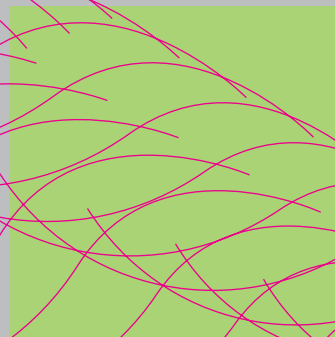
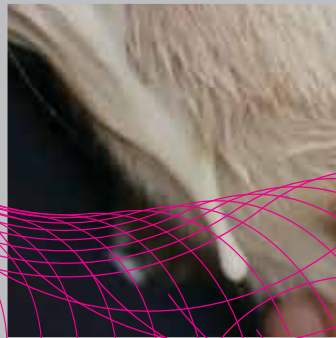


PART C MANAGEMENT
OF THE OUTBREAK

Chapter 7:

The Management and Control
of the Outbreak





Chapter 7: The Management and Control of the Outbreak

7.1 Local Arrangements for Outbreak Control

7.2 Recognising the Outbreak

7.3 Convening the OCT

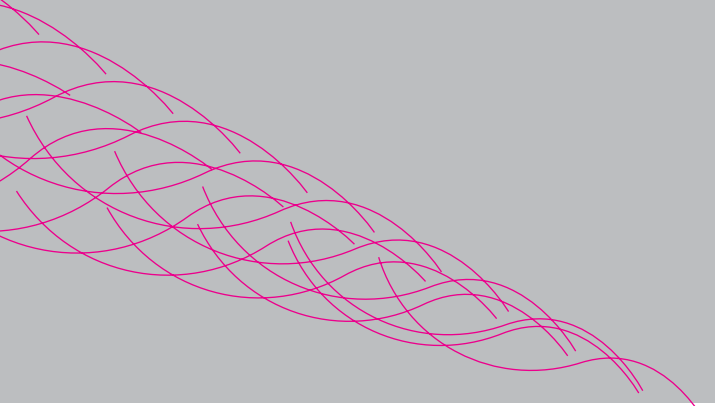
7.4 Responding to the Outbreak

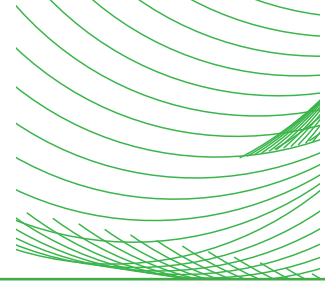
7.5 The Size and Nature of the Outbreak

7.6 After the Outbreak

7.7 References

Key Points

- There was delay in recognising the outbreak due to the fact that no one person in the Health Protection Unit (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 unacceptable delay in carrying out the systematic epidemiological investigation of the outbreak, particularly in commencing the case-control study
 - General practitioners (GPs) 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
 - 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
 - There was unnecessary delay in reaching a decision about reopening Godstone Farm, and in publishing the OCT final report.
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7.1 Local Arrangements for Outbreak Control

The Surrey and Sussex Health Protection Unit (SySxHPU) has an Outbreak Control Plan (i), dated January 2005. It provides details on:

- Managing communicable disease control
- The roles and responsibilities of key agencies
- The OCT
- The investigation of food poisoning and other gastrointestinal diseases.

Among the roles of the HPU are:

- Surveillance of communicable disease including early recognition of outbreaks
- Co-ordination of a joint policy on outbreak control
- Convening an OCT and chairing meetings.

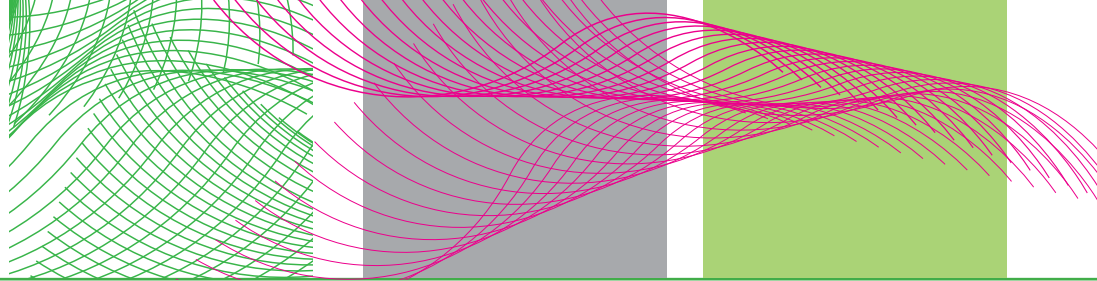
It includes a list of communicable diseases which are categorised according to who leads in the investigation. The consultant in communicable disease control (CCDC) based at the HPU is specified as being generally responsible for leading the investigation of *E. coli* O157 infection, in accordance with the following principles:

