

The role of local government in managing disease risks in rural areas

Local authorities have responsibilities in relation to a range of diseases which affect people and/or livestock. How are these risks changing and how might the latest research from the Rural Economy and Land Use Programme help relevant staff in local authorities to play their part in managing them?



**Policy and Practice notes
for local government**

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The Rural Economy and Land Use Programme is a UK-wide research programme carrying out interdisciplinary research on the multiple challenges facing rural areas. It is funded by the Economic and Social Research Council, the Biotechnology and Biological Sciences Research Council and the Natural Environment Research Council, with additional funding from the Scottish Government and the Department for Environment, Food and Rural Affairs.

Some diseases that affect livestock or wild animals, such as Lyme disease, are endemic – meaning they are constantly present. Others, such as Foot and Mouth disease, are characterised by specific outbreaks. Some diseases are zoonotic – they may be passed onto humans. The threats are diverse and changing. New diseases are arriving in the UK as a result of expanding trade, increased travel and climate change and the incidence of disease, and its impacts, may also increase with changed environmental conditions. The Health and Social Care Bill is expected to strengthen the role of local authorities in protecting and improving public health.

How are local authorities involved?

Local authority staff, across many functions, have diverse roles in relation to disease risks. These include:

- Regulating food hygiene, animal feed hygiene, animal health and welfare, private drinking water supplies, and farm attractions.
- Working with other public bodies, through resilience forums, to manage major disease outbreaks which affect people and/or animals, from detection through to recovery.
- Managing recreational sites, such as parks, gardens, woodlands, open country, beaches, and swimming pools, where ensuring public safety is a critical concern.

The costs to local authorities of dealing with disease risks can be significant, especially in the case of a major outbreak (e.g. of Avian influenza). If this work is not properly resourced, there is a risk that local authorities could fail to perform their legal duties, or even face charges of negligence.

How is research helping us to manage disease risks?

Relu projects are examining a range of disease risks in the countryside, including *E. coli* O157, Lyme disease, Cryptosporidiosis, Avian influenza and Foot and Mouth disease, and some are considering possible further threats.

Understanding risks

Relu research is improving our understanding of risk factors in relation to several diseases. For example, in tackling Lyme disease, it is important to know:

- How tick abundance varies (e.g. diurnally, seasonally, by habitat).
- How many people visit sites where ticks are present and active.
- Why people visit these sites (e.g. to walk, cycle, or pick blackberries).
- How recreational activity varies (e.g. diurnally, seasonally, and with the age of the visitor).

Researchers are bringing these factors together in a model to help predict the risk of people being bitten by ticks, and to inform strategies to manage the likelihood and impact of infection.

A better understanding of risk factors will help in developing management strategies and improving decision-making during outbreaks. Actions which local authorities can take to improve understanding, by collecting and sharing relevant information, include:

- Encouraging land managers and countryside visitors to be vigilant and to report disease outbreaks or potential risks.
- Fulfilling reporting obligations under relevant legislation (e.g. providing returns to the Drinking Water Inspectorate in relation to private water supplies).
- Gathering and sharing feedback from people directly affected by disease, or involved in managing it (e.g. farm managers, visitors, visitor centre staff, veterinarians, and Trading Standards officers).
- Sharing and discussing information on disease risks within resilience forums and with other local authorities, relevant professional bodies, and interested national organisations.

Developing strategies

Relu research offers some important guidelines for developing strategies for managing disease:

- **Learn from previous experience:** what actions were taken, what these cost, and what benefits were gained, can usefully inform actions to prevent, anticipate, alleviate and recover from future disease outbreaks.
- **Integrate different sorts of information to produce a rounded picture:** for example, the *E. coli* O157 project successfully brought together the outputs of quantitative risk assessment, expert opinion, and cost benefit analysis to assess the effectiveness and practicality of over 130 proposed interventions to manage the risks of infection.
- **Recognise that there is uncertainty about disease risks:** strategies may need to be adapted to changing situations (e.g. if a strain of Avian influenza emerges as a real threat to humans), or to new knowledge (e.g. on the incidence and spread of a disease).
- **Promote collective responsibility in tackling disease threats:** for example, by encouraging land and site managers to act responsibly to prevent and contain diseases, and ensuring that all relevant public bodies deploy their limited resources effectively.

