BCTOX BC Toxicology News Monthly Bulletin

Monthly/Vol. 3/No. 11/Pages 382-403 **Nov - 2018**

Keep Engaged with Toxicology News in BC

Contents

Poland hosts climate change conference!

Older generations have "messed up the planet", letting down younger people, who are "angry" about it and want it to stop according to British naturalist Sir David Attenborough (Reuters) –

--- Are you going to be one of those who would betray the young generation?!

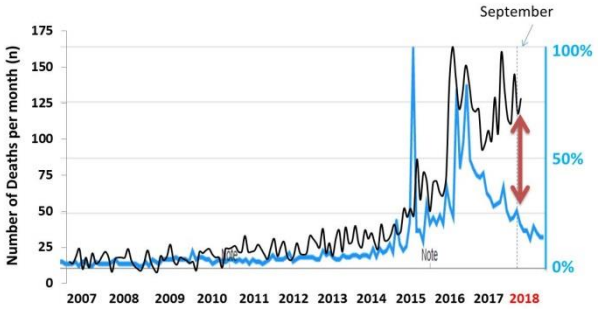
BCTOX is shared with a large number of health and environmental professionals in BC and beyond. It can increase the visibility of your work!

You may contribute to BCTOX by providing 1000 to 2000 word articles and commentaries on a toxicology-related problem or an initiative that you have taken!

These BCTOX "abstracts" are peer reviewed and can be referenced. To cite abstracts of the current issue: Authors' surname, Initials, Title. BCTOX 2018; 3(1): Pages.

BCTOX is available online:
https://blogs.ubc.ca/bctox2015/
GoogleScholar https://bit.ly/2SnZL1n

BC Toxicology Pictures of the Month



Opioid overdose deaths per month as compared to public sentiments from 2007 to 2018 in B.C. See more in at page 393 (graphs are superimposed).

What is BCTOX?

While BCTOX is not official and not liable for reported news from the media, it is BC-related, full of concise and inspiring information, handpicked and fun to read. BCTOX keeps you engaged with Toxicological Issues in Population and Environmental Health in British Columbia.

Solve the mystery! --- For Christmas fans!

--- Participate in our Christmas special toxicological "solve the mystery" and win a prize!

First, let us congratulate Dr Mike Wade from Health Canada, Ottawa (Past President of the Society of Toxicology of Canada) who won last month's prize. BCTOX is thankful for his extensive description of the problem.

Second, Santa Claus' route of entry into people's homes is via billions of chimneys --- This could be a major toxicology hazard for him! He is also exposed to lots of other health hazards. Can you think of any particular disease?

--- Take a guess (or confirm the given diagnosis), and email in your response to be entered into the BCTOX drawing for a $20 gift card (Deadline: Dec 25, 2018).

About Us

Aims and Scope

BC Toxicology News Monthly Bulletin (BCTOX) aims to popularise the knowledge of toxicology and expand use and the awareness of Toxicology News in British Columbia, Canada. It tries to engage health and environmental professionals with online published toxicology news, publicly available information, and by providing short communications. BCTOX mainly focuses on adapting or summarizing relevant toxicology news in BC. The Bulletin accepts and welcomes contributions from professionals and the public as long as they meet BCTOX standards.

How to access the original news items? If you click on the link related to each one of the provided stories, it will take you to the original site of the news.

Publication Frequency: BCTOX is published monthly in English by Reza Afshari.

Provided information in GRAY is not related to the current issue, but could be of interest.

ISSN: 2560-645X

Policies:

Open Access Policy: This bulletin provides open access to all its content.

***Fee*:** BCTOX is free-of-charge for readers and contributors.

Copyright Statement

BCTOX's content is currently prepared by Reza Afshari. The bulletin retains the copyright of their articles and will be able to archive pre-print, post-print, and publisher's versions.

This bulletin is not official and for the most parts is not peer-reviewed. It does not cover all the news, and is not liable for the accuracy of the news from media. It is, however, BC related, informative, handpicked and fun to read. The provided contents are not necessarily BCTOX's views.

BCTOX has been modified since (BCTOX 2017 June 2(6)) issue. It is now accepting 400 words educational material, commentaries, and research abstracts (with data) as long as they are within the scope of the bulletin and meets our standards. We are going to publish up to four short [but not full papers] abstracts in each issue. This section of the journal is peer reviewed.

Archiving. Digital Archiving: In addition to indexing database this Bulletin utilizes digital archive as well as hard copies to guarantee long-term preservation and restoration.

