The (Food)borne Identity: Locating Rogue Pathogens in the United States and Canada

Tainted Carrot Juice and Botulism in Toronto

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Presentation outline

• The Outbreak story
• The IMS model
• Public health control measures
• Communication and media
• Take home messages
Botulism

- Toxin produced by C.botulinum bacteria
- Causes nerve damage
- Foodborne, wound and intestinal botulism
- Incubation period: 12-36 hours (range 6 hours to 10 days)

Botulism

- Early symptoms of fatigue, weakness, dizziness, headache
  Followed by:
  - Vomiting/diarrhea
  - Double vision or blurred vision
  - Drooping eyelids
  - Dry mouth or throat
  - Difficulty swallowing or speaking
  - Difficulty breathing
  - Paralysis
Botulism

• Can be treated with antidote: botulism antitoxin if diagnosed early
• Once paralysis occurs, regeneration of nerves can occur, but takes time
• Risk of death due to complications of paralysis

Botulism Toxin Production

• Conditions deemed necessary for botulism toxin production:
  • Presence of *C. botulinum* spores
  • Low-acid substance
  • Anaerobic environment
  • Temperature above 4 degrees Celsius
  • Eg. home-canned carrots or green beans, garlic stored in oil
Incidence in Toronto

Table 7.1: Summary of rare reportable diseases, Toronto, 1995 - 2005

<table>
<thead>
<tr>
<th>Disease</th>
<th>Disease category</th>
<th>Year of last report</th>
<th>Total number of cases for period 1995 - 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botulism</td>
<td>Enteric, food and waterborne</td>
<td>2004</td>
<td>6</td>
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<tr>
<td>Brucellosis</td>
<td>Vectorborne and zoonotic</td>
<td>2005</td>
<td>11</td>
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<tr>
<td>Cholera</td>
<td>Enteric, food and waterborne</td>
<td>1998</td>
<td>3</td>
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<tr>
<td>Cytomegalovirus infection, congenital</td>
<td>Sexually transmitted and bloodborne</td>
<td>2006</td>
<td>19</td>
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<tr>
<td>Reenomphus influenza b disease, invasive</td>
<td>Preventable by routine vaccination</td>
<td>2004</td>
<td>19</td>
</tr>
<tr>
<td>Haemorrhagic fever</td>
<td>Vectorborne and zoonotic</td>
<td>1997</td>
<td>2</td>
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<tr>
<td>Hepatitis D</td>
<td>Sexually transmitted and bloodborne</td>
<td>2005</td>
<td>31</td>
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<tr>
<td>Herpes, neonatal</td>
<td>Sexually transmitted and bloodborne</td>
<td>2005</td>
<td>13</td>
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<tr>
<td>Leprosy</td>
<td>Direct contact and respiratory</td>
<td>2005</td>
<td>19</td>
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<tr>
<td>Ophthalma neonatorum</td>
<td>Sexually transmitted and bloodborne</td>
<td>2004</td>
<td>34</td>
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<td>Pneumococcosis/otitis</td>
<td>Vectorborne and zoonotic</td>
<td>1996</td>
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<tr>
<td>Q fever</td>
<td>Vectorborne and zoonotic</td>
<td>2004</td>
<td>19</td>
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<tr>
<td>Rubella, congenital syndrome</td>
<td>Preventable by routine vaccination</td>
<td>2004</td>
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<tr>
<td>Severe Acute Respiratory Syndrome</td>
<td>Direct contact and respiratory</td>
<td>2003</td>
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<td>Syphilis, congenital</td>
<td>Sexually transmitted and bloodborne</td>
<td>1999</td>
<td>2</td>
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<td>Tetanus</td>
<td>Preventable by routine vaccination</td>
<td>1997</td>
<td>2</td>
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<tr>
<td>Tularemia</td>
<td>Vectorborne and zoonotic</td>
<td>1997</td>
<td>1</td>
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</table>

*Rare reportable diseases not summarized in this section include anthrax, denguevirus, diphtheria, encephalitis, kala-azar, leishmaniasis, leprosy, malaria, meningitis, plague, poliomyelitis, rabies, smallpox, transmissible spongiform encephalopathies, typhoid fever, yellow fever.*

