

## MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE



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## BALTIMORE CITY HEALTH DEPARTMENT



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### Introduction

On Tuesday, February 26, 2013, the Baltimore City Fire Department (BCFD) Emergency Medical Services (EMS) reported to an office complex operated by a Maryland academic institution (Facility A), following a call from building residents who were reported to be exhibiting symptoms including rapid heartbeat, headache, and nausea. EMS personnel, concerned about the possibility of carbon monoxide poisoning, assessed the personnel while BCFD responders also evaluated the building for the presence of carbon monoxide. During the initial response, seventeen people were transported to local hospital emergency departments, while a number of other personnel eventually also received medical evaluations through their health care provider or a hospital emergency department. BCFD Hazmat testing of the facility produced negative results for carbon monoxide or any other airborne hazards for which testing was available. As a result of the 911 call with patient illness, the Baltimore City Health Department (BCHD) was notified of a potential environmental health issue at Facility A. The initial report was a call to the Bureau of Environmental Health from a complainant reporting possible food poisoning at the facility. Shortly thereafter, based on contact with a hospital emergency department that diagnosed an elevated blood level of methemoglobin, BCHD and the Maryland Department of Health and Mental Hygiene (DHMH) launched a joint epidemiological and environmental investigation of the facility. Food and water samples were taken from the facility, and water samples were taken and tested for chemicals/toxins. The facility was initially closed while the investigation was under way, and early sampling and testing on samples collected Day 1 and Day 2 revealed elevated levels of nitrites and nitrates in the potable hot water system.

Three possible theories were advanced to explain the presence of nitrites and nitrates in the hot water:

1. A possible biological bloom in the hot water heater that produced the higher than normal nitrite and nitrate levels;
2. An accidental or intentional introduction of a substance into the hot water system; or
3. A cross connection with either the fire suppression or HVAC system that was causing cross-contamination of the hot water system.

Initially, the building was closed while the extent and cause of the contamination were evaluated. Once it appeared that the contamination was limited to the hot water system, the building was allowed to reopen with extensive restrictions to prevent exposure to the contaminated water supply. However, a second illness event occurred on March 4, 2013, when an additional twelve people reported feeling ill, and seven were transported to local emergency departments. The remainder of this report describes the results of the public health investigation and management of the contamination incident.

### Background

Facility A is a corporate office complex with approximately 1,200 employees. It consists of two buildings. The North Building was built in 1970 and renovated in 1999. The South Building was built in 1981. There is one food service facility located on the first floor in the South building of the complex. Facility A is used exclusively by the academic institution for office space, primarily related to the institution's medical center operations. The buildings are managed by a property management company.

### Methods

*Case Definitions:* After the first day of the incident, employees were seen either at the occupational health unit of the facility, by a personal provider, or in some cases at hospitals in the area. During the early days of the response, cases were defined by DHMH and BCHD as anyone in the complex who exhibited any symptoms. Following the resolution of the incident, cases were retrospectively defined DHMH and BCHD as someone who became sick at the facility from February 25, 2013 until March 4, 2013 and tested positive for methemoglobinemia

(defined as a methemoglobin level of 1.6 or greater than 1.5%) and experienced any one or more of the following symptoms: nausea, fatigue, lightheadedness, dizziness, abdominal cramping, difficulty breathing, or vomiting.

*Case Finding:* Cases were initially identified by the BCFD EMS, or by Facility A management or by the occupational health department of the academic institution. The Maryland Department of Health and Mental Hygiene (DHMH) sent an alert to notify Baltimore area acute care facilities and the Maryland Poison Control Center to look out for possible cases related to the investigation and to test for methemoglobinemia in suspected patients. The BCHD and DHMH epidemiologists conducted phone interviews using a standard questionnaire of cases who were seen in the emergency room and tested positive for methemoglobinemia. Additionally, the DHMH and BCHD, with input from the academic institution, developed an online standard questionnaire for all employees and visitors since who had been in Facility A since February 25, 2013, irrespective of any illness. The questionnaire included questions about symptoms, onset and duration of illness, foods and water consumed, and office locale. The online questionnaire (Appendix) started on February 27, 2013 and responses were received until March 15, 2013.

