Viva!

STOP Bugging me!

AMANDA WOODVINE, NUTRITIONIST

Bugs! Superbugs! Food poisoning germs practically always originate from meat, fish and dairy or manure. Here's why animal products should have a government health warning

£1.50

STOP BUGGING me!

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by Amanda Woodvine
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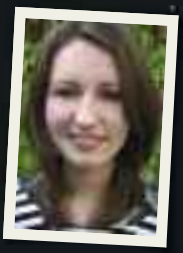

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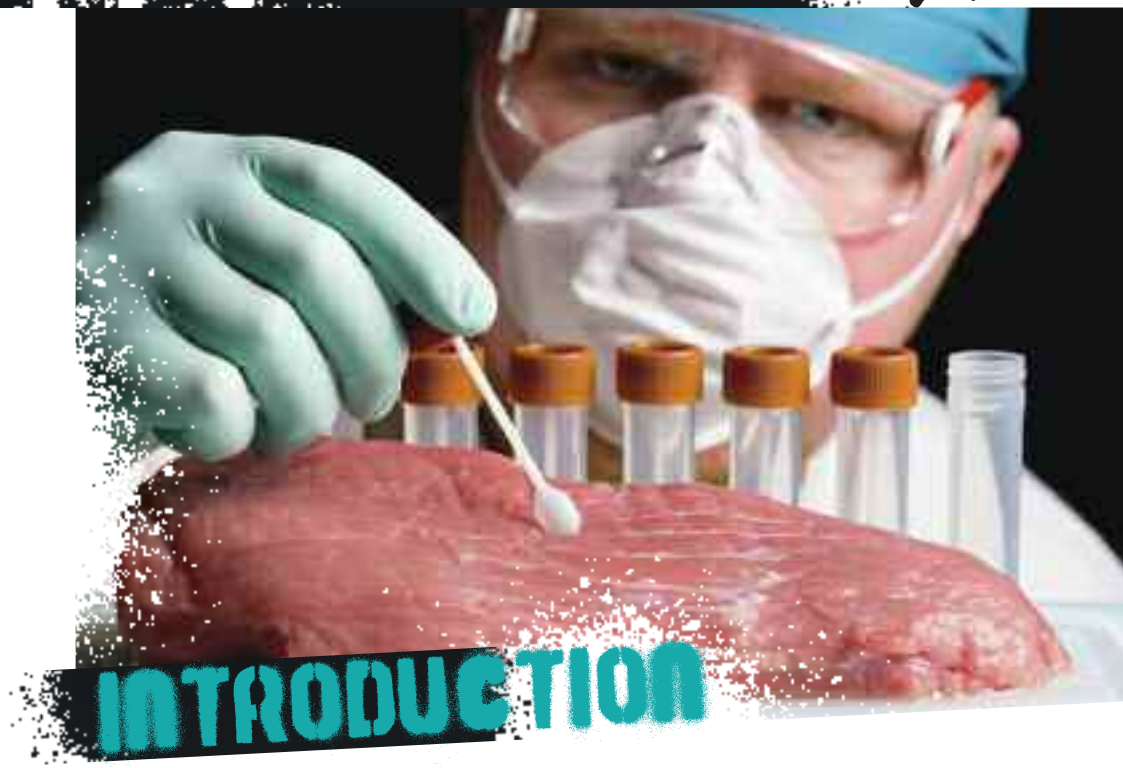
Viva!



INTRODUCTION

According to the Food Standards Agency (FSA), food poisoning affects around 850,000 of us in the UK every year – enough to fill Wembley Stadium almost ten times over. It costs the economy more than £1.5 billion a year – similar to the Ministry of Defence's annual ICT[1] spend. And it is twice as rife during the summer months.

Even top chefs are fallible. In January 2009, 529 people reported illness after dining at Heston Blumenthal's the Fat Duck restaurant in Bray, Berkshire. The cause of the illness was later given as norovirus (see page 11), which was a result of eating contaminated shellfish. Seventy per cent of those affected experienced nausea, vomiting and diarrhoea. The Fat Duck's oyster supplier blamed poor sewage treatment at a nearby plant for the contamination (*Guardian*, 2010).

Further afield, in April 2010, more than 200 students in North West China had symptoms of food poisoning after drinking school breakfast milk.

More than 100 pupils in primary and middle schools in Hanzhong City started to vomit and had stomach aches after drinking milk, and 27 were hospitalised. In Ankang City, almost 100 primary and middle school pupils had the same symptoms. Twenty were treated with intravenous drips. The milk was delivered to the schools by a large milk processor and supplier in the province (*China Daily*, 2010).

The fact is that almost all food poisoning germs originate from animal farming and animal foods.

Even the relatively few recent outbreaks of food poisoning from plant foods have been traced to contamination and run-off from animal manure. Intensive factory farming methods have made the situation worse.

