

**REPORT ON THE REVIEW
OF THE
APPROACHES AND PROCESSES UTILIZED
IN THE
INVESTIGATION OF AN
ESCHERICHIA COLI O157:H7 OUTBREAK
IN
NEW BRUNSWICK, DECEMBER 2001**

**PRESENTED TO THE
MINISTER OF HEALTH AND WELLNESS
NEW BRUNSWICK**

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GLOSSARY OF TERMS AND ABBREVIATIONS

Terms and Abbreviations used in this report are listed below alphabetically with their definitions.

ADM	Assistant Deputy Minister
Central Office	For the purposes of this review, Central Office refers to professional staff within the Office of the Chief Medical Officer of Health and the Provincial Epidemiology Service located in the Department of Health and Wellness in Fredericton, who provide support and consultation to the Regional Public Health Offices in communicable disease situations.
CMOH	Chief Medical Officer of Health. The CMOH is the senior representative of the Department of Health and Wellness for matters of public health in the province. The CMOH advises the Minister and Senior Management in the Department on public health issues, programs and policies. The CMOH is part of a team of professionals in the Office of the CMOH that provides support and consultation to Department and Regional staff for numerous public health programs.
Daycare community	Refers to the YM/YWCA managed daycare facilities at the YM/YWCA (Infant and Toddler daycare) and the Mercantile Centre Daycare. Three other facilities, the YM/YWCA Child Care Centre, Kids Zone and Prince Charles Daycare, were also included in investigations.
<i>E. coli</i> O157:H7	<i>Escherichia coli</i> O157:H7. The bacteria commonly associated with Haemolytic Uraemic Syndrome (HUS) and referred to in the media as “hamburger disease”.
EpiInfo	An internationally accepted software application used by epidemiologists to collate and analyze data collected during an outbreak investigation.
Excel	A commercially available spreadsheet application.
FCS	Family and Community Services - the department responsible for setting care standards in daycares in New Brunswick.
HACCP	Hazard Analysis Critical Control Point is a widely accepted approach to the systematic analysis of food preparation or production procedures designed to identify steps critical to maintaining the safety of the product.

MOH	Medical Officer of Health. In New Brunswick, the MOH has a broad range of public health responsibilities which include enforcement of the Health Act and its applicable regulations, control and prevention of disease, and advocating for the improvement of conditions and factors leading to better health in the community.
PFGE and PT	Pulsed Field Gel Electrophoresis (PFGE) and Phage Typing (PT) are internationally recognized methods for sub-typing many bacterial species, including <i>E. coli</i> O157:H7.
PHI	Public Health Inspector
PHN	Public Health Nurse
PHS	Public Health Services in Saint John, NB.

INTRODUCTION

A letter dated May 21st, 2002, from the Assistant Deputy Minister, Public Health and Medical Services Division, Department of Health and Wellness, New Brunswick, to the Assistant Deputy Minister, Population and Public Health Branch, Health Canada, requested the assistance of Health Canada in conducting a review of the processes used in investigating the *Escherichia coli* O157:H7 outbreak that occurred in Saint John, New Brunswick in December, 2001. In response, a Review Team was formed which included representatives from Health Canada and the New Brunswick Department of Health and Wellness. The Review Team was co-chaired by one representative from Health Canada and one from the New Brunswick Department of Health and Wellness. The approach to the review and its objectives were clarified in a series of telephone conferences with the team and Terms of Reference for the review were agreed (Appendix A) and endorsed by the Minister. This report presents the results of the review process and is in four parts corresponding to a description of the outbreak review process, a brief description of the outbreak investigation, the findings of the review, and conclusions.

PART 1

OUTBREAK REVIEW PROCESS

Composition of the Review Team

Health Canada	Dr Paul Sockett (co-chair), Director, Division of Enteric, Foodborne and Waterborne Diseases, Centre for Infectious Disease Prevention and Control
	Dr Linda Panaro, Director, Field Epidemiology Training Program, Centre for Surveillance Coordination
	Dr Andrea Ellis, Head, Outbreak and Issues Management Section, Division of Enteric, Foodborne and Waterborne Diseases, Centre for Infectious Disease Prevention and Control
New Brunswick	Ms Rachel Bard, (co-chair), Assistant Deputy Minister, Public Health and Medical Services, Department of Health and Wellness
	Dr Wayne MacDonald, Chief Medical Officer of Health
	Dr Christofer Balram, Provincial Epidemiologist, Director, Provincial Epidemiology Service
	Dr David Assaff, Medical Officer of Health, Health Regions 2, 5, 6, and 7
	Ms Shirley Clarke, Regional Director Public Health Services, Region 2

Mandate

The review was requested by the Minister of Health and Wellness, New Brunswick. The intent of the review was to examine the processes and approach used by the regional and provincial public health personnel in the investigation of the *E. coli* O157:H7 outbreak related to the Saint John YM/YWCA Daycare Community in November and December, 2001, and to prepare a report to the Minister of Health and Wellness.

Methodology

The team reviewed the processes utilized to investigate the outbreak. The steps used in the investigation were compared to a recommended approach to outbreak investigation adapted from that described by Dr Michael Gregg, 2002¹ (see Appendix B). The team conducted the review via telephone conference calls and held face to face meetings in Saint John and Fredericton, New Brunswick. The team met key individuals from the public health authorities involved in the outbreak investigation in New Brunswick. The review was carried out in three phases:

- Compilation and review of key documents (June and July, 2002).
- Team meetings in New Brunswick (July and September, 2002).
- Preparation and finalization of report (August to October, 2002).

Compilation and review of key documents

The Public Health investigative team in Health Region 2 compiled key documents produced during the outbreak investigation. Provincial Public Health authorities added other documents for the review team's package. These documents included investigators' reports, investigation team notes, team and data management tools, the report of the post outbreak debriefing and information provided for daycare attendees parents and daycare staff.

Team meeting in New Brunswick in July 2002

The Review Team met in Saint John, New Brunswick from July 17th to 19th, 2002. The purpose of the meeting was to consider the roles and responsibilities of the regional, provincial and federal agencies involved in the outbreak investigation. The meeting provided the opportunity for Health Canada to seek clarification on the sequence of events and further detail on the processes used.

The review team benefited from a systematic chronology of the outbreak investigation and a detailed description of the investigation and control activities. This included the rationale for specific decisions taken with respect to the investigation and management of the outbreak. This chronology was helpful in establishing the context of the documents provided to the team.

The review team was assisted by the members of the Regional investigation team who cooperated fully and frankly in their responses to questions and in their participation in discussions. The emotional strain on the investigation team members was noted and reflected their high level of concern for the children and families involved in the outbreak.

¹ Michael B. Gregg. In: Field Epidemiology, 2nd Edition, Oxford University Press, 2002

Prior to the review, parents of children involved in the outbreak had asked to be included in the process. The concerned parents were encouraged to submit, in writing, their comments and observations for consideration by the Review Team. Comments were received by the review team chairs in August 2002, and were reviewed by the team.

Preparation and finalization of report

It was agreed that the Health Canada co-chair would draft the Review Team report. This draft would be circulated to all review team members for review and comment individually and at a further face-to-face meeting. This meeting was held in Fredericton in late September 2002. A final version would then be provided to the New Brunswick Minister of Health and Wellness.

The approaches and processes utilized in this outbreak investigation were compared with recommended steps in outbreak investigation procedure and are presented in Part Three of this report under the headings:

- Actions that **Went well**.
- Actions that **Could be improved**.

In addition **Recommendations** for further actions to be taken are identified and improvements that have been implemented are noted. **Responses** from the Department of Health and Wellness to these recommendations are also included.

PART 2

SUMMARY OF THE OUTBREAK INVESTIGATION PROCESS

This part of the report summarizes the outbreak investigation of *E. coli* O157:H7 which was related to a daycare community in Saint John, New Brunswick in November and December, 2001, and the investigation by the public health personnel. The YM/YWCA daycare included Infant and Toddler sections located on separate floors; the nearby Mercantile Centre daycare was in another building. During the course of the investigation a baby-sitting service, “Kids Zone,” operated by the YM/YWCA in the same building as the Infant and Toddler Daycares was also identified. Two other daycares located elsewhere in Saint John, the YM/YWCA Childcare Centre and Prince Charles daycare, were also considered in the investigation. Saint John Public Health staff were informed during the investigation that each of the daycares and the baby-sitting service operated independently (i.e. separate staff and facilities), although they had a common management. The exceptions to this were the food preparation kitchen serving the Infant and Toddler sections in the YM/YWCA building; the YMCA swimming pool and gymnasium which served the Infant, Toddler and Mercantile Centre daycares.

Summary of the Outbreak

Seven cases, including six with laboratory confirmed *E. coli* O157:H7 infection, were associated with an outbreak related to the Saint John YM/YWCA daycare community in December, 2001 (see Table). Three were infants, two were toddlers and the remaining two cases were a school age child and an adult. The three infants attended the Infant daycare, one toddler attended the Toddler daycare and the other had recently transferred from the Infant daycare to the Mercantile Centre daycare. All six children were seen by a physician and three were treated in hospital including one child who died (one child had been treated in hospital in September); the remaining children and the adult recovered. A number of other reports of diarrhea during November and December 2001 were noted in staff and children in the daycare community. All individuals, including symptomatic and asymptomatic individuals who submitted specimens, except the six confirmed cases noted above, were stool culture negative.

