Report into outbreak of Cryptosporidiosis associated with Greenmeadow Community Farm

 Agencies represented on the Outbreak Control Team:
  - Public Health Wales
  - Health and Safety Executive
  - Torfaen County Borough Council
  - UK Cryptosporidium Reference Unit
  - Aneurin Bevan Health Board
  - Animal Health and Veterinary Laboratory Agencies

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The Outbreak Control Team is indebted to the many individuals and organisations whose advice and assistance was invaluable in investigating and managing this outbreak.

We are grateful to you all.
1 Summary

A suspected outbreak of Cryptosporidiosis linked to Greenmeadow Community Farm (GCF) (an open farm owned by Torfaen County Borough Council (TCBC) was reported in early April 2012. Investigations found ten confirmed cases of Cryptosporidium parvum gp60 sub-type IlaA15G2R1. Nine of these were in people working on the farm, who were bottle feeding young ruminants (goat kids and lambs) that had diarrhoea, and one in a visitor (although that individual had other potential exposures). Of the nine farm ‘workers’ affected, only one was an employee, the others were students or volunteers, or family / friends of farm employees. Specimens taken from the animals, and the bedding from the pens in which they were housed, were also positive for the same strain of C. parvum.

Case finding was undertaken to ascertain if the outbreak involved visitors to, or anyone else working on, the farm. There was only one confirmed case in a visitor to the farm, although the individual concerned had other potential exposures. There were 7,128 visitors to the farm during the period 19th March 2012 (the date the goats came onto the farm) to 13th April 2012 (the date that the goats were euthanised). On the day (13th April 2012) that the one confirmed visitor went to the farm there were 373 visitors. It is possible that there had been other cases that had either not reported illness, or had not been identified through microbiological testing.

Diarrhoeal illness i.e. scouring, in goat kids bought in from a farm in Monmouthshire on 19th March 2012 for the specific purpose of demonstrating bottle feeding to visitors during the Easter Holidays, had occurred at the time of their arrival at GCF. These goats had not been isolated as per recommended animal husbandry practice, but were housed in pens adjacent to lambs born on the farm, which subsequently also became unwell.

On the day the index case was first reported (5th April 2012), it emerged that the individual concerned had been bottle feeding young ruminants (goat kids and lambs) that had diarrhoea.
A number of other people working at the farm were also said to have symptoms of gastroenteritis. Advice was therefore given to cease public access to the sick animals with immediate effect, and to restrict access to the sick animals to the farm employees only. The affected animals were subsequently euthanised on 13th April 2012.

An environmental investigation was undertaken by TCBC’s Environmental Health department (EHD) on the 5th April 2012 (Maundy Thursday, prior to Easter holiday) and recommendations were immediately made to protect visitors and farm workers. Initial investigations into suspected cases were continued over the Easter Holiday period and into the following week. The information gathered was discussed at an Incident Control Team meeting convened for Thursday 12th April 2012. An outbreak was declared during that meeting based on the information gathered during the investigations to date, and case definitions discussed to assist with the investigation and management of the outbreak.

An action plan setting out other urgent actions to be implemented was sent to the farm managers on 13th April 2012 following the first outbreak control meeting. Follow up visits were made throughout the duration of the outbreak investigation to ensure the recommended actions were being implemented and maintained.

There were some misconceptions by farm personnel that this was a working farm rather than an attraction regularly frequented by visitors which required a different approach to health and safety measures. Those working on the farm included employees, volunteers and NVQ students; some volunteers with learning difficulties had placements arranged through TCBC Social Services.

*C. parvum* also has the potential to cause serious illness in immunocompromised individuals, and sufficient health checks had not been undertaken prior to their induction to elicit the suitability for NVQ students to be placed there. The date of onset of the last confirmed case in a farm volunteer was 30th April 2012.
The outbreak was reported by TCBC to the Health and Safety Executive (HSE) who undertook a health and safety inspection of the farm premises on the 18th April and the 4th May 2012 and subsequently served an improvement notice on 18th June 2012 requiring a ‘suitable and sufficient assessment’ of the health risks from possible exposure to zoonoses. This notice has been complied with to the satisfaction of the HSE.

A review was also undertaken of the extent to which recommendations made by the Independent Investigation Committee into the major *Escherichia coli* 0157 outbreak at Godstone Farm in Surrey in 2009 (known and referenced hereafter as the Griffin Report) had been implemented with specific reference to the measures needed to reduce the risk of visitor contact with faecal matter, and also of the need for greater awareness of the risks of animal contact among farm personnel and visitors to the farm.

The outbreak was declared over and communicated via a press release on 1st June 2012. The lessons arising from the outbreak were discussed with those responsible for managing the farm and the need for adequate resourcing to enable the farm to operate safely with respect to visitors and workers was highlighted to senior Council officials.

Key recommendations from the Griffin Report that still needed to be addressed were also highlighted and the farm advised to follow the new Industry Code of Practice “Preventing or controlling ill health from animal contact at visitor attractions” issued in June 2012.

There were discussions during the outbreak meetings about whether the farm should be closed, but this was felt to be unnecessary as ‘at risk’ groups appeared to be restricted to only those involved in handling sick animals.

Training sessions were undertaken after the outbreak was declared over to help workers on the farm understand the risk posed by zoonotic infections on farms and the infection control measures needed to protect themselves and visitors.
2 Glossary

**Case Definition:** A list of criteria that must be fulfilled in order to identify a person as a case of a particular disease. It is used in outbreaks of illness to identify who should be included on a list of cases. The criteria can include the symptoms of the illness, laboratory test results, the time and place of illness.

**Colostrum:** is a form of milk produced by the mammary gland (an organ in female mammals) just prior to giving birth. It contains antibodies to protect the newborn offspring against disease.

**Communicable Disease:** Any disease that can be passed from one person to another. (Also see Zoonoses)

**Consultant in Communicable Disease Control (CCDC):** A doctor in a branch of medicine that is responsible for the prevention and control of communicable disease in the community.

**Descriptive Epidemiology:** Describing the characteristics of cases i.e. time, place or person characteristics such as date of onset of illness, place of residence, age or sex.

**Environmental Health Officer (EHO):** A qualified individual trained in environmental health issues such as housing, sanitation, food, health & safety, clean air, noise and water supplies. Responsibilities include the enforcement of food and health & safety legislation in commercial businesses, and the investigation of food and waterborne disease.

**Epidemiology:** The study of the patterns, causes, and control of disease in groups of people.

**Epidemiological link:** Cases linked by close proximity to a plausible source

**Gastroenteritis:** Common signs of Gastroenteritis are vomiting and/or diarrhoea, but other symptoms such as fever, stomach aches and bloody stools may also be present.
Incident Control Team: A multi-disciplinary meeting of interested parties and organisations connected with the outbreak.

Microbiologist: A doctor, mainly laboratory based, who specialises in the diagnosis, treatment and control of infectious agents such as parasites, bacteria, viruses and fungi.

Outbreak: An increase in the number of people with an illness or disease that is above what you would normally expect in the population at that particular time, or two or more linked cases with the same illness.

Outbreak Control Team (OCT): A team of people from different, usually public bodies, brought together, according to official guidance primarily to control the spread of disease during an outbreak. This is done through assessing the range and extent of the outbreak; identifying the source of the problem if possible, implementing prevention and control measures and communicating with relevant parties and the public.

