

# EXECUTIVE SUMMARY



## Introduction

In August and September 2009 an outbreak of *Escherichia coli* O157 led to severe illness in a number of visitors to Godstone Farm in Surrey. The Health Protection Agency (HPA) established an independent investigation of the outbreak, the factors that contributed to it and its subsequent handling. The purpose of the investigation was to analyse the events of the outbreak, make recommendations to reduce the risk of those who visit Open Farms contracting *E. coli* O157 and to improve the health protection response to future outbreaks of this infection.

## *Escherichia coli* O157

*E. coli* O157 infection is relatively uncommon but, because the illness it causes (bloody diarrhoea which can be complicated by haemolytic uraemic syndrome [HUS]) can be severe or fatal, it remains a serious public health issue.

*E. coli* O157 is a highly virulent organism; it can survive for long periods of time in the environment; ingesting just a few organisms, possibly between 10 and 100, can cause illness in humans; young children (particularly under five years of age) and older people (particularly over 75 years of age) are very vulnerable; the illness can be very serious and is sometimes fatal; after recovery from illness some people are left with permanent kidney or brain damage. There is currently no recognised, specific treatment other than good supportive care, but there are opportunities for new treatments.

*E. coli* O157 is commonly carried by animals and ruminants are considered the major reservoir of infection, although the organism has been found in a wide variety of animals. *E. coli* O157 causes no clinical signs of infection in animals, but may colonise the rectum of cattle and these colonised animals greatly increase the potential for spread of *E. coli* O157 in their faeces. There are no established on-farm control options, so all ruminants need to be considered as infected by *E. coli* O157.

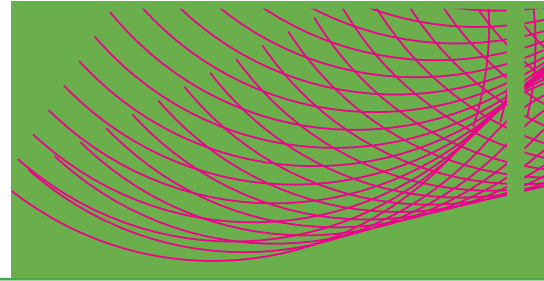
A variety of sources have been identified for *E. coli* O157 outbreaks in humans, including foodborne, waterborne, person-to-person spread and animal contact. The common link is that the organism is excreted in animal or human faeces and gains access to susceptible humans through ingestion. Agricultural and environmental exposures, particularly contact with ruminants, are well recognised causes of *E. coli* O157 human infections, both as outbreaks and sporadic cases.

## Standard Public Health Procedures for *E. coli* O157

Each report of a presumptive *E. coli* O157 infection should be actively investigated and the risk of onward spread assessed. Enquiries relating to contact with animals or animal faeces should always be made. A general outbreak of *E. coli* O157 may be defined as two or more cases from separate households linked to a common source.

Early recognition of an outbreak requires careful investigation and documentation of individual cases, co-ordination and exchange of information between Health Protection Units (HPUs) and Local Authorities (LAs), and an efficient and sensitive national surveillance system. In outbreaks of a zoonotic infection such as *E. coli* O157, the HPA has overall responsibility for managing the outbreak. However, LAs are responsible for enforcement actions at Open Farms.

The specific objectives in the preliminary phase of an outbreak investigation are: to confirm the outbreak or incident is real; to quickly describe the nature and extent of the outbreak; to ensure



immediate steps are taken to identify those who are ill or at risk; to ensure those ill or known to be exposed receive appropriate treatment and care; to control the source and contain the infection; to decide whether the incident requires special arrangements for investigation and management; and to alert those who need to know at local, regional or national levels.

All outbreaks warrant a thorough epidemiological description and analysis.

## **Open Farms**

The types of venue where the public may have animal contact are many and varied. Open Farm enterprises may be large scale and include attractions where animal contact is only one part of the visit. The age profile of visitors with an interest in animal contact is predominantly the under-10s and their parents or carers. There is no national list of Open Farms, but evidence gathered during our investigations suggests that there are several hundred Open Farm enterprises in the UK and that some have visitor numbers in excess of 200,000 per annum.

A variety of non-regulatory organisations are involved with the Open Farm sector. No 'badge' for Open Farms exists to provide the public with reassurance of their adherence to safety standards. Farming and Countryside Education (FACE) is a registered charity that has developed curriculum resources and encourages school visits to farms and other rural locations. The Countryside Educational Visits Accreditation Scheme (CEVAS) is run by FACE and exists for the accreditation of educational visits to farms.

