



Zoonoses and farming

Evidence, ethics and implications

A report of the Business Forum meeting
on 17th November 2009

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Introduction

As the incidence of swine flu rises, the food and farming sectors can expect renewed public debate around the relationships between farming and human disease. While animal welfare groups allege that the H1N1 virus originated in large-scale confined production systems, the industry points to only two outbreaks in pigs during the current pandemic, and they caught it from humans.

Is there evidence that farming animals has played a direct part in the current pandemic? What is the evidence and level of uncertainty over whether farming played any indirect role, for example in the emergence of H1N1? What are the pros and cons of different farming systems in controlling the emergence and spread of zoonoses in general? How much do zoonoses cost the farming and food industries? Is government doing the right things to reduce the risks of zoonotic disease?

The November meeting of the Food Ethics Council's (FEC) Business Forum discussed such issues. We are very grateful to Prof Hugh Pennington, University of Aberdeen, and Lord Rooker, Chair of the Food Standards Agency, for speaking. The chair was Helen Browning OBE, Food and Farming Director of the Soil Association and chair of the FEC.

This report outlines points raised during the meeting. Contributions are not attributed. The report was prepared by Sean Roberts. It does not represent the views of the Food Ethics Council, the Business Forum or their members.

Key points

- **Zoonoses** are infectious diseases passed from non-human animals to humans. Of the 1407 human pathogens we know about, **816** are zoonotic.
- England and Wales experience about **one million** food-borne illnesses per year, 20,000 of which require hospitalisation, and 400 of which result in death.
- New zoonoses appear through a process of evolution, so there is no real prospect of **eradication**. Progress is nevertheless possible, and there have been significant reductions in the incidence of **Salmonella enteritidis** and **v CJD**.
- The **Food Standards Agency** places increasing emphasis on **enforcement** in discharging its responsibilities regarding food safety and standards.
- **Low levels of public awareness** about the risks associated with zoonoses make it difficult to **prevent** them from spreading.
- Greater **transparency** on the part of business and government has played an important part in **restoring public confidence** and avoiding **food scares**.
- **E coli** and **Campylobacter** are two of the FSA's main priorities, because we have yet to develop effective ways of dealing with either of them.
- The current **H1N1 pandemic** is technically a zoonosis, although it is primarily spread from person to person rather than by eating or being in contact with infected swine.
- There is an urgent need for **more effective measures** to deal with zoonoses, and we need a **culture change** on farms, in industry and in local government.

Zoonoses – an overview

Zoonoses are infectious diseases that can be transmitted from non-human animals to humans. Of the 1407 human pathogens that we know about, 816 are zoonotic. Campylobacter is by far the most common zoonotic food-borne infection, with the Health Protection Agency (HPA) recording 49,880 cases in England and Wales in 2008. There were 4,190 cases of Salmonella enteritidis, 948 of E coli O157, and just one case of variant Creutzfeldt Jacob Disease (vCJD). However, there is known to be significant underreporting of zoonotic infection, so the actual levels of incidence – particularly of the less serious infections – might be as much as seven times higher than these figures suggest.

In total, the HPA records about one million food-borne illness per year, 20,000 of which require hospitalisation, and 400 of which result in death. These levels have been relatively stable for a while. The HPA estimates the economic cost of food-borne disease at £1.5 billion per year.

New zoonoses appear through a process of evolution, with one pathogen opening the way for more to follow - which means that there is no real prospect of eradication. Each pathogen is different, and they are spread in different ways. Some will spread when animals are kept in close proximity, while for others this is not a factor. It has been suggested that animals' experience of stressful conditions could increase the spread of zoonoses, by lowering their immunity. But because pathogens operate by

invading the immune system, the relationship between stress and susceptibility to pathogens is complicated. Other factors, such as age, are more important in determining susceptibility than stress. Another suggestion is that the increased tendency to eat out, or to consume take-away food, might be a factor in explaining current levels of zoonotic infection – but while it is true that a slight majority of Campylobacter cases are from eating out, it is difficult to say whether this is a relevant factor.

The Food Standards Agency

The Food Standards Agency is responsible for protecting consumer interests in relation to food safety and standards. It is a relatively small government department, with an annual budget of around £150 million, about one-fifth of which is allocated to meat hygiene regulation. Dealing with food-borne disease is one of the FSA's main priorities.

The FSA adopts a risk-based approach to setting its spending priorities, relying on evidence of where the greatest problems are occurring. Enforcement is a key element of this risk-based approach – the FSA's 2010-2015 strategic plan places increased emphasis on enforcement. The Agency is, nevertheless, anxious not to over-regulate, or “gold-plate”, and has moved away from inspection for inspection's sake. Ninety-five percent of UK food regulations originate from the EU.