Table 1: Seven cases of *E. coli* O157:H7 identified in the daycare community investigations

CASE #	LABORATORY CONFIRMED	DATE OF ONSET	DATE REPORTED	DAYCARE	COMMENT
1	✓	30/11	6/12	I	Died
2	✓	5/12	7/12	I	
3	✓	17/11	10/12	M	Transferred from I to M 3/12
4	✓	7/12	11/12	T	Sibling of case 2
5	✓	6/12	12/12		Parent of case 3
6	✓	15/10	13/12		School age sibling of case 3
7*		26/11	10/12	I	
<p>Legend: I = Infant M = Mercantile T = Toddler</p> <p>*Case 7 was originally designated suspect case B. This case met the clinical case definition but was culture negative (the first stool specimen was collected 11 days after onset of symptoms²).</p>					

Summary of the Outbreak Investigation Procedures

Public health investigation started December 6th with the first case; control activities were initiated the same day and extended on December 7th when the second, presumptive, case of *E. coli* O157:H7 infection was reported by the Laboratory. These activities included:

- **Public Health investigations** initiated to ascertain the scope of the outbreak and the source of the organism.
- **Public Health control** measures to reduce the risk of infection to daycare centre attendees, staff and family contacts.

² A further suspect case, suspect Case A, was consistently culture negative (the first stool specimen was collected one day following symptoms in the hospital).

- **Environmental investigations** to identify potential risk factors for infection in the daycare community and evaluate practices with regard to food preparation, cleaning and sanitizing, diapering, hand washing and movement of staff and children.
- **Microbiological investigations** including the examination of specimens from both human and environmental sources. Laboratory studies encompassed both routine microbiological examination and detailed characterization of the outbreak strains of *E. coli* O157:H7 by Pulsed Field Gel Electrophoresis (PFGE) and Phage Typing (PT).
- **Public Health response** to monitor the progress of the outbreak and review response and control activities.

Two investigation debriefings took place: the first at the Regional level on January 25th, 2002, followed by a joint session with Regional and Central Office on February 6th, 2002. A final report was presented in March, 2002.

PART 3

RESULTS OF THE REVIEW

The findings of the review process are presented below. The results are described under the recommended steps adapted from Gregg, 2002 (see Appendix B).

Determine the existence of an outbreak

Following laboratory confirmation and notification to the Saint John Public Health Services, of a case of *E. coli* O157:H7 infection on December 6th 2001, the Public Health Services (PHS) in Saint John attempted to contact the parents of the case. At the time of notification to public health, the child, who was seriously ill, had been transferred to a speciality care facility in Halifax, Nova Scotia. PHS was informed of the child's name and medicare number only, and had to work with hospital records and the paediatric ward staff to determine that the parents were in Halifax with their child. The parents then had to be located in the Halifax facility to which the child had been transferred. It took approximately 4-5 hours to establish contact with the parents through this process.

Initial questioning of the parents revealed that the child attended a daycare facility in Saint John run by the YM/YWCA. The daycare management was informed immediately of the child's illness and advised about the symptoms of *E. coli* O157:H7 infection. Daycare management was requested to inform the PHS if there had been any history of diarrhea during the previous two weeks, or currently occurring in the daycare. The daycare was also asked to report any new incidents of diarrhea to the PHS and was advised to ensure their normal exclusion policy for ill children was enforced. The MOH, who is based in Miramichi, was informed of the case, and in turn notified Central Office in Fredericton.

The daycare management stated that they were not aware of any other cases of diarrhea currently or in the previous two weeks, although they noted that cases of "fever" and "pink-eye" had been observed. At approximately 3.30 pm on December 7th a second, presumptive, case of *E. coli* O157:H7 infection was reported to the PHS. The daycare management was informed immediately that an outbreak was occurring.

Went Well

It is clear from the sequence of events on December 6th and 7th that the laboratory at the Atlantic Health Sciences Centre in Saint John acted rapidly to inform the PHS of confirmed or probable *E. coli* O157:H7 identification. The PHS then responded quickly to establish the link with the daycare, to ensure the MOH and Central Office³ were kept informed, and took the initiative to

³ The Central Office included staff from the Office of the CMOH and Provincial Epidemiology Service.

investigate the Infant daycare facility. The MOH promptly initiated control activities, and closed the Infant daycare as soon as the second, presumptive, case was reported.

Within the Saint John Region the immediate notification (including after hours notification) of the PHS, by the hospital laboratory, of a single positive *E. coli* O157:H7 infection is normal practice. PHS staff interviewed cases and/or their parents using a standard provincial generic case questionnaire. These were forwarded to the Provincial Epidemiologist. In addition, a provincial directive from the Provincial Epidemiologist calls for confirmed *E. coli* O157:H7 infections to be investigated within 24 hours of notification to the Regional Public Health Office.⁴

Could Be Improved

Although attempts were made in the early stages of the outbreak to ascertain if illness was occurring in the daycare (children and staff), information provided to public health indicated that there were no other individuals with diarrheal illness in the facility. Attempts to identify other potential cases and to determine the existence of pertinent data sources in the daycare, including attendance records, daily activity sheets and medication records, should have been actively pursued. The existence of day sheets for each child in the infant daycare was not indicated by daycare management to Public Health staff and Public Health only learned of their existence in late December from a parent.

Recommendations/Actions

1. Family and Community Services should review with the daycare management the implementation of exclusion policies and consider the development of an agreement, co-signed by parents, to report absenteeism and the reasons for absence, particularly symptoms of a communicable disease. Absenteeism information should be recorded and collated by daycare staff and be made available to Public Health authorities upon request.

Communicable Disease Standard Operating Procedures are currently being developed to standardize the approach and procedures to control communicable diseases within the province.

Public Health has made contact with the Department of Family and Community Services, which licenses daycares in New Brunswick, and has completed a review of their current policies and standards pertaining to infectious diseases in daycares. Public Health has initiated meetings with Family and Community Services staff to present recommendations to revise and enhance the areas of exclusion criteria and their enforcement, re-entry following exclusion, recording of absenteeism, reporting of communicable diseases to public health, communication to parents on the presence of communicable diseases and enhancement of the daily care/activity record.

⁴ This follows a Directive from the Provincial Epidemiologist dated October 1999.

2. Public Health and Family and Community Services should collaboratively review record keeping and data collection processes within daycares. This is to ensure accuracy and timeliness of information recorded and to ensure that both institutional and Public Health authorities are aware of the need to identify and access all potentially relevant information in a public health emergency such as an outbreak.

Public Health Services and the Department of Family and Community Services are jointly addressing this issue (see response to recommendation 1).

Confirm Diagnosis

All staff and attendees of the three daycares were requested to provide stool specimens. Stool specimens were collected from over 132 daycare staff, attendees and their family contacts. The daycare staff and management provided help in contacting staff, attendees and their parents to request they submit stool specimens. Specimen bottles were distributed by PHS staff with verbal instructions on how to collect the stool. Lists of individuals receiving the bottles were provided to the laboratory. The rationale for extensive stool testing was based on a recommendation contained in the Control of Communicable Diseases Manual⁵ and the perceived need to identify the full extent of infection in the children and staff in the daycare community.

The laboratory at the Atlantic Health Sciences Centre, Saint John, provided diagnostic microbiology throughout the investigation of the outbreak, including the examination of over 150 specimens. In addition, the laboratory accessed national reference laboratory services (National Laboratory for Enteric Pathogens, National Science Centre, Winnipeg) for detailed characterization of the outbreak strains of *E. coli* O157:H7. Initial results on strain characterization were received on December 12th (Phage Typing results) and December 14th (Pulsed Field Gel Electrophoresis results). PFGE technology is not available in New Brunswick although it is available in public health laboratories in other provinces. All cases were identified as PT 32. However, molecular typing using PFGE showed that three cases had indistinguishable PFGE patterns while the remaining cases had different PFGE patterns. The significance of these results is unclear.

Went Well

The PHS staff, with the assistance of the daycare staff and management, distributed stool specimen collection bottles to daycare staff and attendees and to a number of their family contacts, and ensured the laboratory was provided with lists of those receiving specimen bottles. This enabled the laboratory to prioritize and track specimens submitted as part of the outbreak investigation. The laboratory diagnosis was timely and the laboratory took advantage of strain characterization methods to further define the outbreak. The prompt reporting of the pathogen by the laboratory enabled the PHS to rapidly assess the potential seriousness of the outbreak and to take action to immediately close the Infant daycare. This also enabled PHS to identify and

⁵ American Public Health Association. In: Chin, J, ed. Control of Communicable Diseases Manual, 17th ed. Washington D.C. American Public Health Association; 2000: p.157.

exclude from the daycares, individuals shedding *E. coli* O157:H7 in their stools, in order to prevent further transmission of the organism in the daycare setting.

Could Be Improved

The implications of negative laboratory results for stool specimens and the negative predictive value of laboratory results were not fully explored. False negative results can occur for a variety of reasons including the time interval between collection and testing, methods of storage after collection and the time interval between onset of symptoms and specimen collection. If stool specimens are collected from asymptomatic individuals, each person should complete a case ascertainment form. This additional epidemiological data may have helped clarify the associations and relationships between the laboratory confirmed cases, and could have helped differentiate those who spontaneously report symptoms from those who have symptoms but require systematic questioning to ascertain this. Verbal instructions only on stool specimen collection were given whereas written instructions would have improved the likelihood of proper specimen collection, storage and transport.

In this investigation, interpretation of the variations of the PFGE patterns was difficult based on the epidemiological data collected for the identified cases. PFGE patterns, when considered with systematically collected epidemiological data, are useful in interpreting the relationship between cases and common exposure sources. Building the capacity of New Brunswick to do its own PFGE characterization, establishment of a PFGE patterns database and linkage to PulseNet Canada would improve the timeliness and accuracy of the interpretation of results.

Recommendations/Actions

3. Establish the technology and skill to perform PFGE characterization in a New Brunswick microbiology laboratory center. Establish a database of PFGE patterns and linkage to PulseNet Canada to improve the accuracy of the interpretation of results and the timeliness of reporting to the MOH.

This recommendation will be reviewed with Regional Health Authorities and the Institutional Services Division of the Department of Health and Wellness.

4. Clear written instructions on stool collection should be developed and provided to individuals requested to submit specimens. These instructions should include guidance on collection, storage, transport and hygiene. This should be done in collaboration between public health and laboratory services in the province. Instructions should be included in a stool collection kit.

