



# Is factory farming making you sick?

A GUIDE TO ANIMAL DISEASES AND  
THEIR IMPACT ON HUMAN HEALTH

Written & researched by Kelly Slade



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



# CONTENTS

Introduction.....	I
Avian (Bird) Flu .....	2
Bovine TB .....	4
BSE .....	6
Campylobacter .....	8
E.Coli (O157:H7) .....	10
Foot and Mouth Disease.....	12
Johne’s Disease.....	14
Meningitis .....	16
MRSA .....	18
Q Fever.....	20
Salmonella .....	22
Swine Flu .....	24

With grateful thanks to Michael Greger M.D. (Director of Public Health and Animal Agriculture, Humane Society International) for providing expert assistance during the compilation of this report.

# INTRODUCTION

The majority of farmed animals in the UK are crowded inside filthy, barren sheds – the perfect breeding ground for viruses and bacteria. These intensive systems of animal agriculture threaten both the global environment and public health.

Equally, the concentration on a few high-yield breeds has led to genetic erosion and weakened immunity. This is the perfect setting in which a disease organism can spread rapidly. Farmed animals are fed drugs, including antibiotics, in an attempt to keep them healthy. During an Animal Aid pig farm investigation in 2009, we found dustbins overflowing with used veterinary product bottles and syringes. Among the conditions the products were intended to treat were pneumonia, respiratory disease, diarrhoea, wasting and dehydration. The animal farming industry’s overuse of antibiotics and antiviral drugs has allowed pathogens to mutate into more dangerous forms and become drug resistant. This places people as well as animals at serious risk. As always, when animals are exploited, we have to pay the price as well.

The global rise in foodborne diseases has been attributed to both increased consumption of animal-origin foods and methods of intensive production.<sup>1</sup> However, disease can be spread to the wider community via many routes – including through contaminated water, and even through farm workers and their families. Eighty-two per cent of farmers who responded to a 2007 *Farmers Weekly* survey admitted to having limited or virtually non-existent on-farm biosecurity. This is a matter of serious concern, given that approximately two-thirds of the 1,400 known human pathogens (biological agents that cause disease) are thought to have originated in animals. In recent years, animal farming has brought us 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. Stressed animals standing for weeks or months in their own filth, alongside dead and dying animals, are more vulnerable to infection.



DISCARDED VETERINARY PRODUCT CONTAINERS

<sup>1</sup> Adams, M. and Motarjemi, Y. (1999) *Basic Food Safety for Health Workers*. Geneva, Switzerland: World Health Organization Press.



# 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. In its natural state, the virus has existed for millions of years as a harmless, intestinal infection of aquatic birds, such as ducks. But, on poultry farms, bird flu has become a lethal condition that is occurring around the world more frequently.

## History

Avian influenza was first discovered among poultry in Italy in the 1870s. The H<sub>5</sub>N<sub>1</sub> strain of highly pathogenic (disease-causing) avian influenza, which became widespread in South East Asia in early 2004, has led to the destruction of hundreds of millions of birds, and has spread west through Europe and Africa.

## Source

A *New Scientist* article indicated that drug resistant strains of H<sub>5</sub>N<sub>1</sub> developed as a result of the widespread use by Chinese poultry farmers of the antiviral drug Amantadine.<sup>1</sup>

One of the largest outbreaks in the UK 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 musculo-skeletal conditions commonly affect commercial poultry.<sup>2</sup>



CROWDED 'BROILER' SHED

## Symptoms in animals

Birds shed the virus in their saliva, nasal secretions and faeces. The mild form of influenza produces symptoms, including respiratory problems, so inconspicuous that the outbreak may go unnoticed. The severe form 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>: '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>3</sup>

## Symptoms in people

Human victims have died of multiple organ failure. Their lungs filled with blood, their livers and kidneys became clogged with dead tissue and their brains swelled with fluid. The mortality rate is currently 60 per cent.<sup>4</sup>

## Routes of transmission

H<sub>5</sub>N<sub>1</sub> can enter poultry sheds through supplies, cages, clothes, delivery vehicles, mammals and even insects. Equally, diseased material can just as easily leave such units.<sup>5</sup> The H<sub>5</sub>N<sub>1</sub> virus was first shown to have passed from birds to humans in 1997, during an outbreak among poultry in Hong Kong. The first possible case of human-to-human transmission was reported in Thailand in 2004.<sup>6</sup> The disease cannot pass easily from one human to another, although recent

research has shown that rapid mutation of the virus might make this easier in the future.

People are most likely to pick up the bug through direct contact with secretions from infected birds, especially faeces. At the slaughterhouse, during removal of internal organs, the intestines are often ripped. A study found that 42 birds who followed a ripped carcass on the line were also cross-infected.<sup>7</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>8</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.

An antiviral drug that inhibited replication of the many naturally occurring human and animal strains of flu type A was used routinely in poultry in China. Now the drug is worthless against certain strains of the virus.

## REFERENCES

- 1 News Service 22nd June 2005. [www.newscientist.com](http://www.newscientist.com)
- 2 Annual Disease Directory: Poultry World.
- 3 Greger, M. (2006) *Bird Flu. A virus of our own batching*. Green Press.
- 4 [http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2010\\_04\\_21/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2010_04_21/en/index.html)
- 5 Yousaf, M. (2004) Avian influenza outbreak hits the industry again. *World Poultry*, Vol 20, No 3.
- 6 Macnair, T. (2007) Avian flu (bird flu). [www.bbc.co.uk](http://www.bbc.co.uk).
- 7 Ibid.
- 8 Ibid.



# BOVINE TB

## What is it?

Bovine tuberculosis (bTB) is a serious disease arising from infection by a bacteria called *Mycobacterium bovis* (*M. bovis*). Cattle, buffalo and bison are the natural hosts but nearly all warm-blooded animals are susceptible to the infection. This complicates the control of bovine TB, particularly when the infection becomes self-sustaining in wildlife species.