*Laboratory Investigation:* Laboratory results are summarized and discussed in the Results section, below. Early in the event, some but not all patients seen in the hospital emergency departments had blood and urine collected to be tested for methemoglobinemia in many but not all cases. In the initial response, DHMH requested that any urine and blood samples collected from case-patients from the complex be forwarded to the DHMH Lab for further testing (but not for methemoglobinemia). After the first several days of the response, clinical and laboratory evaluation of building occupants with symptoms was less consistent. Some occupants were evaluated by the occupational health unit, some by their personal physicians, and some at emergency rooms or other facilities. DHMH and BCHD received some but not all of these clinical and laboratory results, and in general testing for methemoglobin occurred only when the evaluation took place in an emergency room (see discussion for further details).

*Environmental Investigation:* The initial environmental assessment started the evening of the original incident, February 26. DHMH and BCHD staff at the facility collected environmental samples from the kitchen facility including tap water, used cooking water, food items, and beverages, based on results from the initial screening questionnaire of symptomatic individuals. Initial samples were tested on-site by test strips for chlorine, pH, and combined nitrates. Samples were also tested at the DHMH Environmental Chemistry Laboratory for a number of agents, including pH, chlorine, nitrates and nitrites, metals, volatile organic compounds (VOCs), phosphate, trihalo methanes and total haloacetic acid, metals, and cyanide.

The South and North Buildings, though connected by a walkway, have separate hot and cold potable water systems, as well as separate heating and cooling systems. The kitchen facility and cafeteria are located in the South Building on the second floor. The potable hot water heater and some other major building systems, are contained in two penthouses, one on each building.

## **Results**

*Symptom Frequency:* Symptoms were reported on the DHMH/BCHD online questionnaire and tabulated. DHMH received a total of 62 reports of ill individuals from February 25 through March 4, 2013, as well as 8 reported illnesses occurring after March 4. Three reports during the period February 25 to March 4 were incomplete and excluded, as well as the eight illnesses reported after March 4, none of which had either symptoms or abnormal methemoglobin levels. Of the 59 individuals included in the line list, 44 provided information about where their office was located; all but 2 worked in the South Building. The most frequent symptoms among the 59 reported illnesses included headache, dizziness, and nausea (Table 1).

*Case characteristics:* A case was defined as a person reporting symptoms on February 25 – 27, 2013 with a methemoglobin level greater than 1.5 %, which was the upper limit of normal for the laboratories testing methemoglobin. Table 2 summarizes the characteristics of the cases and non-cases. 14 of the 59 (23.7%) of the symptomatic individuals evaluated met the criteria for a case. All of the cases (100%) were female, with a mean age of 44.5 years. The 45 non-cases were predominantly female (34, 75.6%), with a mean age of 38.3 years. The difference in ages was not statistically significant.

*Laboratory Findings:* Laboratories were obtained for a majority of the workers referred for health care, but; it was not possible to obtain records for many who obtained medical care on their own. The mean methemoglobin level in cases was 4.8 % with a median of 2.5% (range 1.6 – 32.3 %). Ten of the eleven cases were also tested for carbon monoxide; the mean CO level was  $1.2 \pm 0.7\%$  (for those above the level of detection, the range was 0.5 – 3.5%). By contrast, the mean methemoglobin level among the 26 non-cases tested for methemoglobinemia was 0.5 % (range 0.0 – 1.5 %).

*Environmental Health Findings:* In response to the clinical finding of elevated methemoglobin levels in some building occupants, water samples collected at the facility on the evening of February 26 were tested for the presence of nitrate and nitrite. A number of samples showed elevated levels of nitrate ( $\text{NO}_2$ ) and combined nitrate and nitrite ( $\text{NO}_3 + \text{NO}_2$ ) by rapid strip testing (Table 3). Nitrate and nitrite are well known causes of methemoglobinemia, and the chemical mechanisms for both are quite complex. The ferrous (iron II) part of the hemoglobin iron is oxidized to the ferric (iron III) state, and there is also co-oxidation of the oxy-hemoglobin complex. Both of these mechanisms produce methemoglobinemia, a condition whereby the blood cannot carry usable oxygen to the cells, resulting in a chemical form of asphyxiation. The DHMH Environmental Chemistry Laboratory subsequently confirmed the presence of elevated combined nitrate and nitrite, primarily in the form of nitrite in potable water samples.