This need has been identified in provincial debriefings and staff have been assigned to develop a specimen collection kit and a process for stool specimen collection in outbreak situations This will be included in Standard Operating Procedures for communicable diseases that are now under development by Public Health Services.

Assemble team and assign roles and responsibilities

Following the laboratory reports on December 6th and December 7th, Public Health Inspectors (PHI) and Public Health Nurses (PHN) were assigned to visit the Infant daycare and to enquire about illness at the facility. A teleconference, including the regional public health staff and Central Office, was called on December 7th and continued on at least a daily basis for the week of December 10–14, 2001, to respond to the developing situation. Thereafter, teleconferences were held on an “as need” basis until the end of December. Responsibilities were assigned and a management spread sheet was created to facilitate the investigation and control activities.

On December 11th, 2001, Health Canada was informed about the outbreak and responded that assistance was available if needed. The normal procedure in New Brunswick is for Regional Public Health to request help from the Provincial Epidemiologist who in turn may request assistance from Health Canada.

On December 12th the Regional Director of Public Health requested assistance from the Provincial Epidemiology Services in Fredericton. Two professional staff from the Office of the Provincial Epidemiologist were sent to Saint John, arriving on December 13th. One of them continued to provide support for the investigation both locally and at the Central Office; the other returned the following day because he was unclear about the specific contribution required. Also, on December 12th, the Provincial Epidemiologist informed the Assistant Deputy Minister (ADM) that he was available to return to the province from a meeting in Ottawa to assist in the investigation. The staff from Central Office set up an EpiInfo database to facilitate collation and analysis of data from a number of sources and existing in several formats. However, Regional staff were unfamiliar with EpiInfo and data was exported to an Excel spreadsheet for local analysis on December 28th.

Went Well

The Regional public health staff responded rapidly to the initial and subsequent cases in the daycare community. The managers mobilized appropriate local resources to investigate and control the emerging outbreak. The MOH and Central Office were included in discussions by telephone conference from December 7th onwards and teleconferences to assess the progress of the outbreak and to discuss its investigation and control were held frequently (daily or twice daily initially).

An Excel spread sheet created to assist in the management of the multiple tasks assigned to the team members provided an excellent summation of activities. The Regional Director of Public Health recognized when further expertise was needed and made the appropriate request for assistance on December 12th. Following this request the Provincial Epidemiologist deployed two professional staff to help with data management; they traveled to Saint John the following day.

Could Be Improved

Although the actions related to the investigation and control of the outbreak were identified and assigned, not all of the outbreak investigation and control team were clear about their specific roles and responsibilities. Some of the team members were not fully aware of the steps involved in conducting an outbreak investigation.

The leader of the investigation team must have experience in managing outbreak investigations and the ability to devote 100 per cent of their time to the investigation. The leader must also have access to necessary resources, for example, epidemiological, laboratory and biostatistical expertise. No one individual appears to have had on-site, comprehensive, functional responsibility to coordinate the outbreak investigation and control activities. As a result, direction came from more than one source and accountability for ensuring actions were taken was diffuse. In addition, lack of strong on-site epidemiological expertise in the early stage of the investigation led to incomplete case ascertainment. Failure to actively seek, early in the investigation, symptomatic as well as laboratory confirmed cases may have affected the perception of the extent of the outbreak. The two persons who could have provided this expertise were the MOH and the Provincial Epidemiologist. Participation of these individuals was hampered by intraprovincial functional, resourcing and organizational issues.

At the time of the outbreak, the MOH served the public health needs of a geographically dispersed population encompassing four Health Regions and had multiple responsibilities⁶. The availability of full time MOH resources in the province is in a state of critical and chronic shortage and should be addressed as a matter of urgency.

Although participation of the Provincial Epidemiology Service was requested within three working days (on December 12th) of the outbreak being declared, the expertise provided was limited to data management. The role of provincial epidemiology staff, how they should be incorporated into the investigative team, and how, and from whom, they receive direction on site was not clear to either the regional Public Health Services or the deployed provincial Epidemiology staff.

Members of the investigation team fulfilled multiple roles suggesting a lack of available human resources with the appropriate skills and knowledge, and a lack of advance planning to ensure the capacity to respond to urgent issues. Consequently, some individual team members were assigned too many roles while others were under utilized. The response was further hampered by the need for senior Regional Public Health staff to respond to internal requests for situation updates, the news media, communicate with worried parents and the YM/YWCA management, as well as lead the assessment of information and critical decision making. A communications officer to coordinate and control media requests and press conferences should have been identified and utilized at an earlier stage.

⁶ At the time of the outbreak the Province was being served by two full-time Medical Officers, (the CMOH and one MOH) and three physicians providing part-time services. The normal compliment of full time Medical Officers is 6.

Recommendations/Actions

5. Outbreak investigation skills for all public health staff should be enhanced.

The need for further training in outbreak investigation for public health professionals was identified and addressed within six months by the provision of a joint training course by Health Canada and the Provincial Epidemiology and Public Health Services. Two workshops were held in May and June 2002 for all Regional staff in both official languages.

6. Understaffing of MOH positions within the province should be urgently addressed. The current staffing situation is inadequate for the population served, and places intolerable stress on the existing staff. The current demands on public health decision-makers (MOHs) are not sustainable.

There is increasing competition, within Canada and internationally, for physicians with specialized training in the field of public health. The Department of Health and Wellness is currently seeking to fill several vacancies in this area, and has sought to provide competitive compensation packages to attract candidates to fill these positions. The MOH position in Region 2 (Saint John and area) is currently filled on an acting basis, however, the Department is working to hire a full-time MOH for the region as soon as possible.

7. The role of the Provincial Epidemiologist and provincial epidemiology staff in outbreak investigations should be clarified. The Provincial Epidemiologist must be an integral member of the outbreak investigation team and automatically involved from the beginning of an outbreak investigation.

The Department of Health and Wellness has taken steps to clarify the role of the Provincial Epidemiology Service in relation to outbreak investigations.

8. Epidemiological expertise in outbreak investigation in New Brunswick should be reviewed and enhanced by the identification of specifically trained individuals who would be available to provide on-site epidemiological leadership during an outbreak.

The Provincial Epidemiology Service will have a clear role in the investigation of outbreak situations (see response to recommendation 7).

9. A provincial protocol for outbreak investigation should be developed and should address issues such as:
- identification of an on-site functional manager to lead and coordinate the outbreak response and with access to epidemiological and other expertise;
 - lines of authority for reporting and responding to outbreaks; roles and responsibilities for the outbreak investigation team members and selection of appropriate individuals to those roles;
 - access to provincial or national expertise/resources and information on how to access them;
 - provision of checklists, templates and frameworks respectively for activities, data collection and analysis;

The provincial protocol could be linked to the national Foodborne Illness Outbreak Investigation Protocol that contains many of these elements. The protocol should warn the team leader and members that they may become overwhelmed and provide guidance on how to identify when they have exceeded their expertise or other resources and how and where to seek assistance.

Standard Operating Procedures for communicable disease control are in the process of being developed and will address outbreak investigation and control process. Issues related to staff functions, investigation leadership, roles and responsibilities, use of provincial and/or national resources and review processes will be addressed in these procedures.

10. An individual responsible for developing communications materials and mediating provincial information media requests should be appointed early in an investigation. This individual should have responsibility for developing communication materials, including press releases and background facts, providing regular updates to media and Ministerial officials (verbal or written material), and arrange and manage press conferences and interviews.

The Communications Branch of the Department has hired a media liaison coordinator who routinely coordinates media requests and may speak on behalf of the Department. In addition, the Director of Communications for the Department has indicated that in an outbreak situation, a communications person will be available, on site, as part of the response team, to organize media requests and assist in communication aspects of the investigation.

11. The current provincial procedures, which indicates that only the Provincial Epidemiologist is to request outside assistance from Health Canada for an outbreak investigation should be changed. Either the Provincial Epidemiologist or CMOH should be able to request assistance from Health Canada if needed.

Federal epidemiologists and other specialists can assist in an investigation upon request by the Provincial Epidemiologist or CMOH.

Implement immediate control measures

On the morning of December 7th, an inspector took environmental swabs of the diaper changing area, eating utensils and samples of drinking water at the Infant daycare. Pool water samples were taken on December 10th and pool maintenance records were reviewed on December 11th. The inspector visited the kitchen that served both the Infant and Toddler daycares and discussed with the cook food hygiene practices, cooking procedures, and staff training and kitchen staff health. Equipment and refrigerator temperatures were also checked. Recent menus served at the daycare were reviewed for possible high risk foods, and the procedures for handling and cooking these foods were reviewed with the cook. All meals were prepared *en masse* for children and staff except some items for a small number of children with special dietary needs. Toy cleaning procedures were investigated on December 10th, 2001.

Following the report of a second positive child in the Infant daycare the MOH decided to close the facility after discussions with the PHS and the Central Office. The daycare management was fully cooperative with this decision. Since the laboratory report came late in the afternoon, the daycare was allowed to close normally and parents were informed that the daycare would not reopen until further notice. Based on information provided to public health at the time the Toddler daycare was allowed to stay open. Family and Community Services, which licenses daycare facilities, were kept informed of these decisions and subsequent developments. Disinfection of the Infant daycare was carried out on December 7th and repeated on December 11th prior to reopening the facility on December 13th.

The laboratory reported a positive asymptomatic child at the daycare in the Mercantile Centre, and a positive child attending the Toddler daycare, also managed by the YM/YWCA, respectively on December 10th and December 11th. These cases were linked to the Infant daycare: one was one of two children recently transferred from the Infant daycare to the Mercantile Centre daycare, and the other was a sibling of a case in the Infant daycare. As soon as the possible involvement of these daycares was identified the facilities were visited by PHS. Children and staff in the Toddler daycare and the Mercantile Centre daycare were subsequently requested to provide stool samples. These daycares contained older children who were not considered to be at as high a risk for person-to-person transfer, the mode of transmission considered by the investigation team to be the most likely explanation for the outbreak. Closing the other two daycares was considered, but on the basis of information contained in the RED

BOOK⁷, they were allowed to remain open while reinforcing exclusion, hygiene and sanitation policies and procedures.