## History

During the 1930s, at least 40 per cent of British cows were infected with bTB.<sup>1</sup> Many were kept near large cities to provide urban dwellers with fresh milk and most were closely confined, in poorly ventilated cowsheds. Many infected cows developed TB in the udders and shed *M. bovis* in the milk. Because most milk was drunk raw, it was a major cause of TB in humans, with around 2,500 people dying annually from the disease.<sup>2</sup> Routine pasteurisation of cows' milk and inspections of cattle carcasses at slaughterhouses were introduced. And, by

the 1980s, the government had begun a TB testing and slaughter scheme for cattle.

## Symptoms in animals

Due to the slow progression of infection and the early age at which cattle are slaughtered, the clinical signs of bTB are now rarely seen in cattle 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>3</sup> Lesions are common in the lungs, and these 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. The udder can also be affected, with hard lumps appearing.<sup>4</sup>

## Source

Bovine TB is spread primarily when bacteria are released into the air through coughing and sneezing. This transmission usually happens when animals are in close contact with each other, so crowded conditions play a major factor.



ZERO-GRAZED DAIRY COW

Up to 40,000 cattle are slaughtered every year due to bTB. This number has risen by a third since 2007.<sup>5</sup> In the UK, badgers have been blamed for hosting the disease. Since 1975, 30,000 badgers have been destroyed in a failed attempt to curb its spread. Tests revealed that 80 per cent of the slaughtered animals were free of TB.<sup>6</sup>

## Routes of transmission

Bovine TB can be transmitted from affected animals to people, causing a condition very similar to human TB. The risk of exposure is greatest in enclosed areas, as invisible droplets containing TB bacteria may be inhaled. While less than one per cent of all confirmed cases of TB in humans are due to infection with *M. bovis*, Defra believes that the disease has the potential to be a significant health risk.

## Symptoms in people

TB in humans causes the same symptoms whether it is caused by *M. bovis* or the human pathogen *M. tuberculosis* (chest pain, coughing up blood and a prolonged cough). And, in the same way that cattle can spread bTB to humans, a person carrying bTB can infect cattle.

## Treatment

The course of treatment for humans with bTB takes 6 to 9 months, with the success rate being more than 95 per cent.<sup>7</sup> In animals, the policy is to control bTB within an affected herd through regular testing

and slaughter of any single animal who tests positive until the entire herd tests negative for the disease.

A nine-year official government study found that when badgers were killed to try to control outbreaks (proactive culls), incidence of the disease in cattle actually rose by about 20 per cent because the badgers moved to escape the slaughter, thereby infecting new areas. Proactive culls, which continue year after year, were found to reduce the disease in the cull areas by 23 per cent, but increase it by even more in surrounding areas as infected badgers move in. And unless the culling continues, they eventually return to their old haunts.<sup>8</sup> Other studies suggest that a more effective way of tackling bTB would be to monitor and control cattle movements, given that most cases are caught from other cattle. A badger vaccine against TB is almost ready and could be administered orally, through bait, by 2014.

## REFERENCES

- 1 Davies, C. (2009) Bovine TB is 'out of control', warn farmers. *Guardian*. 8th March.
- 2 Defra. (2003) Update on Bovine statistics. TB Forum paper TBF 87, points 13-15 [www.Defra.gov.uk/animal/tb](http://www.Defra.gov.uk/animal/tb).
- 3 McGinness, S. (1998) Bovine Tuberculosis Research Paper 98/63. House of Commons.
- 4 Lean, G. (2010) Bovine TB: An ill wind blows for Mr Badger. *Telegraph*. 22nd January.
- 5 Andrew Turnbull, Disease Control Division of MAFF speaking at the All Party Parliamentary Group for Animal Welfare meeting, 21st May 1996.
- 6 <http://www.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/abouttb/index.htm>.
- 7 McGinness, S. (1998) Bovine Tuberculosis Research Paper 98/63. House of Commons.
- 8 Pugh, J. (2009) Target TB: What you really need to know about TB in cattle. *Farmers Guardian*. 8th May.



# BSE

## What is it?

BSE (*Bovine Spongiform Encephalopathy*) – also known as ‘mad-cow disease’ – is caused by an abnormal, infectious protein known as a prion. The late 1980s and early ’90s UK BSE crisis was one of the most devastating disease epidemics that has ever struck the European cattle population.

## History

The first animal fell ill with BSE in Britain in 1984. Over the next few years, the epidemic spread nationwide. To date, there have been around 180,000 confirmed cases in cows and another 4.7 million adult animals were destroyed during the eradication programme.<sup>1</sup> BSE is now found in at least 25 countries and is estimated to have cost European Union taxpayers £65 billion.<sup>2</sup>

## Source

In 2000, a government-commissioned inquiry found that BSE developed into a disaster because of the feeding of cows, who are natural herbivores, with the remains of other cows.<sup>3</sup> The feed also included the ground and cooked body parts of sick and injured animals taken from the slaughtering process.

## Symptoms in animals

BSE causes a spongy degeneration in the brain of cattle. It has an incubation period of about four years, before symptoms appear. They include changes in mental state and abnormalities of posture, movement and sensation.

## Symptoms in people

Anxiety and depression are often the first symptoms of the human form of BSE, known as variant Creutzfeldt-Jakob Disease (vCJD). As in cattle, it affects the nervous system, causes a degenerative brain disease and is invariably fatal. There may be pain and strange sensations in the face and limbs. Months later, there might be jerkiness in movement, unsteadiness in walking, progressive dementia and, eventually, loss of ability to move or speak.