This guide explains:

- **the major causes of food poisoning**
- **other ways that contaminants in food can affect us**
- **what happens when you are poisoned**
- **the steps you can take to protect yourself and your family.**

As we'll see, the simplest, most effective way to cut your risk – and to reduce the problem in society as a whole – is to avoid eating or serving animal products.

1 Information and Communication Technologies

FOOD POISONING

CAUSES OF FOOD POISONING

1. BACTERIA

What are bacteria?

Bacteria are the main cause of food poisoning. They are microscopic germs that exist everywhere – in food, air and water. We have bacteria on our skin (on average one million per square inch) and in our guts, where the 'good' bacteria help to protect us from infection.

Because they can reproduce at such a fast rate, it is easy for bacteria to get out of control. And too many in our bodies can lead to illness. After a contaminated food is eaten, the bacteria grow in the body and then they cause symptoms. Not only can the bugs themselves cause illness, but the chemicals (toxins) that they release while they are growing in food can harm us, too. These toxins cause food-poisoning symptoms soon after the food is eaten.

The gap between eating contaminated food and developing symptoms is called the incubation period. This can be anything from an hour to 90 days. Most cases of food poisoning have an incubation period of between one and three days.

Common food poisoning bacteria include:

- *Salmonella*
- *Campylobacter*
- *E. coli* – including a harmful strain (type) called 0157:H7
- *Listeria*.

These are discussed in detail on pages 8 to 10.

Which foods are they found in?

A relatively small number of types of bacteria are responsible for almost all serious food poisoning in the UK. According to BUPA (2008), these food poisoning bacteria come from:

- meat and meat products – such as minced meat and pâtés
- poultry – such as chicken or turkey
- seafood – fish and shellfish
- eggs and raw egg products (such as mayonnaise)
- unpasteurised milk (or milk contaminated after pasteurisation)
- soft and mould-ripened cheeses
- cooked foods – such as fried rice.

In fact, 95 per cent of food poisoning is caused by animal products – either directly or by them contaminating other foods. And chicken is the worst culprit of them all.

Feel like chicken tonight?

Just picking up a package of chicken in a supermarket could be enough to put you at risk of food poisoning. Researchers swabbed the outside surface of packages of raw meat – and found *Salmonella*, *Campylobacter* and multidrug-resistant *E. coli* bacteria (Burgess *et*

WHAT IS FOOD POISONING?

Food poisoning is an illness caused by eating or drinking contaminated food or beverages. The usual contaminants are bacteria, viruses and other parasites. Less often, food and drinks may be polluted by toxins, chemicals or metals, such as lead or mercury (see page 12).

Symptoms of food poisoning are generally the same, regardless of the bug. You might get stomach cramps, abdominal pain, nausea, vomiting, diarrhoea, a high temperature (fever), muscle pain and chills. In vulnerable people, it can even lead to organ failure and death. People with a weakened immune system, pregnant women, babies and the elderly are most at risk.

Five hundred people die every year from food poisoning in the UK. This is about the same as the number of pedestrians killed in road traffic accidents each year (Office for National Statistics, 2009).

al., 2005). Poultry was most contaminated, followed by lamb, pork and beef.

Just one swab of the meat picked up over 10,000 live *E. coli* bacteria. And it only takes 10 *E. coli* 0157:H7 bacteria to lead to a potentially fatal infection (CAST, 1994).

The researchers concluded: "The [outside of the] packaging of raw meats is a vehicle for potential cross-contamination by *Campylobacter*, *Salmonella*, and *E. coli* in [shops] and consumers' homes" (Burgess *et al*., 2005).

Chicken is the main source of food poisoning in Europe. In recent years, the amount of chicken eaten in the UK has risen dramatically, so it is not surprising that food poisoning has shown an increase.

So where does all of this bacteria come from, and how does it get into food?

Animal excrement (poo): a bum deal

According to Dr Michael Greger, medical doctor, author and an internationally recognised speaker on nutrition, food safety and public health issues: "Food poisoning comes from animals, specifically animal faeces [poo].

"Animal products, particularly fish and poultry can be covered in faecal bacteria. It's so bad that while the [US] federal government recommends we wash our fruits and veggies, we're not even supposed to rinse meat and poultry for fear of the viral and bacterial splatter...