Went Well

The initial control actions of the PHS were carried out rapidly to protect the children and staff in the Infant daycare from further exposure to infection. The initial inspection focused on both the possibilities of a food source and the potential for person-to-person or environmental spread within the facility.

As soon as the second case was reported, the MOH declared an outbreak. The decision to close the Infant daycare was implemented immediately with the cooperation of the YM/YWCA management. The approach to closing the facility avoided unnecessary disruption to parents and staff, and parents were informed that the facility would remain closed until further notice. Following reports of cases in the other two daycares, the investigation was extended to include these facilities.

PHS staff were assured that the daycares' exclusion policy was being implemented, however, not all parents cooperated with the policy and the Toddler and Mercantile Centre daycare staff attempted to isolate ill children until their parents could return for them. The regional public health staff contacted the designated contact person for the two daycares which remained open for active surveillance purposes on a daily basis from December 10th – 13th, inclusive.

A comprehensive disinfection program was initiated for the Infant daycare and was carried out before the facility was reopened. Toy cleaning procedures in the Infant daycare were reviewed. Normal daily cleaning procedures were continued in the other two facilities affected.

Could Be Improved

Assessment of daycare food preparation concentrated on routine practices as described by the cook. The value of this type of information could have been improved by observation of the kitchen staff during meal preparation and by probing what was actually done during the suspect timeframe using a HACCP approach. This should include details of the menu items served, their sources and where and how they were stored and prepared. This meticulous examination is important to include or eliminate food as a possible source of *E. coli* O157:H7 infection.

The decision not to close the Toddler and Mercantile Center daycares was made on the basis of the reported absence of linkages (other than the common kitchen) between the Infant and Toddler facilities, information available to decision makers at the time, about the extent of illness in the Daycare Community, and review of the recommendations in the RED BOOK. Based on the available information and assessment of available literature, the decision to leave these daycares open was reasonable. However, daycares housed within the same building are likely to have more connections than those in separate buildings and the potential for other linkages

⁷ American Academy of Pediatrics. In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infections Diseases, 25th ed. EIK Grove Village, Illinois; American Academy of pediatrics; 20:p.247.

between the daycares could have been more fully explored. There are currently no nationally developed public health guidelines on the optimal control measures for enteric outbreaks in these or other institutional facilities with high risk populations.

Although the Infant daycare had a policy of exclusion for children with specific symptoms who became ill on the premises, there was no obligation for parents to report absenteeism or the reasons for being absent. Had this information been available it may have alerted the daycare management earlier to the possibility of enteric illness among the children, leading to earlier investigation of the facilities or in different decisions being made to control the situation in the daycare community.

Recommendations/Actions

12. National guidelines should be developed for management of outbreaks of enteric disease in daycares and other high risk communities. These should include guidance on exclusion policies and clearance (re-entry) criteria for specific enteric pathogens. National guidelines would provide a basis for the development of local protocols.

This matter will be referred to Health Canada for review.

13. A protocol, agreed between Public Health Services and Family and Community Services, should be prepared to specify criteria for closing and sanitizing daycare premises where an outbreak has occurred. This would provide a clear mandate for action. Such a protocol should include, for example, check lists of surfaces which may need to be cleansed (e.g., tables, toys, light switches, door handles) as well as recommended disinfection procedures and products.

This is currently under way as part of the daycare standards review process being developed by Public Health Services and the Department of Family and Community Services, as referred to in the response to recommendation 2.

Define a case

A case definition is an essential epidemiological tool for identifying ill individuals exposed to a risk factor (e.g., an event, location or specific food). The definition may therefore incorporate elements of time, place or person. Thus, the case definition will identify the time period over which exposure to a risk factor may have occurred and a description of symptoms to distinguish cases from other illness occurring concurrently in the population. The definition is often more sensitive during the initial case finding stage and may become more specific when microbiological evidence becomes available. Case definition(s) are often revised during an outbreak to focus the investigation as more facts become available. This was important in the investigation under review in order to distinguish children with enteric symptoms from children with “pink eye” and “fever” already occurring in the daycare community.

A verbal working case definition to aid in the identification of cases potentially linked to the outbreak was developed on December 11th and included any individual with vomiting, diarrhea

or stomach cramps in the past few weeks. A written, refined case definition was prepared on December 17 and finalized December 18th (Appendix C).

Went Well

The final case definition incorporated elements of time, place and person. Laboratory confirmation of infection was used to identify individuals linked to the *E. coli* O157:H7 outbreak in the daycares. Inclusion of suspect individuals, based on symptoms, was helpful in trying to define the scope of the outbreak.

Could Be Improved

Before active surveillance is carried out, sensitive (based on symptoms) and specific (based on laboratory confirmation) case definitions should be developed. The concept of secondary cases should be incorporated into the definitions early to aid in interpreting the primary cases' exposure histories. Case definition(s) should be developed and put in writing as soon as possible and shared with everyone involved in the investigation and follow-up activities. This enables the scope of the outbreak to be described; possible clusters identified, and will guide decisions relating to both the optimal investigation procedure adopted and the extent of control measures.

In this outbreak, the organism causing illness was known from the beginning and the definition developed should have incorporated all the recognized symptoms. Although the suspect case definition included criteria that could be evaluated (e.g., the number of loose stools in a 24-hour period was included in the written definition), this information was not requested in the questionnaire. No distinction was made between primary and secondary cases in the definition.

Recommendations/Actions

14. Ensure that the outbreak protocols developed by the province clearly identify the need to develop both sensitive and specific case definitions early in the investigation and that these definitions are distributed to the appropriate staff.

Communicable disease Standard Operating Procedures are being developed and will address the issue of case definition development.

Determine who is at risk

Initially investigation focused on the Infant daycare. The Infant and Toddler daycares at the YM/YWCA were considered separate facilities, except for food service and administration. All children reportedly had the same diet from the daycare kitchen with the exception of a small number with special dietary requirements. This was checked by comparing the diets of three children with confirmed infection and three children with negative stool cultures and no symptoms.

After December 6th, the central daycare administration designated contact person was asked regularly if increased diarrhea illness in the daycares was observed. The scope of the investigation was extended to the Mercantile Center on December 10th and to the Toddler

daycare on December 11th following reports of positive children at these facilities. One was a symptomless child who had transferred to the Mercantile facility on December 3rd, and the other was a sibling of a positive case in the Infant facility. The Mercantile Centre Daycare shares administration with the YM/YWCA daycares, but is in a different building and has separate staff and food service facilities.

The scope of the investigation was further extended on December 12th when PHS was informed that the mother of case 3 was positive for *E. coli* O157:H7 and that she currently worked for a home care agency. She was visited at home on December 13th to verify her client list and her clients were contacted on December 14th and were advised of the need for testing; no symptoms were reported in this group. Also, on December 11th, an informal babysitting group (Kids Zone) located in the YM/YWCA building was identified. Kids Zone was not considered at risk because public health was informed by the YM/YWCA administration that they had separate staff; a separate location; no meals were supplied; and children were there for short periods of time on an infrequent basis and had no interaction with the daycares.

The YM/YWCA requested follow-up on two other daycare facilities located elsewhere in the city for which they were responsible; one with six children and three staff and the other with forty-three children and six staff. None reported symptoms in children or staff and no further investigations were made.

Went Well

As the investigation team became aware of other groups, they actively broadened surveillance and control activities and the designated contact person for the daycares was asked whether there was an increase in diarrhea in the facilities. The rapid identification and testing of two children transferred to the Mercantile Centre daycare meant that facility was quickly identified as being potentially at risk and included in investigation and control considerations. Similarly, when the team identified that the mother of case 3 was positive and worked for a home care agency they obtained a list of her clients within 24 hours, and initiated contact activities.

The identification of the risk groups linked to the Infant daycare enabled the investigation team to create lists of potentially exposed individuals that were supplied to the laboratory. This helped facilitate linking of positive cases of *E. coli* O157:H7, or any other enteric pathogen, to the outbreak and supported efforts to define its scope.

Could Be Improved

Initial information collected by public health services indicated that the only link between the Infant and Toddler daycares was the common kitchen. The potential for other linkages could have been more fully explored. A subsequent examination of flow patterns by PHS staff did not reveal any additional connections. However, more detailed exploration of the patterns of interaction between staff, children and their families, and inanimate objects may have provided further clues to common exposures and helped clarify who was at risk.

The possibility that food was a risk factor could have been looked at in more detail. The comparison of the diets of three positive and three negative and symptom free children from the Infant daycare was useful in identifying no dietary differences in the Infant daycare, but was a small sample of the cohort and did not explore the possibility of food brought in by parents.

Reports from the daycare administration that there was no unusual increase in reporting of diarrheal illness in the daycares may have been misleading to the investigation team and may have led to underestimation of the true prevalence of illness.

Recommendations/Actions

15. Public Health Inspectors should be offered training to enhance their skills in identifying patterns of interaction during epidemiological investigation.

Training sessions have been held for Public Health Inspectors earlier this year, as indicated in the response to recommendation 5, and opportunities for further training will be developed.

Conduct case finding

Case finding was based on two approaches in this investigation: inquiries for information on illness from the daycare community, and laboratory reporting of positive stool test results. Stool specimens were requested from individuals at risk of exposure; this initially included children and staff in the Infant daycare, but as the situation developed, testing was extended to include children and staff at the Toddler and Mercantile Centre daycares. Other children using the Kids Zone service were later included at the request of their parents, however, not all parents asked for their children to be tested. When stool collection bottles were distributed, a letter requesting the PHS be notified of any child with symptoms of diarrhea, vomiting or stomach cramps was sent home to parents of children in the Toddler and Mercantile daycares. Parents who received their specimen bottles directly from PHS were asked about symptoms of their child or family.