The beginning...case 1

- 59 yr F, otherwise healthy
- **Mid-Aug**: mild diarrhea, vomiting, resolved
- **Aug 24**: diarrhea, vomiting
- **Aug 25**: dizziness, weakness, blurry vision, seen in ER; admitted to hospital
- **Aug 26**: tested for WNV is negative
- **Aug 28**: paralysis, intubated, trached and ventilated
- **Aug 30**: diagnosis of fissure variant Guillain-Barre Syndrome
The beginning… Case 2

- 68 yr M, partner of 59 yr F
- **Aug 22-26**: traveled to California on own for business
- **Aug 25**: partner admitted to hospital
- **Sept 12**: diarrhea, general fatigue
- **Sept 13**: blurred vision, difficulty moving tongue, went to ER, sent home
- **Sept 14**: difficulty speaking, difficulty opening eyes, dysphagia, SOB, went to ER; admitted

The beginning… case 2

- **Sept 15**: cannot open eyes or move tongue
- **Sept 16**: paralysis, intubated, trached and ventilated; can squeeze hand
- **Sept 16**: WNV testing negative, diagnosed with Miller Fisher Guillain-Barre Syndrome
The beginning… case 2

- **Sept 26**: Neurologist called TPH to request food sampling for heavy metal testing; aware that partner of 1st case also very ill
- **Sept 29**: WNV testing repeated

Timeline of events

- **Sept 26th**: CFIA recall on gravy chilly sauce for botulism
- **Sept 29th**: FDA recall on carrot juice brands for botulism
FDA News

FOR IMMEDIATE RELEASE
PAO-153
September 23, 2006

FDA Warns Consumers Not To Drink Bolthouse Farms Carrot Juice Due To Botulism Concerns

In response to a fourth case of botulism being linked to Bolthouse Farms, Bakersfield, California brand carrot juice, the Food and Drug Administration (FDA) is warning consumers not to drink Bolthouse Farms Carrot Juice, 453 ml and 1 liter plastic bottles, with “BEST IF USED BY” dates of NOV 11 2006 or earlier. Consumers should discard this product. FDA is also revisiting its advice to consumers to keep carrot juice — including pasteurized carrot juice — refrigerated.

The fourth case of botulism poisoning involves an adult female in Florida who is currently suffering from paralysis. To date, no link between the illness and the consumers appears to be that the juice they drank was not properly refrigerated once it was in the home, which allowed the Clostridium botulinum spores to grow and produce toxin. FDA is investigating other possible links.

Clostridium botulinum is a bacterium commonly found in soil. Under certain conditions, these bacteria can produce a toxin that if ingested can result in botulism, a disease that may cause paralysis or death. Cases of botulism from processed food are extremely rare in the U.S.

Symptoms of botulism can include: double-vision, droopy eyelids, altered voice, trouble with speaking or swallowing and paralysis on both sides of the body that progresses from the neck down, possibly followed by difficulty in breathing. Anyone experiencing these symptoms should seek immediate medical attention.

Adequate refrigeration is one of the keys to food safety and is essential to preventing bacterial growth. Refrigerator temperatures should be no higher than 40°F and freezer temperatures no higher than 0°F. Consumers should check the temperatures occasionally with an appliance thermometer.

FDA Consumer Advisory on Refrigeration of Carrot Juice

FOR IMMEDIATE RELEASE
PAO-125
September 17, 2006

FDA Consumer Advisory on Refrigeration of Carrot Juice

Three Cases of Botulism Possibly Caused by Improper Refrigeration

The U.S. Food and Drug Administration (FDA) is advising consumers of the vital importance of keeping carrot juice — including pasteurized carrot juice — refrigerated. There are three cases of botulism in the state of Georgia associated with pasteurized carrot juice that may have been due to the product not being properly refrigerated.

FDA, the Centers for Disease Control and Prevention (CDC), and health authorities in Georgia have been closely monitoring and continue to investigate these three cases of foodborne botulism.