Working agricultural enterprises participate in occasional public events, such as Open Farm Sunday, organised by Linking Environment and Farming (LEAF). LEAF and the National Farmers' Union (NFU) Business Guide Reference 058 offer health and safety advice for farms on open days.

## **The Regulatory Framework for Open Farms**

The legal and institutional framework for protection of human health and the prevention of disease outbreaks in Great Britain is complex. The prevention of an outbreak involves different laws and regulatory authorities from those that are involved in the control of an outbreak of disease.

Separate regulatory frameworks have been set up by Parliament for animal health (including zoonoses), public health, food safety and occupational health and safety. Each regime is the responsibility of a different Government Department, with separate agencies and different mechanisms for delivery of the intended outcomes.

Four separate streams of legislation apply to health hazards that may be present at Open Farms, covering public health, food safety, animal health, and health and safety at work. Prevention of risks to human health arising at Open Farms is governed principally by food safety, and by health and safety law which covers risks to visitors and depends primarily on compliance by farm operators with statutory duties.

There is a wide range of regulatory options for the control of risks to health and safety. Options include prohibition, licensing, regulations, approved codes of practice and non-statutory guidance. Enforcement of health and safety law at Open Farms is the responsibility of LAs, who may seek advice from the Health and Safety Executive (HSE). Inspectors have powers to serve improvement or prohibition notices and to prosecute.



International comparisons show that there is no European Directive for Open Farms but we found some regulations and guidance in North American and Australian States. In addition, the Netherlands is currently strongly considering changing a guidance scheme into a structured enforceable scheme.

### **Description of the Outbreak**

An outbreak of *E. coli* O157 occurred at Godstone Farm in August and September 2009. This is the largest outbreak of *E. coli* O157 linked to an Open Farm to have occurred in the UK. There were 93 people affected, of whom 76 (82%) were under 10 years of age. Of the 78 people with symptoms, 27 (35%) were admitted to hospital and 17 (22%), all of them children, were diagnosed with HUS. Eight of the children with HUS required dialysis, some of whom have been left with permanent kidney damage.

It is possible that some children with HUS will experience long term damage including hypertension and kidney failure. Children with reduced kidney function may need a kidney transplant at some stage in the future.

Laboratory investigations confirmed that there were clear microbiological links between nearly all the cases, since all the cases from whom isolates were available were infected with the same strain of *E. coli* O157. The similarity of human, animal and environmental strains of *E. coli* O157 indicates an outbreak with a common source.

Epidemiological investigations point to the main animal petting barn at Godstone Farm as the source of the outbreak. This is corroborated by the high proportion of faecal samples from animals from the main barn that tested positive. There was also evidence of environmental contamination at the Farm, suggesting that even without direct animal contact there was a risk of infection from contact with railings or soiled footwear.

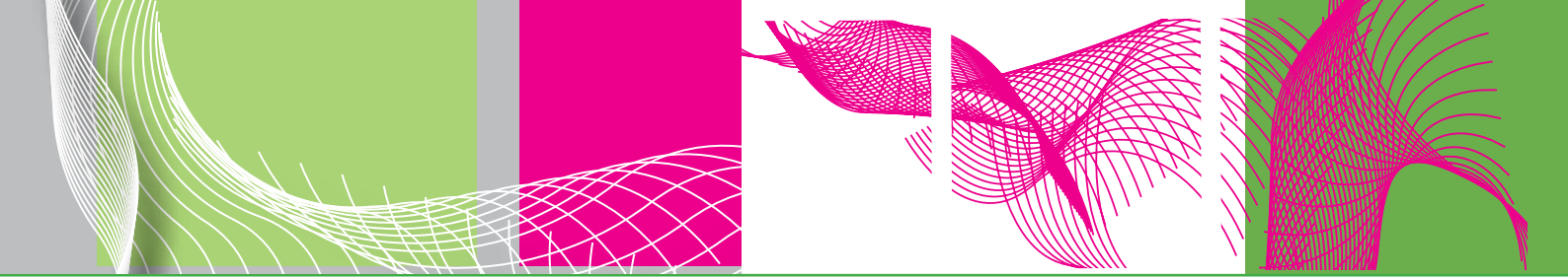
The outbreak ceased after the animal petting barns at Godstone Farm were voluntarily closed on Friday 4 September 2009.

### **The Views of Parents**

The majority of the 20 families who wished to be interviewed were regular visitors to Godstone and said that their children enjoyed visits to the Farm. When asked if there had been anything different about their visit, some noted that the Farm was exceptionally busy. There had been a queue to get in and/or they had to wait to use the handwashing facilities.