- The chief environmental health officer (CEHO) ensures that the HPU is notified and consulted promptly by fax or phone
- The HPU investigates but may request assistance from the CEHO
- The HPU and CEHO share information
- The HPU will liaise with the CEHO on establishing an OCT
- The HPU will convene an OCT when considered necessary
- The HPU will chair the OCT.

The NHS and local authorities (LAs) were asked by circular HSG(93)56 to ensure that they had up-to-date joint plans covering the structures and procedures for managing communicable disease control in their areas, both on a day-to-day basis and if an outbreak occurred (1). We note that circular HSG(93)56 appears not to have been revised since 1993 and understand that the Faculty of Public Health and Health Protection Agency (HPA) have recently written to the Department of Health to seek clarification.

We conclude that it would assist future joint working if it were brought up to date. **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.



7.2 Recognising the Outbreak

On 20 August 2009, the first case of *E. coli* O157 linked to Godstone Farm was reported to SySxHPU and Tandridge EHD. By Friday 28 August, three cases of *E. coli* O157 linked to Godstone Farm had been reported to the HPU and four cases (including two siblings) had been reported to Tandridge EHD (ii).

This knowledge should have led to recognition of a potential outbreak linked to the Farm.

This failure to recognise the outbreak was 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 failure was related to a number of factors (iii):

- There were breakdowns in communication within SySxHPU, leading to responsible staff members being unaware of recent telephone reports of cases of *E. coli* O157
- A computerised case management and decision support system (HPZone) in use at the HPU since August 2006, which was intended to facilitate the identification of linked cases did not perform its intended function because of technical difficulties in the IT infrastructure. We were informed that these were connectivity problems due to insufficient broadband capacity at the Leatherhead office and that this had been reported through formal HPA governance routes. This meant that information entered on HPZone was sometimes lost and no longer visible on the system
- There was resulting uncertainty and confusion at the HPU about the size of the outbreak in its very early stages. This may have delayed the decision to investigate further.

We conclude that this uncertainty could and should have been avoided, both by proper connectivity of HPZone and by robust handover arrangements. Had these deficiencies not occurred, the outbreak associated with Godstone Farm could have been identified earlier.

We recommend that HPU staff are required to log every case of *E. coli* O157 on HPZone as a matter of urgency and routine, and that the technical functionality of HPZone is reviewed.

We recommend that the risk associated with each case of *E. coli* O157 should be assessed and the following aspects specifically considered:

- The possibility that the case may be part of a cluster or outbreak
- The possibility that there may be a preventable ongoing source of infection that may affect others
- The risk of secondary spread to household contacts
- The risk of secondary spread to other contacts, particularly children in pre-school childcare settings.

We recommend that all HPUs and EHDs should have robust handover arrangements in place, during working hours and out of hours, to ensure that details of recently reported *E. coli* O157 cases are communicated to the relevant staff.

7.3 Convening the OCT

Friday 28 August was a crucial day in the management of the outbreak. Both the HPU and the EHD were aware of at least three cases of *E. coli* O157 linked to Godstone Farm. It was the Friday before the August Bank Holiday weekend, a period when Godstone Farm might be expected to be at its busiest. Yet this knowledge does not seem to have generated any undue concern and the primacy of public safety was neglected.

The HPU discussed the situation with Tandridge EHD and agreed a course of action. Tandridge EHD contacted Godstone Farm by telephone to advise them of the cases and of the need to alert parents about handwashing and hygiene measures, and to arrange a visit to the Farm (ii). The HPU did not declare an outbreak, did not make any arrangements to review the circumstances over the Bank Holiday weekend, and did not convene an OCT. No visit was made to the Farm over the weekend.

There were nearly 5,500 visitors to the Farm that weekend, including 2,000 children.

We believe that a visit to the Farm by staff from the HPU and EHD might have led to a different assessment of the risk based on the likely number of visitors that weekend and the various possible sources of exposure to *E. coli* O157 at the Farm. A visit might also have prompted an earlier decision to call an OCT and a consideration of whether enforcement action should be taken by the EHD.

