



Maine Center for Disease Control and Prevention
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Dear State Swim Meet Participant:

The purpose of this letter is to update you on the Maine Center for Disease Control's (ME-CDC) investigation of reports of illness associated with the state swim meet that occurred on March 5 – March 8 at the University of Maine in Orono. In this letter, we discuss the following:

1. Why ME-CDC is conducting this investigation?
2. What is being investigated and who is involved?
3. What will be the outcomes of the investigation?
4. What is the status of the investigation?
5. How you can obtain a copy of the final investigative report?
6. What have we learned thus far?
7. What you should know about respiratory irritants and indoor swimming pool air quality?
8. Who you can contact for more information?

1. Why ME-CDC is conducting this investigation?

The Maine Center for Disease Control received a call Tuesday, March 10, 2009 reporting illness associated with a state swim meet that occurred on March 5-March 8 at the University of Maine in Orono, ME. The caller was a school nurse and stated they were aware that a number of individuals attending the event had acute onset of cough, sneezing, and burning eyes beginning on Saturday, March 7 and continuing into the early part of the week. The report also included individuals with gastrointestinal symptoms, though it was unclear if this illness was related to the event. As is standard practice for reports of an outbreak of illness at an event of this type, ME-CDC initiated a public health investigation to determine the scope and severity of illness, provide an explanation for this occurrence, and recommend interventions to prevent illness at future events.

2. What is being investigated and who is involved?

There are four related parts to the ongoing investigation. The electronic survey that many of you responded to was one part. This survey was developed and e-mailed to Swim Team leaders for distribution to event participants. The purpose of the survey was to quickly gather evidence on the type and severity of reported health symptoms, onset date of these symptoms, resolution of illness, and the role of individuals at the event, i.e. swimmer, spectator, official. One of the objectives of the survey was to determine if illness was from a food related source, a contagious agent or was more likely to be a chemical exposure. The survey was open for 4 days. It was not intended to be an in-depth scientific study, nor necessary that everyone who participated in the event complete the survey. This work was undertaken by ME-CDC's Infectious and Acute Epidemiology Program.

A second part of the investigation focused on the pool itself. The ME-CDC Health Inspection Program (HIP) has rules that govern proper operation and maintenance of swimming pools for safety and sanitation concerns. A health inspector from the ME-CDC HIP was sent to the University of Maine to inspect the pool, retain records of chemical monitoring and inquire as to the appropriate functioning of the ventilation and exhaust systems.

The third part of the investigation involves a more comprehensive assessment of the operation and maintenance of the ventilation and exhaust systems for the indoor pool. This effort is being performed by the Department of Labor's SafetyWorks program that has staff industrial hygienists capable of inspecting the proper operation and maintenance of these systems.

A fourth part of the investigation involves a review of published studies on outbreaks of eye and respiratory irritation at indoor pool events associated with exposure to chemical byproducts made when the chlorine disinfectant chemicals react with sweat and urine from swimmers. This is an emerging area of concern for the U.S. Centers of Disease Control and Prevention. This work is being undertaken by ME-CDC's Environmental and Occupational Health Program.

3. What will be the outcomes of this investigation?

The survey will document the types of health symptoms reported by swimmers and spectators who attended this sporting event.

The pool investigation will attempt to document whether the pool was operated and maintained according to ME-CDC rules, and depending on findings, may make recommendations with respect to the ongoing operation and maintenance of the pool.

The investigation of the operation and maintenance of the ventilation and exhaust systems will attempt to document whether these systems were working properly during the swim meet event, if not why not, make any necessary recommendations for improved operation and maintenance practices, and perform a final inspection to confirm the system is now operating appropriately.

The literature review is to learn from similar events that have occurred elsewhere and to help focus some of aspects of the investigation, as well as better understand the health effects from potential chemical exposures.

4. What is the status of the investigation?

Surveys were completed for over 350 participants at the swim meet. These data are currently being analyzed by ME-CDC staff. The electronic survey closed at the end of the 4-day period, so answers can be compiled and analyzed.

The inspection of the pool facility was completed on March 12th.

The Department of Labor SafetyWorks Program initiated its investigation of the ventilation and exhaust system on Friday, March 13th, and intends to complete its work by March 20th.

ME-CDC intends to complete all parts of its investigation by the end of March.

5. How can you obtain a copy of the investigative report?

Once the report is finalized, you will be provided with an internet link that will enable you to download a copy. The link will be provided to Maine Swimming Incorporated for distribution to participating teams. It will also be available on the ME-CDC website.

6. What has ME-CDC learned thus far?

Based on information from the survey, pool inspection, food concession investigation, and discussions with the University of Maine as well as consultation with the Department of Labor SafetyWorks Program, the ME-CDC has been able to rule out a food source as responsible for the reported outbreak of illness.

The preliminary results from the electronic survey indicate that many of the respondents reported health symptoms such as cough, headache, eye irritation, and sore throat.

These reported health symptoms are consistent with reports in the published literature on exposure to chemicals called chloramines that can be present in the water and air of indoor swimming pools. The levels of these chemicals in the air may have been unusually high during the swim meet due to an apparent lack of proper ventilation. We do not have any information about the levels of these chemicals in the air, as they are not routinely measured, and we do not have the necessary information to estimate the levels from water chlorine measurements. A review of records on chemical monitoring of pool chemistry found that free-chlorine levels were slightly elevated based on current regulations, however would be within normal levels under new proposed regulations. Other pool chemistry was normal and maintained at acceptable levels. We do have information indicating that the ventilation and exhaust systems may have been off for the entire swim meet, and thus may have allowed chloramines to accumulate in the air.

7. What you should know about respiratory irritants and indoor swimming pool air quality?

Chlorine-based products used to disinfect swimming pool water can lead to the generation of chlorine-containing compounds. The typical smell of swimming-pool atmospheres is commonly attributed to “chlorine” in the air. However, studies have revealed that the smell and eye and respiratory irritant properties of swimming-pool air are mainly due to a group of chemicals called “chloramines”. The chloramines are generated by the reaction of the chlorine-based disinfectant (hypochlorite) with nitrogen containing compounds (ammonia and amino-compounds) that originate from the sweat and urine of the swimmers.

These chloramines are quite volatile and can escape into the pool-room air, more so with increased pool activity. The conditions that determine the production and resulting air levels of chloramines depend on the following: the degree of water chlorination, the contamination of water by nitrogen-containing compounds (which in turn depends on the number of swimmers, as well as their behavior and hygiene), water temperature and air recirculation.

Outbreaks of complaints of eye irritation, respiratory irritation, coughing, and headaches have been reported to be associated with exposure to chloramines. Respiratory symptoms are usually of short duration, though some (lingering cough, chest tightness) may last up to 14-days. If you have persistent symptoms, you should consult your primary health care provider.

8. How do I get more information?

Below are contacts and internet links that will provide more information:

- For information about the status of the ME-CDC Investigation:
Dr. Andrew Smith, State Toxicologist – 866-292-3474
Dr. Diane Silverman, Toxicologist – 866-292-3474
- For information about the ME-CDC Swimming Pool Regulations:
<http://www.maine.gov/dhhs/eng/plumb/documents/cmr202.doc>
- For information about irritants and indoor pool air quality:
<http://www.cdc.gov/healthyswimming/irritants.htm>