Identifying practical actions

Past experience can suggest practical options for tackling disease:

- **Solutions adopted in tackling one disease may be applicable to others, with minimal adaptation. If so, this will save time and costs and may bring valuable wider benefits.**

For example, providing agri-environment incentives to help farmers fence livestock out of watercourses could:

- Reduce the risk of contamination of drinking water, not only from *Cryptosporidium*, but also from *E. coli* O157. This applies both in the case of rivers which provide public water supplies, and of streams or springs used as private water supplies.
 - Reduce transfers of a range of faecal indicator organisms to watercourses, thereby improving compliance with water quality standards for bathing water and freshwater fish, and helping to protect downstream fish-farming and shellfish businesses.
 - Reduce bank-side erosion, thereby reducing potential losses of phosphorus, nitrogen and sediment to watercourses, and improving biodiversity. This will in turn contribute towards the water quality outcomes sought by the Water Framework Directive.
 - Reduce risks not only in the immediate vicinity but also further away. Pathogens from livestock which enter a stream in an upland grassland catchment can impact on the health of bathers and surfers on beaches many miles away.
- **Adopt a proportionate approach in assessing options for action, taking account of costs and benefits.**
- For example, in tackling the risk of contracting Lyme disease:
- One option may be to reduce tick populations by controlling vegetation, managing animal populations, or spraying acaricides. However, this approach may be relatively ineffective or expensive, or have unwanted impacts on other wildlife.
 - Another option may be to manage how people use recreational sites by erecting signs, excluding access from some areas, or diverting paths. However, visitors may resent being restricted in this way and feel that their enjoyment has been reduced.
 - A further option may be to seek to influence behaviour by raising awareness of the risk of infection and of how people can reduce it themselves. This approach may be

relatively cost-effective, but only if people receive and heed the advice given.

— **Be alert to possible unintended consequences.**

For example:

- ‘Boil water’ notices are sometimes issued to tackle *Cryptosporidium* in drinking water, but this may lead to more domestic burns or scalds.
- Farmers are required to present animals for slaughter as ‘clean’, to safeguard food, but this may result in more fractured limbs among stockmen.

Influencing behaviour

Local authorities can usefully support a range of actions to influence behaviour and reduce risks. It is important to target the right people, at the right time, in the right way.

For example, it is unlikely that one leaflet alone will be able to encompass all the guidance needed by regulatory staff, land managers and the public to tackle threats such as *E. coli* O157 or Avian influenza.

Some key messages from Relu research for local authorities include:

- **Actively engage stakeholders who can take action to reduce risks.** This is critical where people are not convinced that their actions are contributing to the risks or are reluctant to take action because of the cost. This can be a challenge, for example, in relation to the management of livestock waste. It is important in such cases to be able to provide clear local evidence of risks and impacts. It may also be helpful to work with voluntary organisations that are trusted as sources of advice. Personal approaches from sympathetic and knowledgeable advisers can often be effective.
- **Define who is at risk and target and time messages accordingly.** For example, in tackling risks from *E. coli* O157 at farm attractions, separate messages may need to be developed and made available, both in advance, and at the site itself, for:
 - Parents: e.g. highlighting the risks to young children, and the possibility that family dogs could be a source of infection if their fur becomes contaminated.
 - Vulnerable adults: elderly people, pregnant women, and

people with impaired immune systems.

- Teachers leading school trips: e.g. providing information in advance on what clothing to recommend, and on site about specific precautions to be taken.
 - Farm staff: e.g. encouraging them to be particularly alert to the risks to vulnerable groups, and to lead by example in demonstrating appropriate behaviours.
- **Provide prompts or ‘nudges’ which raise awareness of disease risks.**
- For example:
- Promote appropriate messages on web sites, in written and display materials, and through any informal contact between staff and members of the public.
 - Dispense tick removal tools on the counter at visitor centres and information points.
 - Provide plenty of facilities at farm attractions to enable visitors (including children) to wash their hands after any contact with livestock and before eating any food.
 - Ensure that local authority staff exemplify good behaviours which minimise disease risks when they interact with visitors and other stakeholders.
- **Promote a range of straightforward preventative actions and encourage people to adopt these as part of their normal behaviour.**
- For example:
- ‘Wash your hands thoroughly with soap and water, after any contact with livestock, or fences or other surfaces around them, and before eating any food, to reduce the risk of infection from *E. coli* O157. Using gels or wipes will not be sufficient.’
 - ‘Check for ticks within 24 hours of a walk, and remove them safely, using a tick removal tool, to reduce the risk of contracting Lyme disease. Wear full-length trousers, tucked into your socks, and shoes, not sandals. Use insect repellents.’