Based on the clinical findings and preliminary test results, DHMH and BCHD staff returned to the facility on February 27 and conducted extensive sampling of the entire facility, using rapid test strips and confirmatory laboratory testing. The results confirmed that there were elevated nitrate levels throughout the potable hot water system of the building. Of 44 samples collected on the following (2/27/2013), the concentration of combined nitrate/nitrite ranged from a low of 1.6 mg/L to a high of 532.0 mg/L; all of the elevated results were seen in hot water lines or mixed hot/cold lines in the South building of the complex. There were no elevated concentrations of nitrate/nitrite in the cold water supply. The results of testing are shown in Table 43. It should be noted that the samples taken in the basement and penthouse on March 4, 2013 that had elevated nitrate/nitrite levels were not potable water but rather from heating and cooling systems.

Field samples collected showed no evidence of nitrate/nitrite coming into the building from the public water supply, or of cross-contamination into or out of the fire suppression system. Consultants visually hired to assist Facility A's manager inspected the facility for and were unable to find any cross-connection between the potable water system and the building's heating, ventilation, and cooling water system. Samples from the South Building's hot water tank showed elevated nitrate/nitrite concentrations in the tank which were confirmed when the tank was removed from service and destroyed.

Additional sampling performed by a contractor for the facility on 3/1/2013 were reported to showed non-detectable total coliform, heterotrophic plate counts, and ammonia, from water samples collected from a bathroom on the 4<sup>th</sup> floor, the building inlet, and the hot water tank.

An investigation by the facility (details were unavailable to either BCHD or DHMH) subsequently revealed that on February 25, 2013, a technician introduced approximately 2.5 gallons of a corrosion inhibitor (Chemstar 634) into what was supposed to be the heating cooling water system, but was in fact a drain site for the recirculating loop of the hot water system in the penthouse of the South Building. The material safety data sheet for Chemstar 634 describes it as 39% sodium nitrite and less than 2% each of podium polyacrylate, tolytriazole, and sodium hydroxide.

### **Initial Recommendations**

The following recommendations were to Facility A's management:

1. Initially, the recommendation was to shut the facility. Once a likely source was identified, DHMH and BCHD recommended re-opening, but prohibiting access to all drinking water sources and the bathrooms in the South Building. Bathrooms were kept open in the North Building. Subsequently, a decision was made by the facility owner and manager to flush the entire system, replace the hot water heater, and replace the drain site access where the incorrect introduction of Chemstar 634 occurred.
2. The integrity of the potable water system should be verified by using a dye test to confirm that there are no cross-connections between the potable water system and the heating and cooling system.
3. The facility should also confirm there are no cross-connections between the hot water system and cold water system.

4. A recommendation was also made to continue periodic testing for nitrate/nitrite following the other corrective actions.

## **Discussion**

The symptoms, clinical laboratory findings, and environmental testing are all consistent with a finding that this incident was caused by the incorrect introduction of a chemical boiler treatment containing sodium nitrite into the potable water supply of the South Building of Facility A. The maximum contaminant level for nitrate in drinking water is 10 mg/L, and for nitrite 1 mg/L.<sup>1</sup> Environmental samples clearly identified contamination of the potable hot- and mixed-water supply at levels consistent with other, historic reported episodes incidents of methemoglobinemia, described below.

There have been several reported cases incidents in which building systems have been contaminated with nitrates or nitrites. A 1997 CDC MMWR report described two incidents in which building hot water systems were contaminated with nitrite used in boiler treatment solution.<sup>2</sup> In both cases, the problem was determined to be faulty backflow preventers, which allowed treated water in the non-potable boiler system to flow into the potable hot water loop. Nitrite levels in one case reported incident were 4 – 10 ppm in the drinking water several weeks after the treatment of the boiler; in the other case reported incident the nitrate levels were 300 ppm in coffee, and > 50 ppm in hot water samples from several building sites.

One of the questions raised during the episode concerns the symptoms and their relationship to the observed concentrations of methemoglobin. Medical texts and treatment guidelines generally suggest that symptoms such as cyanosis occur at methemoglobin levels above 15%, with more severe symptoms (tachycardia, weakness, lethargy, and dizziness) at concentrations above 20%. Methemoglobin (bound hemoglobin) interferes with oxygen delivery, so patients who have medical conditions that predispose them to symptoms when oxygen delivery is impaired (pneumonia, anemia, or heart disease) may develop symptoms at lower methemoglobin levels. In most cases it was impossible to determine for DHMH or BCHD to determine whether occupants had any additional diagnoses because of limited access to medical records, so it is not known whether those occupants who experienced symptoms had any other contributing factors. In the current episode, symptoms were reported with methemoglobin levels well below 15%, but while this does not mean that the symptoms were unrelated, the attribution of symptoms to methemoglobinemia is not clear.

