

Summary of Swimmer's Itch Data from the CSA Beach, 2013-2021

INTRODUCTION:

Congregational Summer Assembly (CSA) waterfront staff have collected information on the number of swimmers and cases of swimmer's itch (SI) at the CSA beach for eight of the past nine years. Information was not collected in 2020 due to COVID related swimming restrictions. Data were recorded daily for: the total number of swimmers, total cases of SI, time-of-day swimmer counts (morning/afternoon), prevailing wind direction, wind speed, and water temperature. Daily records were collected from approximately the third week of June through the middle of August.

RESULTS:

Overall Incidence:

As shown in Table 1, the overall SI incidence has been approximately 3.3% (i.e. 3.3 cases for every 100 swimmers) over the course of study. Incidence rates climbed from 2.9% in 2013 to 5.3% in 2015, then decreased consistently to a low of 0.6% in 2019. A return to higher incidence levels occurred in 2021 (3.0%). One possible explanation for fluctuating incidence rates may be the merganser brood removal program instituted in 2016. The program was quite successful, with complete brood removals in 2016-2018. However, complete brood removal was not possible in 2019 and 2020. Mergansers have historically been the primary SI vector and inability to remove all broods may have led to a return to higher SI incidence.

TABLE 1: OVERALL INCIDENCE BY YEAR

YEAR	TOTAL SWIMMERS	TOTAL SI CASES	INCIDENCE RATE (% = #CASES/100 SWIMMERS)
2013	3981	114	2.9%
2014	5068	244	4.8%
2015	6894	367	5.3%
2016	5084	245	4.8%
2017	4468	151	3.8%
2018	5261	90	1.7%
2019	6115	34	0.6%
2021	5105	153	3%
TOTAL	41976	1398	3.3%

Although the overall incidence rate increased in 2021, the probability of getting SI on any particular day remained low. As shown in Table 2, no cases were reported in over one half of the study days, and 90% of the study days had fewer than five cases of SI reported. Two-thirds of all reported cases occurred on four study days (12, 20, 30, 32) with unusually high SI rates. On each of those four *high incidence* days, the prevailing winds were out of the north and blowing directly on shore.

TABLE 2: 2021 DAILY INCIDENCE

	TOTAL NUMBER OF SWIMMERS	% OF ALL SWIMMERS	TOTAL CASES REPORTED	% OF ALL CASES
0	2,888	56.6%	0	0%
1	689	13.5	7	4.6
2	443	8.8	10	6.5
3	290	5.7	12	7.8
4	151	3.0	8	5.2
6	131	2.6	6	3.9
8	134	2.6	8	5.2
12	110	2.2	12	7.8
20	69	1.4	20	13.1
32	98	1.9	32	20.9
38	102	2.0	38	24.8
TOTAL	5105	100%	153	100%

Associated Variables:

Two variables – wind direction and time of day – have consistently been associated with an increased risk of SI. Table 3 presents data for wind direction. Past studies have suggested that onshore winds act to concentrate schistosome cercaria in shallow areas near the shoreline, thus increasing the probability of SI. From 2013-2018, the probability of having at least one case of SI was significantly higher on days when the prevailing winds were from the northwest, north or northeast (i.e. “onshore” winds). However, the percentage of days with any SI for 2019 was notably similar for onshore (23.5%) vs. offshore (20.6%) days. We do not have a definitive explanation for this change, but will continue to monitor it in future years. The 2021 results were more consistent with earlier patterns of higher onshore SI rates.

TABLE 3: DAYS WITH POSITIVE SI CASES BY WIND DIRECTION

WIND DIRECTION	PERCENT OF DAYS WITH AT LEAST ONE CASE OF SI								
	2013	2014	2015	2016	2017	2018	2019	2021	TOTAL
ONSHORE*	68.8% (11/21)	79.2% (19/27)	54.5% (12/22)	59.1% (13/22)	62.5% (10/16)	65.2% (15/23)	23.5% (4/17)	43.5% (10/23)	55.0% (94/171)
OFFSHORE* *	31.2% (5/27)	20.8% (5/26)	3.3% (1/30)	10.0% (3/30)	5.9% (2/34)	4.2% (1/24)	20.6% (7/34)	36.8% (14/38)	15.6% (38/243)

* Onshore = North, Northwest or Northeast

** Offshore = South, Southwest, Southeast, West or East

Incidence rates for morning versus afternoon swimmers are presented in Table 4. Overall, the incidence rate for morning swimmers (6.4%) was more than double the afternoon rate (2.5%). This pattern has been consistent throughout the study. While we are not certain why the difference occurs, a recent study of five Michigan lakes (including Crystal Lake) found that schistosome cercarial concentrations are highest early in the morning and drop throughout the day.¹ This provides a logical explanation for higher morning SI rates.

TABLE 4: INCIDENCE BY TIME OF DAY

TIME OF DAY	INCIDENCE RATE OF SI (CASES/TOTAL WATER USES)								
	2013	2014	2015	2016	2017	2018	2019	2021	TOTAL
AM	5.2% (51/972)	13.1% (117/890)	13.3% (161/1209)	9.6% (98/1022)	6.0% (55/916)	3.7% (54/1446)	1.6% (28/1689)	3.9% (63/1621)	6.4% (627/9765)
PM	2.1% (63/3009)	3.0% (127/4178)	3.9% (220/5687)	3.8% (155/4090)	2.7% (96/3552)	0.9% (36/3815)	0.1% (6/4426)	2.6% (90/3484)	2.5% (793/32241)

¹ Rudko, S.P., Reimink, R.L., Froelich, K., Gordy, M.A., Blankespoor, C.L., Hanington, P.C. Use of qPCR-Based Cercariometry to Assess Swimmer's Itch in Recreational Lakes. Ecohealth. 2018: 15(4): 827-839.

CONCLUSIONS:

The overall incidence of SI appears to be decreasing, and was especially low in 2019. The risk of SI continues to be highest during morning hours, possibly due to higher cercarial concentrations. With the exception of 2019, SI rates were also higher for days with onshore winds. We will continue to monitor wind direction to determine whether 2019 was an anomaly or indicative of a true change in SI patterns. SI rates in 2021 indicate a possible return to higher incidence levels; however, the probability of experiencing SI on any particular day remains low. Days with strong onshore winds (e.g. from the north) continue to have higher associated SI rates.

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