PCR (polymerase chain reaction): The PCR is a test in which DNA sequences are rapidly copied so that they can be analysed.

Regional Epidemiologist: A doctor specialising in communicable disease epidemiology in a population, working at the all Wales level.

Zoonoses: Infectious or parasitic diseases of animals that can be transmitted to humans.
3 Background

3.1 Community farms and the regulatory framework

GCF is owned and managed by TCBC and is a popular attraction for visitors. It receives an estimated 60,000 visitors per year (individuals, families, and groups) and is open to the public seven days a week. The animals on the farm include cattle, sheep, goats, llama, alpaca, chickens, ducks, geese, horses and donkeys. A few small pet animals such as guinea pigs are also kept. Goat kids are brought in around Easter specifically for the purpose of demonstrating bottle feeding to visitors, for which lambs born on the farm are also used.

It is classed as an ‘open farm’, i.e. a ‘visitor farm attraction / animal petting farm’ and both workers and the general public are protected by the provisions of the Health and Safety at Work Act (1974) and the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and other appropriate legislation, specifically that related to biological hazards such as zoonotic infections. The enforcing authority, as determined by the Health and Safety (Enforcing Authority) Regulations 1998 is usually the Environmental Health Department of Local Authorities. However, as the Community Farm is owned by the Local Authority (i.e. Torfaen CBC), responsibility for enforcement in this case rests with the Health and Safety Executive (HSE).

HSE’s Enforcement Policy Statement sets out general principles and approach that health and safety enforcing authorities are expected to follow. The ultimate purpose of these authorities is to enforce health and safety legislation by ensuring that duty-holders manage and control risks effectively, thus preventing harm to both staff and visitors.

3.2 Cryptosporidium

*Cryptosporidium* is a protozoan parasite which, if ingested, can cause an illness called Cryptosporidiosis (Crypto).
It is one of a number of organisms that can give rise to gastro-intestinal illness, whose main symptom is severe watery diarrhoea, often accompanied by stomach cramps, fatigue, low-grade fever, and nausea and vomiting. Healthy people with Cryptosporidiosis will recover without treatment although it is not unusual for the illness to last for up to three weeks. In individuals with severely weakened immune systems, serious, prolonged and potentially life-threatening illness may develop. Cryptosporidiosis is more common in young children and two species, *Cryptosporidium hominis* and *Cryptosporidium parvum*, account for most of the laboratory confirmed cases in the UK (Davies and Chalmers, 2009). Transmission is usually via the faeco-oral route but there are many sources for human infection including: from other people, from animals and their faeces, from untreated drinking water contaminated by either agricultural or human sewage sources, from swimming in contaminated water, and eating contaminated food (Public Health Wales, 2012). *Cryptosporidium* is a recognised risk on farms, and seasonal outbreaks of Cryptosporidiosis are associated with farm visits during which animal handling and bottle feeding takes place, when *C. parvum* is acquired directly from the animals. Cryptosporidiosis is probably the most common zoonoses associated with visiting farms (Gormley et al., 2011), and bottle feeding is a particular risk factor for Cryptosporidiosis in these settings (Pritchard, 2011). Due to this inherent and well recognised risk, there is a much detailed regulatory framework to protect farm workers and farm visitors.

### 3.3 Recommendations from previous open farm outbreak investigations

A review of the measures taken by the farm to minimise the risk of visitors and staff acquiring zoonotic infections, especially *E. coli* O157 was undertaken during the course of the investigation. This approach is recommended by the Griffin Report which reviewed the major outbreak of *E. coli* O157 associated with Godstone Farm in 2009.

In the weeks after the outbreak at GCF was declared over, a new Industry Code of Practice “Preventing or controlling ill health from animal contact at visitor attractions” was issued (June 2012).
4 Introduction

On Wednesday 4th April 2012, Torfaen County Borough Council (TCBC) was informed of a case of Cryptosporidiosis in a farm-worker employed at GCF – an open farm that it owns and manages. The individual had been bottle feeding young ruminants (goats and lambs) who had been symptomatic with diarrhoea. It was also reported that other members of staff, volunteers and NVQ Students who worked at the farm had gastro-intestinal symptoms. A list of all persons known to have handled goat kids and lambs was collated by the farm and interviews of suspected cases were commenced by TCBC.

On Thursday 5th April 2012, at an internal meeting of TCBC, it was confirmed that the farm worker had been notified by her GP as having Cryptosporidiosis (later confirmed as C parvum). During this meeting, a further 7 people, made up of members of staff, volunteers and NVQ students were also reported as being unwell with symptoms of gastroenteritis. It also became apparent that friends and family members of some of the farm workers had also been in contact with the sick animals.

The Public Health Wales Health Protection Team (HPT) was informed by the local authority of this situation at 11.30am. The Consultant in Communicable Disease Control (CCDC) at Public Health Wales recommended that the local authority Environmental Health Department (EHD) at TCBC should visit the farm to ensure that access by members of the public to the sick goats and lambs, and their pens ceased with immediate effect. The EHD also emphasised the importance of good hygiene practices by all those who had contact with the symptomatic animals and advised that only workers employed by the farm should be involved in feeding and caring for these animals. Environmental Health Officers (EHO) investigated during that day and reported back to the HPT. Senior Environmental Health personnel advised the farm on that day on the infection control precautions that needed to be put in place immediately.

A number of goats had been brought onto the farm on Monday 19th March 2012, and were observed to have had diarrhoea that day. A vet had attended in order to treat the diarrhoea.
The goats were reported as being very ill on the 21st March 2012, with both goats and lambs confirmed as being ill on the 23rd March 2012 – there being numerous diarrhoeal episodes in the lambs and goat kids, in which members of staff and others reported they had become heavily contaminated with animal faeces. Hand-washing was reported by some as being hit or miss with no supervision.

Isolation of affected animals and restriction of access to these animals by the public was carried out on the day of the first visit to the farm by TCBC’s EHD, i.e. 5th April 2012.

Further interviews with staff revealed that a farm-worker had invited family members and friends, some of whom were former farm volunteers, on the social networking site Facebook to assist in the bottle feeding of the goats and lambs.

The first case of human Cryptosporidiosis had an onset of illness date of 28th March 2012, with laboratory confirmation of the case on 4th April. Further cases, with onset dates of 29th and 30th March, came to light between April 6th and April 11th 2012.

Initial investigations to look for other cases commenced on 5th April 2012 and continued over the Easter Holiday period and into the following week. An Incident Control Team meeting was convened for the Thursday 12th April 2012. A further 4 confirmed cases had been found, 2 of which were reported on that day. An outbreak was therefore declared during this meeting and case definitions were agreed to assist with further investigation and management of the outbreak. On Thursday 12th April, a further site visit was carried out by TCBC and Public Health Wales, with a representative from the Animal Health and Veterinary Laboratories Agency (AHVLA), to collect samples. The CCDC also visited the farm over the Easter bank holiday weekend to see the layout and to proactively identify any factors that could facilitate the spread of infection between animals and humans, and to reiterate the advice given by the EHD.
5 Investigations

Following the report of the first confirmed case, and reports of other ill farm workers, the investigations focussed on case finding (clinical and microbiological) to determine if there was an outbreak. Microbiological investigations were commenced to try to identify the microorganism, and were also conducted on the affected livestock. Following the declaration of an outbreak, case finding was extended and epidemiological investigations were commenced.

a) Case definitions

The case descriptions for persons having Cryptosporidiosis were discussed at the first Outbreak Control Team (OCT) meeting on 12th April 2012, and agreed subsequently by e-mail correspondence between OCT members. Cases were classified as “possibly linked to the outbreak” or “probably linked to the outbreak” or “confirmed.”