## Routes of transmission

vCJD is thought to be acquired through exposure to BSE by eating contaminated beef products.<sup>4</sup> A total of 167 cases of vCJD have been reported in the UK (the last one in 2008), of which 164 have proved fatal.<sup>5</sup> Doctors and scientists have warned that a second wave of vCJD could sweep Britain over the next two to three decades, as it has emerged that the long-incubating illness infected a patient with a different gene type from previous British victims. A major complicating factor of prions are their virtual indestructibility. They cannot easily be destroyed by heat treatment.<sup>6</sup> Scientists have also confirmed that vCJD can be



VICTIMS OF THE BSE 'CULL

passed from person to person through contaminated medical equipment and blood transfusion.<sup>7</sup>

## Treatment

From 1988, the UK government began introducing various restrictions on the types of foods that could be fed to farmed animals and what parts could go into the food chain. There was a mass slaughter of adult animals judged to present a risk to human health, and farmers were compensated (Over Thirty Month Scheme). Young calves were also killed (Calf Processing Scheme) as a measure to protect the devastated trade in cattle meat. The EU banned exports of live cattle and cattle meat from Britain but, over the years, the

various restrictions have been eliminated, with exports to Europe re-commencing in 2006.

## REFERENCES

- 1 Brown, D. (2000) The recipe for disaster that killed 80 and left a £5bn bill. *The Daily Telegraph*. 27th October.
- 2 McKie, R. (2008) Warning over second wave of CJD cases. *The Observer*. 3rd August.
- 3 The BSE Inquiry, led by Lord Phillips of Worth Matravers, report published October 2000. Defra (2007) *Zoonoses Report*.
- 4 Defra (2007) *Zoonoses Report*.
- 5 Andrews, N. J. (2009) Incidence of variant Creutzfeldt-Jakob disease diagnoses and deaths in the UK. Statistics Unit, Centre for Infections, Health Protection Agency.
- 6 Moss, L. (2007) Britain may never be rid of vCJD threat without screening. *Scotsman*. 24th September.
- 7 (2006) vCJD case highlights blood transfusion risk. Medical Research Council.



# 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*.

## 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>1</sup>

## Source

*Campylobacter* is present in the intestines of farmed animals worldwide but they, typically, show no signs of illness. A British abattoir survey revealed that 24 per cent of cattle, 17 per cent of sheep and 94 per cent of pigs carried *Campylobacter* of public health significance in their faeces.<sup>2</sup>

A 2007-2008 Food Standards Agency (FSA) survey of chicken meat samples found that nearly two thirds of supermarket chicken was *Campylobacter*-contaminated,<sup>3</sup> compared with around half in 2001.<sup>4</sup>

It was reported in January 2010 that around 440,000 people fall ill and 80 die each year in the UK alone.<sup>5</sup> This is an increase of 40,000 on 2006.

## Symptoms in animals

The types most commonly found in people (*C. jejuni* and *C. coli*) are not associated with illness in animals. As a result, the way in which the infection

spreads between and within herds and flocks is not fully understood.

## 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 only occur in the very young or elderly, or those with another serious disease.

Long-term consequences can include paralysis, arthritis, heart infection and septicæmia.<sup>6</sup>

## Routes of transmission

Undercooked meat (especially poultry) is the main cause of illness. Other sources include contact with live poultry, unpasteurised milk and untreated water.

## Treatment

The wide occurrence of *Campylobacter* and the fact that most reports are individual cases as opposed to outbreaks, makes it difficult to pinpoint an exact source. Improved bio-security can reduce the incidence in poultry kept in closed housing conditions. Hygiene practices at slaughterhouses may reduce contamination of carcasses by faeces.<sup>7</sup> The only method

presumed to eliminate *Campylobacter* from contaminated foods is heat (cooking or pasteurisation) or irradiation. Other countries have reduced contamination by disinfecting chicken meat with chlorine washes – a method currently banned in the EU.

The FSA reports that the number of *Campylobacter* strains resistant to antibiotics has risen from 48 per cent in 2001 to 87 per cent in 2009.<sup>8</sup>

## REFERENCES

- 1 Defra (2007) *Zoonoses Report*.
- 2 Defra. Summary profile for *Campylobacter*.
- 3 Poulter, S. (2010) Food poisoning bug is found in two thirds of supermarket chicken. *Daily Mail*. 27th January.
- 4 Food Standards Agency (2001) <http://www.food.gov.uk/multimedia/webpage/111802>.
- 5 Poulter, S. (2010) Food poisoning bug is found in two thirds of supermarket chicken. *Daily Mail*. 27th January.
- 6 Roberts, T. et al. (2009) The Long-Term Health Outcomes of Selected Foodborne Pathogens. Center for Foodborne Illness Research and Prevention.
- 7 World Health Organisation (2000) *Campylobacter*. [www.who.int](http://www.who.int).
- 8 Poulter, S. (2010) Food poisoning bug is found in two thirds of supermarket chicken. *Daily Mail*. 27th January.



AN AILING TURKEY



# E.COLI (O157:H7)

## What is it?

*Escherichia coli* (*E.coli*) are members of a large group of bacteria – more than 700 types have been identified. They are mainly harmless and inhabit the intestinal tract of people and other warm-blooded animals but a few strains, including the notorious O157:H7, can be deadly.

## History

*E.coli* O157:H7 was first described as an ‘emerging foodborne zoonotic pathogen’ (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 burgers.<sup>1</sup>

## Source

The US Centers for Disease Control and Prevention has estimated that 85 per cent of *E.coli* O157:H7 infections are foodborne

in origin. *E.coli* O157:H7 is found in the guts of many animals, but mainly cows. The bacteria is excreted in the faeces and is a potential risk to anyone working with or visiting farmed animals and their environment.

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>2</sup> Sweden<sup>3</sup> and Canada<sup>4</sup> have identified a positive correlation between the cattle density of an area and rates of human infection.



A YOUNG CASUALTY OF ‘ZERO-GRAZE’ FARMING

Britain’s deadliest human *E. coli* O157:H7 outbreak occurred in 1996 when 21 people died after eating infected meat from a butcher in Lanarkshire, Scotland. Another 400 were infected. An inquiry found that there had been contamination between raw and cooked meat.<sup>5</sup> Scotland has the highest incidence of *E. coli* O157:H7 in the world – every year about 250 people fall ill.<sup>6</sup> Research by the Scottish Agricultural College suggests that *E.coli* O157:H7 is present in about eight per cent of cattle on about one in five farms. More recently, a major *E.coli* O157:H7 outbreak occurred in September 2009, when 36 cases were confirmed by the Health Protection Agency. The disease was spread by animals at a petting farm in Surrey. Twelve children under the age of 10 were hospitalised.<sup>7</sup>

## Symptoms in animals

*E.coli* O157:H7-infected farmed animals show no signs of illness.