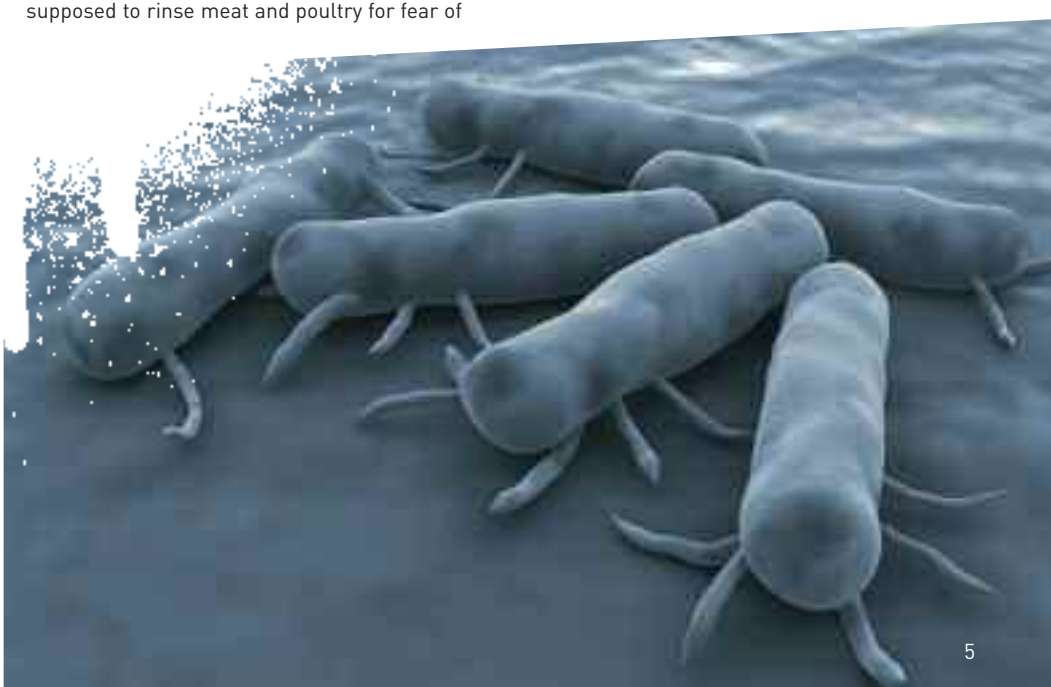
"Chicken carcasses are so covered in faecal matter that researchers at the University of Arizona found more faecal bacteria in the kitchen on sponges, dish towels and the sink drain than they found swabbing the toilet, even after bleaching everything twice!"

Dr Greger continues: "In a meat-eater's house, it is safer to lick the rim of the toilet seat than the kitchen counter top, because people aren't preparing chickens in their toilets" (Rusin *et al*., 1998).

And it seems that fish is no safer than meat and poultry. Researchers swabbed sushi (a Japanese seafood dish, eaten raw) for faecal bacteria. They found 30,000 bacteria per piece in Nigiri tuna, 47,500 in Nigiri salmon, 75,400 in Nigiri whiting, and 90,000 in Nigiri shrimp (Atanassova *et al*., 2007).

[US] National Food Standards suggest that no more than 30,000 faecal bacteria should be found in ready-to-eat foods – meaning that none of the seafoods passed the food safety test.

Says Dr Greger: "[The researchers] also swabbed vegetarian sushi (avocado and cucumber rolls) and found zero contamination – zero faecal bacterium. Unlike salmon and tuna, avocados and cucumbers don't have rectums [anuses]!" (Greger, 2007).



WHY EATING ANIMALS INCREASES YOUR CHANCE OF INFECTION

Bacteria in animals are much more likely to infect us than bacteria from plants. This is because our cells are more like other animals' cells than those of vegetables. For example, a cow's bacteria would find it easier to live on, or in, us than in a courgette.

Indeed, people catch many diseases from cattle, including tuberculosis, listeriosis, *Salmonella*, *E. coli* poisoning and BSE.

Germs from all other farmed animals have the potential to infect us, too.

Germs love animal products. Meat, milk, cheese and eggs all provide the ideal environment for them to grow. And from farm to fork, food poisoning germs have several chances to infect animal products.

The conditions in which animals live

Intensive (or factory) farming is a root cause of food poisoning. Thousands of animals squeezed into cramped, dirty and unnatural habitats create a breeding ground for germs.

The main aim of intensive farming is to produce maximum output with minimum input. It therefore involves crowding as many animals as possible into a limited space – which makes infection unavoidable. Bacteria and viruses (see page 10) thrive in this environment, and can infect a large number of animals in a very short time. Poor ventilation in buildings also means that airborne bacteria spread easily.

Consider broiler (meat) chickens – a major source of food poisoning bacteria. Thousands of chickens are kept per shed, in tightly confined spaces – and the birds aren't cleaned out during their six week lives. They can easily pick up *E. coli* O157 and *Campylobacter* bacteria (see pages 8-9), which may come from outside the sheds.

Broiler chickens spend their short lives essentially living in their own excrement. They may also live on top of other chickens that have died in the factory farming process. These conditions are ideal for the spread of disease.