Cases possibly linked to the outbreak (“Possible” cases)

a) Anyone who has worked at the Community Farm since 19th March, 2012 and has had diarrhoea or other symptoms of infectious gastroenteritis lasting less than 48 hours.

b) Anyone who has visited the Community Farm since 19th March, 2012 and has had diarrhoea and other symptoms of infectious gastroenteritis lasting more than 48 hours.

Cases probably linked to the outbreak (“Probable” cases)

Anyone who worked at the Community Farm since 19th March, 2012 and had diarrhoea and other symptoms of infectious gastroenteritis lasting more than 48 hours.

Cases confirmed after positive sample analysis (“Confirmed” case)

Anyone who has worked at or visited the Community Farm since 19th March, 2012 and who has laboratory confirmed Cryptosporidiosis.
Case finding

Case finding was undertaken through:

- Environmental Health Department (EHD) staff identifying and contacting individuals who had worked at the community farm since 19th March 2012 and had reported illness (done at the outset when the outbreak came to light);

- The HPT informing healthcare professionals in Gwent, including primary care, hospital doctors and local microbiologists, reminding them to report by telephone all suspected or laboratory confirmed cases of Cryptosporidiosis to the HPT or Public Health Wales on call public health professional;

- The HPT asking other Wales Health Protection Team members to review the investigations of existing and new cases of Cryptosporidiosis and to notify the local HPT of any cases that might have visited the farm within the incubation period;

- Reporting of the outbreak at the weekly Health Protection Agency teleconference to alert the public health agencies in other UK countries to inform the health protection team cases of Cryptosporidiosis in their residents who visited the farm in the incubation period;

- TCBC EHD contacted other EHDs across Wales to ask them to report any cases of Cryptosporidiosis in individuals who reported visiting the farm within the incubation period for their symptoms. All EHDs in Wales use a standard questionnaire for investigating cases of Cryptosporidiosis, which includes a question on farm visits;

- Contacting the organisers of group visits (i.e. private pre-school nurseries) to the farm during March 2012 to enquire and report to the EHD any cases of gastro-intestinal (GI) illness that had come to light in the group;
• Asking Corporate Health and Safety Teams in other local authorities to make organisers of school visits during March aware of the outbreak, and to enquire about, and report to the TCBC EHD any increase in cases of gastrointestinal illness since their visit;

• Reports in the media – a number of members of the public, who heard about the outbreak through media reports, had visited the farm, and who had symptoms of gastroenteritis, contacted the EHD or HPT.

All of these cases were investigated by TCBC’s EHD, in liaison with the HPT at Public Health Wales.

b) Epidemiological

The population at risk included:

• Workers at the farm (employees, volunteers, NVQ students, others)

• Visitors to the farm (from 19th March to 17th May 2012 – the date of the last OCT meeting), including group visits.

All suspected cases were interviewed by EHD staff using the standard Cryptosporidium investigation questionnaires for sporadic cases. The questionnaires collected details such as demographics, occupation, and date of onset of symptoms, main clinical features, immunosuppression history, hospital admission and clinical outcome. The questionnaires also captured information about specific, known risk factors for Cryptosporidium infection including overseas travel, exposure to farm animals and swimming pool exposure. When the community farm was identified as the potential source of infection, the EHOs sought further detail of the nature of this exposure including areas of the farm visited, hand-washing routine following animal contact and whether they had participated in bottle feeding lambs and kid goats. A case list with relevant information was developed and maintained by the HPT. The questionnaire responses were analysed in detail to identify all likely sources of infection.
c) **Microbiological (human)**

Initially microbiological testing focused on identifying the gastro-intestinal pathogens that caused the illness.

Once it was established that *Cryptosporidium* was the cause, all specimens tested at the primary laboratories in South-East Wales (Microbiological services, Aneurin Bevan Health Board (ABHB) and Public Health Wales Cardiff) were forwarded to the Cryptosporidium Reference Unit (CRU) laboratory in Swansea for confirmatory testing and initial typing to the species level by real-time polymerase chain reaction (PCR). Microbiological investigations were requested on probable and possible cases (see case finding section) and were also undertaken for hospitalised patients who reported visiting the farm.

The usual methods of detecting *Cryptosporidium* oocysts in stool samples are by acid-fast or auramine-phenol staining and microscopy, or by antigen detection. More sensitive, specialist tests available at the CRU include PCR and immunofluorescence microscopy (IFM) and for maximum sensitivity, prior processing by immunomagnetic separation (Davies and Chalmers, 2009).

During this outbreak the two laboratories concerned (Microbiology services at ABHB and the PHW Cardiff laboratory) were also asked to forward to the CRU the samples that tested negative for further testing by the more sensitive immunofluorescence microscopy (IFM).

There were a few cases which fitted the probable case definition whose symptoms had ceased by the time the EHD were made aware of them. Advice was sought from the CRU regarding the maximum time period after which specimens should no longer be tested in such individuals. In a similar outbreak, the CRU reported that it had previously tested samples up to two weeks post symptoms and found 59% of 46 children who had been exposed during a farm visit were still shedding oocysts detectable by IFM but not auramine phenol in routine testing (CRU, unpublished data). A negative result after two weeks would not mean the individual did not have *Cryptosporidium* infection.
It was agreed, following discussion with the CRU and other core OCT members that a two week cut off point would be used in deciding whether or not to test an individual whose symptoms had stopped. Furthermore it was agreed that probable cases identified within the two week period would be retested twice if they had an initial negative result.

All Cryptosporidium positive samples from this outbreak were further sub-typed by sequencing part of the gp60 gene.

d) Microbiological (veterinary)

Eleven faecal samples were collected in total from goat kids, lambs and their bedding by the AHVLA Veterinary Investigation Officer (VIO) on the 12th April 2012 and examined for Cryptosporidium. A further three faecal samples were collected from the muck heap that only contained bedding from these animals.

A small number of samples were rapidly pre-screened at AHVLA Carmarthen, and all 14 were forwarded for testing by IFM at AHVLA Weybridge as described by Pritchard et al (2007) - this test can be used to quantify oocysts on a scale of 0 (<1X10^3 oocysts per gram) to 5 (<1X10^6 oocysts per gram).

e) Environmental investigations

Following the farm visit on 12th April 2012, the VIO from the AHVLA produced a summary report of all findings and comments. The aim of the veterinary investigation was to assist the Outbreak Control Team in determining putative animal sources of human infection and advice on control measures within the veterinary remit, pertaining to zoonotic transmission. The VIO made enquiries (using a questionnaire) of the farm director and staff into animal husbandry practices, and also toured the farm areas inspecting the working environment.

TCBC EHD staff and the Corporate Health and Safety Team undertook regular environmental inspections during the course of the investigation, starting on the day an outbreak was first suspected.
The EHD discussed the findings with farm management, made oral recommendations and subsequently incorporated these into an action plan to the farm on 13\textsuperscript{th} April 2012 highlighting key issues that needed to be urgently addressed. Target dates were set for each action identified and the EHD checked that the actions were being taken.

