

REPORT ABSTRACT

The Chicago Health, Environmental Exposure, and Recreation Study (CHEERS) evaluated the health risks of limited contact water recreation activities - motor boating, canoeing, fishing, kayaking, and rowing – on the Chicago Area Waterways System (CAWS). The CAWS receives treated, but non-disinfected, wastewater from water reclamation plants of the Metropolitan Water Reclamation District of Greater Chicago, the funder of CHEERS. CHEERS was designed using the methods of USEPA studies of water recreation and health. In addition to enrolling participants at CAWS locations, a comparison group was recruited at area inland lakes, rivers, and Lake Michigan. A third comparison group consisted of people who participated in recreation activities such as jogging and cycling, which do not involve water.

A variety of bacteria, viruses, and parasites that can cause human disease were measured in the water. Generally, levels of these bacteria and parasites were much higher at CAWS locations than at other waters. For most of these microbes, levels were higher downstream of the water reclamation plants compared to upstream of the plants. Some of the microbes were found at high levels at non-CAWS rivers and at inland lakes.

During the water recreation seasons of 2007-2009, 11,297 individuals participated in the CHEERS study and provided telephone follow-up information. Figure 1 summarizes the types and frequency (the best estimate and the 95% confidence interval) of illness attributable to limited contact recreational activities on the CAWS, with non-water recreation as the reference category. If the confidence interval for a type of illness is entirely above 0, that means that CAWS users have a higher risk of developing that type of illness than the non-water recreators. The number next to the confidence interval is the best estimate of number of excess cases that we would expect in the CAWS group compared to the non-water group. This shows that if 1,000 people used the CAWS and 1,000 people did non-water recreation, about 12-13 more cases of acute gastrointestinal illness and 15-16 more cases of eye symptoms would occur among CAWS users. This takes into account demographic and other differences among the study groups. There were no differences among groups in the risk of acute respiratory illness, skin rash, or acute ear symptoms.

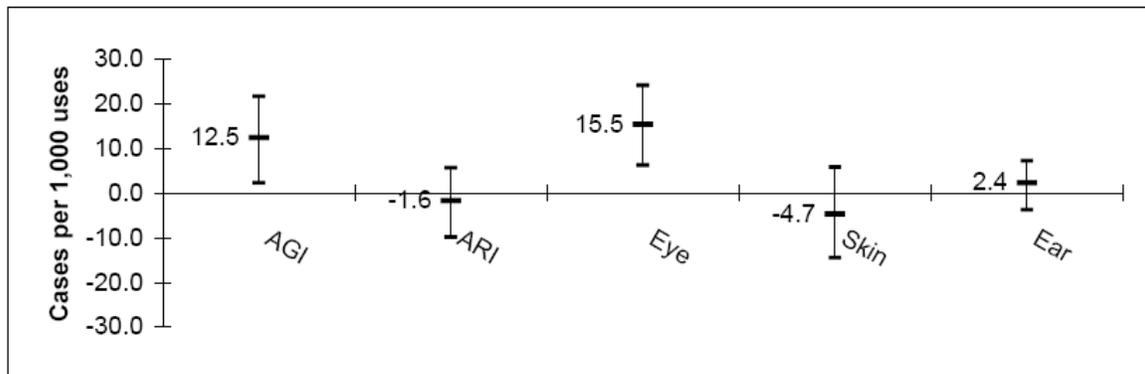


Figure 1: Cases attributable to CAWS recreation, with non-water recreation as the reference group. AGI= acute gastrointestinal illness. ARI=acute respiratory illness.

Figure 2 summarizes the types and frequency of illness attributable to limited contact recreational activities on general use waters, with non-water recreation as the reference category. This shows that if 1,000 people used general use waters and 1,000 people did non-water recreation, about 13-14 more cases of acute gastrointestinal symptoms would occur among general use waters users. This takes into account demographic and other differences among the study groups. There were no differences between groups in the risk of acute respiratory illness, eye symptoms, or acute ear symptoms. Skin rash was less common among users of general use waters than among non-water recreators.