Publication Ethics

This bulletin follows International Committee of Medical Journal Editors (ICMJE)'s Recommendations. Authors (i) must declare any conflict of interest in a given manuscript, and we utilize COPE workflow to transparently handle it, (ii) follow ICMJE definition of author and contribution, and (iii) accept the ethical policy including regulation and malpractice statement.

Guide for Authors

From June 2017 (BCTOX 2017 2(6)) we publish original research, mini reviews, short communications, letters, case reports, and case series as long as they are limited to 400 words and the content is British Columbia related. These publications are peer reviewed.

References

References should be given in the Vancouver style and numbered consecutively in the order which they are first mentioned in the text. Citation in the text should be in line with text in parenthesis with Arabic numbering style.

List of contributors of this issue

Reza *Afshari*; Editor-in-Chief
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Contact Us

To contribute to the next issues, provide your opinion or report a mistake, please email us, your Feedback is greatly appreciated.

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BCTOX does not have a professional website yet, but materials could be found from

https://plus.google.com/105713713266879554108

Google Scholar

https://scholar.google.ca/citations?user=uaHeNh8AAAAJ&hl=en

New subscribers will be added to the mailing list upon their request.

If this bulletin is not of interest to you, let us know please so we do not to fill up your mailbox in future.

Toxicology news in this month was focused on Wildfire and Fentanyl overdose, followed by food recall and drinking water quality.

How to cite BCTOX's articles:

AUTHOURS. TITLE, *BCTOX* 2017;2(8): PAGES.

Acknowledgment

BCTOX respectfully acknowledges that it is published on the ancestral homelands of the Coast Salish peoples, including the territories of the xʷməθkwəy̓ əm (Musqueam), Skwxwú7mesh (Squamish), Stó:lō and Səl̓ílwətaʔ/Selilwitulh (Tsleil-Waututh) Nations.

Erratum from the previous issues

BCTOX's Toxicology News Surveillance System in BC and Health Regions in Nov 2018

Reza Afshari*, Environmental Health Services, BC Centre for Disease Control, BC. Reza.Afshari@bccdc.ca [Editorial 2018-11-30]

Public Health & Environmental Toxicology: What is BCTOX & why?

Health professionals (HP) including policymakers, health educators and researchers need to be regularly updated on environmental toxicology issues to keep up with rapidly evolving toxicology information, emerging health risks from environmental chemicals and to manage issues that are locally highlighted in the popular press and news media.

Environmental toxicology training is limited during education, and when HPs enter the field, they lack information on the responsibilities for regulation and risk communication among local, provincial and federal agencies, as well as their relations to international organizations, scholarly articles, and private sectors, including industry [1]. All of these factors lead to avoidable confusion.

BCTOX acts as a local up-to-date resource to answer current toxicology issues. The business model of BCTOX is flexible in order to maximise its applicability. BCTOX is also still developing, and will be determining its future directions along the way.

BCTOX acts like a pendulum. It mobilises your interventions to other places where they can also be used, and also back-translates the health activities that have had a "life outside of the health system" and have made societal impacts.

While BCTOX is not official and not liable for the reported news from media, it is BC-related and full of concise information that is handpicked and fun to read. BCTOX keeps you engaged with toxicology news in BC. ***BCTOX is full of inspiring ideas dedicated to B.C!***

Major toxicological statistics June 2018

Mortalities In total, around 700 premature deaths could be attributed to toxic exposures in BC in May including:

- **ACUTE exposures**; [estimated]≈
  ≈120 due to Illicit drug overdose
  10 due to suicides (CO, drugs and alcohol)
- **CHRONIC current and past exposures; [estimated]** ≈
  - 500 due to smoking and tobacco use,
  - 81 (air pollution),
  - 11 (radon)
  - 7 (asbestos)

These are equal to overall $15*10^{-5}$ population toxic exposure-induced deaths in March alone, including $2.4*10^{-5}$ acute and $13*10^{-5}$ chronic toxicities (estimations are subject to assumptions and limitations, and overlaps are possible (see BCTOX 2(8): 103)).

Morbidities Around 2200 calls were made to BC-DPIC (estimated from August 2017)

Sola dosis facit venenum **Only the dose makes the poison!**

Paracelsus (1493 – 1541 CE)

Reference

1. Liverman CT, Ingalls CE, Fulco CE, et al. Toxicology and Environmental Health Information Resources: The Role of the National Library of Medicine. Institute of Medicine (US) Committee on Toxicology and Environmental Health Information Resources for Health Professionals; Washington (DC): National Academies Press (US). 1997.