### 6 Results

#### a) Case finding and epidemiology

Reports were received for 56 individuals who said they had worked in or visited GCF, and said they had symptoms. Of these, 14 were excluded from further investigations because they did not fit the probable or possible case definitions. Of the remaining 42 individuals:

- There were 10 confirmed cases, ranging in age from under 11 to 35 years of age. Nine cases had worked on the farm - all in the combined categories of volunteers, friends, work experience, and NVQ students: six cases were aged between 11 and 16, and the remaining three cases were all over 16 years old. The tenth case was in a visitor who had other possible exposure factors.

- There were 4 probable cases, all of whom had worked on the farm (one part-time worker, two NVQ students and one person on work experience)

- There was 1 possible case in an individual who had visited the farm but did not submit a sample for testing.

- There were 27 negative cases (13 in farm workers and 14 farm visitors).

The goats came onto the farm on 19\textsuperscript{th} March 2012 and the visit date of the last confirmed human case was 13\textsuperscript{th} April 2012. Between these two dates (19\textsuperscript{th} March and 13\textsuperscript{th} April 2012), the farm had 7,128 visitors. On the day that the one confirmed visitor went to the farm there were 373 visitors.
The case histories of this Cryptosporidiosis outbreak are presented graphically by means of epidemic curves for two distinct sets of timeline dates:

i) Dates of actual farm visits ranging from 21st March to 25th April 2012 (see appendix 2).

ii) Dates of onset of symptoms ranging from 23rd March to 30th April 2012 (see appendix 3).

b) Microbiological results (human)

Cryptosporidium-positive stools sent to the CRU laboratory for typing showed Cryptosporidium parvum profiles in samples from 10 human confirmed cases. More than one negative result was obtained for 4 probable cases.

All 10 confirmed cases were the same gp60 sub type Ila A15G2R1, which is one of the common sub types found in farmed animals and people with animal contact.

c) Microbiological results (veterinary)

Table 1: Results of IFM for Cryptosporidium oocysts on faeces samples from lambs and goat kids and their environment.

<table>
<thead>
<tr>
<th>Location</th>
<th>Animals present</th>
<th>Number of Samples</th>
<th>Number Positive</th>
<th>Number Negative</th>
<th>Score of positive samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pen 1</td>
<td>6 kids, 2 lambs</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>3+</td>
</tr>
<tr>
<td>Pen 2</td>
<td>5 kids, 3 lambs</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4+, 3+</td>
</tr>
<tr>
<td>Muck Heap</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1+</td>
</tr>
</tbody>
</table>
The results indicated that some of the animals in this group had been shedding *Cryptosporidium* oocysts. The 4 positive samples were submitted to the Cryptosporidium Reference Unit (CRU) for typing. Three of the samples were IFM positive and were the same *C parvum gp60* subtype as the human cases.

Five faecal samples including two samples from the muck heap were also pre-screened by modified Ziehl-Neelsen (mZN) stained smears for *Cryptosporidium* oocysts. These results were reported as provisional as the IFM is a more sensitive and specific test.

Two muck heap samples were reported as positive (but were negative by IFM) and subsequent investigation suggests these were false positives due to the presence of pollen grains, spores or other bodies of similar size.

**d) Environmental investigations**

Environmental investigations were undertaken with a view to recommending measures that would minimise the risk of zoonotic infections for visitors to the farm, as well as people working there. The following observations were made:

- The washbasins in the dairy were dispensing cold water only at the time of inspection.
- There was a large amount of signage about washing hands. However, the signage on the outside of the dairy was partially obstructed by a tractor at the time of the visit.
- Visitors do not always have to pass the hand washing facilities to access the picnic areas but are directed to use the hand washing facilities nearby.
- Directional signage to wash hand facilities should be improved.
- The maintenance of hand-washing facilities was an issue, with some hot water supplies and soap dispensers not working, and daily checks were therefore recommended to the farm.
- Interviews with those involved in animal feeding showed that hand washing was not always occurring after animal feeding due to time constraints, and that some people might not wash their hands unless supervised.
It was agreed that additional hand washing facilities and training would help promote effective hand washing practices, and more focussed use of existing mobile hand washing facilities was recommended to promote and assist staff hand washing.

e) Animal husbandry aspects

The lambs were orphan lambs from the flock at the community farm and the goat kids were brought in from a dairy goat herd. The animals were kept in an open barn which, at the time of a visit by the AHVLA VIO, LA EHD, and HPT on the morning of 12\textsuperscript{th} April 2012 was closed to public access and clearly signed ‘isolation area, staff only’.

The VIO estimated that about half of these animals had evidence of very recent diarrhoea based on liquid faeces on the hair in the perianal region or the tail. Some of the others had dried faeces adhering to the hair in the perineal region suggesting they had previously had diarrhoea. The VIO advised that lambs and kid goats are at higher risk of Cryptosporidium infection, and if they are unwell, public access should cease.

7 Control Measures

After the index case was first reported, early investigations indicated that bottle feeding of sick goat kids and lambs was considered to be a likely risk factor. The area where these animals were housed was isolated and access was limited to a small number of staff employed by the farm, alongside reiteration of advice on infection control measures that they should follow to protect themselves. Access was stopped to all visitors at this point in time, and all sick animals were subsequently euthanised on 13\textsuperscript{th} April 2012.

Inspections across the farm during the course of the outbreak investigation by TCBC’s EHD, Corporate Health and Safety Team, the AHVLA VIO, and HPT led to further recommendations on measures that needed to be put in place urgently.
These were confirmed in a health and safety action plan and sent to farm management on 13th April 2012 to implement. Local authority staff monitored their implementation and maintenance.

A number of other areas for improvement were identified as the outbreak investigation progressed. A COSHH assessment for biological agents was undertaken and an action plan to implement effective control measures sent to farm management by TCBC’s Corporate Health and Safety Team.

This section of the outbreak report covers the control measures that were implemented during the outbreak investigations and highlights the medium to longer term measures the farm needed to address. However, adequate resources and effective farm management systems are essential to ensure the implementation and maintenance of control measures.

### 7.1 Prevention/minimisation of contact with animal faeces – Farm Workers

Farm workers are at risk of zoonotic infections. They will have contact with animal faeces in the course of their work, and need to take appropriate measures to minimise their risk of contracting such infections. This must be underpinned by effective management and appropriate training. Farm management must provide suitable and sufficient personal protective equipment (PPE) to minimise the risk of staff acquiring zoonotic infections.

- A number of the individuals working with the sick goat kids and lambs regarded diarrhoea (scouring) as normal, and did not appreciate the risks posed and therefore did not consider it a priority to decontaminate hands or faecally contaminated outer clothing at the earliest possible opportunity.

- Farm management were advised by the VIO that diarrhoea in animals should not be regarded as ‘normal’, and that veterinary advice should be sought in such instances, if the diarrhoea persisted, in accordance with good animal husbandry practices.
Following the outbreak of diarrhoeal illness in the animals, it was advised that the isolation pens, in which sick animals were housed until they were euthanised, should be thoroughly cleaned (preferably steam cleaned) and disinfected before public access was recommenced. This was carried out week commencing 21st May 2012 as per instructions and public access remained restricted prior to this.

- It was agreed by the OCT that the composting of bedding waste was acceptable providing it reached an appropriate heat and that the leachate was controlled.

### 7.2 Potential for environmental contamination with animal faeces – visitors

The Griffin Report notes the importance of preventing visitor contact with animal faeces in the environment of open farms.

