals. As a result, human outbreaks are often associated with the farming birthing season.<sup>132</sup> It is also possible for people to become infected through drinking unpasteurised milk or via skin abrasions.<sup>133</sup>

## Symptoms in animals

Signs of the disease are uncommon, but pregnant cows, sheep and goats may miscarry.

## Symptoms in people

Q fever usually causes strong, but treatable,

symptoms in humans, including fever and muscle pains. However, some people develop pneumonia, hepatitis or meningitis, and for others it develops into a chronic illness with symptoms persisting for more than six months.<sup>134</sup> Infection during pregnancy can have an adverse effect on the unborn child, including miscarriage.<sup>135</sup> Only 1-2 per cent of people with acute Q fever die of the disease, but as many as 65 per cent with chronic versions may die.<sup>136</sup>

## Treatment

*C. burnetii* is resistant to heat, drying and many disinfectants, which means the organism can survive in the environment for many months.<sup>137</sup> It is difficult, therefore, to prevent farmed animals from becoming infected and there are no formal control programmes or vaccines.<sup>138</sup>

During a 2009 Netherlands outbreak, the Dutch government ordered preventative measures, including vaccinations and a transport ban, as well as the slaughter of tens of thousands of pregnant sheep and goats. In most people, Q fever requires no treatment and symptoms will clear up on their own. Antibiotics may be prescribed for some patients.



## REFERENCES

- 128 RM Jones et al, 'The Infectious Dose of *Coxiella burnetii* (Q Fever)', *Applied Biosafety*, 11(1) pp. 32-41, 2006
- 129 'Q Fever', [www.patient.co.uk](http://www.patient.co.uk), 16 Jul 2010
- 130 Ibid
- 131 'Guidelines for Action in the Event of a Deliberate Release: Q fever', Health Protection Agency, 14 Jun 2010
- 132 T Sterling, 'Dutch cull first of 40,000 goats to counter Q-fever outbreak, which has killed 6 people', *The Canadian Press*, 21 Dec 2009
- 133 'Q fever: information for farmers', Health Protection Agency, 3 Oct 2010
- 134 'Guidelines for Action in the Event of a Deliberate Release: Q fever', Health Protection Agency, 14 Jun 2010
- 135 'Q fever: information for farmers', Health Protection Agency, 3 Oct 2010
- 136 'Q fever', The Center for Food Security and Public Health, Iowa State University, April 2007
- 137 'Q fever: information for farmers', Health Protection Agency, 3 Oct 2010
- 138 Ibid



# SALMONELLA

## What is it?

*Salmonella* is a group of bacteria presenting one of the commonest causes of food poisoning in Great Britain. They can also cause typhoid and paratyphoid fevers. More than 2,500 different strains of *Salmonella* have been identified, most of which rarely cause disease. In humans, illness is caused by about 10 strains – the most important are *S. enteritidis* (which originates in infected poultry and eggs) and *S. typhimurium* (which occurs in cows, pigs and turkeys).

## History

The *Salmonella* bacterium was first found in pigs in the late 1800s and outbreaks have occurred throughout the last 100 years. Between 1981 and 1991, the incidence of the non-typhoidal types of *Salmonella* increased by more than 170 per cent. The rate peaked in 1993.<sup>139</sup> The Chief Medical Officer advised consumers to stop eating raw eggs and that all vulnerable people should eat

only eggs that had been thoroughly cooked.<sup>140</sup> Hundreds of thousands of birds were slaughtered, farmers were compensated and a programme of disinfection was introduced.<sup>141</sup> A voluntary vaccination scheme was also initiated.<sup>142</sup> The rate of infection in people has been declining ever since, although there were still more than 8,634 cases confirmed in England, Wales and Northern Ireland in 2010.<sup>143</sup>

According to a 2007 report, nearly a quarter of chicken flocks reared for meat across Europe are infected with *Salmonella*<sup>144</sup> and around 10.3 per cent of pigs going to slaughterhouses across the EU test positive for it.<sup>145</sup>

## Routes of transmission

The bacteria are shed in the faeces of infected animals<sup>146</sup> so it is

simple for animals on farms to infect one another, particularly as chickens and pigs – the animals most commonly affected – are also the species most commonly intensively reared. Studies show that poor ventilation, high dust levels<sup>147</sup> and overcrowding<sup>148</sup> aid the spread of *Salmonella* among chickens, as does keeping sheds permanently populated.<sup>149</sup>

*Salmonella* can be transmitted to people through eating contaminated foods, usually of animal origin; via faeces from an infected animal or person; and through direct contact with infected animals. The most common sources of infection are poultry meat and eggs. Salad vegetables, spices and herbs, which may have been cross-contaminated with animal faeces, have also been implicated in large outbreaks of the infection.