Infected chickens excrete high numbers of these bacteria in their faeces. As chickens eat faeces, these germs spread through the flock – without necessarily making the birds themselves ill. *E. coli* O157 may be a particular threat, as infected birds can show no symptoms of disease, but excrete large numbers of the bacteria (Food Standards Agency, 2008). It is easy for bacteria to lurk in poultry sheds which haven't been cleaned well enough. And germs are often spread further at slaughter.

Bacteria can also easily be spread from parent to offspring (for example, through eggs, in the case of *Salmonella*).

The food that animals eat

In Britain, cows were fed the brains of other cows and sheep which led them to contract a fatal disease – BSE or mad cow disease. In 1996, it was finally acknowledged that this disease can pass to people via infected meat, causing a lethal brain infection called new variant Creutzfeldt-Jakob Disease.

This practice was outlawed and ruminant animals can no longer be fed mammalian meat and bonemeal. However, cattle can still be given tallow and gelatine, made from pig bones (European Commission Health and Consumer Protection Directorate-General, 2003).

In other countries, such as the US, farmed animals are still fed the remains of other

animals, as well as their faeces (coated with molasses) – an ideal way to spread disease.

The use of animal manure as a fertiliser

Animal manure, along with certain wastes from abattoirs, such as gut contents and blood, are commonly used as a fertiliser for crops (Microbiological Safety of Food Funders Group, 2006). This means that bacteria, parasites and viruses may directly contaminate fertilised crops and animals eating them. More indirectly, they may also contaminate water sources.

At the slaughterhouse

Animals arriving at the slaughterhouse may be covered in faeces. This means that potentially fatal bacteria such as *E. coli* O157 and *Salmonella* can enter a meat processing plant on the skins of infected animals.

To keep slaughterhouse costs to a minimum, animals are put through the system as quickly as possible. Similar principles apply for the preparation of chickens, cattle, sheep and pigs.

Automated slaughter and processing on a factory production line means that bacteria and viruses can spread widely. The same implements are used to slaughter one animal after another with little washing in-between, meaning that bacteria spreads rapidly between carcasses. When an animal is split open, his insides fall out along with the gut contents, which is often where the bacteria live. It is likely that the bacteria will spill onto the rest of the animal and infect the meat. Even if a living animal went into a slaughterhouse germ-free, there is a good chance that he would emerge as a disease-ridden carcass.

In the home: cross-contamination

Cross-contamination occurs when harmful bacteria are transferred from foods (usually raw foods) to other foods, surfaces and equipment. Raw meat can contaminate cooked meat and also plant foods in this way.

Contamination can be direct, when one food touches or drips onto another food type. This can happen if raw meat is stored above ready-to-eat meals, such as a chicken placed in the fridge above an uncovered sandwich. The juice can easily drip onto the meal below and contaminate it. And, as Dr Michael Greger puts it: "That chicken juice isn't juice – it's essentially raw faecal soup."

Contamination can also happen indirectly, when bacteria on hands, equipment, work surfaces, or utensils are spread on to food.

For example, if raw chicken is prepared on a chopping board and the board isn't washed before preparing a ready-to-eat meal such as a salad, harmful bacteria can be spread from the chopping board to the ready-to-eat food.

Some common types of bacteria are described overleaf.

CAMPYLOBACTER

Campylobacter is the UK's most common cause of bacterial food poisoning; estimated to cause around 300,000 cases of food poisoning and 15,000 hospitalisations each year (Food Standards Agency, 2010a). Around 70 of these cases are fatal.

Like *Salmonella* and *E. coli*, *Campylobacter* are bacteria found in the intestines of many animals, whether they are reared organically or non-organically. Most commonly they are found in poultry (Newell and Fearnley, 2003) but they're also in red meat, unpasteurised milk and untreated water.

Chicken is the largest single source of *Campylobacter* poisoning. And it only takes a few days for an entire flock to be infected. It is more common in free-range and organic birds because *Campylobacter* is widespread in the environment (Newell and Fearnley, 2003).

In people, the bacterium causes severe abdominal pain and often bloody diarrhoea, too. Vomiting is not normally a symptom. Rare but serious long-term effects can develop, such as Reiter's Syndrome, a type of arthritis. Around one in a thousand people infected with *Campylobacter* go on to suffer Guillain-Barré Syndrome (GBS), a neurological condition that can be fatal (Ellis, 2007).

Markus Babbel, a former international footballer, contracted GBS in 2001. He lost almost an entire year of his footballing career and never again showed the same level of ability. And according to a peer-reviewed study in 2003, it was also more likely that former US President, Franklin D. Roosevelt's, paralysis was GBS, even though it had long been attributed to polio (Goldman *et al.*, 2003).

Recently, in May 2009, a brewery was fined £5,100 after guests at a wedding reception in Chislehurst (London) were struck down with a serious outbreak of *Campylobacter* food poisoning. It was linked to homemade chicken liver pâté and a soft-centred chocolate pudding made from unpasteurised eggs, which were on the wedding reception menu.