Diseases reviewed in this Note

***E. coli* O157**

Hazard: A bacterium *Escherichia coli* O157.

Impacts: Causes mild to severe bloody diarrhoea. Can cause two potentially-fatal conditions, Haemolytic Uraemic Syndrome and Thrombotic Thrombocytopenic Purpura that affect the blood, kidneys and sometimes the central nervous system.

Sources: Consuming meat products or water contaminated with livestock waste, or direct or indirect contact with infected water, soil, livestock, or waste.

At risk: People living in, or visiting, the countryside, especially infants, young children and elderly people.

Incidence: Certain strains of *E. coli* commonly live in the intestines of healthy people and animals without causing any ill effects. Other strains do, rarely, cause illness in people. In particular, *E. coli* O157 infects about 1,000 people per year in Britain. The infectious dose of this bacterium is very low (<100 bacterial cells). Infection spreads rapidly in families, particularly those with infected children, and in day nurseries. Outbreaks at farm attractions have caused particular concern.

Local authority role: Regulating aspects of food hygiene, illegal food imports, animal feed hygiene, the quality of private water supplies and bathing waters, and farm attractions.

Lyme disease

Hazard: A bacterium *Borrelia burgdorferi*.

Impacts: Causes Lyme borreliosis (Lyme disease). Symptoms include a fever and often a distinctive but painless rash. If it is untreated, severe health impacts can result.

Sources: People become infected after being bitten by hard-bodied ticks (*Ixodes* species) which have previously fed on birds or mammals carrying the bacterium in their blood. The infection is carried by only a small proportion of ticks. It is unlikely to be transmitted if the tick is in place for less than 24 hours. Ticks are present in many habitats, including forests, deer parks, heathland, moorland and grassland.

At risk: Recreational visitors to forests and the open countryside, and people working on the land (e.g. forestry workers, deer managers, gamekeepers and farmers). People of all ages and both sexes are susceptible, with the highest proportion of cases occurring in people between the ages of 30 to 59 years.

Incidence: The disease is rare in the UK: about 1,400 cases were recorded in 2009 (of which about 200 were acquired overseas). Many cases were from areas with high recreational use (e.g. Exmoor, New Forest, South Downs, Thetford Forest). Recent apparent increases in the incidence of the disease (e.g. of 27% between 2008 and 2009) may in part reflect greater awareness and improved diagnostic methods.

Local authority role: Managing town parks and gardens, country parks, local nature reserves, woodlands, moorlands and other sites where infected ticks may occur.

Avian influenza

Hazard: A disease of birds caused by viruses closely related to human influenza viruses.

Impacts: Only significant for people where Avian influenza is transformed into a form that causes severe disease in humans and spreads easily from person to person.

Sources: Infected wild birds and poultry. 'Highly pathogenic Avian influenza' can cause large outbreaks which spread rapidly and cause high mortality in poultry.

At risk: Influenza viruses circulate all the time but vary in their severity. For example, the H1N1 'swine flu' pandemic virus which emerged in Mexico in 2009 has caused severe illness and death in a small proportion of cases, particularly in vulnerable groups. The threat of a more severe and disrupting pandemic remains.

Incidence: The H5N1 virus has caused substantial outbreaks of Avian

influenza, with high mortality of poultry in several countries. Transmission to humans in close contact with poultry or other birds occurs rarely and only with some strains of Avian influenza. The H5N1 outbreak in Hong Kong in 1997 led to 18 human cases with 6 deaths. All these cases were linked to exposure to live infected poultry.

Local authority role: Contributing to local resilience activities by responding to outbreaks and their ensuing economic, social and environmental impacts.

Cryptosporidiosis

Hazard: A protozoan parasite, *Cryptosporidium*.

Impacts: Causes an infection, Cryptosporidiosis, which is characterised by mild to severe diarrhoea. If *Cryptosporidium* infects public water supplies, it can cause many cases at any one time, with widespread disruption. The organism's oocysts, which are very small (4-5 microns in diameter), are resistant to chlorination.