## Symptoms in animals

When farmed animals, particularly poultry and pigs, become infected, they frequently become carriers of the infection without showing signs of ill health. Nevertheless, infection in pigs can lead to pneumonia, coughing, bloody diarrhoea and death;<sup>150</sup> in chickens it can cause blood poisoning, diarrhoea, difficulties breathing and death.<sup>151</sup>

## Symptoms in people

Symptoms include diarrhoea, stomach cramps, vomiting and fever. *Salmonella* can trigger an arthritic condition known as reactive arthritis, which causes painful and swollen joints.<sup>152</sup>

## Treatment

Most commercial flocks are now vaccinated.<sup>153</sup> Human symptoms usually clear up without medical intervention although, in severe cases, treatment may be required for dehydration. In some cases, antibiotics may be prescribed (a number of *Salmonella* strains have been found to be resistant to antibiotics).<sup>154</sup>

## REFERENCES

- 139 PM Griffin, 'The "Decline and Fall" of Nontyphoidal *Salmonella* in the United Kingdom. *Clin Infect Dis* 1; 56(5): 705-710, Mar 2013
- 140 Ibid
- 141 Ibid
- 142 Ibid
- 143 '*Salmonella* (non typhoidal / paratyphoid) – 2010 update', Health Protection Agency, Jan 2013
- 144 'One in four chicken flocks has salmonella', *The Telegraph*, 4 Apr 2007
- 145 'Report of the Task Force on Zoonoses Data Collection on the analysis of the baseline survey on the prevalence of *Salmonella* in slaughter pigs, in the EU, 2006-20071, Part A: *Salmonella* prevalence estimates', European Food Safety Authority, 30 May 2008
- 146 'Salmonellosis', The Pig Site
- 147 RK Gast et al, 'Detection of Airborne *Salmonella enteritidis* in the Environment of Experimentally Infected Laying Hens by an Electrostatic Sampling Device', *Avian Diseases* 48(1):148-154, 2004
- 148 SL Foley, 'Population Dynamics of *Salmonella enterica* Serotypes in Commercial Egg and Poultry Production', *Appl Environ Microbiol*; 77(13): 4273-4279, Jul 2011
- 149 'Salmonellosis', The Pig Site
- 150 Ibid
- 151 'Chicks', The Chicken Vet website
- 152 T Roberts et al, '*The Long-Term Health Outcomes of Selected Foodborne Pathogens*', Center for Foodborne Illness Research and Prevention, 2009
- 153 'Zoonoses Report', Defra, 2007
- 154 '*Salmonella* in livestock production in GB 2003', Veterinary Laboratories Agency, 2003



MANY CHICKENS DIE IN THE REARING SHEDS



# SWINE FLU

## What is it?

Swine influenza is a common respiratory illness in pigs caused by a strain of influenza A virus. 'Classical' swine flu viruses do not normally infect people but when human and avian influenza viruses infect pigs, they have the potential to swap genes. New pathogens, which are a mix of swine, human and/or avian viruses, can then emerge.

## History

The swine flu virus was first laboratory-confirmed in pigs in 1931. In 1976, an *H1N1* virus jumped from pigs to people, killing one person in the US. By 1977, it was circulating in people in China. In 1998, the first hybrid virus was discovered in a North Carolina factory farm, which made thousands of pigs ill.<sup>155</sup> Within a year, a triple hybrid virus – containing gene segments from bird, human and swine flu – had spread throughout US pig factories.<sup>156</sup> In April 2009, 900 cases of suspected swine flu were reported in Mexico and two months later, a pandemic was declared.<sup>157</sup> In England, between 144,000 and 670,000 people fell ill during the first wave (April – September),<sup>158</sup> with another serious wave of illness and death reported in the winter of 2010/11. Worldwide, more than 200 countries reported laboratory-confirmed cases, including at least 15,292 deaths.<sup>159</sup>

## Routes of transmission

Influenza viruses can be transmitted between pigs, from pigs to people, from people to pigs, and between people. The virus is transmitted in the same way as seasonal flu – through tiny droplets emitted when pigs or people cough or sneeze.

## Symptoms in animals

Swine flu viruses can cause high levels of illness yet low death rates in pigs. Symptoms include fever, depression, coughing (barking), discharge from the nose or eyes, and breathing difficulties.