Twenty-nine guests at the wedding complained of diarrhoea and vomiting. Nine cases were confirmed as *Campylobacter* (FoodHACCP.com, 2010a).

As one expert report explains, *Campylobacter* infections in people can only be reduced when its prevalence and concentration in retail poultry are reduced (Food Standards Agency, 2009). Indeed, *Campylobacter* is a common finding in chickens on supermarket shelves, and can even survive for three months on chickens that have been frozen (O'Brien, 1997).

The most recent figures suggest that most chicken sold in the UK contains *Campylobacter*. The survey, by the FSA, checked over 3,000 samples of fresh chicken for *Campylobacter*. Sixty five per cent were contaminated with traces of the bacteria (NHS Choices, 2009).

SALMONELLA

Salmonella bacteria are often found in raw meat and poultry. There are 2,000 different types, and the intestines of chicken act like a reservoir and

provide the potential for the spread of bacteria.

According to a government survey, organic laying hen farms seem to have a lower level of *Salmonella* than caged hens. The study showed that around a quarter (23.4 per cent) of farms with caged hens tested positive for *Salmonella* compared to 4.4 per cent in organic flocks and 6.5 per cent in free-range flocks (*The Veterinary Record*, 2007).

Salmonella poisoning can cause vomiting, diarrhoea, severe abdominal pain, and fever lasting for several days. You can be ill with it for up to three weeks, but may continue to carry the bacterium for up to three months or longer after the symptoms have eased. When it spreads to the blood and other organs, it can be fatal. *Salmonella* cause between 50 and 100 deaths in the UK every year.

Normally, relatively large numbers of bacteria would be needed to make healthy adults ill. But vulnerable groups, such as the very young, the elderly and immuno-compromised can be infected by lower numbers.

A recent FSA survey of retail chicken showed that about six per cent of chickens were contaminated with *Salmonella*. And the bacterium can be spread easily around the kitchen. It can also be passed into dairy products such as eggs and unpasteurised milk.

Foods that contain raw eggs, such as homemade mayonnaise, ice cream, cake mix and mousse, carry the risk of *Salmonella*. The FSA advises that people should avoid eating raw eggs or uncooked foods made from them. Pregnant women, babies, toddlers, and elderly people, and people who are already unwell, should be particularly careful when it comes to eggs and egg-dishes. The vegan versions of these products, such as egg-free mayonnaise and scrambled tofu, are of course egg-free.

E. COLI

As with *Campylobacter* and *Salmonella*, the presence of Escherichia coli, known as *E. coli*, in undercooked food is a sign of faecal contamination – from the meat, dairy and egg industries (Schoenl and Doyle, 1994).

Most strains are harmless but the strain called *E. coli* 0157:H7 can cause serious illness. Most cases of *E. coli* food poisoning occur after eating undercooked beef or drinking unpasteurised milk.

If you're infected with *E. coli*, you might get abdominal cramps and bloody diarrhoea. In extreme cases it can progress to kidney failure, seizures, coma and death. *E. coli* 0157:H7 infection is a leading cause of acute kidney failure in children.

Urinary tract infections (UTIs): an unpleasant complication

Additionally, millions of people develop 'extra-intestinal' *E. coli* infections – urinary tract infections (UTIs). These can invade the bloodstream and cause death. UTIs are among the most common infectious diseases in women – and may well be linked to eating meat.

Scientists have warned that the *E. coli* found in animal carcasses is becoming resistant to antibiotics. This is because of antimicrobial agents used in food-animal production (see page 12). A BBC

investigation in 2005 found that about half of British chickens contained antibiotic resistant *E. coli* bacteria – resistant to the antibiotic Trimethaprim, used to treat UTIs.

Scientists suspect that by eating chicken and other meat, women infect their lower intestinal tract with antibiotic-resistant bacteria, which can then creep up into their urethra, causing a UTI. A BBC 1 television report expressed concerns that: "these types of bacteria could make infections in humans more difficult to treat" (ElAmin, 2005).

LISTERIA

Listeria bacteria are common and have been found in a range of chilled ready-to-eat foods including pre-packed sandwiches, pâté, butter, soft cheeses, cooked sliced meats and smoked salmon. The bacteria are unusual in that they can flourish at very low temperatures, such as in refrigerators. They can also survive vacuum packing and even microwave cooking! (Gundavarapu *et al.*, 1995).

Contracting listeriosis, an illness caused by *Listeria*, produces flu-like symptoms and is a big risk for pregnant women. It can lead to blood poisoning, miscarriages and stillbirths, and can produce abscesses, meningitis, septicemia and death.

People aged over 60 who have a weakened immune system are more likely to pick up an infection. For example, people who have had a transplant, those taking drugs, or with an illness that weakens the immune system, such as leukaemia, may be more vulnerable.