All the parents said they were aware of the need to wash their children's hands. A number said they were very careful and had used hand gels. Several commented that the taps were difficult to use, particularly for the younger children, and at most of the sinks there was only cold water. Many of the families commented that there was little supervision by farm staff and considered that there should have been more staff supervision at handwashing and animal contact areas. Most families had noticed signs about handwashing at the Farm but some felt there should have been more.

The majority of parents had heard about *E. coli* but only three were aware of the association with animals and thought this was specifically a problem during pregnancy. None was aware of the association of *E. coli* O157 infection with animal faeces or animal contact in children, or the serious nature of this infection. Communication and advice received by the parents did not appear to be consistent.



Several of the parents made repeated visits to their General Practitioner's surgery or out-of-hours service before the potentially serious nature of bloody diarrhoea was recognised and stool samples were taken. Some decided to present to their local Accident & Emergency Departments and their children were then admitted as their clinical condition deteriorated rapidly.

Many of the families said their experiences had been so traumatic they would not visit an Open Farm with their children again. However, many recognised the value of an animal contact experience for children in general and thought that much more information should be made available so that parents could make an informed decision on animal contact.

Many of the families could not understand why the Farm had not closed earlier and did not realise that the HPA did not have the regulatory authority to implement closure. They felt this situation required changing.

### **The Management and Control of the Outbreak**

There was delay in recognising the outbreak due to the fact that no one person in the HPU appears to have had a clear picture of how many cases of *E. coli* O157 with links to Godstone Farm had been reported. The Outbreak Control Team (OCT) was convened exceptionally late in the course of the outbreak. Had the OCT been convened earlier, there would have been a more timely assessment of the public health risks and almost certainly more effective control of the outbreak.

There was unacceptable delay in initiating strict control measures at Godstone Farm. Had a decision been made on the August Bank Holiday weekend (or even after it, on Tuesday 1 September) to stop all contact with ruminant animals, a substantial number of cases of *E. coli* O157 could have been prevented. There was also unacceptable delay in carrying out the systematic epidemiological investigation of the outbreak, particularly in commencing the case-control study.

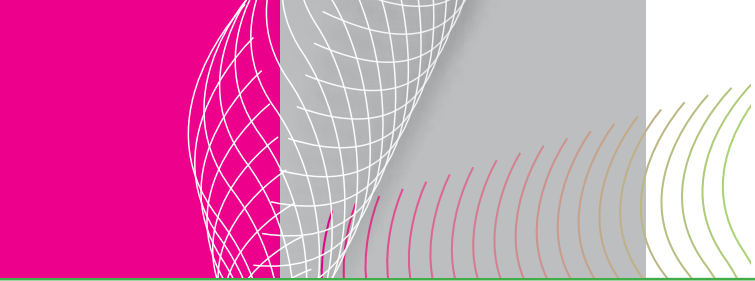
General Practitioners and hospital clinicians serving the catchment area of Godstone Farm, including paediatric renal unit staff, should have been alerted much earlier to the occurrence of the outbreak. There was unnecessary delay in reaching a decision about reopening Godstone Farm and in publishing the OCT final report.

Even with prompt action this would have been a big outbreak. Nevertheless, there was a lack of public health leadership and a missed opportunity to exercise decisive public health action and thereby restrict the size of the outbreak.

### **Assessing and Managing the Risks**

The assessment of risk carried out by Godstone Farm was inadequate as it principally relied on the actions of the public, primarily through handwashing, to control the risks. The risk assessment process used by the LA did not facilitate the identification of hazards on the Farm and, despite a regular programme of inspections, the regulatory visits carried out by the LA were ineffective in preventing an outbreak occurring.

The HSE, in a joint statement of position with the Local Authorities Co-ordinators of Regulatory Services (LACORS), have confirmed that they continue to regard the risk of infection to visitors at Open Farms as 'low', and as such, not significant enough to warrant additional action. Due to the potential severity of *E. coli* O157 infection, we conclude that the level of risk on Open Farms is not acceptable and good practices in the industry should have been more actively pursued by the regulators.



It is currently very difficult for families to make their own informed decisions about the risk of visiting an Open Farm. In addition to public education on the risks of infection from *E. coli* O157, an accreditation scheme, led by the farming industry, would assist the public in understanding which farm premises were operated to a known and acceptable standard.