At GCF:

- There was effluent and straw from the Animal House on the edge of an external walkway (to which visitors had access). It was recommended that public access to the area should be stopped unless this could be controlled. Public access was stopped until environmental cleaning was undertaken.
- Consideration should also be given to the routes taken by visitors around the farm, so that, after animal contact areas, visitors must pass hand washing facilities prior to accessing picnic areas.
- There was also a risk of faecal contamination by small lambs escaping animal pens and accessing the internal walkway in the same building. This could be prevented by adapting the barriers of the pens that hold the young lambs. As a control measure, perspex has been added to the pens in the Animal House to control the contact with animals and faeces.
- Bottle-feeding of young ruminants is a major visitor attraction at the farm in early spring. The farm was advised that if bottle feeding by visitors is to be carried out in future years, this should be through a physical barrier from the public side of the pen gates.
- The farm tractor is used for a number of different tasks around parts of the farm.
These include towing a visitor farm train and regular farm tasks involving contact with manure storage areas, following which it then travels along public footpaths around the farm. Farm management were advised to review the route taken by the tractor.

- The farm took the decision to wash the wheels of the tractor before public use, and purchased a large industrial steam cleaner, which includes a jet wash/pressure wash function to remove faecal contamination. The farm has also put in place a process for cleaning the tractor wheels when it leaves the muck heap areas.

### 7.3 Hand washing

Measures were recommended to improve hand washing and the action plan required the farm to ensure that a constant supply of hot water is available to all wash hand basins, especially to the Animal House and wherever animals were being handled. Warm water (or hot and cold water) should be consistently provided for hand-washing according to AIS23 [http://www.hse.gov.uk/pubns/ais23.pdf](http://www.hse.gov.uk/pubns/ais23.pdf) (now withdrawn and replaced with new Industry Code of Practice – recommendation remains the same). It also recommended that a daily audit should be carried out of hand washing facilities throughout the day for hot water, soap, hand drying facilities and arrangements put in place to immediately rectify any issues identified.

Checks should also be made on signage to wash hand basins, and improvements made to directional signage to direct visitors to hand washing facilities. Any picnic areas without access to suitable hand washing facilities should be closed until such time as suitable facilities are made available.

### 7.4 Animal husbandry

The VIO advised that

- The farm health plan written by their veterinary surgeons should be regularly reviewed to help reduce the risk of zoonoses. Current farm stock should be used rather than buying in.
If purchase of young animals is considered necessary, an assurance should be obtained on the health of the animals including that the animals have received adequate colostrum. A four week isolation period should ideally be used for the introduction of purchased (replacement or additional) stock (refer to additional advice in Pritchard G, 2011).

- If there are outbreaks of diarrhoea in animals on the farm or outbreaks of unexplained disease, they should be fully investigated, including laboratory investigation if appropriate.
- Where contact with animals or their faeces is unavoidable, risk mitigation measures (such as PPE and hand washing) must be provided.
- Diarrhoeic animals or animals that are not healthy should not be placed in public animal contact areas and veterinary advice sought.
- If bottle feeding of orphan lambs/goat kids is to be carried out in future years, bottle-feeding behind barriered pen gates is likely to reduce the contamination of visitor clothing or footwear.

7.5 Protection from infection

The Farm Management are responsible for ensuring health and safety (H&S) at GCF, and work in liaison with the Corporate Health and Safety Team to ensure that the relevant H&S measures are in place on the farm. The Corporate H&S Team had undertaken a risk assessment based on previous HSE guidance for farms, but this appeared to be predominantly based on those visiting, rather than working on the farm.

The HSE visited the farm on 18 April and 4th May 2012 following notification of the outbreak and written advice was left at this visit. The HSE subsequently served an Improvement Notice on the 18th June 2012 requiring a suitable and sufficient risk assessment of the health risks from zoonoses to be undertaken – a notice that has since been complied with to the satisfaction of the HSE).

The Council’s Corporate H&S team also undertook a detailed COSHH risk assessment, and have recommended measures to minimise the risk to human health from zoonotic infections.
The OCT recommends that LA Corporate H&S teams work in close collaboration with LA EHDs, who have much knowledge and experience in undertaking risk assessments in relation to public health and infection hazards posed on farms.

### 7.6 Farm Workers

Individuals working on the farm included employees and others such as farm friends, volunteers and NVQ students.

Employees who have received training should have a greater awareness of the risks involved in handling animals, whereas volunteers, NVQ Students, Farm Friends etc. would not necessarily fully appreciate these risks. Further, during the course of the investigations it came to light that friends and family members of some of the farm workers had been informally asked to help out on the farm, and that some of these had contact with the sick animals.

The OCT was informed by TCBC that financial resource issues within the farm meant that it was under capacity in relation to employed staff and therefore the volunteers’ support was crucial to the operation of the farm.

- When the outbreak came to light, farm management were instructed that only farm employees should work with the sick animals.

- Farm workers did not have access to personal protective equipment (PPE) prior to the outbreak. This was brought to the attention of farm management. The action plan issued on 13th April 2012 instructed the farm to ‘provide suitable and sufficient PPE for those feeding and mucking out any animals suffering from scouring’. The farm was also told to provide ‘suitable and sufficient cleaning facilities for PPE’.

- It became apparent during the investigation that there was no health assessment undertaken for NVQ students, informal visitors or volunteers before they started working on the farm. It was agreed that separate risk assessments for employees, NVQ students, informal visitors and volunteers were needed.
• The farm workers, NVQ students and volunteers have an induction at the farm however it was recognised that family members, friends and ‘social networking’ friends etc. would have fallen outside of formal induction arrangements.

• It was acknowledged that there had been insufficient attention given to the training of volunteers before they started work on the farm. Notwithstanding that, it was felt that people working within the farm had a basic knowledge and understanding of risks etc. However, there was a failure amongst farm workers to fully appreciate the importance of hand washing and an assumption by farm management that regular, effective hand washing was taking place.

• It was recommended that more information should be provided for the carers and parents of NVQ students on the risks of working on an open farm, including infections, and of the importance of hand washing to preventing such infections.

7.7 Measures to increase visitor awareness of the potential risk of zoonotic infections on farm visits

The OCT felt that more should be done to alert potential visitors to the (infection) risks associated with visiting an open farm beforehand, and that information should also be provided on arrival. The action plan indicated the farm should ensure that staff in the shop area, who have initial contact with visitors, provide information emphasising the importance of good hand hygiene (including hand washing and boot washing), eating in designated areas, and the additional potential risks relating to pregnant women. Also the farm should devise a systematic method of monitoring and verifying customers’ understanding of the hand washing information given.

The Farm also put information on the home page of its website advising visitors of the infection risks associated with visiting open farms. It was recommended that this be placed in a prominent location on the website and that use be made of notice boards at the entrance to make clear the specific risks to pregnant women and other, vulnerable groups.
7.8 Implementation of the control measures recommended by the OCT

Officers of TCBC EHD and the CCDC carried out a visit to GCF on 26th April 2012 following confirmation of a visitor (case No 9) to ensure that control measures were in place and being maintained.

Observations were:-

i) Given the amount of rainfall in the days prior to the visit there was minimal effluent on the path.

ii) Additional signage had been improved with directional arrows to highlight hand washing facilities.

iii) The bales of hay identified previously which had been considered to be potentially contaminated due to their immediate proximity to the isolation area had been disposed of.

iv) The staff room was previously being used for both staff and animal foods etc. The staff room is now used as only a staff room and a fridge has been provided for the animal food etc. in a separate area.