On September 15, 2006, Georgia health authorities issued a press statement, which in part stated the following: “... At this time we believe that these three cases are an isolated incident... During the investigation, other community members have been identified as having purchased and consumed the same product from the same vendor within the past three weeks. These persons have not become ill or developed any symptoms. The fact that additional cases have not been identified suggests that the toxin was not present before the sale of the product...”

“Because botulism is such a potentially serious illness, we want to remind consumers that it is critical to refrigerate carrot juice for safety. Consumers should not keep carrot juice unrefrigerated,” said Dr. Robert Brackett, Director of FDA’s Center for Food Safety and Applied Nutrition (CFSAN). Inadequate refrigeration of carrot juice allows botulinum spores to multiply to the level at which they can cause illness.

Botulism is a rare but serious paralytic illness caused by botulinum toxin, a neurotoxin produced by Clostridium botulinum bacteria. Following ingestion, the toxin selectively blocks the release of neurotransmitters, resulting in a flaccid paralysis and, potentially, death.
Timeline of events

- **Sept 30th**: CFIA recall on carrot juice brands
Botulism Toxin Production in Carrot Juice

- Conditions deemed necessary for botulism toxin production:
  - Presence of *C. botulinum* spores
    - can be common in carrot juice
  - Low-acid substance (high pH)
    - plain carrot juice has a pH of about 6
  - Anaerobic environment
    - present in sealed bottles
  - Temperature above 4 degrees Celsius to allow spores to germinate and produce toxin
Timeline of events

• **Oct 2:** Confirmed ability to collect food samples from home; one of the food products (carrot juice) was noted as part of CFIA recall for botulism
• **Oct 3:** Food samples collected; CFIA and Health Canada notified
• **Oct 4:** Urgent Health Alert sent to ER and ID physicians
• **Oct 6:** TPH media release issued
  • Friday of long-weekend
Timeline of events

- **Oct 6**: MMWR article was released (previous promed postings)

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**MMWR Dispatch**

Vol. 55 / October 6, 2006

**Botulism Associated with Commercial Carrot Juice — Georgia and Florida, September 2006**

On September 8, 2006, the Georgia Division of Public Health (GDPH) and CDC were notified of three suspected cases of foodborne botulism in Washington County, Georgia. On September 25, the Florida Department of Health and the Florida Department of Health and the Florida Department of Health were notified of an additional suspected case in Tampa, Florida. This report describes the joint investigation and control measures undertaken by state and local health departments, CDC, and the Food and Drug Administration (FDA).

On September 8, the three patients from Washington County, Georgia, went to a local hospital with cranial nerve palsy and progressive descending flaccid paralysis resulting in respiratory failure; the patients had shared meals on September 7. On the evening of September 8, physicians suspected foodborne botulism, notified the state health department, and collected clinical specimens for testing at CDC, departments or to CDC. During this time, FDA launched an investigation of the Bolthouse Farms, Inc., manufacturer of the implicated brand of carrot juice, including from different lots, and all were negative for botulism toxin. Because botulism toxin was found only in the bottle of carrot juice consumed by the three patients, a lapse in refrigeration of the carrot juice bottle during transport or storage suggested, which would have allowed for growth of *Clostridium botulinum* and subsequent production of botulism toxin. Based on the CDC test results, on September 17, FDA issued a consumer advisory on the importance of keeping carrots refrigerated. However, information obtained from patient interviews regarding storage and transport of the carrots did not confirm mishandling by the patients.
Timeline of events (long-weekend)

- **Sat Oct 7:** Carrot juice in refrigerator of cases tested positive for botulism toxin A
- **Sun Oct 8:** Six weeks since onset of symptoms, case 1 still showed clinical specimen samples that were weakly positive for toxin
- Anti-toxin administered after consultation with CDC
- A lot of media interviews over weekend

Public Health Measures

- Implement IMS model
- Primary prevention: ensure recalled carrot juice is not available for sale or consumption
- Secondary prevention: case finding and follow up
- Public and health care provider awareness primarily through the media
Incident Management System