The SySxHPU Outbreak Control Plan defines an outbreak as 'an occurrence of disease clearly in excess of normal expectancy'. It indicates that the responsibility for convening an OCT lies with the HPU, but does not stipulate a timeframe within which an OCT should be called other than 'as soon as possible' (i).

The first OCT (Chapter 5) did not meet until Monday 7 September, 10 days later. This was in spite of the fact that four cases linked to the Farm had already been recognised by Tuesday 1 September and that substantial further activity had occurred on 3 and 4 September. This included an inspection of the Farm on 3 September; recognition of an additional four cases and email correspondence with the Farm owners suggesting possible courses of action, one of which was voluntary closure (ii,iv,v).

The first OCT meeting decided that there appeared to be no ongoing risk (vi). This decision seems to have been based in part on the fact that none of the newly recognised cases had visited the Farm after Monday 31 August. The date of the next OCT meeting appears to have been set for Friday 18 September; the end of the next working week.

We conclude that, in relation to normal practice, the OCT was convened exceptionally late in the course of the outbreak. This delay is unacceptable, even taking into account the deficiencies in the flow of information that delayed initial recognition of the outbreak.

We conclude that, 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.

We conclude that the failure to convene the OCT on Tuesday 1 September, when both the HPU and EHD were aware of a cluster of four linked cases, represents a failure of public health leadership, and that the main responsibility for this failure lies with the HPU.

We conclude that the decision by the OCT that there was no ongoing risk was premature. Since the incubation period for *E. coli* O157 can range from two to 12 days and cases may not be diagnosed for some days after onset of symptoms, there can be an interval of two to three weeks between exposure



and diagnosis. The decision not to reconvene until Friday 18 September shows a failure to appreciate the seriousness of the situation.

We recommend that an OCT should be convened by the CCDC as soon as two or more presumptive cases of *E. coli* O157 infection from different households but with a potential common link are identified.

We recommend that the first OCT meeting should specifically assess the ongoing risk to the public based on:

- The possibility that there may be a preventable ongoing source of infection that may affect others
- The size and vulnerability of the population at risk
- The risk of secondary spread to household contacts
- The risk of secondary spread to other contacts, particularly children in pre-school childcare settings and in primary schools
- The availability of effective control measures.

7.4 Responding to the Outbreak

7.4.1 Epidemiological Investigation

By the time the first OCT was called on Monday 7 September, 13 cases of *E. coli* O157 linked to Godstone Farm had been reported (Chapter 5). The following day, the outbreak was declared a HPA level 2 incident, ie, an incident of wider local impact requiring deployment of both local and regional resources. This was already the second largest outbreak linked to an Open Farm to have occurred in the UK. There appear to have been no plans made at this stage to carry out a systematic epidemiological investigation by gathering and collating detailed information about cases (vi). The case-control study interviews to test hypotheses about the cause of the outbreak did not start until Monday 28 September (ii).

We conclude that there was unacceptable delay in carrying out the systematic epidemiological investigation of the outbreak, particularly in commencing the case-control study.

We recommend that the OCT should ensure that hypotheses with a clear focus on identifying the source and mechanism of spread of infection are tested, wherever possible, by means of an analytical epidemiological investigation, and that this is carried out as a matter of urgency.

7.4.2 Farm Restrictions and Closure

During the early stages of the investigation of an outbreak, it is often impossible to pinpoint which specific activities are sources of infection. However, given the existing literature implicating animal contact in previous outbreaks of *E. coli* O157 infection (Chapter 1), there should be a high index of suspicion that this is the likely source in an Open Farm outbreak.

In the first instance, therefore, an OCT should consider introducing control measures that restrict animal contact, particularly with ruminants, as well as those that promote and encourage good hygiene. Control measures should be introduced as a matter of urgency and should not await the findings of

the outbreak investigation. They may be modified at a later date, if required, based on the results of investigations. Action to protect public safety should take precedence over economic considerations.

Since the first OCT did not meet until Monday 7 September, initial decisions about control measures were based on the assessment made at the joint Farm visit by SySxHPU and Tandridge EHD on Thursday 3 September (iv,v). This visit appears to have focused particularly on the adequacies of handwashing facilities. However, following the site visit and an email sent by the CCDC, the Farm owners suspended the sale of animal feed and voluntarily closed the animal barns, goat bridge, and some of the sandpits at close of business on Friday 4 September (vii). The Farm was not asked to carry out any cleaning.