Farm operators must base their risk assessments and any preventative or remedial actions on the assumption that *E. coli* O157 is present on the farm. A risk management approach which relies primarily on handwashing to prevent risk of infection is, in our view, misdirected. Control measures should primarily focus on preventing visitor contact with animal faeces or faecal matter. Handwashing however remains the principal control measure available to the public and must be actively encouraged by the farm operator.

To minimise visitor contact with animal faeces or faecal matter, we have identified specific issues that should be addressed as a matter of urgency. These could form the basis of an agreed code of good practice within the industry. Farm layout and design are critical to reducing the risk of infection. The practice of 'deep bedding' should not be permitted in children-animal contact areas.

### **Meeting the Regulatory Challenges**

The existing regulatory structure is not securing compliance with standards and is unlikely to reduce the risk of future outbreaks at Open Farms unless reinforced. Non-statutory, unenforceable guidance leaves room for doubt about standards of protection; simply revising guidance will not be sufficient to meet the challenge of improving public health protection.

A voluntary accreditation scheme for Open Farms is strongly recommended as helpful to both operators and regulators but we do not recommend making special regulations or licensing of Open Farms at this time. An Approved Code of Practice (ACoP) would provide clarity and certainty about standards, helping both operators and enforcing authorities.

A definition of an Open Farm is needed and a national register of Open Farms would help to target awareness raising, education and inspection programmes.

The HPA has no enforcement powers and is not an enforcing authority; the powers of the Consultant in Communicable Disease Control (CCDC) and LA inspectors to prohibit activities or close premises need clarification. The confidence and competence of Environmental Health Officers (EHOs) to inspect and enforce standards at Open Farms needs to be strengthened. There is a need for agencies to share information and work much more closely together in regulating Open Farms.

### **Conclusions and Recommendations**

Even with the promptest of control measures, the Surrey 2009 outbreak would have been the largest *E. coli* O157 outbreak associated with animal contact ever reported in the UK. This emphasises the importance, not only of prompt identification and control of outbreaks, but also of measures to reduce the risk of acquiring *E. coli* O157 infection.

Prompt identification and control of outbreaks require implementation of existing HPA procedure and guidelines and clarity regarding the respective roles of the HPU and EHD. The HPU should provide public health leadership and the EHD should have both the competence and confidence to issue prohibition notices if a farm is suspected as the source of an outbreak of zoonotic disease. Animal contact, especially with ruminants, should be prioritised as the activity to be closed at the earliest suspicion of a farm-related *E. coli* O157 outbreak.



The time course of the Godstone Farm outbreak clearly demonstrates that handwashing alone cannot be relied upon to prevent outbreaks of *E. coli* O157 infection acquired by contact with animals or their faeces. Open Farm operators should ensure that visitor contact with animal faeces is minimised or eliminated.

There needs to be greater awareness of the risks of animal contact among farm owners, regulatory authorities and visitors to Open Farms. Public education on the risks of infections acquired by animal contact needs to be reinforced, both before and during the farm visit.

The content of all existing guidance touching on human health and safety at Open Farms needs to be reviewed, improved and clarified, where necessary. Regulatory authorities and industry representatives should pursue the development of an ACoP, and an associated national accreditation scheme for Open Farms.

The evident complexity of the regulatory regime relating to Open Farms requires a strategy of 'joined-up regulation' to provide more effective oversight of safety and opportunities for reducing the inspection burden.

Our enquiry focused on the larger scale Open Farms, as exemplified by Godstone Farm. However, the principles we recommend for reducing the risk of infection may also be applied to a wider range of farm premises and rural activities in which contact with ruminant animals or their faeces may occur.

#### **Summary of Top Six Recommendations:**

- Farm operators should ensure that the layout and design of public areas are such that visitor contact with animal faecal matter (particularly ruminant) is minimised or eliminated
- There is a need to raise public awareness of the potential infection risks when arriving at a farm attraction, emphasising the parent/carer's decision to allow children to have animal contact
- There should be a reassessment of the risk of *E. coli* O157 infection as 'low'. Its probability may be low but the impact is high and the consequences very severe
- An Approved Code of Practice (ACoP) should be developed for the Open Farm industry, involving relevant authorities and in close consultation with leading representatives of the industry to underpin the industry's initiative in establishing an accreditation scheme
- The regulatory agencies and others should explore ways of working together in regulating Open Farms clarifying roles, responsibilities and relationships
- Research should be pursued to assist clinicians in the rapid diagnosis of *E. coli* O157 and the identification of and treatment for children likely to develop severe complications of the infection. Research should also be undertaken aimed at preventing or limiting carriage of the organism in animals.