- Used by agencies across the City of Toronto to respond to emergencies
- Enhance our ability to communicate, cooperate and respond collectively with other emergency response agencies and internally
Public Health Measures

• Implement IMS model
• Primary prevention: ensure recalled carrot juice is not available for sale or consumption
• Secondary prevention: case finding and follow up
• Public and health care provider awareness primarily through the media

Primary Prevention: Food Safety

• **Oct 3:** On a routine food inspection of a food premise, a Healthy Environments inspector of TPH noticed a recalled brand of carrot juice for sale. CFIA was notified.
• **Fri Oct 6:** Aware of 2 cases on Toronto, TPH HE began a blitz to inspect food premises in Toronto to ensure recalled carrot juice not available for sale or consumption
• Blitz occurred on Canadian Thanksgiving long weekend (Oct 7-9)
Food Premise Inspections:

- Original CFIA voluntary recall was Sept 30th
- Active inspections by local health departments over long weekend
- 2868 food premises inspected in the City of Toronto; 5628 in Ontario
- 13 premises had recalled juice present or for sale in Toronto (74 bottles of juice)
- Last date of recall juice found was Oct 9th, 10 days after CFIA recall
Public Health Measures

• Implement IMS model
• Primary prevention: ensure recalled carrot juice is not available for sale or consumption
• Secondary prevention: case finding and follow up
• Public and health care provider awareness primarily through the media

Secondary Prevention: Case Finding and Follow-up

• Numerous calls about suspect cases
• Triage function
• Provide information
• Facilitate laboratory testing
• Facilitate anti-toxin administration as deemed necessary
Public Health Measures

• Implement IMS model
• Primary prevention: ensure recalled carrot juice is not available for sale or consumption
• Secondary prevention: case finding and follow up
• Public and health care provider awareness primarily through the media

Communication

• Awareness and education of internal and external stakeholders
• Updating TPH web site
• Media
• Provincial/federal teleconferences
• Promed
Media

- Media inquires to Toronto Public Health on Botulism for 2006:
  - Jan to Sept- 0
  - Oct - 73
  - Nov - 1
  - Dec - 3
Communication

- Promed
- A good avenue for local, national and international information dissemination
BOTTULIS, CARROT JUICE - USA (GERMIA) : ALERT

A commercial beverage has been confirmed as the cause of a cluster of 3 botulism cases in Georgia. The 3 cases had onset of symptoms on Friday, 5 Sep 2004, after consuming a common meal that included commercially produced carrot juice in Thu, 4 Sep 2004. Of 2 bottles of juice consumed, all 3 cases drank from bottle 1, whether all 3 patients drank from bottle 2 or unknown. Bottulism toxin type A was identified in the serum and stool of all 3 patients by reverse bioassy. Subsequently, botulism toxin type A was identified from carrot juice remaining in bottle 1 by mouse bioassy. Bottle 2 had been mixed with water, and the test for toxin was negative.

BOTTULIS, GRAVIS, CHILL SAUCE - CANADA: RECALL

The Canadian Food Inspection Agency (CFIA) and Select Food Products Limited are warning the public not to consume certain canned products described below because the products may be contaminated with Clostridium botulinum. Canned produce of this bacterium may cause botulism, a life-threatening illness.

The following canned products are affected by this alert:
- Brand/ Product/ Site/ WIC/ Lot Codes (on lido)
  - Select / Beef Gravy / 200 g (2.24 fl oz) / WIC/ C 6360000215/ Lot codes: up to and including 2004
  - Fast Eddie's / Crazy Chili Sauce / 4 oz 4 oz (2.53 kg) / WIC/ C 6560000168/Lot codes: up to and including 1756
In response to a 4th case of botulism being linked to Rite-Hite Bottle Company, California brand carrot juice, the FDA is warning consumers not to drink Rite-Hite Bottle Company Carrot Juice, 450 ml and 1 l plastic bottles, with "BEST IF USED BY date of 1 Nov 2006 or earlier. Consumers should discard this product. FDA is also reinforcing its advice to consumers to keep carrot juice – including pasteurized carrot juice – refrigerated. [Previous cases were in Georgia residents; see ProMED-mail posting 20060926.2366 referenced below.]