The options available under existing health and safety legislation for premises that are suspected as the source of an *E. coli* O157 outbreak are limited to restrictions (improvement notices and prohibition notices) on specific activities rather than closure of the entire location (Chapter 4). If there is suitable and sufficient evidence of a risk of serious personal injury from one or more activities, those activities can be prohibited until remedial action is taken. Some activities may be so fundamental to the business that the effect is, de facto, to close it. We understand that voluntary closure is the usual outcome in outbreaks at Open Farms, but should there be a need for enforced closure this is the responsibility of the LA EHD, usually at the request of the OCT. Since April 2010, a new health protection power has become available under the Health Protection (Part 2A Orders) Regulations 2010. This permits closure of premises that may be contaminated and present significant harm to human health, although this requires an application to be made by the LA to a Magistrates' Court for an order (Chapter 9).

Godstone Farm did not close completely until Saturday 12 September. However, it is clear that no further primary cases occurred after the animal petting barns were voluntarily closed by the Farm on Friday 4 September (Chapter 5) and that this measure was therefore successful in bringing the outbreak of *E. coli* O157 infection at the Farm under control.

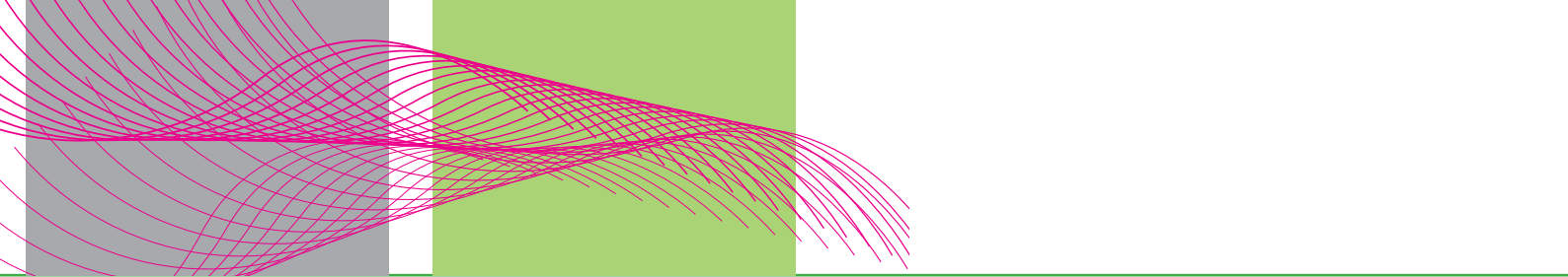
We conclude that there was unacceptable delay by the HPU and EHD (in the absence of an OCT) in initiating strict control measures at Godstone Farm and, if action had been taken sooner to stop all contact with ruminants, a substantial number of *E. coli* O157 cases could have been prevented.

We recommend that the first OCT meeting should consider what control measures are available, should decide which activities should be prohibited or improved, and should identify who is responsible for ensuring each of its decisions are implemented. 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.

7.4.3 Handwashing

Thorough handwashing with soap and hot water followed by careful drying of hands protects against *E. coli* O157 infection (Chapter 1). Reliance on sanitising hand gels or cursory handwashing do not. However, even provision of good handwashing facilities without additional measures to minimise the risks associated with animal contact and contamination of the farm environment may prove inadequate.

On Friday 28 August, an EHO from Tandridge DC phoned Godstone Farm to advise them that cases of *E. coli* O157 had been linked to the Farm and ask them to alert parents to the need for handwashing. We received evidence that the Farm displayed such notices at the entrance (vii), but none of the parents we interviewed remembered seeing these. Nevertheless, all the parents said they were aware of the need for handwashing and had washed their children's hands after touching the animals (Chapter 6).



We conclude that the Godstone Farm outbreak clearly demonstrates that handwashing alone is insufficient to prevent outbreaks of *E. coli* O157 infection at Open Farms. A range of additional measures are necessary to reduce the risks associated with animal contact and to minimise faecal contamination of the environment (Chapter 8). The case-control study did not show that handwashing was protective, but the report of the study also said that ‘the effect of reporting and recall bias could not be excluded’ (ii).

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.