## Symptoms in people

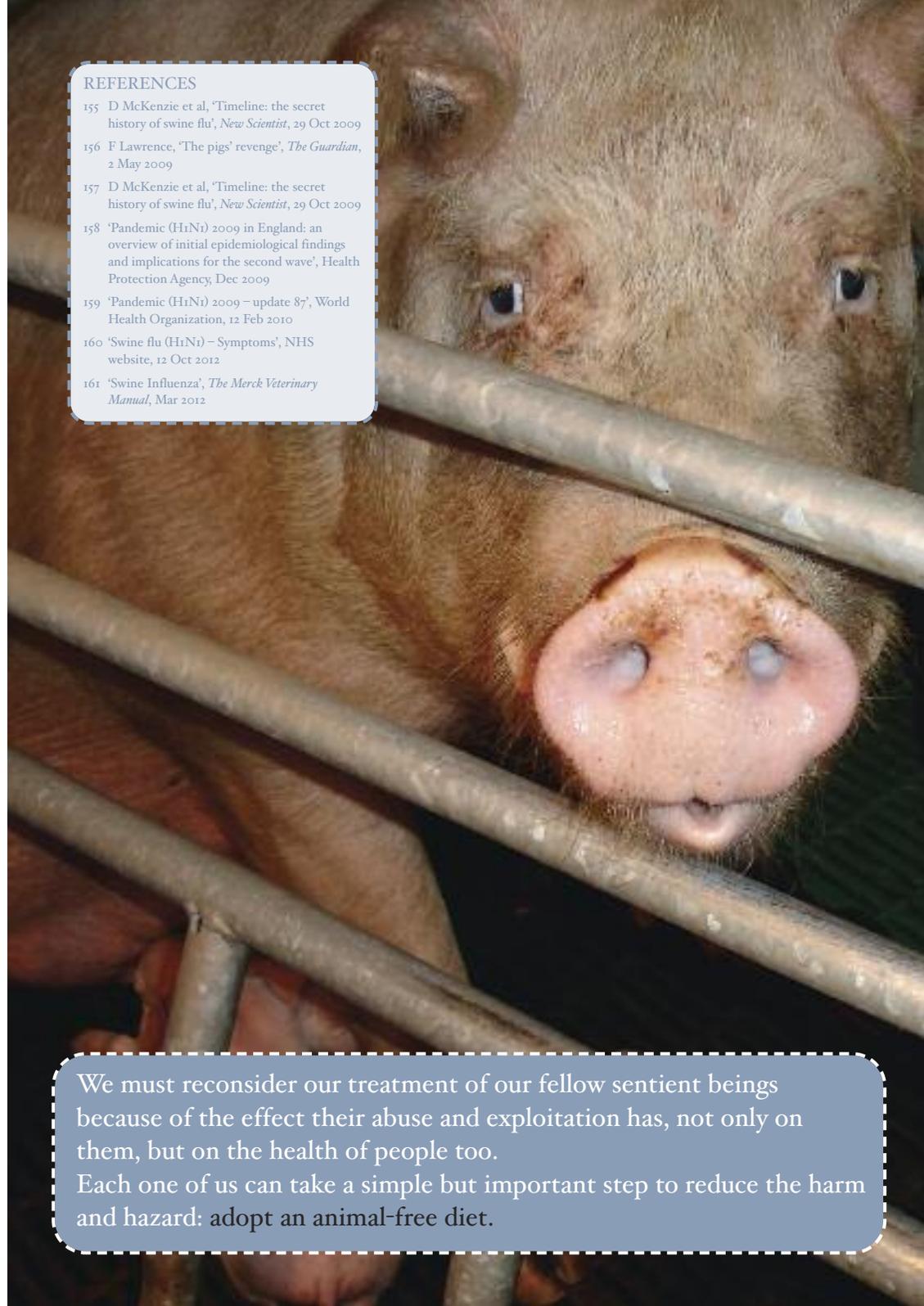
The symptoms are similar to seasonal flu. They include fever, a temperature, aching muscles, diarrhoea or vomiting.<sup>160</sup> In vulnerable people, pneumonia can also develop.

## Treatment

There is no effective treatment for pigs. Antibiotics may be used to reduce secondary bacterial infections, but this contributes to the over-use of antibiotics and the subsequent increase in resistant bacteria. Vaccination and strict movement controls are recommended, as is keeping animals free from stress, particularly due to crowding and dust.<sup>161</sup> This is impossible in most intensive pigs farms. There are antiviral drugs and vaccines available, respectively, to treat and prevent swine flu in humans, but their safety, usefulness and high cost have been seriously challenged.

## REFERENCES

- 155 D McKenzie et al, 'Timeline: the secret history of swine flu', *New Scientist*, 29 Oct 2009
- 156 F Lawrence, 'The pigs' revenge', *The Guardian*, 2 May 2009
- 157 D McKenzie et al, 'Timeline: the secret history of swine flu', *New Scientist*, 29 Oct 2009
- 158 'Pandemic (H1N1) 2009 in England: an overview of initial epidemiological findings and implications for the second wave', Health Protection Agency, Dec 2009
- 159 'Pandemic (H1N1) 2009 – update 87', World Health Organization, 12 Feb 2010
- 160 'Swine flu (H1N1) – Symptoms', NHS website, 12 Oct 2012
- 161 'Swine Influenza', *The Merck Veterinary Manual*, Mar 2012



We must reconsider our treatment of our fellow sentient beings because of the effect their abuse and exploitation has, not only on them, but on the health of people too. Each one of us can take a simple but important step to reduce the harm and hazard: adopt an animal-free diet.

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