2. BCCoronersService-2018-06-13. Suicide Deaths in BC 2006-2016. Ministry of Public Safety and Solicitor General. .

- **Elizabeth May's engagement!**

BCTOX congratulates Green party Leader Elizabeth May on her engagement. --- Thank you Elizabeth for your work preventing environmental pollution! CASTANET (Read more)

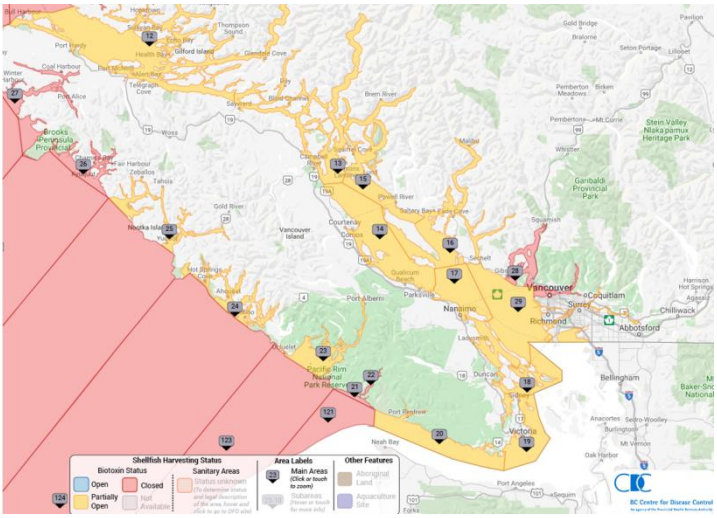
Shellfish Safety, Nov 2018, BC

One of the biggest concerns surrounding shellfish consumption are biotoxins such as Saxitoxin, Domoic acid and Okadaic acid that can survive cooking. The BC Centre for Disease Control (BCCDC) has developed a webpage on Shellfish Harvesting & Control that includes a wide range of information regarding shellfish harvesting and poisoning

A brochure on how to avoid getting sick from shellfish you've harvested from the beach is also available that provides information on cooking shellfish, BC programs for ensuring shellfish quality and safety, advice for harvesters, and storing shellfish.

BCCDC has also developed a shellfish harvesting mapping tool that reports on shellfish openings and closures of areas where shellfish can be harvested that include biotoxin and sanitary contamination closures. The map is freely accessible to the general public.

http://maps.bccdc.org/shellfish/



This tool is user friendly. You may zoom in on the area that you are looking for. --- This map is being frequently updated (the data is not BCCDC's).

Fisheries and Oceans Canada (DFO) is provided data for bivalve shellfish contamination closures. They stated that "It is both illegal and unsafe to harvest shellfish from closed or contaminated areas."

Information on Paralytic Shellfish Poisoning could be obtained from the Website. --- Basically, clinical illness* within 12 hours of consumption of at risk shellfish** and in the absence of other known causes is defined as a "probable case".

* Clinical illness is defined as: neurological symptoms such as paresthesia and/or paralysis involving the mouth and extremities, which may be accompanied by gastrointestinal symptoms.

** At risk shellfish include filter feeding molluscan bivalve shellfish: clams, mussels, scallops (digestive tissues), oysters, cockles, and whelks and the hepatopancreas of crab according to BCCDC.

Summary of Toxicology News for First Nations Populations, Nov 2018, BC

- **Contaminated water supply, low reservoir level leads to local state of emergency in Ahousaht.**
  (Read more)

Summary of Toxicology News for Fraser Health, Nov 2018, BC

- **Fraser Health authority warns of overdose spike in north Surrey, B.C.**

CBC (Read more)

.*******.

- **25% of those employed in B.C. prior to a fatal overdose worked in construction**

Photo is unrelated to the text

Based on a report by Statistics Canada on Nov. 13 (click here), nearly 25 per cent of those employed in B.C. prior to a fatal overdose worked in construction.

26% were employed in the five years prior to their death. In addition to construction, 13% worked in building maintenance, waste management and other support service industries.

(Read more)

- **Science World offering "harm reduction 101" forum for Vancouver residents fighting the fentanyl crisis**

@ 6:30 p.m. - December 4 [Click here]

A panel discussion by B.C. Centre for Disease Control; Canadian Drug Policy Coalition, Fraser Health Authority and an emergency paramedic.