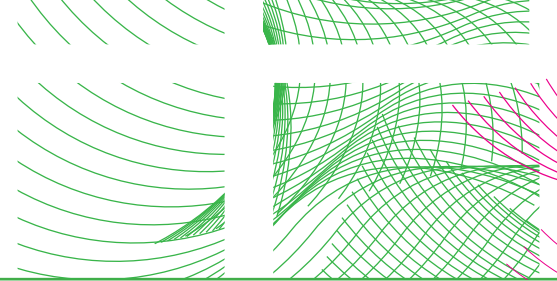
Recommendations directed at farm owners and regulators are discussed in detail in Chapters 8.

7.4.4 Communications

Rapid communication with professional colleagues and with the public during an outbreak serves a variety of purposes. These include making sure that cases are diagnosed quickly and receive appropriate care, identifying cases that may have been diagnosed elsewhere but have not yet been linked with the outbreak, and reminding colleagues of the importance of prompt reporting of new cases.

Communication with health care professionals was not discussed at the first OCT on 7 September and the HPU did not send out letters to GPs and hospital clinicians until 10 September (iii,vi). Paediatric renal units serving South East England were not informed of the outbreak. It is clear, from reports to the Investigation Committee (viii) by the tertiary care centre (the Evelina Children’s Hospital) caring for children with haemolytic uraemic syndrome (HUS), that despite several phone calls between 8 September and 11 September 2009, the HPU did not appreciate the urgency of the incident and responses were rudimentary and inadequate. Promised calls were not returned and the clinicians reported that the HPU did not appreciate the severity and the serious nature of the outbreak. It was not until there was an intervention from another senior clinician that the HPU showed some awareness that the situation was becoming critical.

After the Farm closed on 12 September, there was extensive media coverage of the outbreak. Public reaction to the media coverage triggered reports of earlier cases related to Godstone Farm that had not been identified or reported to SySxHPU and Tandridge EHD.



We conclude that GPs 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.

We recommend that the first OCT meeting should discuss and agree an appropriate communication strategy for professional colleagues, the public and the media.

7.4.5 Rapid Diagnosis and Clinical Investigations

A common theme that emerged from interviews with parents was the lack of urgency with which GPs regarded symptoms of bloody diarrhoea and stomach cramps (Chapter 6). Acute bloody diarrhoea is a rare event in previously healthy children and should be considered a medical emergency. GPs should refer patients to hospital as soon as possible when the risk of *E. coli* O157 infection is high or its consequences are likely to be severe (Chapter 1). Some of the delays in diagnosis might have been avoided if local GPs and Accident and Emergency departments had been alerted earlier about the outbreak.

We conclude that there needs to be greater awareness among GPs of the importance of symptoms of bloody diarrhoea and stomach cramps in previously healthy children.

We recommend that the HPA considers ways to increase awareness among GPs of the importance and seriousness of acute bloody diarrhoea in previously healthy children.

We recommend that GPs refer previously healthy children with acute, painful, bloody diarrhoea, but no fever, urgently to hospital both to ensure appropriate clinical management and to reduce the risk of spread within the household.

Generally, much of the delay in the diagnosis of *E. coli* O157 infection is caused either by patients hesitating to seek medical attention or doctors failing to recognise early symptoms. However, there is also scope for improving the speed of microbiological diagnosis. We understand that a rapid polymerase chain reaction (PCR) test that can be used directly on stool specimens and which will diagnose *E. coli* O157 within hours rather than days is already under development.

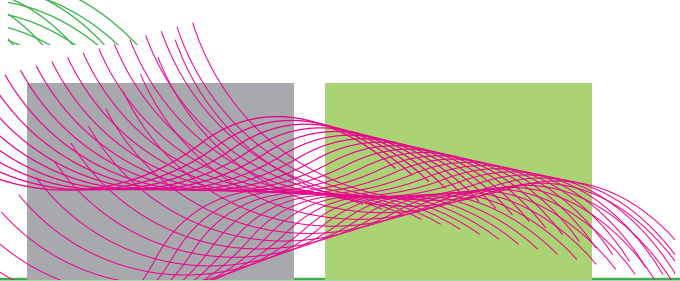
Acute kidney failure is the most serious, and indeed life-threatening, consequence of *E. coli* O157 infection. When *E. coli* O157 infection is diagnosed, there is currently no way of accurately predicting which children will develop kidney failure. Nor is there any specific treatment that will stop kidney failure developing. However, there is some early research on using a monoclonal antibody to treat *E. coli* O157. This acts by removing the toxin produced by *E. coli* O157 from the circulation in order to prevent the kidney damage that it causes. Further large-scale, international research is required.