The occurrence of other, concurrent, illness (fever; pink eye) in the Infant daycare affected the ability to determine onset dates for some cases. On December 6th Public Health requested the daycare management to report all children in the Infant daycare with symptoms of *E. coli* O157:H7 during the previous two weeks. Public Health was informed at the time that no diarrhea illness had occurred. (Parents are not required to report a reason for absence to daycare staff.) In addition, daycare management was requested to report any new cases of diarrheal illness to PHS and to exclude these children from daycare. Anecdotal information from a parent suggested that there may have been noticeable absenteeism at the Infant daycare on November 29th; however, this was not supported by daycare attendance records, which may not show that a child has been removed from the facility after arrival.

On December 10th the PHS became aware of other possible cases of diarrhea in the daycare community and further investigations were initiated to verify this. On December 11th a letter requesting parents to phone public health if their children had had diarrhea, vomiting or stomach

cramps in the previous few weeks, was provided by PHS to daycare management for distribution to parents of children in the Toddler and Mercantile Center daycares.

Interpretation of the laboratory findings for six confirmed cases was complicated by the results of the strain characterization tests. All six confirmed cases were characterized as PT 32, but PFGE patterns indicated at least four distinct strains were present. These strains were genetically distinct and interpretation of the results remains unclear.

Went Well

Actions were initiated to identify further cases which included requests for information on sickness in the Infant daycare from the contact person designated by the daycare. This was extended on December 11th to include a request for attendance records. As the scope of the outbreak unfolded the investigation of sickness in other parts of the daycare community was expanded, and the need to follow up symptomatic children and staff and to monitor child and staff health was recognized. A letter to parents included a request to inform the PHS of any child with symptoms. Distribution of stool collection bottles and giving the results also provided opportunities for the Public Health Nurses to ask parents about illness in other family members. The laboratory reported all results, positive and negative, as they became available.

A phone number was made available to parents to leave a message with PHS if anyone in their family developed symptoms. Calls were followed up by a PHN and arrangements were made for stool specimen collection; individuals with symptoms were encouraged to see their family doctor. On December 13th all family physicians in Health Region 2 were informed by letter about the outbreak and asked to be on the alert for possible cases. The letter provided clinical information regarding diagnosis and management of *E. coli* O157:H7 infection. A similar letter sent to Chiefs of Medical Staff and Laboratory Directors of Regional Hospital Corporations in the province also reminded recipients that infection with *E. coli* O157:H7 is reportable in the province.

Could Be Improved

A standardized case ascertainment questionnaire was not administered to the daycare community. Case finding in the investigation relied on reporting of symptomatic cases by the designated daycare contact person, attendees' parents, and laboratory reports. As a result, valuable information may have been missed. For example, the daycare management initially reported, on December 6th, that there had been no diarrheal illness, other than Case 1, in the Infant daycare during the previous two weeks.

The initial indication that an outbreak was occurring in the Infant daycare should have suggested the need for active systematic interviewing of all staff and attendees' parents using a standardized case ascertainment questionnaire. The early availability of written, standard, case definitions for laboratory confirmed and suspected cases would have helped distinguish cases linked to the outbreak from concurrent illness in the daycares due to other infections.

When passive surveillance and positive laboratory reports indicated involvement of the wider daycare community, systematic interviewing should have been broadened to include the additional staff, and attendees' families. Some information on symptomatic individuals was available but its significance was not fully appreciated by field staff, and it was not immediately communicated to the MOH and Regional Director of Public Health. This was a missed opportunity to conduct active surveillance for cases and inform the MOH.

In Saint John all staff and attendees were tested for *E. coli* O157:H7 without obtaining detailed histories. Other precedents have also been set in Canada that, in a daycare setting, children are uniformly tested. This recognizes the potential risk of asymptomatic individuals shedding in a vulnerable environment. Accepted practice in epidemiological investigations is to obtain detailed histories from exposed individuals prior to, and sometimes concurrently, with laboratory testing. Laboratory data without epidemiological context is difficult to interpret, and could be misleading. The ideal sequence of events should be:

- identification of all children and staff attending the daycare and associated facilities;
- identification of new suspect cases through systematic application of the case ascertainment questionnaire to each parent or guardian and staff member;
- symptomatic individuals requested to submit stool specimens and answer a case questionnaire to obtain details of symptoms, onset dates and times, exposures, etc.

The generic provincial case questionnaire should be adapted to reflect the setting under investigation. In addition, a national guideline on the management of enteric outbreaks in vulnerable communities is needed to ensure a consistent approach.

In this outbreak the lack of more complete case ascertainment contributed to the interpretation of the negative stool samples as having a high negative predictive value, i.e. those testing negative were believed to be truly negative; this may have resulted in an underestimation of the size of the outbreak.

Recommendations/Actions

16. Outbreak investigation teams should ensure that systematic collection of case ascertainment data on all individuals in a cohort (e.g., daycare children and staff) is considered early in an investigation.

A standardized case ascertainment questionnaire was developed in March, 2002 in Saint John, and was utilized in an outbreak investigation by that region. Subsequently, a more detailed case ascertainment questionnaire was used in an outbreak in Miramichi in June, 2002. This is being refined and will be disseminated to all Public Health Regions.

17. A protocol describing the main steps in an outbreak investigation and identifying specific roles and responsibilities should be developed for the use of public health professionals in the province. This could include templates of standard case ascertainment and generic case questionnaires, letters, advisories, draft press releases, etc.

This will be addressed in Standard Operating Procedures for communicable disease outbreaks, as described in the response to recommendation 9.

18. A national guideline for the management of enteric shedders in vulnerable populations should be developed and made available to provincial public health authorities for adaptation and use in their jurisdictions.

The preparation of a national guideline for enteric shedders has been initiated by Health Canada.

Orient findings in terms of person, place and time

It is standard practice in an epidemiological investigation for the information collected to be orientated in terms of person (e.g., details relating to the individual including demographics, exposure to risk factors and outcome of disease), place (e.g., where individuals were at the time of exposure to risk factors) and time (e.g., when the individual was exposed, when symptoms started). This facilitates the systematic review of the information collected in order to describe the outbreak and develop hypotheses of the cause of infection. These may be tested in further, analytical, studies e.g., a case-control or cohort study. This approach is facilitated by the systematic collection of standardized data using a standardized case definition.

Information pertinent to this outbreak was collected in more than one format, and the collation of outbreak related information into a single database was initiated on December 13th by staff from Central Office. A line listing of cases was available to the Region on December 14th, prior to finalizing of the case definition on December 18th. A database, which incorporated information on daycare attendees, their parents and siblings, was set up in EpiInfo.⁸ As new information became available it was added incrementally into the database. This was exported to Microsoft EXCEL⁹ for use by professionals in the Saint John PHS who were unfamiliar with EpiInfo. Delays were initially experienced in obtaining some essential information such as contact addresses and telephone numbers for the children attending the Infant daycare.

The possibility that the outbreak in Saint John could have been linked to other *E. coli* O157:H7 PT32 case elsewhere in the province or the country was considered and epidemiological links with cases in other provinces was investigated with the assistance of Health Canada. This included follow-up of a case in Moncton reported December 12th, 2001, and *E. coli* O157:H7 PT 32 cases in Ontario, British Columbia and Saskatchewan.

⁸ EpiInfo is an internationally accepted software application for outbreak investigations

⁹ A commercially available spreadsheet application.

Went Well

Contamination of geographically widely distributed products such as ground beef has occurred recently, and it was important to establish that the Saint John outbreak was an isolated incident and not part of a wider provincial or interjurisdictional outbreak.

Could Be Improved

A line listing of all individuals, their essential demographic details, and their health status including symptoms, onset dates and outcomes, should have been developed at an early stage in the investigation. Descriptive epidemiological summaries of all data collected by person, place and time, for all possible, probable, confirmed on secondary cases in children, staff and family contacts, should have been submitted to the team leader or MOH daily during the investigation. This information would have facilitated understanding of the dynamics of the outbreak and contributed to the identification of information gaps. Ongoing data analysis and interpretation is the responsibility of the epidemiologist assigned to the outbreak team and should be reviewed by their supervisor and shared with the outbreak team on a regular basis. A line list contributes to the systematic investigation, analysis and interpretation of the available information. Daily updates on the distribution and health status of individuals linked to the daycare community provided in a standardized format would have enabled team members to concentrate on the management of control activities.

The early assumption that the outbreak was due to person-to-person spread was based on information obtained from the daycare at the time that there was no diarrheal illness in the facilities, the nine day spread in reported onset dates for the laboratory confirmed cases, an assessment of the food preparation practices, and environmental assessment of the facility and the quality of local drinking water. Systematic questioning of all individuals reporting gastrointestinal symptoms, clarification of onset dates and denominators (numbers and distribution of persons at risk), and systematic analysis of other potential risk factors, including calculation of attack rates by potential risk-factor exposure, may have either confirmed or strengthened the stated hypothesis or may have led to consideration of other potential hypotheses.

Recommendations/Actions

19. Minimum standards for the collection, collation, analysis and review of outbreak related information should be described in a provincial protocol and descriptive epidemiology should be done throughout an investigation to aid decision-making. The protocol should address standards for the recording of outbreak control meeting notes. Decision-making about significant steps in the investigation should be documented with explanations of why they were taken.

Documentation for the decision-making process in outbreak investigations will be addressed in Standard Operating Procedures for dealing with communicable diseases and outbreak situations, as outlined in the response to recommendation 9.

20. A detailed report of the investigation should be produced by the designated epidemiologist assigned to the team for all significant outbreaks. A standard template should be developed to facilitate this.

The process for preparing reports in outbreak situations will be addressed in the Standard Operating Procedures described in the response to recommendation 9.