Sources: *Cryptosporidium* is found in soil, food and water. Transmission occurs through animal-to-human or human-to-human contact. Consuming contaminated water or food, or swimming in contaminated water bodies, can also lead to infection.

At risk: People depending on private water supplies in rural areas.

Cryptosporidiosis is most common in children aged between 1 and 5 years, but it can affect anyone. People with weak immune systems are likely to be most seriously affected.

Incidence: About 5,600 cases of Cryptosporidiosis were reported in the UK in 2009, a 14% increase on 2008. This includes some cases associated with foreign travel.

Local authority role: Monitoring water quality for private water supplies, and providing information to the public on the quality of water at designated bathing beaches. Local authority swimming pools may also be a source of infection.

Foot and Mouth disease (FMD)

Hazard: A highly infectious viral disease of cloven-hoofed animals, in particular cattle, sheep, pigs and goats. It can also affect deer and camelids. The disease causes fever, followed by the development of blisters in the mouth and on the feet.

Impacts: While FMD is not normally fatal to adult animals, it is debilitating and causes significant loss of productivity (e.g. milk yields may drop or the animals may become lame). In young animals it can be fatal on a large scale. Outbreaks, if not quickly contained, can spread rapidly, and devastate entire livestock sectors. Six million animals were culled during the FMD epidemic of 2001, resulting in losses of £3.1 billion to agriculture and the food chain. The Government paid £2.5 billion in compensation for slaughtered animals and in disposal and clean-up costs. There were damaging knock-on impacts on rural businesses, and on tourism nationally.

Sources: FMD is endemic in parts of Asia, Africa and South America with sporadic outbreaks in disease-free areas. The virus is present in the fluid from the blisters, and it can also occur in saliva, milk and dung. It can also spread in the air, and through the movement of contaminated animals, people and vehicles.

At risk: FMD is not a threat to public health. Reported cases in humans have been mild and self-limiting, no human-to-human transmission has ever been reported, and the disease is not transmitted to humans through the food chain.

Incidence: Some 2,030 farms were directly affected by the FMD outbreak in the UK in 2001. An incident in south-east England in 2007 involved eight confirmed cases.

Local authority role: Contributing to local resilience activities by responding to outbreaks and their ensuing economic, social and environmental impacts.

What is distinctive about Relu research?

Relu projects differ from many others because they:

- Involve multiple disciplines, often drawing on expertise from several academic institutions.
- Provide integrated social, economic and environmental perspectives on current issues.
- Obtain inputs from people and communities affected by the issues they are studying.

Relu research is firmly located in the real world, where experts disagree, difficult decisions have to be made between competing priorities, people need practical solutions, and issues can be a source of political controversy.

Relu scientists challenge and learn from the assumptions and perspectives of different disciplines and institutions. They 'cover all the angles', not just adopting one narrow perspective in framing the issues. Their integrated approach to research helps to create rounded solutions.

The projects involve people and communities with a direct stake in the issues. This helps the research to focus on questions which matter in the real world, and to provide practical solutions which can readily be adapted to local conditions.

Further information

This Policy and Practice Note was written by Alan Woods. It draws mainly on the work of the following Relu projects:

- Reducing *E. coli* risk in rural communities.
- Assessment of knowledge sources in animal disease control.
- Assessing and communicating animal disease risks for countryside users.
- Sustainable and safe recycling of livestock waste.

More information (including copies of Policy and Practice Notes relating to specific projects), is available from the Relu website www.relu.ac.uk/research, or by e-mailing relu@ncl.ac.uk.

Useful resources

The 'Zoonoses Report UK 2009', published by Defra, provides up-to-date accounts for Cryptosporidiosis, Lyme disease, Avian influenza and many other zoonoses (www.defra.gov.uk)

The following web sites provide information on the diseases mentioned, including statistics, where available, and guidance notes on disease risks, how to prevent infection, and treatment:

***E. coli* O157, Cryptosporidiosis, Lyme disease, and Avian influenza: Health Protection Agency (www.hpa.org.uk) and Health Protection Scotland (www.hps.scot.nhs.uk).**

Foot and Mouth disease: Department for Environment, Food and Rural Affairs (www.defra.gov.uk).

The individual Relu project web sites also provide further detailed information and useful links. They are accessible via www.relu.ac.uk/research.