## Symptoms in people

*E.coli* O157:H7 can cause a range of symptoms in people, from mild diarrhoea to severe abdominal pain. In a proportion of patients (2-7 per cent and mainly children), it can cause kidney failure. Infection with *E. coli* O157:H7 is now the leading cause of acute kidney failure in previously healthy children.

## Routes of transmission

Consuming contaminated beef products is the most common source of infection for

people, but the disease can spread by any food or drink that has been contaminated by animal (especially cattle) manure. Contact with infected animals or their faeces are other routes of transmission.

## Treatment

Most people recover without specific treatment. 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.

Slaughterhouses are an obvious place for contamination of meat. Operators are urged to ensure the animals’ skins are not covered in faeces, and prevent the spillage of the digestive tract contents during and after evisceration (organ removal).

## REFERENCES

- 1 Riley, L.W. et al (1983) Hemorrhagic colitis associated with a rare *Escherichia Coli* serotype. *N. Engl. J. Med.* 30 8, 681-685.
- 2 Haus-Cheymol, R. et al. (2005) 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.
- 3 Kistemann, T. et al. (2004) 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.
- 4 Valcour, J.E. (2002) Associations between indicators of livestock farming intensity and incidence of human Shiga toxin-producing *Escherichia coli* infection. *Emerg. Infect. Dis.* 8, 252-257.
- 5 Elliott, V. and Reid, M. (2009) Deadly outbreak at butcher highlights dangers of delay. *The Times*. 14th September.
- 6 Ibid.
- 7 Elliott, V. (2009) 20,000 children put at risk by dithering at *E. coli* farm. *The Times*. 14th September.



# 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 distinguishable only in the laboratory.<sup>1</sup> According to the Department of Food and Rural Affairs (Defra), 'FMD is probably more infectious than any other disease affecting man or animals and spreads rapidly if uncontrolled.'<sup>2</sup>

## History

FMD was first shown to be viral in 1897 by Friedrich Loeffler. After World War II, the disease was widely distributed throughout the world. While some countries have been free of FMD for some time, its wide host range and potential to spread rapidly causes international concern. Most European countries, including Britain, have now been formally recognised as disease-free.

## Symptoms in animals

It affects cloven-hoofed animals, in particular cattle, sheep, pigs, goats, camels and deer. Those raised in crowded factory farm conditions or who are otherwise neglected are especially vulnerable to the severest symptoms. 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 abortion, chronic mastitis and lameness – conditions that are already endemic in dairy herds. In 1920s India, scientist Sir Albert Howard researched what was later called organic farming. Over many years, it is reported that his own cattle never became ill with

FMD even though it was endemic and his animals literally rubbed noses with diseased cattle.<sup>3</sup>

## Source

The first confirmed case of the devastating 2001 UK outbreak was found in an Essex abattoir. This was traced back to a swill farm in Northumberland, where pigs were fed plate scrapings and other foodstuffs of animal origin (including pigmeat), that were considered unfit for human consumption. In the early '70s, British pig farms were badly hit by an outbreak of swine vesicular disease, whose symptoms are practically indistinguishable from those of FMD. The source was again traced to swill farms and to the feeding of pigmeat to pigs. 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 help to facilitate the spread. There were eight confirmed cases of FMD in one area in south-east England in 2007.<sup>4</sup>

## Routes of transmission

FMD crosses the species barrier with difficulty but a few cases of humans getting sick have been recorded.<sup>5</sup> However, the Food Standards Agency considers that FMD has no implications for the human food chain.

## Symptoms in people

Human symptoms are flu-like with a fever and sore throat, although tingling blisters on the hands and feet and in the mouth have been recorded.<sup>6</sup>

## Treatment

During the 2001 UK outbreak, more than 10 million animals were killed. Many were shot with a captive bolt gun – a retractable metal bolt used to stun animals in abattoirs. 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, and they recovered consciousness and experienced their own slow deaths piled up with their fellows.<sup>7</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.

## REFERENCES

- 1 Defra. (2008) Disease factsheet: Foot-and-mouth disease (FMD) <http://www.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/fmd/about/factsheet.htm>.
- 2 Ibid.
- 3 *Private Eye*, March 9, 2001.
- 4 Defra. (2009) Foot and Mouth Disease <http://www.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/fmd/>.
- 5 Armstrong, R., Davie, J., Hedger, R.S. (1967) Foot-and-mouth disease in man. *BMJ*, 4: 529-530.
- 6 Bauer, K. (1997) Foot-and-mouth disease as zoonosis. *Arch Virol*, 13 (suppl): 95-97.
- 7 Branigan, T. (2001) Stunned livestock 'left to die'. *Guardian*. 24th March.



CULLED SHEEP ARE DISINFECTED



# JOHNE'S DISEASE

## What is it?

Johne's disease is caused by *Mycobacterium avium subspecies paratuberculosis* (MAP) – a bacterium, which causes a chronic and sometimes fatal infection, primarily affecting the small intestine of ruminants, such as cows. It is found around the world.

## History

Johne's was first described in 1895. 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>1</sup>

## Symptoms in animals

In cattle, 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. Signs are rarely evident until two or more years after the initial infection.

## Source

Johne's disease is spread primarily by the faecal-oral route. Therefore, one cow with diarrhoea could potentially thoroughly contaminate her surroundings.<sup>2</sup>

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>3</sup> Sub-clinically infected animals

don't have symptoms but they can 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>4</sup> Every time animals are transported between farms, new herds may be infected.