Certain foods, medications, pesticides, contaminated well water, and consumer products are known to cause methemoglobinemia. In the current event, patients who had elevated methemoglobin levels did not report any medications at the time of their ambulance transport (according to the transport records), but complete medical records on the cases were not available to either DHMH or BCHD.

The product Chemstar 634 also contains tolyltriazole. Tolyltriazole (methylbenzotriazole, a mixture of 4- and 5-methylbenzotriazole) is used as a corrosion inhibitor in a variety of water treatment, engine coolant, and other systems. The chemical structure is C<sub>7</sub>H<sub>7</sub>N<sub>3</sub>, molecular weight 133.15, boiling point of 210° C. It consists of a benzene ring linked to an azole. The EPA does not regulate tolyltriazole levels in drinking water. It is not classified or listed as a carcinogen by the Occupational Safety and Health Administration, the American Conference of Industrial Hygienists, or the International Agency for Research on Cancer, and has not been shown to cause damage to DNA in laboratory tests.

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<sup>1</sup> U.S. Environmental Protection Agency. “Basic Information about Nitrate in Drinking Water,” accessed 11/17/2013 at: <http://water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm#four>.

<sup>2</sup> Centers for Disease Control and Prevention (CDC). Methemoglobinemia attributable to nitrite contamination of potable water through boiler fluid additives--New Jersey, 1992 and 1996. MMWR Morb Mortal Wkly Rep. 1997 Mar 7;46(9):202-4.

## **Final Recommendations**

Following the initial assessment that nitrate/nitrite contamination of the potable hot water supply was the likely proximate cause of at least some of the symptoms, the following recommendations were made concerning Facility A:

5. In the first days of the incident, the facility was closed until a likely source of contamination could be identified. Once a likely source was identified that appeared to be confined to the potable hot water system in the South Building, DHMH and BCHD recommended re-opening the facility, but limiting access to all drinking water sources and bathrooms in the South Building. Bathrooms remained open in the North Building, which was noted to have a completely separate hot water system and which tested negative for nitrates and nitrites.
6. DHMH and BCHD recommended that the integrity of the potable water system be verified using a dye test, to confirm the absence of cross-connections between the potable water system and the heating and cooling system. Separately, the facility should also confirm the absence of cross-connections between the hot water system and cold water system. These were done and reported to DHMH.
7. Once the absence of cross connections was confirmed, the facility owner elected to flush the entire system, replace the hot water heater, and replace the drain site access where the problem occurred.
8. Though not required, a recommendation was also made and accepted to continue periodic testing for nitrate/nitrite following other corrective actions.

DHMH and BCHD identified several other technical and administrative issues arising during this incident that should be addressed by the agencies:

In addition to the initial recommendations made to Facility A at the outset of the event, a number of additional findings were identified:

1. Methemoglobin measurement is not standardized across health care institutions, which complicates the interpretation of methemoglobin tests, especially from multiple health care facilities.
2. A significant number of employees were evaluated by the occupational health unit of Facility A's academic institutional tenant. This posed some coordination challenges with the BCHD and DHMH response, particularly regarding decisions regarding testing and notification of employees, as well as public health evaluation of data. In most cases these situations were resolved through telephone conference calls or in-person meetings.
3. This event was particularly challenging because in addition to the regular staff there were a large number of outside employees being trained in the building during the period in question. Fortunately, the institution has a robust communications infrastructure, which allowed building management to assemble a fairly complete list of everyone in order to communicate with most of the building's occupants. However, in a large multi-tenant office complex this process would likely be more challenging, and both DHMH and BCHD would benefit from considering how to rapidly identify and communicate with building occupants in the event of a similar incident.
4. Both BCHD and DHMH identified several issues associated with command and communication during the incident, including:
  - a. The agencies need to be clear about which agency is primary, irrespective of where the subject matter expertise is located.
  - b. The issue of coordination of epidemiology assignments between DHMH and BCHD was raised in after action meetings.
  - c. The location of the unified command, and the presence of private entities in the unified command, complicated the command structure and led to some confusion at times about who was in charge during the incident.