Followed by an hour-long class titled "Harm Reduction 101"

A training session on overdose response and learn how to use naloxone.

Straight (Read more)

Summary of Toxicology News for Interior Health, Nov 2018, BC

- **Chlorine added to water at Interior Health's direction**

Osoyoos; Interior Health would like to go to a full water treatment program eventually. In the man time they asked to do is inject a little bit of chlorine into our system.

"chlorine is a disinfectant added to drinking water to reduce or eliminate microorganisms, such as bacteria and viruses, which can be present in water supplies."

Osoyoos Today (Read more)

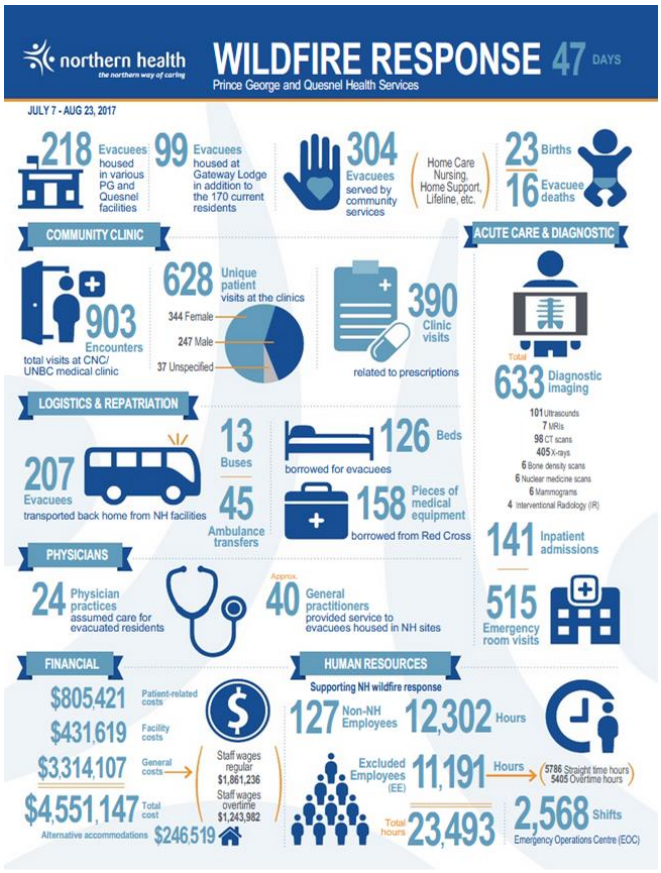
- **Interior Health is asking anyone who does choose to use is advised to take these steps:**

- Don't mix different drugs
- Don't take drugs when you are alone
- Keep an eye out for your friends
- Use less and pace yourself
- Carry a naloxone kit and know how to use it
- Recognize the signs of an overdose
- If someone is experiencing an overdose or is witnessing an overdose, follow the SAVE ME steps and call 911 immediately.
- Consider treatment options & talk with your healthcare provider.

(Read more)

Summary of Toxicology News for Northern Health, Nov 2018, BC

- ✓ **Northern Health infographic shows response to 2017 wildfires.**



QuesnelCaribooObserver (Read more)

Summary of Toxicology News for Vancouver Coastal Health, Nov 2018, BC

- **Death of two dozen children with drug overdoses**

Two dozen children between the ages of 10 and 18 died of drug overdoses last year. British Columbia's children's watchdog has called for comprehensive change. (Click here)

(Read more)

- **Vancouver recovery home is 30 years old now**

Vancouver recovery home celebrates 30 years of helping youth overcome substance abuse .

CBC (Read more)

- **Vancouver launches opioid emergency task force**

The task force includes health experts, Indigenous leaders, and people with experience. It was approved unanimously by city council on Nov. 14. and launched Tuesday**.**

Vancouver Sun (Read more)

- **Vancouver Coastal Health issues botulism warning over Richmond-made sauce.**

"The health authority said investigators have discovered that Betty's King Sauce, sold in six-ounce jars, is being prepared in a Richmond home, which is not an approved or inspected facility."