Results from a 2009 government study<sup>5</sup> indicate that 42.5 per cent of UK dairy herds were infected with MAP.

## Routes of transmission

There are clinical similarities between Johne's disease in ruminants and inflammatory bowel disease in humans,<sup>6</sup> leading some researchers to argue that the



DAIRY COW WITH SEVERELY 'OVERSTOCKED' UDDER

organism is a cause of Crohn's.<sup>7</sup> There are two strains of MAP: one that affects cattle, and one that affects goats and sheep. In 2000, a British government survey of retail pasteurised milk found that *paratuberculosis* bacteria could be 'grown out' of three out of every 100 cartons of milk.<sup>8</sup> While pasteurisation kills most bacteria, MAP survives at higher temperatures and for a longer period of time.<sup>9</sup> Second only to prions<sup>10</sup> (which cause mad cow disease), MAP is considered the most heat resistant pathogen in the human food chain.<sup>11</sup> Scientific studies argue both for and against an association of MAP with human disease.

## Symptoms in people

Crohn's disease is a chronic inflammatory bowel disease. Sufferers experience profuse, urgent diarrhoea, nausea, vomiting, fevers, severe joint pains, lack of energy and weight loss.<sup>12</sup> The immune system starts attacking the lining of the gut, which becomes swollen and inflamed.<sup>13</sup> In extreme cases, this painful, embarrassing condition can affect any part of the digestive system – from the mouth to the anus.<sup>14</sup> The inflammation narrows the digestive tract and can result in excruciating pain during digestion, as well as constant uncontrollable bowel movements.

## Treatment

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. Traditional control methods for treating Johne's disease in farmed animals have involved culling, segregating infected animals and stricter hygiene.

## REFERENCES

- 1 <http://www.johnes.org/zoonotic/index.html>.
- 2 Proceedings of the 1999 Cornell Nutrition Conference for Feed Manufacturers Ithaca, NY: Dept. of Animal Science:130.
- 3 Johne's Disease – a Growing Threat to Dairymen. *Hoard's Dairyman*. 25th March 1981:456-60.
- 4 Pell, A.N. (1997) Manure and Microbes. *Journal of Dairy Science*, 80, 2673-81.
- 5 An Integrated Strategy to Determine the Herd Level Prevalence of Johne's Disease in the UK Dairy Herd. DEFRA Nov 2009.
- 6 Juste, R.A., Elguezal, N., Garrido, J.M. et al. (2008). 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.
- 7 Uzoigwe, J.C., Khaita, M.L., Gibbs, P.S. (October 2007). Epidemiological evidence for *Mycobacterium avium* subspecies *paratuberculosis* as a cause of Crohn's disease. *Epidemiol. Infect.* 135 (7): 1057–68.
- 8 Scientific Committee on Animal Health and Animal Welfare. Possible links between Crohn's Disease and Paratuberculosis. SANCO/B3/R16/2000 European Commission Directorate-General Health & Consumer Protection Directorate B – Scientific Health Opinions Unit B3. Adopted 21st March 2000:50- 51.
- 9 United States Animal Health Association. (1998) *Report of the USAHA Committee on Food Safety*. Minneapolis, Minn.
- 10 Rampton, S. and Stauber, J. (1997) Mad Cow U.S.A.: Could the Nightmare Happen Here? *PR Watch* 4.
- 11 NAID. (Dec 14th 1998) Crohn's Disease – Is There a Microbial Etiology? Recommendations for a Research Agenda. Conference was held in the Natcher Conference Center on the NIH campus in Bethesda, Maryland.
- 12 Isselbacher, K.J., et al. (1994) *Harrison's Principles of Internal Medicine Thirteenth edition*. New York: McGraw Hill.
- 13 Chiodini, R.J. (1996) *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.
- 14 Chiodini, R.J. and Rossiter, C.A. (1996) Paratuberculosis: A Potential Zoonosis? *Veterinary Clinics of North America* 12, 457-67.



# MENINGITIS

## What is it?

Pig meningitis can be caused by the *Streptococcus suis* (*Strep. suis*) bacterium, which can infect people in whom meningitis often develops. It is commonly found in the tonsils and nasal cavities of healthy pigs and is endemic in most countries with a substantial pig industry, including the UK.<sup>1</sup> There are at least 35 different types of *Strep. suis*. Two have been implicated in human infections.<sup>2</sup>

## History

*Streptococcus suis* has been a recognised zoonosis (infectious disease that can be transmitted from animals to humans) since 1968.

## Symptoms in animals

Meningitis is most common in 4-8 week-old pigs. Typical symptoms include involuntary eye movement, convulsions, paddling, shivering, signs of pain/discomfort, raised hair and grinding teeth.<sup>3</sup>

## Source

The bacteria can be spread by direct and indirect contact and can cause disease when too many pigs are crowded together.<sup>4</sup> Pigs may spread infection without showing any symptoms.<sup>5</sup>

Separate studies in 2001 and 2004 concluded that around half of the British pig herd was carrying *Strep. suis*.<sup>6,7</sup>

## Routes of transmission

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.

Just two or three human cases of *Strep. suis* are reported each year<sup>8</sup> but it is a recognised occupational hazard to veterinary surgeons, farmers and meat industry workers.<sup>9</sup>

The last fatal case of pig-linked meningitis in the UK occurred in a farm worker in 1999.<sup>10</sup>

In 2005, a human disease outbreak in China caused by a strain of *Strep. suis* raised concern among the World Health Organization and UN Food and Agriculture Organization. Thirty-seven farmers who died displayed symptoms – bleeding under the skin – that had previously been unheard of with the disease.<sup>11</sup> This outbreak coincided with one in the local pig populations.

## Symptoms in people

Severe cases of *Strep. suis* infection may cause meningitis, septicaemia and inflammation of the heart's inner lining.<sup>12</sup> Long-term deafness and loss of balance may occur in some patients.

## Treatment

Antibiotics are the preferred treatment for meningitis in both animals and people.

