

E coli 0157 Independent Investigation

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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.
- <http://www.griffininvestigation.org.uk/>

The Investigation Committee

- **Professor George Griffin**
Professor of Infectious Diseases and Medicine
- **Dr Meirion Evans OBE**
Public health doctor
- **David Eves CB**
Health and safety consultant
- **Dr Chris Low**
Veterinarian
- **Professor David Strachan**
Epidemiologist and public health doctor

Description of 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.

Description of Outbreak

- 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.

Description of Outbreak

- 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

- 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.

The Views of Parents

- 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 Views of Parents

- 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.

- Some families had been contacted by the HPU and some by the local authority Environmental Health Department (LA EHD).
- Some parents mentioned they had been given a leaflet about E. coli.
- One parent mentioned that the environmental health officer (EHO) who interviewed her had commented that they were more used to investigating restaurants.
- One of the parents had been told by their GP that their child (who still had positive stool samples for E. coli O157) could attend school.

- Another family commented about the lack of awareness of staff in their local A&E Department about the outbreak, even though there were already numbers of cases in the local area at the time their child was admitted.
- The parent of a child who had E. coli O157 associated with Godstone in March 2009 was concerned that there was little awareness by the HPA of this case before the outbreak in August.
- One family (not directly infected with E. coli O157) expressed concern that the primary school attended by two children who were known to be infected, had no idea of the Public Health Regulations and the implications for the school, particularly in terms of preventing secondary spread, and had additionally received no help or instruction from the LA.

The Views of Parents

- 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

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.

The Management and 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.

The Management and Control of the Outbreak

- 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

Assessing and Managing the Risks

- The HSE, in a joint statement of position with the Local Authorities Co-ordinators or 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.

1. The hazards present, eg, the risk from zoonoses; contamination of the general environment; potential for cross-contamination of play equipment
2. The extent to which hazards are controlled, eg, the site layout that allowed the public to walk through runoff from barns; the use of 'deep litter' bedding for the livestock; unsupervised access of children to animal pens; the distances from animal areas to the washing facilities
3. The number of people exposed to the hazards and the frequency of the hazard, eg, the volume of customers. At the time of the outbreak, Godstone Farm was attracting more than 2,000 visitors a day
4. The presence of particularly vulnerable groups, eg, the assessment does not take account of how many children were exposed to the risks from E. coli O157, or how many were of vulnerable age groups
5. The potential severity of the illness. In this outbreak alone 27 children were hospitalised.

- At the request of Tandridge EHD, a joint inspection visit of Godstone Farm by the HSE (in an advisory role) and Tandridge EHD took place on the morning of Monday 21 September (v). This found that:
 - The health and safety risk assessment provided by the Farm ‘did not meet suitable and sufficient criteria’
 - There was no documentation of staff training about *E. coli O157*
 - Signage mostly relied on words rather than visual illustrations
 - Handwashing facilities were not very convenient for the tea room and top barn.

- The COSHH risk assessment did not meet the criteria of being 'suitable and sufficient'
- The assessment was not site-specific
- The assessment was insufficiently detailed on the controls in place to minimise the risk of exposure of staff and visitors to E. coli O157
- The assessment was out of date and referred to only one contact area for animals, which was clearly not the case at Godstone Farm
- Where actions were identified in the assessment no person was named as responsible and there was no evidence of a date by when action should be taken

- No documentation was available to indicate any training had been provided to staff in respect of the risks associated with E. coli O157 or what they had been instructed to do with regard to control measures
- Under Regulation 7 of the Management of Health and Safety Regulations, a specific competent person must be nominated in respect of health and safety. This person was identified as the Assistant Farm Manager for Godstone Farm*. It was confirmed that he had received no training on his health and safety responsibilities.

Assessing and Managing the Risks

- 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.

Assessing and Managing the Risks

- 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.

- During 2009, there was a considerable increase in the number of E. coli O157 outbreaks associated with Open Farms reported in England and Wales (Table 1.5). Six outbreaks were associated with Open Farms compared to an average of one or two outbreaks per year over the previous 15 years.
- Additionally, more people were affected in 2009 than in all previous outbreaks. Possible reasons that were suggested to us for this increase in outbreaks and persons affected include:
 - Improvements in identification of outbreaks linked to Open Farms
 - Increases in the shedding of E. coli O157 by animals on Open Farms
 - A strain of E. coli O157 previously uncharacterised in the UK
 - Changes to the intensity of contact between visitors and farm animals
 - Increase in visitor numbers
 - An increasing reliance on hand gels rather than handwashing with soap and water
 - Change in survival of E. coli O157 in the prevailing climate conditions.

- We were advised by the HPA that 23 outbreaks of E. coli O157 were linked to visits to open/petting farms in England and Wales between 1994 and 2008 (Table 1.4).
- In total, these affected 116 people (109 laboratory confirmed cases) and resulted in 46 hospital admissions, but no deaths.
- The largest outbreak occurred in North Wales in 1999, and affected a total of 24 people with illness due to E. Coli O157 PT 21/28.
- A case-control study of 16 primary cases (and 36 controls) carried out as part of the outbreak investigation found that cases were more likely to have eaten ice cream and candy floss than controls.
- The authors suggested that sticky fingers may have been more likely to become contaminated and/or that the children were cleaning their fingers by licking (54).

Assessing and Managing the Risks

- 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.

Meeting the Regulatory Challenges

- 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

- We recommend
- that circular HSG(93)56 should be revised to bring it up to date and jointly circulated to all LAs.
- We have been advised by the Chartered Institute of Environmental Health that structures within LA Environmental Health Departments (EHDs) are changing rapidly and the post of CEHO often no longer exists. We recommend that to ensure swift and appropriately resourced response to an outbreak, every LA should ensure that a senior post has been identified with responsibility for managing the LA's participation in outbreak control.

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.

Conclusions and Recommendations

- 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.

- We recommend that parents of children visiting Open Farms are clearly informed, before entering animal contact areas, that:
 - Touching or feeding farm animals can be a source of life-threatening infection, particularly in young children
 - It is the parent or carer's choice whether their child is allowed to touch or feed the animals
 - The only way to eliminate this risk entirely is for children to avoid contact with animals and their faeces
 - It is primarily the parent or carer's responsibility to supervise the washing of their children's hands immediately after leaving the animal contact area, before eating or drinking on the farm and after removing footwear
 - Sanitising hand gels are not a substitute for thorough handwashing.

Conclusions and Recommendations

- 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.

Conclusions and Recommendations

- 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.

Conclusions and Recommendations

- 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.