Generate and test hypothesis

Review of all available data relating to potential exposure factors in an outbreak is essential to the development of a working hypothesis as to the cause of the incident. The working hypothesis may change as new information becomes available and as a result of the regular review of the available information. A specific hypothesis would normally be tested by an analytical study. In the incident under review potential commonalities between the Infant, Toddler and the Mercantile Centre daycares were examined as the investigations progressed and the public health authorities became aware of them. This included shared activities such as outings, use of common areas or facilities, for example, the pool and the gym, and specific exposure opportunities including finger painting and food consumed, and flow patterns for children and staff within the daycare community. Since the incubation period between exposure to the *E. coli* O157:H7 bacteria and the onset of symptoms is usually two to eight days, the investigators explored potential risk factors for each case for up to eight days prior to illness.

Went Well

Hypotheses concerning the introduction of infection into the daycare community were explored. Efforts began December 7th to identify commonalities between the Infant and Toddler daycares; these indicated, at the time, that the only shared facility was food preparation. This prompted an inspection of the food preparation area and cooking practices and enquiry about menus served. Possible risk foods were identified from the menus and serving dates were compared with the known onset dates for confirmed cases as the PHS became aware of these.

Other potential common exposures or risk activities were identified and explored, for example, finger painting and use of the YM/YWCA pool. Pool maintenance records were reviewed and water samples submitted for testing. The possibility of person-to-person spread in this outbreak was considered from an early stage. The spatial and temporal distribution of cases indicated some spread of illness was occurring within families linked to the daycares and within the Infant daycare.

Could Be Improved

An early assumption that the outbreak could be explained by person-to-person spread was based on the information available at the time. As new information became available to the team (e.g., daily activity sheets identified in late December), this initial hypothesis was not substantially

challenged. More systematic examination of patterns of play and sibship between the children in the daycare and review of the health of children and staff and their presence at the daycare while experiencing symptoms would have helped to confirm, or otherwise, the initial hypothesis.

Frequent review of all available data is essential to the development and revision of hypotheses concerning the cause of an outbreak. Although regular meetings of the outbreak team took place, the team did not have access to all key data elements until late in the investigation. The hypothesis was generated on the basis of information available at the time. More systematic collection and analysis of data could have led to a more rigorous challenge of the hypothesis.

Recommendations/Actions

21. As far as possible hypothesis generation should be based on systematically collected and validated data. The available data should be reviewed critically on a regular basis by the investigation team leader and the investigation team, and decisions made concerning the direction of the investigation. This approach should be incorporated into an outbreak investigation protocol and training packages and should be accompanied by systematic collation and validation of information.

The development of possible hypotheses in outbreak situations will be addressed through the Standard Operating Procedures described in the response to recommendation 9.

Plan a systematic study if necessary

Epidemiological investigations are dependent on the systematic collection and analysis of pertinent data. A systematic approach is adopted to ensure the comparability of data and consistency of analysis in order to eliminate bias as far as possible. This approach is applied initially to a descriptive study to identify the scope and possible causes of the outbreak and may be further applied to an analytical study to test a specific hypothesis.

Went Well

The random selection of three symptomless and microbiologically negative children with three confirmed cases for comparison of food consumption histories indicated that the need to look at ill and non-ill individuals was considered. This comparison found they were all served the same food prepared in the same kitchen; the same food was served to all the daycare infants, older children and staff with the exception of children with special dietary needs.

Could Be Improved

A cohort study, of this defined population to identify possible causes by allowing comparison of risk factors in ill and non-ill individuals would have also helped to determine the scope of the outbreak. The methodology adopted, of looking at food consumption in three cases and “controls,” does not exclude food as a source. Questioning all parents of children and staff systematically may have revealed different consumption patterns of the same food, or suspect or confirmed cases may have been served from a different batch.

Recommendations/Actions

22. A standardized approach to investigations should be adopted; this could include a standardized case ascertainment questionnaire and a case questionnaire that can be modified to fit the details of a specific outbreak. The approach should define the types of epidemiological and microbiological information required.

The development of a standardized approach to outbreak investigations will be addressed through the Standard Operating Procedures described in the response to recommendation 9.

Implement prevention and control measures

Ongoing prevention and control measures were designed to ensure that the Infant daycare could reopen, and the other linked facilities could operate without further risk to the children attending. These measures fell into the following categories:

- **Hygiene measures.** These included sanitization requirements prior to reopening the Infant daycare as well as ongoing activities to emphasize good hygiene practices.
- **Case reporting.** Reporting of illness in children and staff by daycares to public health was reviewed to ensure that the need for prompt provision of adequate information was understood.
- **Exclusion Policy.** The daycare policy for exclusion of symptomatic children and staff was reviewed, particularly with regard to the implementation of the policy.
- **Clearance Criteria.** The application of criteria to indicate that symptomatic or confirmed cases are no longer shedding bacteria in their stool was reviewed. This is of particular importance in daycares where hygiene standards may be difficult to maintain at all times simply because of the age of the children and the need for diapering.
- **Communication.** It was important to ensure that the parents of all children were kept informed and understood the need for public health actions, such as closure of the premises. Parents were informed by the YM/YWCA that the daycare was closed and why. A letter about potential exposure to infection and the need for stool samples was

provided to the daycare for distribution to parents of children in the three facilities. A fact sheet on *E. coli* O157:H7 was made available to the daycare for distribution to parents; this was also available to the public. Senior Public Health officials held regular media conferences to inform the public of developments.

No new cases were recorded among children or staff after the Infant Daycare reopened.

Went Well

Precautionary measures were taken to reduce the risk of further spread of infection by individuals in the daycare community in addition to the initial control activities. The cook was required to provide evidence of being stool negative before continuing food preparation; all confirmed cases and symptomatic individuals were required to be symptom free and provide two consecutive negative stools taken 24 hours apart and at least 48 hours after use of antimicrobials prior to return. Symptomatic staff were advised to remain off work even if culture negative. When the daycare reopened only stool negative and asymptomatic staff and children were allowed to attend.

Following closure of the Infant Daycare on December 7th, the premises were sanitized twice before reopening on December 13th. In addition, training sessions on hygiene and infection control procedures were held for the Infant daycare staff and other staff at the discretion of the daycare management. Information was provided to parents (see above).

Could Be Improved

Control and prevention actions applied to the three daycares reflected the information available at the time and a review of the available literature. Availability of a nationally accepted guideline would have provided a clear mandate for the actions to be taken.

Reporting of illness in the daycare community to the PHS was not as timely and complete as it should have been. According to case reports, there were children with diarrhea present in the Infant daycare in the week prior to December 6th which were not reported to PHS. In addition, Public Health was not informed about the existence of individual daily activity charts until late in the investigation.

Recommendations/Actions

23. Public Health and Family and Community Services should work together to improve recording and data collection processes within daycares. This should ensure that organizations such as daycares understand their responsibility to identify illness in their clients and staff populations, that illness is adequately documented and that the information is shared appropriately with the local public health authorities.

New communicable disease regulations being developed will make reporting of communicable diseases by daycares mandatory. See response to recommendation 2.

24. A national guideline on the management of outbreaks of enteric illness in daycare situations should be developed.

Health Canada has initiated the development of national guidelines for enteric shedders (see response to recommendation 18).

Disseminate findings and recommendations

The outbreak control team met regularly (daily initially) to review the progress of the outbreak, the investigations and the control actions taken. Information derived from these reviews was disseminated via regional updates and was consolidated in a summary report finalized in March 2002. Information was provided to the parents of daycare attendees in letters provided to the daycare management for dissemination on December 7th and 11th and via an education session at the YM/YWCA on December 20th. A media release by the Department of Health and Wellness on December 10th provided details of the numbers of cases and the death of one case together with a review of the actions taken. Media briefings were provided for several consecutive days.

PHS offered to hold an education session for parents on December 13th, however, daycare management could not accommodate the session until December 20th. Unfortunately, PHS was provided with the incorrect start time and some parents had departed before the Public Health staff arrived.

Went Well

The press release by the Department of Health and Wellness and the media briefings by senior Public Health staff provided the media with clear information concerning the outbreak situation, including the number of cases and the death of one child together with the control actions taken.

Regional Public Health officials were provided with an update by Central Office on December 13th. This included a summary of the situation and was helpful in making a distinction between the outbreak in Saint John and a concurrent case of *E. coli* O157:H7 infection in Moncton. The chronology of the outbreak was documented in a concise summary on January 4th, 2002.

Could Be Improved

The education session with parents should have been held earlier than December 20th. If it had been held shortly after December 7th it would have been an opportunity to inform parents of potential risks, to explain the control actions taken, and request them to report illness in their families.

Information provided to the public via media advisories by both the YM/YWCA management and the Department of Health and Wellness was not coordinated. The Public Health press release, whilst informative, could have directed individuals with symptoms to contact Public Health.

The final report was not available until March 2002, and was presented in the form of a chronology. The report missed some key elements of an outbreak report including the number and proportion of cases hospitalized, the death of one of the cases and details of the numbers of staff and children at risk.

Recommendations/Actions

25. Processes should be developed to ensure that communications with the media are coordinated between public health and the various organizations that may be involved in an outbreak response. In addition, the early designation of a single public health official (not the leader of the investigation team) to act as a media spokesperson could help relieve pressure on individuals involved in essential investigation and control activities.

The Communications Branch of the Department of Health and Wellness will provide a communications officer as part of the on-site response team in outbreak situations (see response to recommendation 10).

26. The Outbreak Report should be written by the designated epidemiologist on the outbreak team as soon as possible after the event. The report should be structured according to a generally accepted format, and should contain all pertinent information.

The format for the Outbreak Report will be identified in the Standard Operating Procedures referred to in the response to recommendation 9.

27. Information concerning an outbreak should be available to all those involved in investigation and control activities via a shared computer drive or alternative mechanism designed to share information while preserving confidentiality.