## REFERENCES

- 1 Defra (2007) *Zoonoses Report*.
- 2 Health Protection Agency (2010) *Streptococcus suis*, general information. <http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAZ/1204100464730/>.
- 3 The Pig Site (2010) Meningitis. <http://www.thepigsite.com/diseaseinfo/66/meningitis>.
- 4 Associated Press (2005) Pig disease may have mutated, Canadian suspects. *The Globe and Mail*. 3rd August.
- 5 Health Protection Agency (2010) *Streptococcus suis*, general information. <http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAZ/1204100464730/>.
- 6 MackHome, N. (2001) Epidemic of pig meningitis infects humans. *Sunday Herald*. 27th May
- 7 Health Protection Agency (2010) *Streptococcus suis*, general information. <http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAZ/1204100464730/>.
- 8 Ibid.
- 9 Defra (2007) *Zoonoses Report*.
- 10 Health Protection Agency (2010) *Streptococcus suis*, general information. <http://www.hpa.org.uk/HPA/Topics/InfectiousDiseases/InfectionsAZ/1204100464730/>.
- 11 Associated Press (2005) Pig disease may have mutated, Canadian suspects. *The Globe and Mail*. 3rd August
- 12 Huang, Y.T. et al (2005). *Streptococcus suis* infection. *J Microbiol Immunol Infect* 38 (5): 306-13.



THESE FACTORY FARMED PIGS DIED BEFORE THEY COULD BE SLAUGHTERED



# MRSA

## What is it?

MRSA (methicillin resistant *Staphylococcus aureus*) is now killing more people in the United States each year than HIV/AIDS.<sup>1</sup> It is a type of *Staphylococcus aureus* – a common bacterium, which lives harmlessly on the skin or in the nose of 20-40 per cent of people – that has become resistant to a range of antibiotics.

## 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.

## Source

In recent years, MRSA cases are increasingly likely to be community - rather than hospital-acquired and there is evidence to suggest that factory farms are a source. The majority of farmed pigs are kept in crowded conditions where bugs can be easily spread. A recent study found that nearly half of Dutch pig farmers and 39 per cent of pigs in Dutch slaughterhouses were carriers of MRSA.<sup>2</sup> Canadian researchers also found a strong link between pigs and the bug. There's evidence that people can transmit MRSA to pigs.<sup>3</sup> Human or animal carriers who do not display any signs of illness can spread MRSA.

## Symptoms in animals

MRSA-infected farmed animals often show no symptoms.

## Symptoms in people

MRSA does not usually harm healthy people but those with compromised immune systems or those who have gone through surgery are vulnerable. An infection can occur when bacteria get into the body through a break in the skin and multiply, causing symptoms such as boils, abscesses, styes, carbuncles (large pus-filled 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 they get into the bloodstream the result can be more serious infections, such as blood poisoning, septic shock (infection of blood that can lead to organ failure), septic arthritis (severe joint inflammation), osteomyelitis (bone infection), abscesses, meningitis, pneumonia or endocarditis (infection of the heart lining).

## Routes of transmission

A new deadly strain – MRSA ST398 – which has been linked to deaths from pneumonia, has been discovered by researchers across Europe. It has been found in both pigs and people. It was first identified in 2003 in the Netherlands, where it is now responsible for 30 per cent of all human cases.



PIGS REARED IN SQUALOR

In 2008, the *Daily Mail* reported that MRSA ST398 had been transmitted to people in the UK. Scientists warned that it could already be in the food chain, as none of those infected worked with animals.<sup>4</sup> A small number of tests found the bug in 20 per cent of raw pork samples, 3 per cent of raw beef and 21 per cent of raw chicken.<sup>5</sup> It is feared that this new form of MRSA could pose a far greater risk to the general

population than the hospital variant. Once it is in the human population, it lives inside the nose, so coughing and sneezing facilitate its spread.

## Treatment

Some MRSA strains are resistant to many important antibiotics but most are said to respond to an intensive course of antibiotics.

## REFERENCES

- 1 McCaughey, B. (2006) To catch a deadly germ. *New York Times*. 14th November.
- 2 Sayre, L. (2009) The hidden link between factory farms and human illness. *Mother Earth News*. [www.motherearthnews.com](http://www.motherearthnews.com).
- 3 Smith, S. (2007) A tale of pigs, people and a shared germ. *The Boston Globe*. 12th November.
- 4 Poulter, S. (2008) MRSA from pigs has passed to humans and could be in the food chain. *Daily Mail*. 2nd June.
- 5 Poulter, S. (2007) MRSA bug discovered in meat and livestock. *Daily Mail*. 24th June.



# Q FEVER

## What is it?

Q (Query) fever – so-called because for many years its cause was unknown – is caused by infection with *Coxiella burnetii*, a bacterium that affects humans and other animals, such as sheep, cattle and goats. It has been suggested that Q fever could be developed for use in biological warfare and is considered a potential terrorist threat.<sup>1</sup>

## History

Q fever was first recognised in abattoir workers in Brisbane, Australia in 1937.

## Symptoms in animals

Signs of the disease are uncommon, but abortions may occur in cattle, sheep and goats in whom the highest infection rates have been reported.

## Source

Human cases of Q fever are rare in the UK. However, there have been recent outbreaks – affecting as many as 138 people – in locations handling animals or processing meat. Because the disease is under-reported, scientists cannot reliably assess its incidence. In the EU, reported human cases increased from 585 in 2007 to 1,599 in 2008.<sup>2</sup>

## Routes of transmission

Infection results from inhalation of contaminated particles in the air, and from contact with the milk, urine and faeces of infected animals. Human outbreaks are often associated with the farming birthing season.<sup>3</sup>

## Symptoms in people

Though Q fever usually causes only strong, but treatable, flu-like symptoms in humans, it can cause severe pneumonia and is known to present an extra threat for people with autoimmune diseases and with heart valve problems. Only 1-2 per cent of people with acute Q fever die of the disease, but as many as 65 per cent of those with chronic (long-lasting) versions may die.<sup>4</sup>

## Treatment

In most people, Q fever requires no treatment and symptoms will clear up on their own. But antibiotics may be needed for some patients. *C. burnetii* is resistant to heat, drying and many common disinfectants. These features enable the bacteria to survive for long periods in the environment. Therefore, it is difficult to prevent farmed animals from becoming infected and there are no formal control programmes or vaccines.<sup>5</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.