The 4th case of botulism poisoning involves an adult female in Florida who is currently recovering from paralysis. To date, one link between the illness and the consumers appears to be that the juice they drank was not properly refrigerated once it was in the home, which allowed the _Clostridium botulinum_ spores to grow and produce...
As of 11 Oct 2006, 4 cases of botulism associated with commercial carrot juice have been reported in the states of Georgia and Florida in the USA, and 2 cases have been reported in Toronto, Canada. All cases had consumed the same brand of carrot juice and no fatalities have been reported to date. The CDC and the Canadian Food Inspection Agency have issued advisory information.

The International Food Safety Authorities Network (INFOSAN) has notified Mexico and Hong Kong SAR where the carrot juice has also been exported.
The two cases of botulism in Toronto are both paralyzed, ventilated and in the ICU [intensive care unit]. The first case first developed mild symptoms of diarrhea and vomiting on 24 August 2006, progressing to weakness and blurry vision by 25 August, and paralysis and ventilation by 28 August that is still ongoing. The second case developed diarrhea and general fatigue on 12 September, progressing to blurred vision, difficulty moving tongue, dysarthria, dysphagia, shortness of breath, and ptosis in the next 24 to 48 hours. By 16 September, this case developed paralysis and was ventilated. Both cases developed botulism before the carrot juice recall was issued in Canada. The Canadian Food Inspection Agency (CFIA) issued its recall on 30 September.

[Many thanks both to Marianne Hopp, for the official WHO report and to Barbara Yaffe and Vinita Dubey for their detailed report from Toronto. - Mod.SH]
What is the result of Toronto Public Health’s promed posting updating the scientific community on Toronto’s botulism cases linked to carrot juice?...

Canadian was first to get botulism poisoning from carrot juice

Last Updated: Monday, October 23, 2006 | 8:42 PM ET
CBC News

The initial warnings about botulism in carrot juice came from the U.S., but the original case happened in Toronto, CBC News has learned.

Six patients — four in the southeastern U.S. and two in Toronto — remain hospitalized and on ventilators after contracting botulism linked to the juice. Quebec health officials reported another case in Montreal on Friday, and Health Canada says test results expected Tuesday will confirm whether it is botulism.

The first person to drink contaminated carrot juice was one of the latest to actually be diagnosed with botulism. The patient is still at North York General Hospital in Toronto. The hospital was also ground zero for SARS 2, the second set of cases of severe acute respiratory syndrome that happened after the outbreak was thought to be over 3½ years ago.

The timeline of events began on Aug. 24, when the patient came into the hospital with diarrhea, vomiting, blurred vision and a paralysis that began in the face and progressed downward.

In most patients with botulism, the eyes don’t move together, there is difficulty swallowing and trouble articulating words, said Dr. Richard Schabas, a medical officer of health in North York. The paralysis then moves down into the shoulders, then down into the limbs. "It’s classically from the top down," he said.

Neurologists and infectious disease experts at the North York hospital were puzzled by the case. Their working
The story continues…

• Where to lay the blame?
Botulism Toxin Production in Carrot Juice

- Conditions deemed necessary for botulism toxin production:
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    - plain carrot juice has a pH of about 6
  - Anaerobic environment
    - present in sealed bottles
  - Temperature above 4 degrees Celsius to allow spores to germinate and produce toxin

The story continues…

- Where to lay the blame?
  - Consumer: lack of refrigeration
  - Manufacturer: food processing
  - Point of sale: break in cold chain
FDA Consumer Advisory on Refrigeration of Carrot Juice

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On September 15, 2006, Georgia health authorities issued a press statement, which in part stated the following: "At this time we believe that these three cases are an isolated incident. During the investigation, other community members have been identified as having purchased and consumed the same product from the same vendor within the past three weeks. These persons have not become ill or developed any symptoms. The fact that additional cases have not been identified suggests that the town was not present before the sale of the product."