The FSA's relationship with local authorities is central to its work. The FSA audits local government, but has resisted calls for local authorities to be required to use Public Analysts in the context of their responsibilities for food standards. There needs to be a change in culture within local government, where people are still cutting corners. Part of the problem is that food safety is not a big issue for local politics – until something goes wrong.

When something does go wrong, the first thing that the FSA does is to check the record on regulation. Following the recent E coli outbreak in Wrexham, it emerged that when the council inspected the fish shop at the centre of the outbreak the previous year, they had awarded it a zero star rating, the lowest possible. They had ordered annual inspections, the next of which was due within days of the outbreak.

Prevention

Relative prognoses are one of the main determinants of public expenditure on the prevention of food-borne infection. For example, despite the fact that Salmonella enteritidis and E coli O157 are far more prevalent than vCJD, total spending on the latter exceeds that on either of the two more common infections. This is because vCJD is fatal. The one case of vCJD reported in 2008 represented a significant reduction on the 27 cases that were diagnosed in 2000 (when there were also 28 deaths resulting from vCJD).

One of the dilemmas faced by public authorities in attempting to prevent zoonotic infection is what position to adopt regarding antimicrobials. If antimicrobials are used relatively widely, including dealing with minor strains of infection, then there is a risk of fostering the emergence and spread of microbes that are resistant to cheap and effective first-choice, or "first-line", drugs. There is a divergence of approaches within the UK, with antimicrobials easily obtainable in England, while in Scotland they can only be obtained through a GP.

The low level of awareness of the risks associated with zoonoses presents another challenge. Food packaging contains little in the way of advice about healthy storage and cooking, although fridge manufacturers do alert customers to the dangers of keeping raw meat above other food, for example. Even in an ideal world, though, there is a limit to how much information can be provided on a food label. Teaching food hygiene in schools is another option, with Scotland again seen as having pursued a relatively successful approach.

Transparency

The food industry has a history of losing public relations battles over zoonoses, much of which is due to its failure to be open and transparent. The salmonella scare linked to Cadbury's chocolate in 2006 is seen as a prime example, where the company delayed informing the authorities of potential contamination for six months, and it ended up costing them an estimated £20-30 million.

While it is true that Cadbury's actions were partly due to receiving poor scientific advice, this still represents a test case in how not to promote objective debate and public confidence.

There is a feeling that business has learnt the lessons of such failures. Companies now hold much more traceability information on their products, and on animal feed – this is reassuring to the public and to regulators. There is greater openness, industry shares information on food safety, and problems are sorted out publicly. Retailers with trusted brands have a particular responsibility for restoring and retaining public confidence. One major restaurant chain describes transparency as its “default position”, recognising that this has not always been the case.

One of the challenges is getting the balance right when the level of risk or the severity of the problem is not yet clear – how can you be transparent without creating concern? The emphasis for the industry must be on ensuring that its comments are well-informed, and in this respect food companies have a better recent record than the health service in being open and avoiding obfuscation. The FSA also has important responsibilities for preventing food scares. The fact that it is entitled to make public the advice that it gives to Government ministers enables the Agency to be seen to be acting openly and independently in protecting the interests of consumers.

E coli O157

E coli and Campylobacter are two of the FSA's main priorities, and they illustrate the different challenges presented by zoonoses. E coli O157 is a bacterium that lives in the guts of animals, including cattle, sheep, deer and goats. It arrived in the UK in the 1970s, and is found in production animals and in wildlife. The incidence of E coli O157 has been constant for several years. Scotland is particularly badly affected.

E coli O157 is impossible to identify on animal carcasses, and we have not yet developed effective ways of dealing with it. Prof Hugh Pennington has chaired two inquiries into E coli food poisoning outbreaks, the second of which indicated little progress since the first, nine years earlier – we must ensure that he doesn't have to write a third. ‘Super shedders’, cattle that excrete higher than normal levels of bacteria, are a particular concern. Improved standards of hygiene in abattoirs would help, but shedding on the way to slaughter is also a significant problem. This has been exacerbated by the closure of abattoirs, resulting in greater travel distances to slaughter. It is not enough to rely on improved standards within the food system, though - we also need to apply good hygiene practice when storing and preparing food at home.

Campylobacter

Campylobacter outbreaks are another significant problem for the FSA, and again we don't have a clear understanding of how to tackle it. There

is no vaccine, and the bacteria are immune to antibiotics. One thing we do know is that the level of 'Campy' infection is linked the scale of the chicken industry. Campy is present in 65% of samples of poultry. Another element of uncertainty is the question of whether different forms of free-range chicken farming have any positive (or negative) implications for the prevalence of Campy. (It is worth noting in passing that chicken has important health benefits in relation to zoonotic infections, in that it contributes to resistance to tuberculosis – and bovine TB from unpasteurized milk was one of the most serious zoonoses in the last century.)

