State of Alaska Epidemiology Bulletin

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International Cooperation Stops Gastroenteritis Outbreak

During June and July 1995, with collaboration between Alaskan and Canadian health authorities, a large outbreak of gastroenteritis among arctic tour bus travelers was investigated. As a result of the joint effort, the outbreak source was traced to a contaminated water supply at a restaurant in Yukon Territory.

Methods: We collected information concerning the occurrence of illness among persons on 10 bus trips along all or part of the Alaska Highway between Whitehorse, Yukon Territory and Fairbanks, Alaska (Table 1). A case of gastroenteritis was defined as a person having diarrhea or vomiting after traveling by tour bus along the Alaska Highway between Whitehorse and Beaver Creek, Yukon Territory during June or July, 1995. Acute and convalescent serum and stool specimens from travelers and water samples from the restaurant were collected. Stool specimens were cultured for bacteria at the State Public Health Laboratory-Anchorage and examined for enteric viruses by electron microscopy at the U.S. Centers for Disease Control and Prevention. Water samples were sent to the (Canadian) National Centre for Entroviruses in Halifax, Nova Scotia and the University of North Carolina in Chapel Hill, NC.

Epidemiologic Results: By reconstructing the itineraries and meal times of the first six trips, a single restaurant in Yukon Territory, where all ill persons had lunch 33 to 36 hours before onset of illness, was identified (Table 2). The implicated restaurant voluntarily closed between June 30 and July 9. Illness was identified among persons who went to the restaurant after it reopened. The most frequent symptoms were diarrhea (93%), vomiting (89%), and nausea (83%). Thirty-nine of 50 ill persons and 40 of 100 non-ill bus travelers had consumed water while at the implicated restaurant (relative risk = 3.2; 95% confidence interval 1.8-5.7). Attack rates by trip varied from 17% to 61%. By applying the weighted mean attack rate (25%) to the estimated 1,805 bus travelers (on 10 trips we studied and 34 trips we did not study) who went to the implicated restaurant during the outbreak, we projected that there were approximately 450 primary cases. There were also many secondary cases. Twelve employees of the implicated business complex had gastroenteritis during the month before the outbreak began. Four of them lived in buildings connected to a shallow septic crib which was found by fluorescein dye testing to contaminate a pit well that supplied water to the implicated restaurant. On July 14, the restaurant was closed until permanent repairs to the well could be made.

Laboratory Results: Nine stool specimens were cultured for *Salmonella, Shigella, Campylobacter*, and *Yersinia*--all were negative. Viral particles were detected by electron microscopy in stool specimens from 7 of 14 ill persons. Reverse-transcription polymerase chain reaction testing and hybridization probing identified a G2/P2B small round structured virus (SRSV) in 11 of the stools. An amplicon containing a nucleotide sequence identical to that found in stool was detected in a water sample from the restaurant. Although we collected serum specimens from 34 persons, none have been examined since there was no test available to detect a serologic response to G2 SRSV.

Table 1. Gastrointestinal illness among tour bus travelers, Yukon Territory and Alaska, June and July, 1995.

Trip no.	Date at implicated restaurant	Itinerary	Number of persons on board	Number of ill persons*
1	June 25	Skagway to Fairbanks	135	16
2	June 25	Skagway to Valdez	41	10
3	June 26	Skagway to Fairbanks	121	16
4	June 27	Skagway to Valdez	44	5
5	June 27	Fairbanks to Skagway	90	19
6	June 27	Skagway to Fairbanks	51	4
7	June 29	Fairbanks to Skagway	25	6
8	June 29	Skagway to Fairbanks	90	11
9	July 9	Whitehorse to Fairbanks	28	17
10	July 11	Valdez to Skagway	19	5

* Due to the investigative methods used, attack rates could not be calculated as number ill divided by number on board.

Discussion: This investigation confirmed that contamination of a well that provided water to a restaurant caused an outbreak of illness due to an SRSV. The SRSVs are a collection of morphologically indistinguishable viral agents that cause gastroenteritis and which have been implicated in numerous gastroenteritis outbreaks. Three antigenic types of SRSVs (or Norwalk-like viruses) have been identified in the U.S.--Norwalk virus, the Hawaii agent, and the Snow Mountain agent--each named for the location where an outbreak occurred.

Viral gastroenteritis was transmitted person to person among employees of the implicated business complex prior to the outbreak among bus passengers. There was a clear association between illness and consumption of water which was confirmed to be contaminated. The source of contamination, a nearby septic system, was identified. This outbreak underscores the importance of fundamental public health practices such as inspections of public dining facilities and assurance of a safe water supply. Collaboration with Canadian public health officials enabled rapid identification of the source, implementation of definitive control measures, and prevented thousands of additional cases of illness.

Table 2. Number of hours between selected meals and mean onset time of illness, by itinerary and location, Alaska and Yukon Territory, June 1995.									
		Number of hours between meal and illness onset, by location							
Itinerary	Trip No.*	Skagway	Whitehorse	Burwash Landing	Beaver Creek	Delta Junction	Fairbanks	Glennallen	Valdez
Skagway to Fairbanks	1,3,6	58	51	33	16	7	2	-	-
Skagway to Valdez	2,4	61	54	36	19	-	-	10	5
Fairbanks to Skagway	5	10	17	34	52	59	64	-	-
* Trip numbers correspond to Table 1.									

(Copies of a detailed report of the outbreak investigation are available from the Section of Epidemiology. Thanks to Robert Bousquet, MD, Andrea Ellis, DVM, Carol Linkswiler, Stephan Monroe, PhD, Fred O'Brien, Rhonda Richtsmeier, PHN, Don Ritter, Kate Slotnick, PHN, Mark Sobsey, PhD, Spencer Lee, PhD, Rose Tanaka, Jean Watts, and Cory Willis. Contributed by Michael Beller, MD, MPH, Sue Anne Jenkerson, RNC, MSN, FNC, and Elizabeth Funk, MD, MPH.)