**Attachments**

**Table 1. Symptoms Reported in Facility A Occupants, February 25 - March 4, 2013.**

Symptoms	Total N=59	Cases N = 14	Non-Cases N = 45
	N (%)	N (%)	N (%)
Headache	21 (35.6)	10 (71.4)	11 (24.4)
Dizzy	20 (39.0)	9 (64.3)	11 (24.4)
Nausea	17 (28.8)	8 (57.1)	9 (20.0)
Fatigue	10 (17.0)	5 (35.7)	5 (11.1)
Vomiting	8 (13.6)	4 (28.6)	4 (8.9)
Shortness of Breath	3 (5.1)	2 (14.3)	1 (2.2)
Diarrhea	3 (5.1)	1 (7.1)	2 (4.4)
Palpitation	3 (5.1)	1 (7.1)	2 (4.4)
Rash	2 (3.4)	2 (14.3)	0 (0.0)
Confusion	2 (3.4)	1 (7.1)	1 (2.2)
Loss of consciousness	1 (1.7)	1 (7.1)	0 (0.0)

**Table 2. Clinical and Laboratory Findings Among Cases and Non-Cases from Facility A, 2013**

Clinical and Laboratory Findings	Cases N = 14	Non-Cases N = 45
Age (Years, Mean $\pm$ Std. Dev.)	44.5 ( $\pm$ 11.4)	38.3 ( $\pm$ 8.5)
Sex		
Female	100%	83%
Male	0%	17%
Methemoglobinemia N	14	26
Mean ( $\pm$ Std. Dev.)	4.8 ( $\pm$ 8.0)	0.5 ( $\pm$ 0.4)
Median	2.5	0.4
Carboxyhemoglobin N	13	23
Mean ( $\pm$ Std. Dev.)	1.3 ( $\pm$ 0.9)	1.7 ( $\pm$ 1.4)
Median	1.3	1.6

**Table 3. Water and Food Samples collected and Analyzed from Facility A, 2/26/2013**

Sample	pH	Chlorine	Combined Nitrate (NO <sub>3</sub> ) and Nitrite (NO <sub>2</sub> ), mg/L	Nitrite (NO <sub>2</sub> ), mg/L
CEPR 580 / sampled from 3 comp sink water collected in bucket by kitchen staff(3:45 pm)	7.6	0	3.9	2.1
CEPR 581A / sampled from faucet water collected in bucket by kitchen staff (10 a.m)	9.5	0.5	435	456.6
CEPR 581B / sampled from faucet water collected in bucket by kitchen staff (10 a.m)	9.5	0.5	439	454.8
CEPR 582A / collected by DEC staff directly from tap in 3rd floor breakroom (~ 7:00 pm)	7.6	0	1.7	0
CEPR 582B / collected by DEC staff directly from tap in 3rd floor breakroom (~ 7:00 pm)	7.3	0	1.7	0
CEPR 583A / collected by DEC staff from counter top filtration system in 3rd floor breakroom (~ 7:00 pm)	7.2	0	1.8	0
CEPR 583B / collected by DEC staff from counter top filtration system in 3rd floor breakroom (~ 7:00 pm)	7.3	0	1.8	0
CEPR 584 / Cream of Wheat (cooked in serving bowl)	NA	NA	712.4	699.6
CEPR 586 / Cream of Wheat cooked in pail, without liquid	NA	NA	>395.7	>398.5
CEPR 587 / Oatmeal in large pail, without liquid	NA	NA	>330.9	>330.1

**Table 3. Combined Nitrate and Nitrite Concentrations in Facility A, 2/27/2013 - 3/4/2013 (mg/L)**

			Nitrate			
			N	Median	Min	Max
Date	Floor	Water				
02/27/2013	2	Cold	1	1.8	1.8	1.8
		Cooking	1	1.7	1.7	1.7
		Hot	2	53.0	4.6	101.3
		Unknown	2	1.7	1.7	1.7
	3	Mixed	2	2.8	1.7	3.9
		Hot	1	4.8	4.8	4.8
		Unknown*	4	1.7	1.7	2.1
	4	Cold	5	1.8	1.7	1.9
		Hot	5	55.4	1.7	532.0
	5	Cold	1	1.8	1.8	1.8
		Hot	2	11.0	7.8	14.2
	Penthouse	Cold	1	1.7	1.7	1.7
		Hot	3	1.7	1.7	4.9
03/04/2013	2	Hot	3	1.9	1.8	4.6
		Mixed	2	1.8	1.8	1.8
	3	Cold	7	1.8	1.6	1.8
		Hot	8	1.8	1.8	1.9
		Unknown*	3	0.2	0.2	1.8
	4	Cold	3	1.8	1.8	1.8
		Hot	4	1.8	1.8	1.8
	5	Cold	5	1.8	1.8	1.8
		Hot	4	1.8	1.8	1.8
	Basement	Non-Potable	3	1.8	0.7	101.0
	Penthouse	Cold	1	613.9	613.9	613.9
		Hot	1	1.8	1.8	1.8
		Non-Potable	2	244.1	100.6	387.5
Unknown	Unknown	2	1.3	0.9	1.8	
03/27/2013	2	Cold	2	1.1	0.4	1.7
		Hot	7	1.7	1.7	1.8
	3	Hot	13	1.7	1.6	1.8
	4	Hot	7	1.8	1.7	1.8
	5	Cold	1	1.7	1.7	1.7
		Hot	6	1.8	1.7	1.8
	Basement	Cold	1	1.8	1.8	1.8
	Penthouse	Cold	1	1.7	1.7	1.7
		Hot	1	1.7	1.7	1.7