We recommend that research into rapid methods of microbiological diagnosis, and rapid detection of acute kidney failure, is encouraged. Clinical research into predicting which children with *E. coli* O157 infection will develop HUS and into the use of monoclonal antibody directed against verocytotoxins should be given high priority.

7.5 The Size and Nature of the Outbreak

7.5.1 Scale

The large number of cases arising in the outbreak at Godstone Farm offers unusual insights into the widely variable clinical presentation and natural history of *E. coli* O157 infection. There is always a time lag between exposure to infection and becoming ill and also inherent delays in diagnosing and reporting



infection. As a result, a substantial minority of the children who would later become ill had already visited Godstone Farm before the earliest evidence of a problem emerged (Chapter 5, Figure 5.4). This highlights the fact that outbreak control can never be more than a second line of defence, and that protecting public health at Open Farms will always rely on good prevention and rapid identification of an outbreak.

The size of the outbreak at Godstone Farm was probably determined by a number of factors (ii), including:

- The scale of the enterprise and the large visitor numbers
- The practices in place at the Farm, with substantial direct animal contact and visitor access to faecally contaminated environments
- The slow responses of the public health authorities to the outbreak itself.

We are aware that large outbreaks associated with Open Farms have been described in the USA, and we note with concern that the frequency of farm-related *E. coli* O157 outbreaks in the UK increased in 2009 (Chapter 1).

We conclude that the outbreak at Godstone Farm was not exceptional, other than in terms of its size. We believe that unless the factors described above are addressed, other large outbreaks at Open Farms could occur in future.

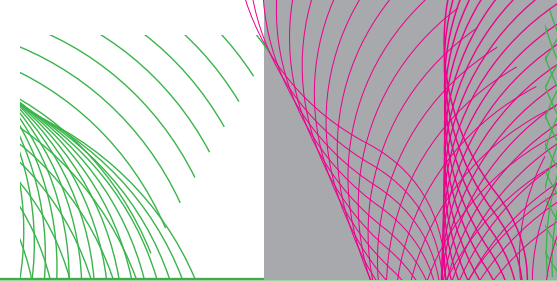
We recommend that the regulatory framework relating to Open Farms is reviewed and reinforced. This is discussed in greater detail in Chapters 8 and 9.

7.5.2 Speed of Response

The timely investigation of incidents and outbreaks and the strategic co-ordination of the multi-agency response are key functions of the local and regional services provided by HPA (ix). In this outbreak, however, there appears to have been a lack of leadership and a paralysis of decision-making, in spite of the fact that OCTs are generally used to dealing with uncertainty.

A potential outbreak at Godstone Farm should have been recognised on Friday 28 August. This should have led to a more proactive response including a decision to visit the Farm and to convene an OCT on the eve of the August Bank Holiday weekend. Thirty-seven of the 65 primary cases visited the Farm after Friday 28 August, including 15 cases who visited over the Bank Holiday weekend and a further 22 cases who visited before Saturday 5 September (Chapter 5). The outbreak ceased only when the Farm voluntarily closed the animal petting barns on Friday 4 September. There was no additional benefit in terms of outbreak control from the decision to close the Farm completely on Saturday 12 September.

We conclude that 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. 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.



7.5.3 Rate of Infection

During the outbreak, attack rates of *E. coli* O157 varied significantly from day to day for reasons which remain unclear. Peak attack rates occurred on 25 August (4.9 cases per 1,000 visitors), 29 August (4.7 cases per 1,000) and 1 September (5.8 cases per 1,000) (Chapter 5). These figures are based on a denominator of all visitors to the Farm, regardless of age and extent of animal contact. Substantially higher daily attack rates may be expected among younger children who visited the animal contact areas. Attack rates in other outbreaks have varied but in one UK outbreak earlier in 2009 in the Yorkshire and the Humber Region, there was an attack rate of 8.6 per 1,000 farm visitors (see Chapter 1).

We conclude that when conditions are right for spreading *E. coli* O157 the risk per visitor may be substantial and quantifiable.

We recommend that a detailed analysis of the epidemiological and microbiological data from Godstone Farm outbreak is completed and published in the scientific literature.

7.5.4 Impact on Health Services

Among the 78 primary and secondary cases with symptoms, 27 (35%) were hospitalised and 17 (22%) were diagnosed with HUS (Chapter 5). Although not all of the HUS cases required renal dialysis, the outbreak nevertheless came close to saturating the specialist paediatric renal services in London and South East England.