The Department of Health and Wellness will examine ways to share information on outbreak investigations with those involved in the investigation process.

Debriefing

A debriefing session is an essential part of a major outbreak investigation. It should provide all those involved with an opportunity to critically appraise the approaches taken to the investigation and control activities, to identify specific issues which went well or not well and to plan for how these issues can be addressed in the future. Debriefing should not only address the mechanics of the response but should also be structured to provide staff with an opportunity to identify the physical and emotional stresses they may have experienced during the outbreak. These result from working long hours under pressure and in having to respond with sensitivity to members of the public who may be angry and confused, while having to deal with their own emotions while carrying out their professional tasks as objectively as possible.

Went Well

Debriefing sessions were held on January 25th, February 6th, 2002, respectively for the Saint John Regional staff and jointly with the Central Office and Regional staff. The debriefing sessions identified a number of needs, which included the following:

- a lead investigator on-site early in the outbreak to coordinate and direct activities;
- an outbreak investigation team of sufficient size and with appropriate skills;
- further training of Public Health staff in outbreak investigation approaches;
- an “investigation kit” containing guidelines, template fact sheets and questionnaires.

The debriefing recognized the value of the early development of a task check list as a management tool in tracking the activities of the team members and for assigning individuals to specific actions.

Could Be Improved

A critical incident stress debriefing session should be offered to all staff involved in an outbreak investigation. Individual counseling may be needed for particularly sensitive or prolonged outbreaks.

Recommendations/Actions

28. The post outbreak debriefing process should offer a critical incident stress debriefing component, with follow-up counseling if needed.

The Department of Health and Wellness provides counselling and other assistance to its employees through established employee assistance plans.

PART 4

CONCLUSIONS

The primary objective in any outbreak investigation is to protect people at risk of infection by defining those at risk and by identifying and eliminating the cause. In the outbreak in Saint John in December 2001, the Public Health Services were aware from the earliest notification that infection was caused by *E. coli* O157:H7 and within the same day identified that the index case attended a daycare. These actions reflected Regional practice of immediate notification of laboratory confirmed *E. coli* O157:H7 infection. Public health policy requires follow-up of such cases within 24 hours.

When a second, presumptive, case from the same daycare was confirmed within 24 hours, public health concluded an outbreak was occurring in that facility. Immediate action was taken to protect the Infant daycare community by closing the facility and warning parents of the risk. This rapid action contributed to limiting the size of the outbreak. Nothing the Public Health authorities could have done would have prevented any of the confirmed cases from becoming ill or the death of case 1, all of whom were either already ill or were incubating the disease when authorities became aware of the outbreak.

The investigation revealed that two children had recently been transferred from the Infant daycare to another facility. These were followed up and one was shown to be stool positive for *E. coli* O157:H7 and removed from the daycare. The cohort of confirmed cases included three family contacts. Public Health authorities responded appropriately to information indicating other daycares and a health care agency could be involved and broadened investigation and control activities to include these. Provision of a local telephone number for parents to contact PHS and the development of a task management tool contributed positively to the control of the outbreak.

Daycare management was advised about the first case on December 6th, and their cooperation was sought by Public Health in implementing control and prevention activities. These included closure and investigation of the facility and keeping parents informed of the situation.

The review identified weaknesses in the response, particularly in relation to the investigation itself. These weaknesses were largely related to process and functionality issues within the public health infrastructure and fell into four categories.

First, it was clear that there was a lack of epidemiological expertise available at the local level from the beginning of the outbreak. This could have been provided by the MOH or the Provincial Epidemiologist or by Health Canada experts if invited by the Provincial Epidemiologist. The MOH was, at that time, managing multiple public health issues for a geographically widely dispersed section of the provincial population. The lack of appropriate resources at a senior level in the Region was further illustrated by the assumption of multiple

roles by a limited number of individuals and lack of clarity among other staff concerning specific roles and responsibilities.

Second, limited availability of staff experienced in outbreak investigation led to systematic weaknesses in the investigation. These included missed opportunities to systematically question the populations at risk and to access all potentially useful sources of information. For example, the availability of daily activity records for each child was not ascertained until December 28th, 2001, and all possible menu items containing risk foods served in the previous month were not immediately identified. As a result, the possibility of previous and concurrent enteric illness in the daycare community was not fully recognized at an early stage, and other potential sources of infection were not fully explored. Similarly, lack of epidemiological expertise and familiarity with standard epidemiological tools (e.g. EpiInfo) resulted in information/data being stored in multiple formats and hampered the regular systematic analysis and reporting of data collected. This in turn could have influenced decision-making processes.

Third, Public Health staff were not aware of all the information available at the daycares (e.g., the daily activity sheets mentioned above), and experienced delays in obtaining some information from the daycares involved. Furthermore, daycares did not report cases of diarrheal illness in children and staff, nor are they required to record the cause of absenteeism. Access to this information is important to defining both the size of the population at-risk and the actual scope of the outbreak.

Fourth, the final report of the outbreak, made available in March 2002, was incomplete. Information relating to the number of cases admitted to hospital and the death of one case was omitted. The final report of an investigation should comprehensively review all pertinent information obtained and appraise the validity of the conclusions drawn as well as critically review the investigation and control processes, and should follow an agreed template.

This review identified a number of activities which went well and contributed significantly to limiting the outbreak. The weaknesses identified do not reflect on the professionalism or devotion of the public health professionals at any level. They do, however, reflect process and function issues which may have hindered some aspects of the investigation of the outbreak. These, in turn, reflect aspects of organization, resources and training within the province's public health structure. These are addressed in recommendations in the body of the report and summarized in Appendix D. Most of the key issues had already been recognized and where actions have been taken to address them, these have been described.

APPENDIX A

TERMS OF REFERENCE

Review of the *E.coli* Outbreak Investigation in Saint John, New Brunswick: November and December 2001

PREAMBLE:

A letter dated May 21, 2002 from the Assistant Deputy Minister, PHMS, Department of Health and Wellness, New Brunswick, to the Assistant Deputy Minister, Population and Public Health Branch, Health Canada, requested the assistance of Health Canada in conducting a review of the processes used in investigating the *E. coli* outbreak that occurred in Saint John, New Brunswick in November and December 2001. In response, a review team will be formed consisting of representatives from Health Canada and the New Brunswick Department of Health and Wellness. The review team will be co-chaired by one representative from Health Canada and one from the Department of Health and Wellness, New Brunswick. The composition of the review team will be as follows:

Health Canada: Dr. Paul Sockett (co-chair)
 Dr. Linda Panaro
 Dr. Andrea Ellis

New Brunswick Rachel Bard (co-chair)
 Dr. Wayne MacDonald
 Dr. Chris Balram
 Dr. David Assaff
 Shirley Clarke

MANDATE:

1. To conduct a review of the investigation of the *E. coli* outbreak that occurred in Saint John, New Brunswick in November and December 2001 to identify what went well, lessons learned, and opportunities for improvement in the future.
2. To prepare a report to the Minister of Health and Wellness by August 31, 2002.

It is not the intent of this review to re-investigate the outbreak or conduct any further investigations.

APPROACH:

To fulfill its mandate the review team will review the methodology used to carry out the outbreak investigation. The methods used will be compared to an accepted approach to outbreak investigation, for example that described by Dr. Michael B. Gregg in: *Field Epidemiology, 2nd Edition*, Oxford University Press, 2002. (A synopsis of the steps to investigate an outbreak, based on Gregg, is appended.) Documents associated with the outbreak including information provided to parents and day care staff and attendees, questionnaires, line lists, epidemic curves, investigator's reports, post outbreak debriefing, and any other items that the review team may deem pertinent will be made available to the reviewers.

APPENDIX A

PROCESS:

The team will conduct the review via face-to-face meetings and by telephone conference calls held as often as is necessary to complete its task. In addition to documentation review, the team may also wish to interview any person involved with the investigation, as deemed appropriate. New Brunswick Health and Wellness will provide secretariat support.

APPENDIX B

Steps in investigating an outbreak *

- Determine existence of an outbreak
- Confirm diagnosis
- Assemble team and assign roles and responsibilities
- Implement immediate control measures
- Define a case
- Determine who is at risk
- Conduct case finding
- Orient findings in terms of time, place, person
- Generate and test hypothesis
- Implement prevention and control measures
- Plan a systematic study if necessary
- Disseminate findings and recommendations

* Based on M.B. Gregg, Field Epidemiology, 2nd Edition, 2002, Oxford University Press.

APPENDIX C

Case definition for Saint John *E. coli* O157:H7 outbreak

Confirmed Case – Lab confirmed *E. coli* O157:H7

Suspect Case – A person with diarrhea (3 times per day or more for one or more days) and one or more of the following symptoms; abdominal cramps; nausea or vomiting commencing on or after November 22, 2001 and having an epidemiological link to the YM/YWCA and Mercantile Daycare facilities.

APPENDIX D

Recommendations/Actions

1. Family and Community Services should review with the daycare management the implementation of exclusion policies and consider the development of an agreement, co-signed by parents, to report absenteeism and the reasons for absence, particularly symptoms of a communicable disease. Absenteeism information should be recorded and collated by daycare staff and be made available to Public Health authorities upon request.

Communicable Disease Standard Operating Procedures are currently being developed to standardize the approach and procedures to control communicable diseases within the province.

Public Health has made contact with the Department of Family and Community Services, which licenses daycares in New Brunswick, and has completed a review of their current policies and standards pertaining to infectious diseases in daycares. Public Health has initiated meetings with Family and Community Services staff to present recommendations to revise and enhance the areas of exclusion criteria and their enforcement, re-entry following exclusion, recording of absenteeism, reporting of communicable diseases to public health, communication to parents on the presence of communicable diseases and enhancement of the daily care/activity record.

