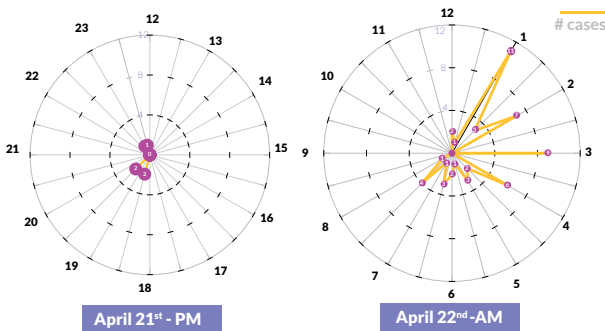




Foodborne illness outbreak investigation of April 21st 2018

Exercise Maple Resolve 2018

Onset time of cases - MR18 22 Apr 2018 foodborne outbreak



- 20 Apr** - Pork dish preparation
- 21 Apr**
 - 14:30 - Evening meal prepared/reheated
 - 16:00 - Meal pickup
 - 17:30 - Meal service begins
 - 18:30 - 23:59 - **First 8 cases**
- 22 Apr**
 - 03:00 - Initial communication with the field clinic (**14 cases total**)
 - 04:48 - Coordination of the evacuation (**19 cases total**) to base clinic. Investigation begins
 - 07:19 - **21 new cases**, All remaining members in the outpost, transferred to main camp (isolation facility)
 - 09:00 - Communication from another outpost, **12 cases** with similar s & s. cases transferred to main camp
 - 15:00 - The initial 19 cases were transferred to the main camp
 - 16:00 - Arrival of the 19 initial cases, all of the identified cases were housed in the isolation facility (**102 total, 62 symptomatic, 40 asymptomatic**)
- 23 Apr** - 09:00 - Isolated members discharged
- 24 Apr**
 - Investigation
 - Gathering of the line listing data
 - Calculation of the food item attack rate
 - Inspection of the food preparation kitchen
 - Revision of the operational procedure for food preparation and handling of the thermal containers used for transport of the meals
- 30 Apr** - **Final investigation report submitted**

Case definition		
Status		# of cases
	Members taking part in Exercise (EX) MR18 that ate from hay boxes on the evening of 21 April 2018 [...].	
Confirmed	[...] with symptoms of non-bloody diarrhea with a stool sample confirmed positive for the presence of <i>C. perfringens</i> .	6
Probable	[...] who displayed the following symptoms: diarrhea with or without cramping.	55
Possible	[...] who displayed gastro-intestinal symptoms without diarrhea.	1

SUSPECTED PATHOGEN

Clostridium perfringens was suspected as the causal food agent in the pork based on clinical presentation (acute onset of non-bloody diarrhea with no emesis). This bacterial agent is present in the environment, which would explain the environmental contamination due to the cow manure present in the nearby field combined with the very windy and dry weather of the season in Alberta. Further proliferation occurred because of the improper use of the thermal containers, which kept the food in the thermal danger zone (4 to 60°C).

FOOD ITEM ATTACK RATE

Unit	S&S	Total	Rice	Corn	Pork	Soup	Salad	Dessert	Fruit	Milk	Juice
5 RALC	with	54	49	47	54	20	17	29	6	15	6
	without	29	15	13	12	4	4	10	3	6	1
1 R22R	with	10	10	10	10	7	3	7	2	4	6
	without	9	9	7	9	4	0	6	4	4	6
Total			83	9	85	35	24	52	15	29	19
Attack rate %			71.1	74.0	75.3	77.1	83.3	69.2	53.3	65.5	63.3

Although a higher attack rate was observed with the pasta salad (83.3) and the soup (77.1) their overall consumption by CAF personnel was very low. The pork dish was identified as the most potential causal food item since its overall attack rate was the next highest, every symptomatic individual from both camps ate this food item, and *C. perfringens* is most often found in meat protein.

(Bennett, S. D., Walsh, K. A., & Gould, L. H. (2013). Foodborne Disease Outbreaks Caused by *Bacillus cereus*, *Clostridium perfringens*, and *Staphylococcus aureus*—United States, 1998–2008. *Clinical Infectious Diseases*, 57(3), 425–433. <https://doi.org/10.1093/cid/cit244>)

SOURCES OF CONTAMINATION AND PROLIFERATION

Initial contamination:
Spores present in the environment contaminated the food prepared in the kitchen tent on a very dry and windy day.

Initial proliferation:
Poor cooling practices from the kitchen staff lead to a prolonged exposure of the pork dish to the thermal danger zone (4 to 60°C).

Secondary proliferation:
Poor practices for the use of the thermal container left the food items in the dangerous temperature zone (4 to 60°C) for a prolonged period of time. By not preheating the container for the prescribed hour before transporting the food pans, and leaving the water in the containers, the water acted as a conductor between the food pans and the containers' walls, thus reducing the temperature of food much faster.

Suspected causes	Improper handling	Risk mitigation
Poor cooling practices prolonged exposure to the thermal danger zone (4 to 60°C).	Cooling of food items at room temperature for four hours without temperature monitoring before refrigeration.	Temperature monitoring of the food item and rapid refrigeration as soon as 60°C is reached.
Poor practices for the preparation of the thermal container allowed for rapid cooling within the thermal danger zone.	Thermal containers were not preheated and hot water was left in them during transport.	The containers should be preheated with boiling water for 1 hour prior to use and the heating water should be discarded before loading the food into them.
Poor practices for the use of the thermal container allowed for rapid cooling and prolonged exposure to the thermal danger zone.	Thermal boxes were left semi open on the service tables for more than 3 hours.	Food items kept in the thermal containers should be discarded within 2 hours after being opened.
Poor maintenance the thermal container prevented optimal insulation.	Most thermal containers had one or multiple broken latch(es), resulting in an incomplete seal of the containers.	Broken containers should not be used; latches should be repaired or the containers replaced.

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