\*Unknown = samples collected from drinking water bottles of unknown origin.

## **References**

Centers for Disease Control and Prevention (CDC). Methemoglobinemia attributable to nitrite contamination of potable water through boiler fluid additives--New Jersey, 1992 and 1996. MMWR Morb Mortal Wkly Rep. 1997 Mar 7;46(9):202-4.

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United States Environmental Protection Agency. (2012). *Drinking Water Contaminants..* Accessed from <http://water.epa.gov/drink/contaminants/index.cfm#Inorganic> on October 9, 2012.

## **CC List:**

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# Keswick office building survey

Letter to Keswick employees

February 27, 2013

Dear Johns Hopkins Keswick employee,

The Baltimore City Health Department (BCHD) and the Maryland Department of Health and Mental Hygiene (DHMH) are working with the Johns Hopkins University (JHU) to investigate reports of some recent illnesses amongst employees at the Keswick campus. We have not yet determined exactly how people became ill, and we want your help to do so, even if you did not get sick.

Please help us by answering questions through an on-line survey, even if you did not become ill. We think this survey may take about 20 minutes to complete, but your full participation is crucial to figuring out what might have happened. This information is collected by public health, the state and city health departments, and will be kept CONFIDENTIAL in accordance with Maryland state law and will not be shared with your employer.

Again, PLEASE COMPLETE THE SURVEY EVEN IF YOU DID NOT HAVE ANY SYMPTOMS, as we also need to hear from those who are not ill, to investigate this situation. If you have any questions about the survey or would like to answer the questions by phone interview, please contact the Division of Outbreak Investigation at 410-767-6677. Also, please distribute this to anyone you know who also works in the building.

Thank you

Please complete a separate survey for each person.

## 1. Please provide your contact information. It may be necessary for us to contact you again during the investigation.

<b>Name:</b>	<input type="text"/>
<b>Job title:</b>	<input type="text"/>
<b>Address:</b>	<input type="text"/>
<b>Address 2:</b>	<input type="text"/>
<b>City/Town:</b>	<input type="text"/>
<b>State:</b>	<input type="text"/>
<b>ZIP/Postal Code:</b>	<input type="text"/>
<b>County:</b>	<input type="text"/>
<b>Email Address:</b>	<input type="text"/>
<b>Phone Number:</b>	<input type="text"/>

## 2. What is your gender?

	Male	Female
Gender	<input type="radio"/>	<input type="radio"/>

## 3. What is your date of birth?

# Keswick office building survey

## 4. Where is your primary work location?

- South Building, 1st Floor
- South Building, 2nd Floor
- South Building, 3rd Floor
- South Building, 4th Floor
- South Building, 5th Floor
- North Building, 1st Floor
- North Building, 2nd Floor
- North Building, 3rd Floor
- North Building, 4th Floor
- North Building, 5th Floor
- My primary work location is not at Keswick

Other (please specify)

## 5. Did you spend any time at any of the following additional locations at Keswick?

- Training rooms
- Cafeteria
- Auditorium
- Kitchen pantry
- Internet cafe
- EPIC training
- Other

Comment (please specify building and floor)

## 6. Describe the location of your cubicle or office.

## 7. Were you at Keswick on these days?

	Yes	No
Sunday, February 24	<input type="radio"/>	<input type="radio"/>
Monday, February 25	<input type="radio"/>	<input type="radio"/>
Tuesday, February 26	<input type="radio"/>	<input type="radio"/>