## REFERENCES

- 1 Madariaga, M.G., et al (2003). Q fever: a biological weapon in your backyard. *Lancet Infect Dis* 3 (11): 709-21.
- 2 European Food Safety Authority. (2010) The community summary report on trends and sources of zoonoses and zoonotic agents and food-borne outbreaks in the European Union in 2008. [www.efsa.europa.eu/en/scdocs/scdoc/1496.htm](http://www.efsa.europa.eu/en/scdocs/scdoc/1496.htm).
- 3 Sterling, T. (2009) Dutch cull first of 40,000 goats to counter Q-fever outbreak, which has killed 6 people. *The Canadian Press*. 21st December.
- 4 Centers for Disease Control and Prevention. Q fever. <http://www.cdc.gov/ncidod/dvrd/qfever/>.
- 5 Defra. (2009) Q fever: information for farmers. <http://www.defra.gov.uk/foodfarm/farmanimal/diseases/vetsurveillance/documents/qfever-farmers.pdf>.



# 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. *Salmonellosis* has been recognised as an important zoonotic disease (one that can be transmitted from animals to humans) for many years. More than 2,500 different strains of *Salmonella* have been identified, most of which rarely cause disease. Human disease is caused by about ten strains – the most important are *S. enteritidis* (which originates from infected poultry and eggs) and *S. typhimurium* (which occurs especially in cattle, pigs and turkeys).<sup>1</sup>

## History

*Salmonella* outbreaks have occurred throughout the last 100 years. By the 1990s, *S. enteritidis* infections from eggs had reached pandemic proportions.

## Source

According to a 2007 report, nearly a quarter of chicken flocks reared for meat across Europe are infected with *Salmonella*.<sup>2</sup> And around 10.3 per cent of pigs going to slaughterhouses across the EU test positive for *Salmonella*.<sup>3</sup>

Studies show that poor ventilation, high dust levels<sup>4</sup> and overcrowding<sup>5</sup> aid the spread of *Salmonella* among chickens. In 2009, the UK Health Protection Agency announced a three-fold increase over the previous twelve months in the number of human *Salmonella* cases reported that year.<sup>6</sup>

## Symptoms in animals

When farmed animals, particularly poultry and pigs, become infected with *Salmonella*, they frequently become carriers of the

infection without showing signs of ill health. Nevertheless, infection may occasionally result in enteritis (inflamed small intestine), abortion, septicaemia, or death.

## Symptoms in people

Symptoms include diarrhoea, stomach cramps and sometimes vomiting and fever. *Salmonella* can trigger an arthritic condition known as reactive arthritis, which causes painful and swollen joints.<sup>7</sup>

## Routes of transmission

*Salmonella* can be transmitted by contaminated food, usually of animal origin; faeces from an infected animal or person; and 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.<sup>8</sup>

## Treatment

Human symptoms usually clear up without treatment. In severe cases, treatment may be required for dehydration. There is concern over the increasing resistance of some *Salmonella* bacteria to antimicrobials. One in five cases is now antibiotic-resistant and one strain, known as DT104, is resistant to five major antibiotics used in human medicine.<sup>9</sup>

Eggs from birds testing positive for *Salmonella* (specifically *S. enteritidis* or *S. typhimurium*) are not allowed to be sold directly to consumers. Most commercial flocks of laying hens are vaccinated against *Salmonella*.<sup>10</sup>

## REFERENCES

- 1 Defra (2006) Summary profile for salmonellosis.
- 2 (2007) One in four chicken flocks has salmonella. *The Telegraph*. 4th April.
- 3 Trickett, S. (2009) Feed strategy to beat salmonella. *Farmers Weekly*. 17th November.
- 4 Holt, P.S. et al. (1998) Airborne horizontal transmission of *Salmonella enteritidis* in molted laying chickens. *Avian Dis.* 42, 45-52.
- 5 Braden, C.R. (2006) *Salmonella enterica* serotype Enteritidis and eggs: A national epidemic in the United States. *Clin. Infect. Dis.* 43, 512-517.
- 6 Food Standards Agency. (2009) Increases in cases of salmonella. [www.food.gov.uk](http://www.food.gov.uk).
- 7 Roberts, T. et al. (2009) *The Long-Term Health Outcomes of Selected Foodborne Pathogens*. Center for Foodborne Illness Research and Prevention.
- 8 Defra (2006) Summary profile for salmonellosis.
- 9 Sayre, L. (2009) The hidden link between factory farms and human illness. *Mother Earth News*. [www.motherearthnews.com](http://www.motherearthnews.com).
- 10 Defra (2007) *Zoonoses Report*.



MANY CHICKENS DIE IN THE REARING SHEDS



# SWINE FLU

## What is it?

Swine Influenza is a respiratory illness of pigs caused by a strain of influenza A virus.

## History

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 influenza viruses, can then emerge. The pandemic H1N1 virus is just such an example. In 1998, the first hybrid swine flu virus in N. America was discovered in a factory farm in North Carolina, which made thousands of pigs ill. By early 1999, a triple hybrid virus had spread throughout US pig factories containing gene segments from bird, human and swine flu.<sup>1</sup>

## Source

There is now a scientific consensus that the virus of the 2009 swine flu pandemic largely arose from this triple hybrid strain.

## Symptoms in animals

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

## Symptoms in people

The symptoms are similar to seasonal flu. They include fever, aching muscles and a sore throat.

## Routes of transmission

Influenza viruses can be directly transmitted from pigs to people and from people to pigs. Human infection from pigs is most likely to occur through close proximity with infected pigs. Human-to-human transmission is thought to occur in the same way as seasonal flu – through coughing or sneezing.