General use waters vs. non-water recreators:

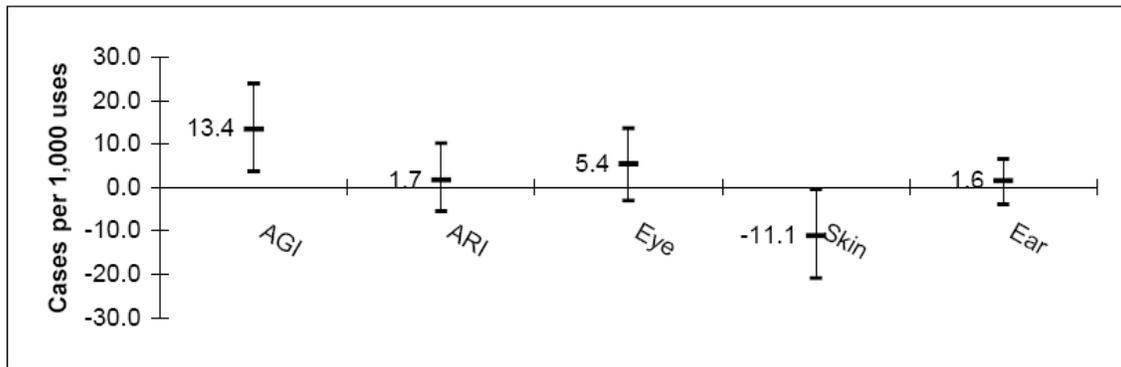


Figure 2: Cases attributable to general use water recreation, with non-water recreation as the reference group. AGI= acute gastrointestinal illness. ARI=acute respiratory illness.

Figure 3 summarizes the types and frequency of illness attributable to limited contact recreational activities on the CAWS, with limited contact recreation on general use waters as the reference category. This shows that if 1,000 people used the CAWS and 1,000 people used general use waters for these same activities, about 11 more cases of eye symptoms would occur among CAWS users. This takes into account demographic, water exposure, and other differences among the study groups. There were no differences between groups in the risk of gastrointestinal illness, acute respiratory illness, skin rash, or acute ear symptoms.

CAWS vs. general use water recreators:

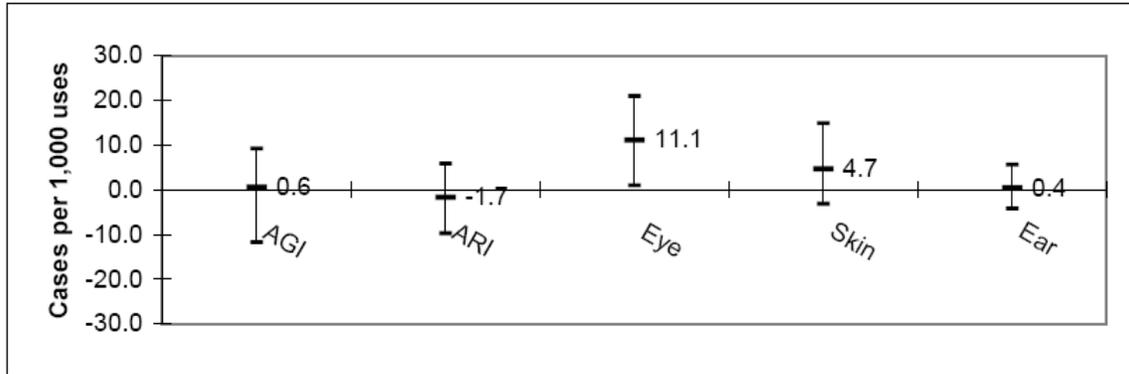


Figure 3: Cases attributable to CAWS recreation, with general use water recreation as the reference group. AGI= acute gastrointestinal illness. ARI=acute respiratory illness.

The severity of gastrointestinal illness was comparable among the three study groups. About one third of study participants who developed symptoms of gastrointestinal illness provided stool samples for analysis. For all three groups of study participants, microbes responsible for illness (pathogens) were detected in about 10% of the cases. The most type of microbes most commonly found in stool samples were viruses. Microbes that generally cause severe illness were not detected in any of the stool samples.

In summary, gastrointestinal illness attributable to motor boating, canoeing, fishing, kayaking, and rowing, occurred at a rate of about 12 cases per 1,000 uses of the CAWS. This risk is comparable to that seen among those who do the same activities on general use waters. Pathogens that generally cause severe illness were not detected in stool samples. Eye symptoms due to CAWS recreation occurred at a rate of 15.5 cases per 1,000 uses. The eye symptoms were mild, but did occur more frequently among CAWS users than among limited contact recreation users of general use waters. The health risks of CAWS recreation appeared to be comparable to the health risks of limited contact water recreation at area rivers, inland lakes, or Lake Michigan, with the exception of somewhat more frequent eye symptoms, which were mild, following CAWS recreation.