Numerous approaches to tackling Campy have been tried around the world, including irradiation, freezing and lactic acid. There is some evidence to suggest that earlier slaughter could be effective. On-farm slaughter might be a viable option, but is currently prohibited, so we need to decide whether it would be worth amending the regulations. Chlorine rinsing can be effective, but is again not permitted in the UK. More immediately practical measures also have a part to play, such as using smaller ventilation grills to cut down the number of flies that get into chicken sheds – but this isn't straightforward either, since it can create problems with airflow.

The H1N1 pandemic

The current H1N1 pandemic is due to a new strain of swine-origin H1N1 influenza virus, or "swine flu". While

technically a zoonosis, the pandemic raises rather different issues because it is primarily spread from person to person, rather than by eating or being in contact with swine. The H1N1 component was probably originally passed to pigs by humans during the 1918-1920 "Spanish flu" pandemic. Transmission of the virus from pigs to humans is not common and does not always lead to human influenza, often resulting only in the production of antibodies in the blood. When the virus is passed to humans, the main explanatory factor is regular exposure to pigs (as opposed to consumption of the meat of an infected animal). This is one of the reasons for the belief that the current pandemic originated in Mexico, where animals are more likely to come in and out of the home.

We have known for many years that pigs are afflicted by a range of avian and human viruses. Pigs act as a host where influenza viruses can exchange genes, producing new and dangerous strains. Farming practice – how well the pigs are fed and kept, etc - is not considered a significant factor in explaining swine influenza.

The future

Recent years have seen real progress in tackling food-borne infections. Butchers have made substantial progress, and the dramatic reduction in the incidence of Salmonella enteritidis – from 22,254 cases in 1997 to 4,190 in 2009 – shows what can be achieved. However, there is still an urgent need for more effective measures to deal with zoonoses. Too

many people within the food sector are still cutting corners, or demonstrating a 'box-ticking' mentality. We need to change the culture on farms, in industry and in local authorities. And we need to address the fact that the economics of the meat industry mean that costs for food safety get passed down the supply chain.

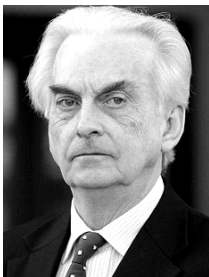
From the perspective of the FSA, one of the priorities is for improved surveillance, so that we can trace where infections are coming from and work out how to control them. Inter-agency

liaison is a potentially fruitful avenue, such as working with the Gangmasters Licensing Authority – on the grounds that producers who are cutting corners in respect of their employment responsibilities are probably doing the same on food standards. The FSA would also like to see some kind of meaningful ranking on restaurant doors, and discussions are ongoing as to which of several competing schemes offer the best way forward.

Speaker biographies



Helen Browning, who was awarded an OBE in 1998 for services to organic farming, runs a 1350 acre organic livestock and arable farm in Wiltshire. Helen is the Soil Association's Food and Farming Director and is chairman of the England Animal Health and Welfare Implementation Group. She has worked with many food and farming organisations over the last twenty years, and was a member of the Government's Policy Commission on the Future of Farming and Food ('the Curry Commission'). Helen is chair of the Food Ethics Council.



Hugh Pennington trained in medicine and obtained his PhD (studies on Newcastle disease virus) at St Thomas's Hospital Medical School. After a postdoctoral fellowship in the USA he worked at the MRC Institute in Glasgow of Virology for 10 years before moving to the Chair of Bacteriology at Aberdeen University (emeritus, 2003) He chaired inquiries into E.coli food poisoning outbreaks in Scotland (1996) and Wales (2005).



Jeff Rooker became Chair of the Food Standards Agency in July 2009. He was Minister for Food Safety at the Ministry of Agriculture Food and Fisheries (MAFF) between 1997 and 1999, during which time he steered through Parliament the Food Standards Bill, which established the agency. He was made a peer in 2001. He became Minister for Food and Farming at the Department for Food and Rural Affairs in 2006, a position he held until he chose to leave the Government in October 2008. Jeff has also held a number of other prominent Government roles, including Northern Ireland Minister (with responsibility for Finance, Environment, Farming and Equality); Minister for Housing, Planning and Regeneration, Home Office Minister (with responsibility for Immigration and Asylum); and Minister for Pensions.

About the Business Forum

Ethical questions around climate change, obesity and new technologies are becoming core concerns for food businesses. We have launched the Business Forum to help senior executives gain expert insights into the big issues of the day. Membership is by invitation only and is strictly limited.

The Business Forum meets six times a year for in-depth discussion over an early dinner at a London restaurant. The forum members shape the meeting agenda.

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