2. Public Health and Family and Community Services should collaboratively review record keeping and data collection processes within daycares. This is to ensure accuracy and timeliness of information recorded and to ensure that both institutional and Public Health authorities are aware of the need to identify and access all potentially relevant information in a public health emergency such as an outbreak.

Public Health Services and the Department of Family and Community Services are jointly addressing this issue (see response to recommendation 1).

3. Establish the technology and skill to perform PFGE characterization in a New Brunswick microbiology laboratory center. Establish a database of PFGE patterns and linkage to PulseNet Canada to improve the accuracy of the interpretation of results and the timeliness of reporting to the MOH.

This recommendation will be reviewed with Regional Health Authorities and the Institutional Services Division of the Department of Health and Wellness.

APPENDIX D

4. Clear written instructions on stool collection should be developed and provided to individuals requested to submit specimens. These instructions should include guidance on collection, storage, transport and hygiene. This should be done in collaboration between public health and laboratory services in the province. Instructions should be included in a stool collection kit.

This need has been identified in provincial debriefings and staff have been assigned to develop a specimen collection kit and a process for stool specimen collection in outbreak situations. This will be included in Standard Operating Procedures for communicable diseases that are now under development by Public Health Services.

5. Outbreak investigation skills for all public health staff should be enhanced.

The need for further training in outbreak investigation for public health professionals was identified and addressed within six months by the provision of a joint training course by Health Canada and the Provincial Epidemiology and Public Health Services. Two workshops were held in May and June 2002 for all Regional staff in both official languages.

6. Understaffing of MOH positions within the province should be urgently addressed. The current staffing situation is inadequate for the population served, and places intolerable stress on the existing staff. The current demands on public health decision-makers (MOHs) are not sustainable.

There is increasing competition, within Canada and internationally, for physicians with specialized training in the field of public health. The Department of Health and Wellness is currently seeking to fill several vacancies in this area, and has sought to provide competitive compensation packages to attract candidates to fill these positions. The MOH in Region 2 (Saint John and area) is currently filled on an acting basis, however, the Department is working to hire a full-time MOH for the region as soon as possible.

APPENDIX D

7. The role of the provincial epidemiologist and provincial epidemiology staff in outbreak investigations should be clarified. The provincial epidemiologist must be an integral member of the outbreak investigation team and automatically involved from the beginning of the outbreak.

The Department of Health and Wellness has taken steps to clarify the role of the Provincial Epidemiology Service in relation to outbreak investigations.

8. Epidemiological expertise in outbreak investigation in New Brunswick should be reviewed and enhanced by the identification of specifically trained individuals who would be available to provide on-site leadership during an outbreak.

The Provincial Epidemiology Service will have a clear role in the investigation of outbreak situations (see response to recommendation 7).

9. A provincial protocol for outbreak investigation should be developed and should address issues such as:
 - identification of an on-site functional manager to lead and coordinate the outbreak response and with access to epidemiological and other expertise;
 - lines of authority for reporting and responding to outbreaks; roles and responsibilities for the outbreak investigation team members and selection of appropriate individuals to those roles;
 - access to provincial or national expertise/resources and information on how to access them;
 - provision of checklists, templates and frameworks respectively for activities, data collection and analysis.

The provincial protocol could be linked to the national Foodborne Illness Outbreak Investigation Protocol which contains many of these elements. The protocol should warn the team leader and members that they may become overwhelmed and provide guidance on how to identify when they have exceeded their expertise or other resources and how and where to seek assistance.

Standard Operating Procedures for communicable disease control are in the process of being developed and will address outbreak investigation and control process. Issues related to staff functions, investigation leadership, roles and responsibilities, use of provincial and/or national resources and review processes will be addressed in these procedures.

APPENDIX D

10. An individual responsible for developing communications materials and mediating provincial information media requests should be appointed early in an investigation. This individual should have responsibility for developing communication materials, including press releases and background facts, providing regular updates to media and Ministerial officials (verbal or written material), and arrange and manage press conferences and interviews.

The Communications Branch of the Department has hired a media liaison coordinator who routinely coordinates media requests and may speak on behalf of the Department. In addition, the Director of Communications for the Department has indicated that in an outbreak situation, a communications person will be available, on site, as part of the response team, to organize media requests and assist in communication aspects of the investigation.

11. The current provincial procedures, which indicates that only the Provincial Epidemiologist is to request outside assistance from Health Canada for an outbreak investigation, should be changed. Either the Provincial Epidemiologist or CMOH should be able to request assistance from Health Canada if needed.

Federal epidemiologists and other specialists can assist in an investigation upon request by the Provincial Epidemiologist or CMOH.

12. National guidelines should be developed for management of outbreaks of enteric disease in daycares and other high risk communities. These should include guidance on exclusion policies and clearance (re-entry) criteria for specific enteric pathogens. National guidelines would provide a basis for the development of local protocols.

This matter will be referred to Health Canada for review.

13. A protocol, agreed between Public Health Services and Family and Community Services, should be prepared to specify criteria for closing and sanitizing daycare premises where an outbreak has occurred. This would provide a clear mandate for action. Such a protocol should include, for example, check lists of surfaces which may need to be cleansed (e.g., tables, toys, light switches, door handles) as well as recommended disinfection procedures and products.

This is currently under way as part of the daycare standards review process being developed by Public Health Services and the Department of Family and Community Services. (See response to recommendation 2).

APPENDIX D

14. Ensure that the outbreak protocols developed by the province clearly identify the need to develop both sensitive and specific case definitions early in the investigation and that these definitions are distributed to the appropriate staff.

Communicable disease Standard Operating Procedures are being developed and will address the issue of case definition development.

15. Public Health Inspectors should be offered training to enhance their skills in identifying patterns of interaction during epidemiological investigation.

Training sessions have been held for Public Health Inspectors earlier this year (see response to recommendation 5) and opportunities for further training will be developed.

16. Outbreak investigation teams should ensure that systematic collection of case ascertainment data on all individuals in a cohort (e.g., daycare children and staff) is considered early in an investigation.

A standardized case ascertainment questionnaire was developed in March, 2002 in Saint John, and was utilized in an outbreak investigation by that region. Subsequently, a more detailed case ascertainment questionnaire was used in an outbreak in Miramichi in June, 2002. This is being refined and will be disseminated to all Public Health Regions.

17. A protocol describing the main steps in an outbreak investigation and identifying specific roles and responsibilities should be developed for the use of public health professionals in the province. This could include templates of standard case ascertainment and generic case questionnaires, letters, advisories, draft press releases, etc.

This will be addressed in Standard Operating Procedures for communicable disease outbreaks, as described in the response to recommendation 9.

18. A national guideline for the management of enteric shedders in vulnerable populations should be developed and made available to provincial public health authorities for adaptation and use in their jurisdictions.

The preparation of a national guideline for enteric shedders has been initiated by Health Canada.

19. Minimum standards for the collection, collation, analysis and review of outbreak related information should be described in a provincial protocol and descriptive epidemiology should be done throughout an investigation to aid decision-making. The protocol should address standards for the recording of outbreak control meeting notes. Decision-making about significant steps in the investigation should be documented with explanations of why they were taken.

APPENDIX D

Documentation for the decision-making process in outbreak investigations will be addressed in Standard Operating Procedures for dealing with communicable diseases and outbreak situations (see response to recommendation 9).

20. A detailed report of the investigation should be produced by the designated epidemiologist assigned to the team for all significant outbreaks. A standard template should be developed to facilitate this.

The process for preparing reports in outbreak situations will be addressed in the Standard Operating Procedures described in the response to recommendation 9.

21. As far as possible hypothesis generation should be based on systematically collected and validated data. The available data should be reviewed critically on a regular basis by the investigation team leader and the investigation team, and decisions made concerning the direction of the investigation. This approach should be incorporated into an outbreak investigation protocol and training packages and should be accompanied by systematic collation and validation of information.

The development of possible hypotheses in outbreak situations will be addressed through the Standard Operating Procedures described in the response to recommendation 9.

22. A standardized approach to investigations should be adopted; this could include a standardized case ascertainment questionnaire and a case questionnaire that can be modified to fit the details of a specific outbreak. The approach should define the types of epidemiological and microbiological information required.

The development of a standardized approach to outbreak investigations will be addressed through the Standard Operating Procedures described in the response to recommendation 9.

23. Public Health and Family and Community Services should work together to improve recording and data collection processes within daycares. This should ensure that organizations such as daycares understand their responsibility to identify illness in their clients and staff populations, that illness is adequately documented and that the information is shared appropriately with the local public health authorities.

New communicable disease regulations being developed will make reporting of communicable diseases by daycares mandatory. See response to recommendation 2.

APPENDIX D

24. A national guideline on the management of outbreaks of enteric illness in daycare situations should be developed.

Health Canada has initiated the development of national guidelines for enteric shedders (see response to recommendation 18).

25. Processes should be developed to ensure that communications with the media are coordinated between public health and the various organizations that may be involved in an outbreak response. In addition, the early designation of a single public health official (not the leader of the investigation team) to act as a media spokesperson could help relieve pressure on individuals involved in essential investigation and control activities.

The Communications Branch of the Department of Health and Wellness will provide a communications officer as part of the on-site response team in outbreak situations to assist with communications issues (see response to recommendation 10).

26. The Outbreak Report should be written by the designated epidemiologist on the outbreak team as soon as possible after the event. The report should be structured according to a generally accepted format, and should contain all pertinent information.

The format for the Outbreak Report will be identified in the Standard Operating Procedures referred to in the response to recommendation 9.

27. Information concerning an outbreak should be available to all those involved in investigation and control activities via a shared computer drive or alternative mechanism designed to share information while preserving confidentiality.

The Department of Health and Wellness will examine ways to share information on outbreak investigations with those involved in the outbreak process.

28. The post outbreak debriefing process should offer a critical incident stress debriefing component, with follow-up counseling if needed.

The Department of Health and Wellness provides counselling and other assistance to its employees through established employee assistance programs.