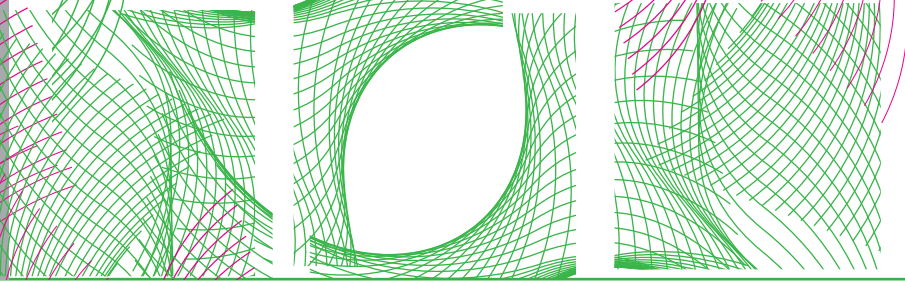
We conclude that rapid identification and control of outbreaks of *E. coli* O157 infection are crucial in limiting the impact of the infection upon affected individuals and their families, and on primary, secondary and tertiary health services.

7.6 After the Outbreak

One of the responsibilities of an OCT is to declare the outbreak over at an agreed juncture, usually when all public health actions have been implemented and there are no more new cases of infection. The OCT should then make a statement to this effect and communicate it to the public and all appropriate agencies.

The outbreak was declared over on 15 October 2009. The last case of *E. coli* O157 infection in this outbreak was a secondary case (an asymptomatic carrier) with an illness onset on 10 October, which was reported to the HPU on 12 October 2009. Godstone Farm remained closed until 26 October, but restrictions on animal contact continued thereafter. The last OCT meeting took place on Friday 5 March 2010.

We are aware that there was considerable uncertainty about when Godstone Farm should reopen. We are surprised that criteria for reopening the Farm were apparently not agreed at the time that the Farm was closed, on Saturday 12 September. The HPA issued interim criteria for advising LAs on the proposed reopening of Open Farms affected by *E. coli* O157 in early October 2009 (x). The Independent Investigation also provided interim advice in March 2010, at the request of the HPA, concerning animal contact at Open Farms (**Appendix 9**). The final report of the OCT was published on 12 April 2010 (ii).



Outbreak reports are a valuable learning opportunity and will often identify new hazards or make useful recommendations about further preventive action (see Chapter 1, section 1.5.6). However, there is no national database of outbreak reports and no mechanism currently for ensuring these recommendations are properly collated and widely disseminated.

We conclude that there was unnecessary delay in reaching a decision about reopening Godstone Farm, and in publishing the OCT final report.

We recommend that the HPA devises a system for ensuring that OCT reports concerning outbreaks of *E. coli* O157 at Open Farms are properly collated and widely disseminated.

7.7 References

- I. NHS Management Executive. Public health: responsibilities of the NHS and the roles of others. November 1993. HSG(93)56

Independent Investigation documents available at www.griffininvestigation.org.uk

- i Health Protection Agency. Outbreak Control Plan – Surrey. Joint Health Protection Agency, health sector, and local authority outbreak control plan excluding hospitals. January 2005.
- ii Outbreak Control Committee. Outbreak of verocytotoxin-producing *Escherichia coli* O157 infection in visitors to Godstone Farm, Surrey: August-September 2009.
- iii Health Protection Agency Internal review of the *E. coli* O157 outbreak associated with Godstone Farm. Health Protection Agency, November 2009
- iv Health Protection Agency. Report of Godstone Farm site visit by joint team from SySxHPU and Tandridge EHD, 3 September 2009.
- v Email from SySxHPU to Godstone Farm, 4 September 2009.
- vi *E. coli* O157 outbreak. Notes of outbreak control teleconference, 7 September 2009.
- vii Godstone Farm additional information – submission to Independent Investigation. Document 2, January 2010.
- viii Notes from the meeting of the Independent Investigation Committee Jan 13 2010
- ix Health Protection Agency. Forward thinking, future working. Framework specification for local and regional service provision 2008-2010. October 2008.
- x Health Protection Agency. Interim HPA criteria for advising local authorities on the proposed reopening of petting farms affected by *E. coli* O157 or other verocytotoxin-producing *E. coli*. Health Protection Agency, 6 October 2009.