"Because botulism is such a potentially serious illness, we want to remind consumers that it is critical to refrigerate carrot juice for safety. Consumers should not keep carrot juice unrefrigerated," said Dr. Robert Brackett, Director of FDA's Center for Food Safety and Applied Nutrition (CSFAN). "Inadequate refrigeration of carrot juice allows botulinum spores to multiply to the level at which they can cause illness."

Botulism is rare but serious paralytic illness caused by botulinum toxin, a neurotoxin produced by certain conditions is produced by Clostridium botulinum, a bacteria commonly found in soil. Botulinum can be killed and inactivation through cooking or pasteurization.

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Canadian botulism victims did properly store carrot juice: officials

Last Updated: Friday, October 13, 2006 | 10:00 AM ET

CBC News

Public health officials are saying that two Toronto residents, who were poisoned after they consumed tainted carrot juice, did indeed properly refrigerate the product.

The maker of the recalled juice, California-based Bolthouse Farms, said earlier this week that consumers in the U.S. were sickened after they had failed to keep the product refrigerated.

However, tests in Canada have shown that the juice consumed by the Toronto residents was handled and stored properly. The two patients, who live in the same household, are in intensive care. Both are paralyzed and on ventilators.

Meanwhile, public health officials are continuing to monitor the recall of the product and plan to inspect shelves at another 1,250 stores over the coming days. Public Health inspectors have already surveyed 2,700 stores. After discovering bottles of the recalled juice still on the shelves in 11 of those, they removed them.

The CFIA issued a voluntary recall of the product on Sept. 30 after four cases of botulism in the U.S. were linked to the toxic carrot juice. The federal regulator followed up with a second alert on Oct. 7 to ensure public awareness.

All containers with a "best before" date of up to Nov. 11 are involved in the recall.

Three brands have been linked to the botulism outbreak:

- Bolthouse Farms 100% per cent Carrot Juice
- Earthbound Farm Organic Carrot Juice
- President's Choice Organic 100 per cent Pure Carrot Juice

A Florida woman has been in hospital and unresponsive since mid-September. Three people in Georgia suffered respiratory failure and are on ventilators since drinking carrot juice a month ago.

Botulism can lead to serious illness or death, and must be treated early. Symptoms can include blurred vision, slurred speech, difficulty swallowing, and paralysis. In severe cases, the paralysis can restrict breathing, forcing patients on to ventilators.

Reema Giovanii
Where to lay the blame?

- The batch of carrot juice consumed by the Toronto cases is the same as that from the 4 cases in the USA.
- Bolthouse Farms had decided to stop production of its 100% Carrot Juice
- Carrot juice added to an acidic juice (such as apple) is safer

Outbreak summary

- What is the role of public health to investigate the differential diagnosis of rare diseases?
- Media attention of general food recalls are important
- Unanticipated media attention can be draining
- After hours and holiday response to outbreaks
Outbreak summary

Coordination with local, provincial, national and international public health

- Media
- Laboratory capacity
- Communication
- Investigation of cases
- Voluntary vs active recall
Politicians, sports stars and Paul McCartney dominated this year’s headlines more often than some of their handlers may have liked. Even those who spend their days communicating managed several missteps. Ketchum Public Relations Canada has, for a third consecutive year, compiled a list of 10 notable communicators — good and bad — among 2006’s top newsmakers. Some are to be lauded for their candour and forthrightness; while others’ comments seem inexcusable. Glancing lessons from their public missteps, Geoffrey Rowan, Ketchum’s messaging director, says the best communicators are those who know how to be engaging. The worst utterances come from those who are defensive and glib. “Everything in life is a story’, he says. When you think about who your best teachers were, who your best friends are, who are the people who can tell great stories that really capture your imagination,” he said. “I saved the big one for last because if Stephen Harper’s public profile and because of his role, that gives him extra weighting, that would be the worst offender.”

TIM WARNER
Spokesman for Bionuine, U.S. maker of vegetable and fruit juices

Situation: Two Canadians are poisoned with botulism after drinking Bionuine brand canned juice.

Quote: “It appears that it was consumers that did not take the good counsel to keep the product refrigerated.”

Effect: Looks bad.

Lesson: Have a little sympathy for the people you make horrible ill.

THANK YOU!