# Keswick office building survey

## 8. What time did you arrive on Sunday, Feb. 24?

Time arrived:  HH :  MM  AM/PM

## 9. What time did you arrive on Monday, Feb. 25?

Time arrived:  HH :  MM  AM/PM

## 10. What time did you arrive on Tuesday, Feb. 26?

Time arrived:  HH :  MM  AM/PM

## 11. Between Sunday, Feb. 24 and Tuesday Feb. 26, did you attend any gatherings with coworkers outside of work?

- Yes  
 No

If yes, please specify what activity, when, and where:

## \*1. Since Sunday, February 24, have you felt ill?

- yes  
 no

## 1. When did your symptoms begin?

onset  MM /  DD /  YYYY  HH :  MM  AM/PM

## 2. Have your symptoms ended?

Symptoms ended  yes  no

## 3. If so, when did your symptoms resolve?

resolution  MM /  DD /  YYYY  HH :  MM  AM/PM

# Keswick office building survey

## 4. Did you have the following symptoms?

	Yes	No
Abdominal cramps	<input type="radio"/>	<input type="radio"/>
Body aches	<input type="radio"/>	<input type="radio"/>
Chills	<input type="radio"/>	<input type="radio"/>
Confusion	<input type="radio"/>	<input type="radio"/>
Diarrhea, bloody	<input type="radio"/>	<input type="radio"/>
Diarrhea without blood	<input type="radio"/>	<input type="radio"/>
Disorientation	<input type="radio"/>	<input type="radio"/>
Dizziness	<input type="radio"/>	<input type="radio"/>
Fainting	<input type="radio"/>	<input type="radio"/>
Fatigue	<input type="radio"/>	<input type="radio"/>
Fever	<input type="radio"/>	<input type="radio"/>
Headache	<input type="radio"/>	<input type="radio"/>
Lightheadedness	<input type="radio"/>	<input type="radio"/>
Nausea	<input type="radio"/>	<input type="radio"/>
Rapid heartbeat/"racing heart"	<input type="radio"/>	<input type="radio"/>
Rash	<input type="radio"/>	<input type="radio"/>
Shortness of breath	<input type="radio"/>	<input type="radio"/>
Skin color changes	<input type="radio"/>	<input type="radio"/>
Weakness	<input type="radio"/>	<input type="radio"/>

Other symptoms

## 5. Did you receive care for your symptoms at the following places?

	Yes	No
Office or clinic visit	<input type="radio"/>	<input type="radio"/>
Emergency room visit	<input type="radio"/>	<input type="radio"/>
Inpatient hospitalization	<input type="radio"/>	<input type="radio"/>

Please provide location, provider name, and phone number for where you were treated, if available.

# Keswick office building survey

## 1. Did you consume the following foods on Monday, Feb. 25 or Tuesday, Feb. 26?

	Date eaten	Source
Bacon	<input type="text"/>	<input type="text"/>
Bacon and egg sandwich	<input type="text"/>	<input type="text"/>
Bagel	<input type="text"/>	<input type="text"/>
Biscuit	<input type="text"/>	<input type="text"/>
Breakfast special	<input type="text"/>	<input type="text"/>
Cereal, other (e.g., Cheerios, granola)	<input type="text"/>	<input type="text"/>
Cheese	<input type="text"/>	<input type="text"/>
Cream of Wheat	<input type="text"/>	<input type="text"/>
Doughnut/ Danish/ Cake/ Pudding/ other desserts	<input type="text"/>	<input type="text"/>
Eggs	<input type="text"/>	<input type="text"/>
French toast	<input type="text"/>	<input type="text"/>
Ham	<input type="text"/>	<input type="text"/>
Hash browns	<input type="text"/>	<input type="text"/>
Muffin	<input type="text"/>	<input type="text"/>
Oatmeal	<input type="text"/>	<input type="text"/>
Omelet	<input type="text"/>	<input type="text"/>
Pancakes	<input type="text"/>	<input type="text"/>
Sausage links	<input type="text"/>	<input type="text"/>
Toast	<input type="text"/>	<input type="text"/>
Daily entree with sides	<input type="text"/>	<input type="text"/>
Deli bar/special	<input type="text"/>	<input type="text"/>
Grill Special	<input type="text"/>	<input type="text"/>
Packaged snack (chips, cookie, bar, chocolate, fruit, yogurt)	<input type="text"/>	<input type="text"/>
Burger (turkey, beef, veggie or other kinds)	<input type="text"/>	<input type="text"/>
Fresh fruit	<input type="text"/>	<input type="text"/>
Hot Dog	<input type="text"/>	<input type="text"/>
Pizza	<input type="text"/>	<input type="text"/>
Salad Bar	<input type="text"/>	<input type="text"/>
Sandwich/Wraps/Subs/Panini	<input type="text"/>	<input type="text"/>
Dinner roll	<input type="text"/>	<input type="text"/>

