

# Oswego County Revisited

*A review of documents and interviews with surviving principals of a famous 1940 outbreak of staphylococcal gastroenteritis*

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AFTER A CHURCH SUPPER in the small village of Lycoming, Oswego County, N.Y., on April 18, 1940, a majority of the participants became ill with gastroenteritis. Epidemic investigation by the New York State Department of Health suggested that the agent was *Staphylococcus aureus*, with homemade vanilla ice cream implicated epidemiologically by food histories and culture as the vehicle of infection (see table).

Although the source of contamination of the ice cream was not established at the time, the appealing story and elegant epidemiology make the data ideal for a teaching exercise, and this is why the outbreak has become famous.

The outbreak was initially used as an epidemic example in 1940 by Wendell Ames, MD, then New York State epidemiologist, at the Albany Medical College. In 1942 it was taken from New York State to the U.S. Navy Epidemiology Training Program in Bethesda, Md., by Stafford Wheeler, MD, and used for training by him and Alexander Langmuir, MD, during World War II. In 1946 Langmuir brought it to the Johns Hopkins School of Hygiene and Public Health, where it was used as a laboratory exercise in the basic course in general epidemiology. In 1949 Langmuir joined the newly established Epidemiology Program of the Communicable Disease Center (now the Center for Disease Control), and what has become known as the "Oswego Problem" has been used in the annual Epidemic Intelligence Service training course

since its first class in 1951. Use of this training exercise has been spread throughout the United States and to several other countries by the generations of persons exposed to it in their own training, and it is now widely used in medical schools, schools of public health, and epidemiology training courses conducted by various health departments. Figures from this exercise are also presented in two manuals devoted to the investigation of foodborne disease outbreaks; these manuals have become important teaching resources (1,2).

## The Investigation, 1940

Records of the original outbreak investigation are preserved in memorandums and publications of the New York State Department of Health (3-5). Most of the cases occurred during the night of the supper, April 18, and the village health officer reported the

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**Food-specific attack rates<sup>1</sup>**

<i>Food or beverage</i>	<i>Group A, persons who ate specified food</i>				<i>Group B, persons who did not eat specified food</i>			
	<i>Ill</i>	<i>Not Ill</i>	<i>Total</i>	<i>Attack rate, percent</i>	<i>Ill</i>	<i>Not Ill</i>	<i>Total</i>	<i>Attack rate, percent</i>
Baked ham .....	29	17	46	63	17	12	29	59
Spinach .....	26	17	43	60	20	12	32	62
Mashed potato .....	23	14	37	62	23	15	38	62
Cabbage salad .....	18	10	28	64	28	19	47	60
Jello .....	16	7	23	70	30	22	52	58
Rolls .....	21	16	37	57	25	13	38	66
Brown bread .....	18	9	27	67	28	20	48	58
Milk .....	2	2	4	50	44	27	71	62
Coffee .....	19	12	31	61	27	17	44	61
Water .....	13	11	24	54	33	18	51	65
Cakes .....	27	13	40	67	19	16	35	54
Ice cream (vanilla) .....	43	11	54	80	3	18	21	14
Ice cream (chocolate) .....	25	22	47	53	21	7	28	74
Fruit salad .....	4	2	6	67	42	27	69	61

<sup>1</sup> Reprinted with permission from teaching materials used in the 1971 Epidemic Intelligence Service course at the Center for Disease Control.

*Church in Lycoming, N.Y., where supper was held*



epidemic to the State health department the next day. The district health officer went to the scene immediately to verify the existence of the outbreak, and a team, including two epidemiology trainees, was assigned to make a full investigation, including food and illness histories, on April 20. Their report states: "All handlers of the ice cream were examined. No external lesions or upper respiratory infections were noted" (5). Nose and throat cultures of the two who made the ice cream mix, however, did grow *S. aureus*.

The ingredients used to prepare the ice cream were fresh, unpasteurized milk, condensed milk, sugar, eggs, flour, chocolate, and vanilla extract. The chocolate and vanilla mixes were prepared in separate containers on April 17, the day before the supper, and left covered overnight at room temperature before being frozen. The raw milk was an unlikely source of infection, because the chocolate ice cream was not contaminated. No plausible explanation for the contamination of the vanilla ice cream was obtained, despite intensive efforts during the several weeks following the outbreak.

Lycoming is a very small rural village located 2 miles from the southeast shore of Lake Ontario. At the time of this outbreak the area was best noted for seasonal production of strawberries; the economy is now based on lettuce farming with substantial contributions from a nuclear power station recently constructed on the lake shore. On a map published in 1954, only 42 dwellings could be counted in the immediate area (6).

### Followup Investigation, 1972

I visited Lycoming in March 1972 and interviewed surviving principals of the church supper. Additional evidence obtained at that time suggested that one of the foodhandlers may, in fact, have had an external lesion on her hand when she made the ice cream. The part-time village health officer who initially reported the outbreak was still in practice; he recalled the outbreak vividly as a major event in his career. The morning after the supper he made a routine home visit to an invalid patient. At that time one of the makers of the ice cream, employed part time in that same household, showed him a small, draining infection on one of her fingers. She was not ill, no culture was taken, and no written record was made. Obviously, if such a lesion had discharged while she was stirring the mix or wiping the spoon, that batch of ice cream could easily have become contaminated, and overnight storage at room temperature would have allowed multiplication of the organism and production of toxin.

Attempts were made to assess the plausibility of this revelation. There is no detailed description in the records of the New York State Health Department of the examinations of the foodhandlers, but only the general statement of negative results cited previously. The two primary makers of the ice cream were still alive, but neither recalled such a lesion. Their examination by the epidemiologic investigators presumably took place late

on April 20—2 days after the supper and 3 days after the ice cream was made. Three days allow ample time for the resolution of uncomplicated staphylococcal skin lesions. The village health officer examined the participants on the morning of April 19.

From reports of the personality of the woman who had the lesion, she would not have volunteered this significant historical information to an outsider. She was hospitalized for an unrelated condition from April 21 to May 5, 1940. Records of that hospitalization also fail to confirm traces of the lesion. Thus, she would not have been available for the additional questioning by the investigators from the State health department which several villagers remember from this period.

Perhaps most remarkable is why the evidence presented here remained in Oswego County for almost 33 years. "Village health officer" in New York State was, and is, a part-time position with nominal reimbursement. These officials are required to report the existence of outbreaks, but they are not responsible for detailed investigations. The village health officer apparently was not interviewed. Was it because of the excitement or because each investigator thought the other had interviewed him? Neither of the two former epidemiologic trainees remembers meeting the village health officer during their investigation. They also cannot specifically remember examining the foodhandlers or any other details which might contradict the hypothesis presented here. It is symbolic of the loneliness of field investigations that both now recall doing the entire job alone.

An annual church supper is still held in Lycoming, and homemade ice cream is still the chief attraction. The two surviving foodhandlers of 1940, vigorous in their 70s, still help out. Although the installation of refrigeration in the early 1950s put an end to overnight incubation of the ice cream mix, they readily admit that their lapse in proper foodhandling continued until then. But a second epidemic did not occur.

### References

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6. U.S. Geologic Survey: Oswego East Quadrangle. Washington, D.C., 1954.