According to the FSA, listeriosis has increased, especially in this age group. In 2007, 455 people in England and Wales were treated for listeriosis. One hundred and sixty two of those cases were fatal. This was one-fifth more than the year before, and almost double the figure for 2000.

To minimise the risk of listeriosis, consumers are advised to:

- **make sure that the fridge is set at 5ºC or below and working correctly**
- **eat foods within four hours of taking them out of chilled storage (or otherwise throw them away)**
- **use food before its 'use by' date**
- **use opened foods within two days, unless the manufacturer's instructions state otherwise (Food Standards Agency, 2010b).**

But research findings published by the FSA suggest that people aged over 60 are more likely than younger people to take risks with 'use by' dates. Less than half of this age group recognise 'use by' dates as a way of checking whether or not food is safe. Forty per cent would eat dairy products up to three days past their use-by date.

Dr Andrew Wadge, Chief Scientist at the FSA, said: "The rise in *Listeria* food poisoning among older people is worrying. *Listeria* can make people very ill, and 95% of cases end up needing treatment in hospital" (Food Standards Agency, 2010c).

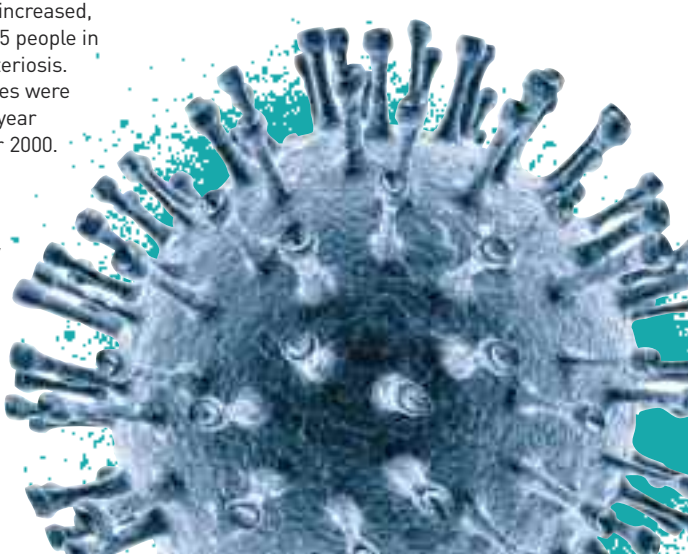
Vulnerable groups are advised to avoid soft cheeses and all types of pâté, including vegetable pâté.

2. VIRUSES

WHAT ARE VIRUSES?

Viruses are smaller and simpler than bacteria. They can't reproduce unless they are inside a living cell, such as that of an animal, plant or bacteria. Some viruses infect and destroy cells, and some co-exist with their host.

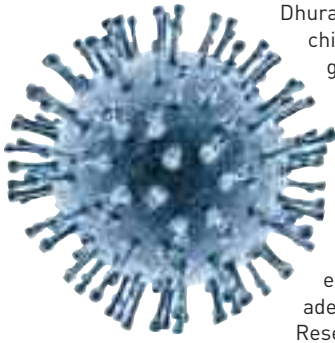
Two common causes of viral food poisoning are the rotovirus and the norovirus. People infected with either virus can contaminate food if they don't wash their hands properly after going to the toilet, and then handle food.



Hepatititis A and E viruses are also spread by the faecal-oral (anus to mouth) route. Hepatitis E is worth a special note, and is discussed below.

HEPATITIS E

Hepatitis E is an example of viral hepatitis. This is common, and responsible for a considerable amount of illness, lasting up to six months. The fatality rate is between 0.5 and 3 per cent. Alarmingly, one in five pregnant women who are infected with hepatitis E will die.



The incubation period ranges from 15 to 60 days, and the virus tends mostly to affect young adults aged 20 to 30.

Hepatitis E virus (HEV) can be transmitted to people via shellfish, pigs, boar, deer and their flesh and entrails (as meat and offal) (Teo, 2010).

Data from Feagins and colleagues (2007) showed that pig livers sold in grocery stores in the USA are contaminated with HEV and that the contaminating virus remains infectious. Scientists are still unsure whether cooking inactivates it.

It is also possible that the relatively high HEV antibody prevalence in normal blood donors in the USA and other countries may be from people eating HEV-contaminated pork products.

ONCOGENIC (TUMOUR-CAUSING) VIRUSES

Some viruses passed from animals to humans may be cancer-causing. Johnson and colleagues (2010) studied deaths from cancer in 2,580 people who had worked at some point in poultry slaughtering and processing plants.

They compared the causes of death in poultry workers with that in the US general population. They found higher rates of a range of cancers, including of the nasal cavity, oesophagus, rectum/anus and liver, either affecting particular subgroups of workers, or affecting the entire poultry group, depending on the type of cancer.