7.9 Control measures and recommendations outstanding and/or actions to follow

Improving health and safety measures on the farm to prevent zoonotic infections in visitors and farm workers is paramount and in support of this, TCBC has completed a COSHH assessment that identifies the hazards and assessment of risks based on current control measures at GCF. Part 1 of this COSHH assessment provides a general risk score for each organism (including Cryptosporidium parvum) within each animal group whilst part 2 lists the current control measures in place and recommendations for any additional arrangements required. Using this COSHH assessment a specific zoonoses action plan has been collated and produced for GCF, which identifies the actions required for additional control measures both for universal controls of all zoonoses on the farm and those required specifically for Cryptosporidium. In total the report includes 26 general additional measures for the farm and 11 specific measures to control Cryptosporidium.
8 Communications

Communications was a specific agenda item at all OCT meetings and a variety of methods were used to inform the public and stakeholders of the latest information. Communications representation from Public Health Wales and TCBC were invited to all the OCT meetings.

At the first meeting of the OCT, it was agreed that the Public Health Wales Communications Team would have the lead for liaison with the media, on behalf of the OCT, and that the Chair of the OCT would act as media spokesperson.

A total of three press releases were issued on behalf of the OCT by the Public Health Wales Communications Team between 13 April and 1 June, 2012. All press releases were agreed by the OCT core members before final distribution to the media. All press updates were published bilingually to the Public Health Wales website.

The decision to proactively announce the outbreak to the media was taken in order to highlight the importance of good personal hygiene when coming into contact with farm animals. This approach is identified as best practice in the Communicable Disease Outbreak Plan for Wales (2011).

The first press release issued on 13 April 2012 highlighted the importance of hand washing after coming into contact with farm animals. The second press release issued on 26 April 2012 updated the number of cases linked to the outbreak and reinforced the message of good hand hygiene when visiting petting farms. The final press release issued on 1 June 2012 confirmed that the outbreak was over.

Two media enquiries were received by the Public Health Wales Communications Team which led to one radio interview with BBC Radio Wales.

The corresponding news items on the websites were viewed 242 times.

TCBC put information on their council webpages with links to the Public Health Wales website and also sent up to date information and communications activity directly via email to elected members and on internal channels to all staff. The Council’s Facebook and Twitter feeds were also updated regularly with up to date information and links to Public Health Wales web pages.
The corporate communication team at TCBC provided communications advice and support to the community farm management on posting information and answering simple operational queries on their own social media channels and again provided links to Public Health Wales information for responding to all health related comments or enquiries.

Following advice, the farm management responded to several press enquiries with factual information and referred all health related issues to Public Health Wales.

9 Discussion

This outbreak of Cryptosporidiosis with nine confirmed cases occurred in people working on GCF (owned by Torfaen County Borough Council) occurred in late March 2012. A single case also occurred in a visitor to the farm, but the individual had other possible exposures and it cannot be known for certain where the infection was acquired.

All ten confirmed cases were the same gp60 sub type Ila A15G2R1, which is one of the common sub types found in farmed animals and in people with animal contact. The source was identified as being young ruminants on the farm with diarrhoeal illness and the staff affected had been feeding these animals while they were symptomatic.

The incident first came to light on Maundy Thursday (5th April 2012) and infection control measures for implementation that day were recommended by the CCDC and senior staff in the EHD at TCBC.

These measures were timely and highly effective in limiting the outbreak: historically, the first peak of visitors to the farm in the year occurs over the Easter holiday.
This outbreak highlighted a number of issues that might be common to other community farms:

1. The perception that this was a working farm rather than a visitor attraction

The farm is a visitor attraction. One of the main themes arising during this outbreak investigation was the recognition that a change in culture is required throughout the farm to recognise that it is a visitor attraction and not just a working farm. There was a perception by staff at the farm that the infection risk was low. A member of staff commented that GCF was simply a farm and it was the visitors’ and volunteers’ responsibility to protect themselves e.g. wash their hands. Being a visitor attraction, the farm, its owners, workers and volunteer staff have a duty to protect the visiting public as well as themselves. This requires a robust combination of increased awareness, responsibility and culture change.

Health and Safety Risk Assessment and Risk Management

Previous health and safety risk assessments on the farm have tended to focus on the potential risks from accidents, but less so on the potential risks to visitors and staff from zoonotic infections. This was acknowledged by the Council, and the Corporate Health and Safety Team at TCBC have produced a comprehensive risk assessment and action plan that has started to address these issues.

Greater awareness of the risk of infection following animal contact among farm owners and visitors to the farm is required – a conclusion that was similarly reached in the Griffin Report (2009, p152). To show the tangible benefits that heightened awareness brings, a survey conducted on an open farm during 2005 (Pritchard et al, 2007) investigating the occurrence of C. parvum commented that, where an increased awareness of such zoonotic infections and associated control methods existed, there were no cases of Cryptosporidium detected in humans on the open farm.
More work needs to be done at GCF to raise the awareness of these risks and the recently published Industry Code of Practice (2012) is referenced as a good practice document that GCF should endorse, understand and follow. This includes a reminder for all staff of the increased risk of handling animals that have diarrhoea or are unwell and the importance of isolating such animals that are unwell.

**Awareness of farm staff.** This outbreak highlights a lapse in the continued and sustained appreciation from all staff at Greenmeadow farm of the risks associated with animal contact. Farm staff includes all salaried employees, all volunteers and associated helpers, who collectively have responsibility to protect not just their own health, but also that of other staff, and visitors to the farm. It was noted that whilst there was an awareness of health and safety at the farm, there was a failure to fully appreciate the importance of hand washing and a lack of capacity and time for staff to wash their hands effectively.

**The level of risk from zoonotic infections was underestimated** and it was recognised that more information should be provided for farm workers, volunteers and visitors to the farm.

In particular, more information must be provided to carers and parents of volunteers and NVQ students on the risks of working on an open farm and about whether there are any health conditions that would make such placements on the farm inappropriate. The overall responsibility lies with farm owners, directors and management to raise awareness of the level of risk presented.

**The use of social networking sites** were a particular cause for concern and is a practice that was immediately ceased, with only workers and volunteers who have received a formal induction, health protection advice and training being allowed to work.
2. Under resourcing at the time the outbreak came to light, with reliance on informal support from volunteers and farm friends

Resource issues were a contributory factor in the management of Health and Safety on the farm with Senior Farm Managers being required to address both executive management and operational matters on a daily basis. Senior Council management addressed the resource issues when these were drawn to its attention.

3. Responsibilities of farm management

The responsibility of farm management is to ensure safe working practices on the farm, alongside complete regard for the health of the people working there.

A comprehensive review of the responsibilities of the farm with regards to the supervision and management of placements from social services is required to protect potentially vulnerable individuals from infectious disease.

Standards of supervision. This is an area that has been shown to be inadequate throughout the investigation. NVQ students in particular, should be supervised more closely because they appear to be generally less aware of the risks and less likely to consistently implement the necessary control measures. It was also reported that there was complete lack of supervision to ensure that farm friends and volunteers washed their hands thoroughly after their work with the farm animals.