# Keswick office building survey

Caesar salad with/without chicken	<input type="text"/>	<input type="text"/>
Nachos	<input type="text"/>	<input type="text"/>
Onion rings	<input type="text"/>	<input type="text"/>
Chili	<input type="text"/>	<input type="text"/>
Soup	<input type="text"/>	<input type="text"/>
Chicken strips	<input type="text"/>	<input type="text"/>
Fries	<input type="text"/>	<input type="text"/>
Salt	<input type="text"/>	<input type="text"/>
Sugar	<input type="text"/>	<input type="text"/>
Sugar substitute	<input type="text"/>	<input type="text"/>
Pepper	<input type="text"/>	<input type="text"/>
Butter	<input type="text"/>	<input type="text"/>
Cream cheese	<input type="text"/>	<input type="text"/>
Other condiment	<input type="text"/>	<input type="text"/>

Please list any other foods you had on Monday or Tuesday that are not listed above and describe where it was from.

## 2. Did you notice anything unusual about any of the foods you had? If so, please describe.

- yes
- no

Please describe anything unusual about the foods you ate.

# Keswick office building survey

## 3. Did you consume the following drinks/ice during Monday, Feb. 25 or Tuesday, Feb. 26?

	Date eaten	Source
Fountain beverage	<input type="text"/>	<input type="text"/>
Coffee	<input type="text"/>	<input type="text"/>
Tea	<input type="text"/>	<input type="text"/>
Milk (regular or chocolate)	<input type="text"/>	<input type="text"/>
Fresh fruit juiced	<input type="text"/>	<input type="text"/>
Bottled or canned drink (juice or soda)	<input type="text"/>	<input type="text"/>
Water (bottled)	<input type="text"/>	<input type="text"/>
Water (not bottled)	<input type="text"/>	<input type="text"/>
Ice	<input type="text"/>	<input type="text"/>

Please list any other foods you had during the morning of February 26 that are not listed above and describe how much you had, what time you ate it, and where it was from.

## 4. If you drank water at Keswick that was not bottled, where was that water from?

- Cafeteria
- Internet cafe
- Break room/kitchen pantry
- Water fountain at Keswick
- Bathroom at Keswick
- Home

If you had water from a fountain or faucet at Keswick, from which location (floor/room)?

## 5. Did you notice anything unusual about any of the beverages you had? If so, please describe.

- Yes
- No

Please describe anything unusual about the foods you ate.

# Keswick office building survey

## 1. Did you use the bathroom at either Keswick building?

- Yes
- No

## 2. Did you use a sink in the bathroom?

- Yes
- No

## 3. Which bathroom

- Closest to elevators
- Furthest from elevators

Other (please specify)

## 4. Did the bathroom sink have an automated faucet?

- Yes
- No

## 5. Did you use the sink for which purpose?

- Wash hands or face
- Get water from faucet for drinking/prepping food
- Brush teeth
- Wash utensils/dishes
- Did not use sink

Other (please specify)

## 1. Other than your usual office or cubicle, did you go anywhere else in the office building on Feb. 25 or 26?

- Yes
- No

Please describe where you were within the building.

# Keswick office building survey

## 2. Did you go anywhere outside of the office building on Feb. 25 or 26?

Yes

No

Please describe where you went.

## 1. Do you know anyone who got sick?

Yes

No

If so, what is the person's name, what is the location of that person's office, did you have any common foods or drinks with that person, and were you near that person when he or she became ill?

## 2. Have you ever been told that you have any of following conditions?

	Yes	No
Cytochrome B-5 Reductatse Deficiency	<input type="radio"/>	<input type="radio"/>
Glucose-6 Phosphate Dehydrogenase (G6PD) Deficiency	<input type="radio"/>	<input type="radio"/>
Hemoglobin M Disease	<input type="radio"/>	<input type="radio"/>
Pyruvate Kinase Deficiency	<input type="radio"/>	<input type="radio"/>

## 1. Comments you feel may help with the investigation:

Thank you for completing the survey.

If you are experiencing symptoms, please consult with a health care provider.

## Keswick office building survey

If you have questions about the survey, please contact the Division of Outbreak Investigation, Maryland Dept. of Health and Mental Hygiene at 410-767-6677.