They suspect that an excess of at least some of these cancers in the poultry workers can be explained by oncogenic (tumour-causing) viruses in poultry, and exposure to fumes.

ADENOVIRUS

Observational studies suggest that chickens infected by the so-called 'adenovirus' gain excess fat. This was confirmed by a study by Dhurandhar *et al.* (1992) who found that chickens that were given adenovirus gained less weight, but more body fat compared with normal (control) chickens. These changes couldn't be explained by differences in their diets, suggesting that the adenovirus was to blame.

But could this exert a similar effect on people who eat adenovirus-infected chicken? Possibly. Researchers at the American Cancer Society followed more than 75,000 people for a decade to find out what it was that caused their weight loss and weight gain. High meat consumption was the food most responsible for them putting on weight (Kahn *et al.*, 1997). Whether men or women, if they had more than a single serving of meat a day, they showed a 50 per cent increase in 'abdominal obesity' – they put on the pounds around their middles.

A similar study was conducted in Denmark more recently. Of the 22,570 people followed over five years, for women, a diet high in poultry (and potatoes and processed meat) was associated with weight gain round their middles (Halkjaer *et al.*, 2009).

3. PARASITES

Food poisoning from parasites is rare in the UK and won't be discussed in detail here. It is much more common in developing countries. When it does occur, it is usually caused by toxoplasmosis.

Toxoplasmosis is caused by a parasite found in the digestive systems of many animals, particularly cats. People can develop toxoplasmosis by eating undercooked contaminated meat, or by eating or drinking food or water contaminated with infected cat faeces.

4. TOXINS

In April 2009, three suspected cases of food poisoning were linked to fresh tuna steaks sold at a Tesco store in Inverness. These cases were of scrombotoxin poisoning, caused by toxins produced in fresh fish that haven't been stored at the right temperature. Symptoms include flushing, sweating, headache, rash, diarrhoea and nausea (FoodHACCP.com, 2010b).

But even independently of how they are stored, there is a risk that all oily fish – such as tuna, mackerel, sardines, trout and salmon – could be contaminated by toxic chemicals.

All of the world's oceans and rivers are polluted with toxic chemicals, mainly as a result of decades of industrial activity. The main contaminants in oily fish are chemicals called polychlorinated biphenyls (PCBs) and dioxins (Consumers' Association, 2002).

The Scientific Advisory Committee on Nutrition, which provides independent expert advice to the Department of Health and other government agencies and departments, states that: "PCBs are very persistent chemicals which are [everywhere] in the environment and are generally present in low concentrations in foods, especially fat-containing foods including milk, meat and fish" (SACN, 2004).

Because they accumulate in fat, PCBs are particularly likely to be present in oily fish. They are implicated in heart disease, cancer and infertility. And they can also harm developing foetuses by disrupting the development of male babies' reproductive organs.

While the levels of toxins in contaminated fish are thought to be low, they could still be a risk to unborn babies. Pregnant women and women who might have a baby one day are advised not to eat more than two portions of oily fish a week.

Some fish contain a high level of mercury, which can also damage an unborn baby's nervous system. Therefore, pregnant women are advised to avoid eating shark, swordfish, marlin, and more than two tuna steaks a week (or four medium cans of tuna a week).

For more information, see the VVF guide, *Fish-free for Life*, available from the VVF (0117 970 5190 or by visiting www.vegetarian.org.uk).

ANTIBIOTICS

There is growing public awareness of antibiotic resistant bacteria and superbugs. But if media reports are anything to go by, most believe the problem is a result of doctors over-prescribing antibiotics. The global use in livestock farming for treating diseases (therapeutic), preventing diseases (prophylactic) and simply to make animals grow faster (growth-promoting) is rarely mentioned.

Despite an EU-wide ban on growth-promoting antibiotics added to animal feed from 1 January 2006, similar quantities of antibiotics are now given for 'disease prevention' (resulting in the desired growth promotion)!

Antibiotic use in farmed animals is a serious threat to human health. Farm use of antibiotics has caused antibiotic resistance to medical drugs in several types of food poisoning, such as *Salmonella*, *Campylobacter* and *E. coli*. Resistance in these food poisoning bacteria has come about mainly from using antibiotics routinely to prevent disease.

In simple terms, antibiotics have been massively overused by farmers in intensive farms to make the animals grow quickly and 'efficiently' and to attempt to stop the rapid spread of disease. This overuse has led to bacteria becoming resistant to the drugs, so that they no longer work when they are used to treat humans (see page 9).

Despite a wealth of scientific interest and

numerous recommendations advocating a change in practice (eg WHO, 1997; National Research Council & Institute of Medicine, 1998; Advisory Committee on the Microbiological Safety of Food, 1999; Soil Association, 1998), the drugs are still administered and the scale of antibiotic resistance has grown.