Whilst it is recognised that there was only one visitor (out of over 7,000) who was confirmed as having *C. parvum*, showing generally effective environmental controls and hand washing practices amongst visitors to the farm to prevent illness, there were however 9 cases of *C. parvum* being confirmed in farm staff. This highlighted a shortfall within the farm procedures and control measures to protect the staff. Pritchard (2007) reported that high standards of supervision on an open farm contributed to there being no cases of Cryptosporidiosis in humans.

4. Awareness of farm visitors to the potential risks of zoonotic infections

Although there was information on the farm’s website about the potential risks of zoonotic infections, it could only be found with some difficulty. It was recommended that this should be in a more prominent position. Clear provision of information is also needed for parents of children and schools visiting the farm before entering animal contact areas.
In view of the low perception of risk on this farm amongst the staff, this report emphasises statements from the Griffin Report that:

- It is the parent or carer’s choice whether their child is allowed to touch or feed the animals.
- Touching or feeding farm animals can be a source of potentially life-threatening infection, particularly in young children.
- 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 hand-washing, but can be used as an additional level of protection following hand-washing.

5. Design and layout of the farm

One of the key recommendations from the Griffin Report is that farm operators should ensure that the layout and design of public access areas are such that visitor contact with animal faecal matter is minimised or eliminated.

In addition, access to fixed hand washing facilities to encourage effective hand washing at areas of greatest risk is needed. The layout of the farm should therefore be reviewed.

6. Infection control measures

Proactive ongoing monitoring of staff working practices will be undertaken by Farm Management to ensure that control measures are being properly implemented and maintained. A regular survey of visitors is suggested as to whether they have seen signage, read the leaflet or been spoken to by staff may also assist in monitoring.

Suitability of external sourcing of animals for bottle feed demonstrations.

There was some discussion about whether the lambs and goat kids would be suitable for future bottle feeding demonstrations. The advice from the VIO was that, as many of them were diarrhoeic, they were not suitable for contact with the public regardless of the results of testing for Cryptosporidium.
If the practice of bottle feeding is to continue, bottle-feeding animals restrained behind a barrier is likely to reduce the potential for contamination of visitor clothing or footwear. The Farm was also advised that it was preferable to rear animals on farm, rather than sourcing animals externally, if possible.

**Animal Husbandry practices.** This report identified cross contamination issues on GCF that arose from placing animals that were ill adjacent to animals that were well. This practice should be reviewed and consideration given to the management and separation of healthy and ill animals. This should also be considered as part of the review of the design and layout as highlighted in point 5 above.

**7. Training**

During the outbreak investigation it came to light that it would be helpful for farm staff to receive training and refresh the knowledge and awareness of control measures and processes in place to control the risk of infection. Such training sessions were carried out jointly with the EHD lead officer and Health Protection Nurse. A training session on ‘Infection control’ was provided to all farm staff, volunteers and friends.

A total of 45 farm staff, volunteers, farm friends and ‘green wellies’ attended a 2-hour training session. In general, the benefits of hand washing and using the ‘glow-bug’ kit, to demonstrate effective hand washing techniques, were found to be beneficial. There were some good discussions around the PPE trials and also a number of questions regarding vaccinations recommended for work on the farm. Overall the training was very well received and permanent farm staff and those who have worked at the farm for a longer period of time appeared to be much more knowledgeable about zoonoses than those volunteering on the farm. Copies of the presentation slides have also been requested in order to provide cascade training for those unable to attend the sessions. There was also a request for similar training to be run twice yearly at the farm to refresh existing staff and to train new staff. As the farm has a similar ‘glow bug’ kit and a copy of the slides (which should be thoroughly reviewed prior to every training event to ensure they are accurate and up to date) and given the knowledge and experience of staff and management at the farm, this can be run in-house with the support of the Corporate Health and Safety and EHD at TCBC.
Using Personal Protective Equipment (PPE). Trainers were surprised to learn that staff had not been using PPE in the past during lambing etc. There was therefore a strong recommendation that PPE is used for all activities, such as lambing, and is incorporated into the consideration and development of risk assessments, policies and procedures relating to PPE and COSHH.

8. Council Commitment.
Early on in the outbreak investigations it was clear that TCBC management understood the seriousness of the outbreak and demonstrated their commitment to implementing the recommendations of the Outbreak Control Team. A meeting was held with senior Council officials and the senior farm managers on 8th June 2012 to discuss the lessons learnt from the outbreak, and to emphasise the importance of ensuring that measures are maintained to protect the public, as well as staff, from infections acquired from animals. Whilst discussions have already taken place at Senior Management level within TCBC as a result of the outbreak, a formal presentation of the lessons learned and associated actions will be made following publication of this report.

10 Lessons Learned and Report Recommendations

It is important that the lessons learned arising from this outbreak be shared across all community ‘open’ farms in Wales and this report now makes a series of recommendations that affect all agencies involved in or with open farms (for ease of reference, recommendations directly related to a specific lesson learned and follow on immediately within the text).

- There needs to be a clear mechanism in place for regulatory bodies to actively promote the implementation of key measures identified in the Industry Code of Practice to protect visitors from zoonotic infections by open farms, and to document when such advice has been given.
- Management and staff at GCF did not fully appreciate that a different, more vigilant approach was required to health and safety to that expected on a working farm.
Recommendation 1: Regulatory bodies should systematically prioritise and assess, having regard to relevant enforcement guidance, the implementation by community farms of the standards set out by the Industry Code of Practice on preventing or controlling ill health from animal contact at visitor attractions.

- Animal contact areas and non animal contact areas must be clearly identified with appropriate fencing in place to prevent contact, where necessary.
- Control measures were not wholly effective in preventing faecal contamination. For example, gaps at the base of fencing allowed straw and bedding, which is likely to contain faecal contamination, to spill onto public walkways. In addition, run-off of contaminated surface water from elevated fields was running across public walkways. Tractor movements from the Manure Storage area to all areas crossed walkways accessible to the public.
- Directional signage to all wash hand facilities should be improved, daily audit checks to ensure the maintenance of hand-washing facilities e.g. hot water supply and working soap dispensers, and proactive surveys of visitor knowledge and awareness should be regularly undertaken.
- Environmental investigations were undertaken with a view to recommending measures that would minimise the risk of zoonotic infections for visitors to the farm, as well as people working there.

Recommendation 2: Farm Management must undertake a thorough review of the design and layout of the Community Farm to ensure that the standards set out by the Industry Code of Practice are fully implemented and maintained.

- There was no monitoring system or surveillance mechanism in place in order to ensure that control measures, designed to prevent zoonotic infection, were being implemented and maintained at all times.
Recommendation 3: Daily audit checks of control measures designed to prevent infection must be maintained and proactive surveys to elicit visitor knowledge and awareness should be regularly undertaken.

- Information for visitors to community farms, especially the parents of young children and schools, warning of the potential risk of zoonotic infections must be easily accessible to enable informed risk assessments by those planning to visit the farm (via their website and other publicity material), and on arrival at the farm.

Recommendation 4: Open farms:

(i) Must display information in an easily accessible, prominent position on their websites to alert visitors to the potential risks from zoonotic infections

(ii) Must provide information to visitors on arrival informing them of the risks, and also what they should do to minimise the risk of such infections

- Community farms must have documented arrangements in place for appropriate health screening mechanisms for potential farm workers (employees, volunteers, those on work experience / placement) - preventable risks to health should be made explicit.
- NVQ students must have a documented health assessment prior to a prospective farm placement to ascertain whether or not this might pose an avoidable risk to their health.
- Community farms must have a policy that explicitly prohibits farm workers from asking their 'friends' to help out.
- All salaried staff, volunteers etc. must be supervised and receive adequate instruction and training in health and safety risks posed by zoonotic infections, before working in animal contact areas. Staff or volunteers without such training should be supervised at all times and/or be restricted to work in non-animal contact areas.
GCF is not alone in this regard as the Griffin Report commented for Godstone Farm on the low level of understanding of the risk of infection from farm animals.