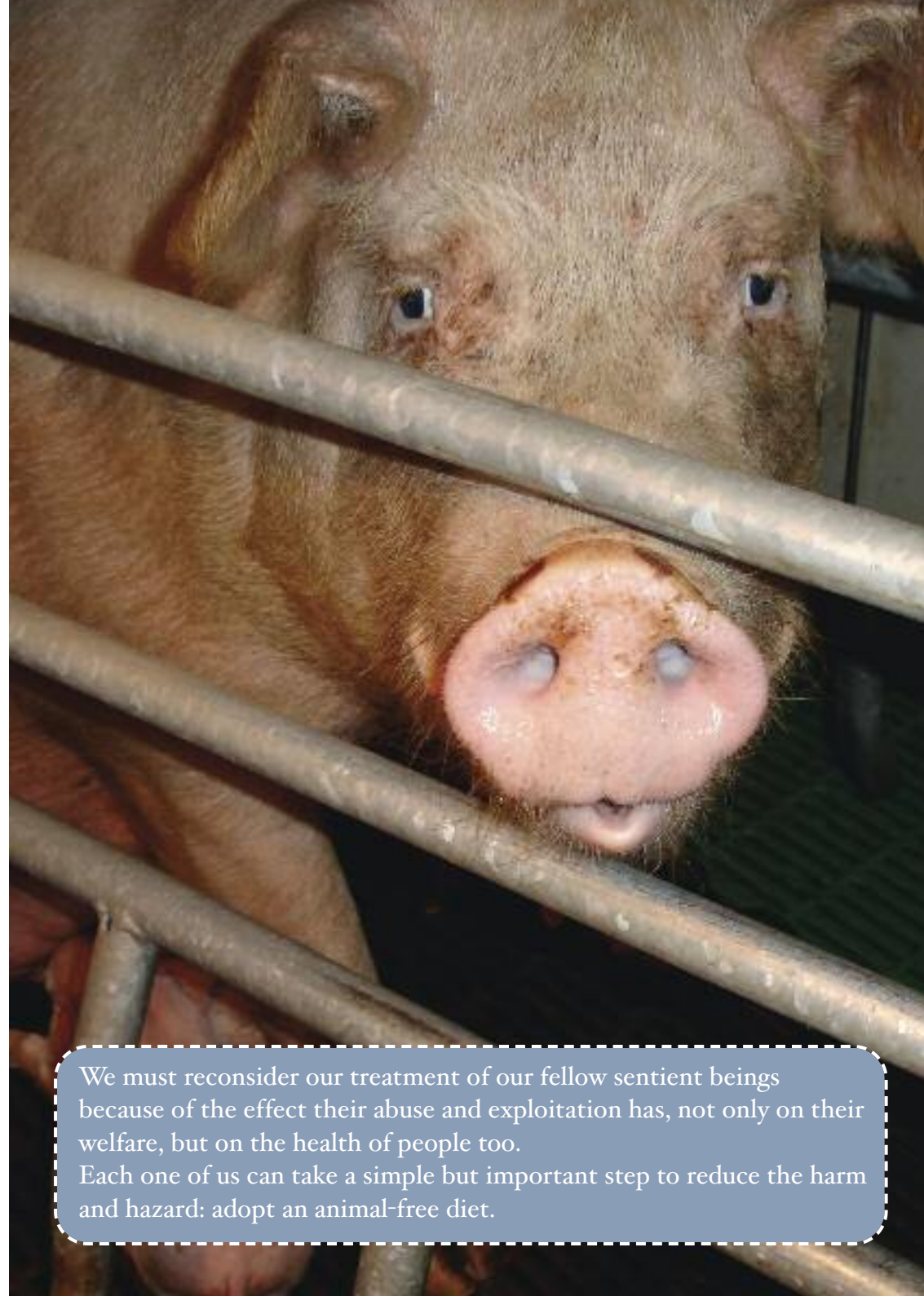
During the first wave (April-September) of the 2009 pandemic in England, between 144,000 and 670,000 people fell ill.<sup>2</sup> There was another serious wave of illness and death reported in the winter of 2010/11. Worldwide, more than 200 countries have reported laboratory confirmed cases, including at least 15,292 deaths.<sup>3</sup>

## Treatment

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. Although they have no effect against the virus, antibiotics are used to prevent secondary infections in influenza-weakened pig herds.

### REFERENCES

- 1 Lawrence, F. (2009) The pigs' revenge. *The Guardian*, 2nd May.
- 2 *Health Protection Agency*. (2009) Pandemic (H1N1) 2009 in England: an overview of initial epidemiological findings and implications for the second wave.
- 3 World Health Organisation (2009) Pandemic (H1N1) 2009 – update 37. [www.who.int](http://www.who.int).



We must reconsider our treatment of our fellow sentient beings because of the effect their abuse and exploitation has, not only on their welfare, 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.

PLEASE SEND ME A FREE GO VEGGIE INFORMATION PACK

I WOULD LIKE TO MAKE A DONATION TO ANIMAL AID

How to make a donation:

By cheque  I enclose a cheque for £ \_\_\_\_\_

Please make cheques payable to Animal Aid and post to the address below

Online at [www.animalaid.org.uk](http://www.animalaid.org.uk)

By phone on 01732 364546

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_

Email: \_\_\_\_\_ Telephone: \_\_\_\_\_

If you would prefer NOT to receive information from like-minded organisations, please tick here



Animal Aid The Old Chapel, Bradford Street, Tonbridge, Kent, TN9 1AW

Tel: 01732 364546 • [info@animalaid.org.uk](mailto:info@animalaid.org.uk) • [www.animalaid.org.uk](http://www.animalaid.org.uk)

Published by Animal Aid May 2010, re-published January 2011 ISBN 978-1-905327-23-2

Registered in UK 1787309. Incorporated as Animal Abuse, Injustice and Defence Society, a company limited by guarantee.