The British Medical Association's former chairman summed up what many people now believe, stating: "There is a real prospect that the majority of our antibiotics could become impotent for the purposes upon which we have relied upon them for 40 years."

Research in the journal *PLoS Medicine* (2007) confirms that transmission of the bugs from agriculture had a greater impact on humans than over-prescribing. Indeed, when Denmark banned growth-promoting antibiotics there was a drop in the prevalence of resistant bacteria in farmed animals, around farms, on meat and in people. Both the source and the remedy seem pretty clear.

A worrying example of a superbug from farmed animals transferring to humans is happening in the Netherlands. The superbug methicillin-resistant *Staphylococcus aureus* (MRSA) has developed amongst intensively farmed pigs, chickens and other livestock on the Continent.

MRSA in farmed animals has already transferred to farmers, farm-workers and their families in the Netherlands, causing serious health impacts. Forty per cent of Dutch pigs and 50 per cent of pig farmers have been found to carry farm-animal MRSA (Soil Association, 2007). In the Netherlands, MRSA has been found in 20 per cent of pork, 21 per cent of chicken and 3 per cent of beef on sale to the public. Dutch scientists and government officials blame this new strain of MRSA in farmed animals on the high levels of antibiotics used in intensive livestock farming (Soil Association, 2007).

AVOIDING FOOD POISONING

Outside the fridge, just 10 invisible germs can multiply to 1,000 in six hours. According to Andrew Wadge, the FSA's chief scientist, smelling food isn't enough – you can't smell *Salmonella*, *E.coli* and *Listeria* – all potential killers.

Most bacteria grow best and increase in number in a moist environment between a temperature 'danger' zone of between 5°C and 60°C. Most bacteria can't grow effectively at temperatures above or below this.

The FSA advises: "It's very important to cook meat properly to make sure that any harmful

bacteria have been killed. Otherwise you might get food poisoning" (Food Standards Agency, 2008).

Unfortunately, you could be stuck between a rock and a hard place. Thoroughly cooked meat may increase the risk of cancer. The temperature required to kill these faecal bacteria (160ºF/71ºC) is the same temperature which produces carcinogenic (cancer-causing) compounds called heterocyclic amines.

HETEROCYCLIC AMINES (HCAS)

Heterocyclic amines, or HCAs, are a group of hazardous chemicals linked to cancer in humans. They are produced when many animal products are cooked – including chicken, beef, pork and fish. Even normal grilling, frying or roasting can produce significant quantities of HCAs (Skog *et al.*, 1998; Robbana-Barnat *et al.*, 1996; Thiebaud *et al.*, 1995). The longer and hotter the meat is cooked, the more these compounds form (Knize *et al.*, 1994). Consequently, the concentrations of HCAs in different meats can vary by more than 100-fold.

In January 2005, HCAs were added to the US federal government's list of known carcinogens (US Department of Health and Human Services, 2005). Several HCAs also occur in tobacco smoke and diesel exhaust.

Even at low concentrations, HCAs have been shown to induce DNA damage and initiate cancer (Felton *et al.*, 2002).

According to Dr Michael Greger: "Although there are cooking methods that result in lower carcinogen concentrations (marinating followed by a microwaving pre-treatment and pouring off of the 'juices', followed by relatively low-temperature frying with frequent flipping), there does not seem to be a way to cook meat to an internal temperature necessary to kill off [food poisoning] bacteria without producing at least some carcinogenic compounds.

"And even low doses have been shown to cause human DNA mutations which could lead to cancer" (Greger, 2005).

PROTECTING YOURSELF AND YOUR FAMILY FROM FOOD POISONING

The individual alone is limited in what he/she can do to ensure that food is safe to eat. As long as intensive farming, slaughterhouses and processors exist, controlling food poisoning is effectively out of our hands. But we can choose what we eat, how we cook and serve it. A vegan household is extremely unlikely to cause food poisoning as it contains no animal products. Almost all cases of food poisoning originate from meat, fish, shellfish and dairy products or from plants contaminated with animal products. A vegan diet is by far the safest for you, your family – and the planet.

For inspiring recipes and meal ideas, visit www.vegetarianrecipeclub.org.uk, www.viva.org.uk or www.vegetarian.org.uk or call Viva! on 0117 944 1000.

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Viva!

STOP Bugging me!

Food poisoning affects around 850,000 of us in the UK every year – enough to fill Wembley Stadium almost ten times over. It can feel like a full on battle between your body and the food you have eaten!

The fact is that almost all food poisoning germs originate from animal farming and animal foods.

This guide explains:

- the major causes of food poisoning
- what are the nasties... bacteria, viruses and superbugs?
- what happens when you are poisoned
- the steps you can take to avoid a war with bugs!
- why going vegetarian or vegan protects you and your family.

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ISBN 978-0-9561094-7-7

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£1.50