**Recommendation 5:** More information must be shared and provided on the risks of an open farm by means of appropriate two-way communication channels open to all relevant agencies and personnel.

**Recommendation 6:** Open farms must also be encouraged to have a policy that explicitly prohibits farm workers from inviting their friends to assist with farm work on an informal basis as these people would be unaware of the risks, would not have received appropriate training and as such, the appropriate level of supervision cannot be guaranteed.

**Recommendation 7:** Written Policies and Procedures must be put in place in relation to the appropriate risk assessment, instruction, training and supervision of ALL staff working on the Farm.

There needs to be a clear distinction made between the executive oversight of farm management and the responsibility for operational day to day running of the farm. This requires a management structure with clearly defined responsibilities and lines of accountability with regard to health and safety and appropriate levels of supervision.

**Recommendation 8:** Management systems must be in place on community farms to keep responsibility for executive direction separate from that for day-to-day operational duties.

Farms should also have sufficient resources to allow for effective day to day running, rather than rely on partially trained ‘farm friends’
Recommendation 9: Adequate resources must be provided to ensure a ‘safe’ environment for both workers and visitors. Appropriate levels of training and supervision must be maintained at all times.

- Local authority Corporate Health and Safety Advisers must ensure that Health and Safety risk assessments are as robust as possible by working in close liaison with other Council departments that have the relevant expertise.

Recommendation 10: A close working relationship between Corporate Health and Safety Advisors and Environmental Health staff should be actively encouraged within Local Authorities.

- It would have been helpful at the first meeting of an OCT, to have a standard agenda item on informing non-core, and reminding core members of the importance of ensuring that control measures recommended by the OCT are fed back to implicated premises and implemented in a timely way and to identify OCT members charged with the responsibility to do so.

Recommendation 11: An effective feedback process between the implicated and/or affected premises and OCT must be maintained throughout the outbreak investigations.

It became apparent during the outbreak that communications with potentially affected persons and confirmed cases were ad-hoc and were mainly of a verbal nature. As a result, letters confirming their involvement or exclusion from the outbreak were sent to all affected persons and confirmed cases. This has been seen as an example of good practice and has been included in the revised ‘Communicable Disease Outbreak Plan for Wales.’
Recommendation 12: All Local Authorities should ensure that they continue to work to the current version of the ‘Communicable Disease Outbreak Plan for Wales’

- Consideration should be given as to whether current farm stock can be used rather than buying in. If purchase of young animals is considered necessary, an assurance should be obtained on the health of the animals from the seller.

Recommendation 13: It is preferable to avoid buying young animals in, but if this is necessary, it is important to ensure that they have had adequate colostrum intake to ensure good immunity, and they are isolated on arrival and monitored - only granting public access if they are healthy. Animals showing signs of ill-health must be excluded from contact with the visiting public.

11 Conclusion

There were 10 cases of laboratory confirmed Cryptosporidium parvum infection during the outbreak period – 9 cases were in farm workers with 1 case recorded in a visitor (who had other possible exposures).

The outbreak was caused and directly linked to bought in young ruminants that had been symptomatic with diarrhoea and not isolated as per recommended animal husbandry practice, but on receipt at the farm were housed in pens adjacent to lambs born on the farm, which subsequently also became unwell as a result of cross contamination.

The early notification of the first farm worker case to the local authority and proactive response potentially prevented a much larger outbreak, with only 1 confirmed visitor case out of over 7,000 visitors.
Pro-active communication from the OCT with subsequent widespread publicity allowed cases to be identified and appropriate infection control advice given to limit the spread of the infection.

Control measures are essential to prevent the spread of infections in a farm environment and include hygiene and infection control procedures. A comprehensive review of all control measures at the farm was undertaken, concurrent with a series of recommendations necessitated and made by the OCT.

Gaps and weaknesses in policies and operational procedures on the farm and non-adherence to procedures by some staff are likely to have contributed to spreading Cryptosporidium contamination. An over-reliance upon volunteers and a shortfall of awareness, knowledge and training of existing and new staff and volunteers in addition to inadequate supervision during the working days were also contributing factors to this spread of Cryptosporidium contamination. The outbreak highlighted and necessitated a new training procedure to regularly inform, update and maintain farm staff and volunteers’ knowledge and awareness.

A change in culture is required throughout the farm to recognise, understand and act accordingly that it is a visitor attraction and not just a farm. There is a need to introduce additional control measures on GCF to reduce contact with faecal matter. Further, in line with the recommendations arising from the Godstone Farm investigation, there needs to be greater awareness of the risks of animal contact among farm owners, regulatory authorities and visitors.

As owners of the farm, TCBC have addressed the issues with the completion of a comprehensive Health and Safety risk assessment review of all the farm’s activities, with identified actions and controls required. All these actions and additional forms of control have identified personnel responsible alongside appropriate timescales for completion.

The Griffin Report emphasised that owners/managers of Open Farms have a duty of care to their visitors who have an expectation to be in a safe environment.
Given that many of the control measures required to minimise the transmission of Cryptosporidium in response to this outbreak are identical to, and taken from the Griffin Report (which arose from an E. coli O157 outbreak in very similar circumstances), this report reinforces the stark message that had this infection been E. coli O157, all agencies involved could have been dealing with very different and severe outcomes.
12 References


13 Appendices

13.1 Appendix 1 – Outbreak Control Team (OCT)

Main core membership
Dr Lika Nehaul Consultant in Communicable Disease Control, Public Health Wales
Jason Austin Senior Environmental Health Officer / Lead Officer for Communicable Disease Control, Torfaen CBC
Kim Pugh Head of Public Protection, Torfaen CBC
Alison Hughes Head of Food, Health and Safety Team, Torfaen CBC
Liz Vann Senior Environmental Health Officer, Torfaen CBC
Kate Brain Food Safety Enforcement Officer, Torfaen CBC
Dr Meirion Evans Regional Epidemiologist Public Health Wales
Dr Rachel Chalmers Head, UK Cryptosporidium Reference Unit
Jonathan West Principal Health Promotion Specialist, Public Health Wales (representing Executive Director of Public Health, Aneurin Bevan Health Board)
Susan Belfourd Communications Executive, Public Health Wales
Neil Jones Head of Communications, Torfaen CBC

Main co-opted membership
Jeff Jones Veterinary Investigation Officer, Animal Health and Veterinary Laboratories Agency
Hugh Emment Inspector, Health and Safety Executive
Ceri Harris Health Protection Nurse, Public Health Wales
Claire Burt Corporate Health and Safety Manager, Torfaen CBC
Paul Bowkett Health and Safety Adviser, Torfaen CBC

In Attendance
Gareth Holyfield Principal Public Health Pharmacist, Public Health Wales
13.2 Appendix 2: Epidemic curve - DATE OF VISIT/CONTACT – ALL CASES
13.3 Appendix 3 Epidemic Curve – Date of Onset All Cases

BARN CLOSED

GOATS REMOVED FROM FARM