(Read more) or (Read more)

Photo adopted from Global News

Summary of Toxicology News for Vancouver Island, Nov 2018, BC

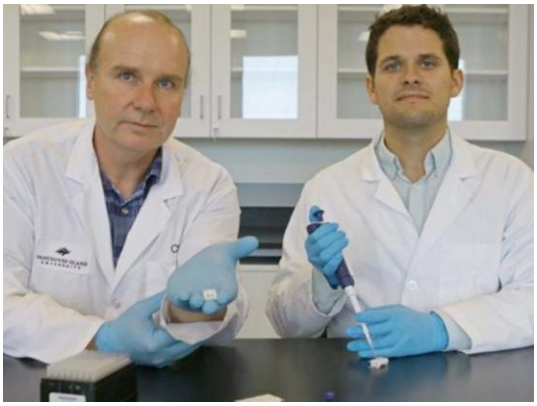
- **Overdose deaths in Vancouver Island**

Area	Frequency	***Death rate per 100,000 people***
North Vancouver Island	20	***21***
Central Vancouver Island	67	***32***
South Vancouver Island	97	***33***

CHEK (Read more)

- **VIU researchers develop method for detecting lethal fentanyl levels**

"Chris Gill et al, have developed a drug-testing method that, within minutes, could tell an opioid user whether the drugs they're about to take contain a lethal dose of fentanyl.



Vancouver Sun (Read more)

- **Mobile harm reduction team on the road to fight overdose crisis in Campbell River**

Outreach team responding to rash of overdoses taking place in private homes.

CRM (Read more)

- **Canadian life expectancies and overdose**

--- "While Canadian life expectancies are rising, in B.C., they have dropped because of opioid overdoses. Last year, drug overdoses led to more deaths than suicides, homicides and motor vehicle accidents combined**."**

(Read more)

BCTOX's Marine Biotoxins Surveillance System in BC – Data from CFIA

Shifting pattern of biotoxins on the west coast of Canada – Comparison of 2017 and 2018 **(Jan to Nov)**

Reza Afshari,

Public health surveillance is "the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice" according to WHO.

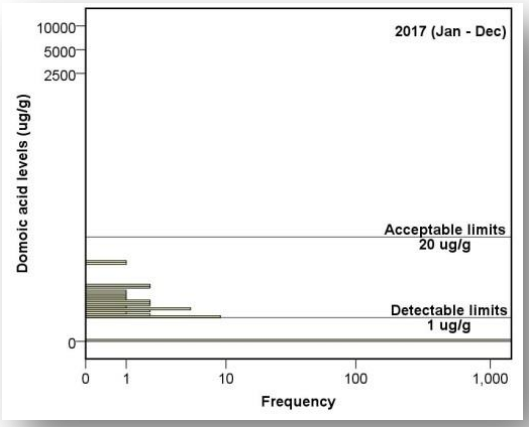
BCTOX is hopeful that this initiative will draw the attention of public health professionals to the changing patterns of marine biotoxins that may cause shellfish poisoning. The graphs could be predictive indices for what is going to come next month!

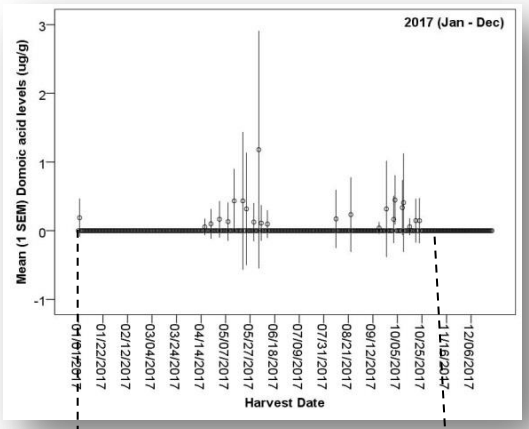
Frequency **Mean (1 SEM) concentrations**

1. *Domoic acid*

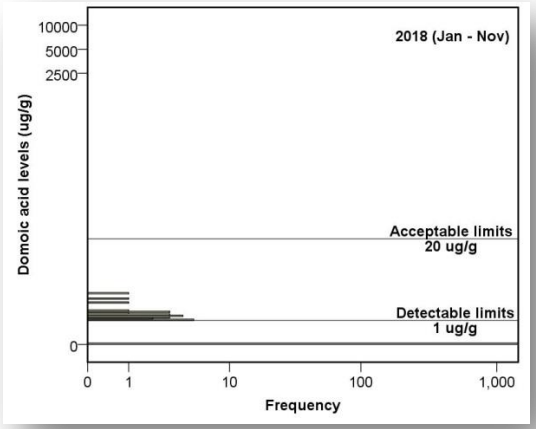
Domoic acid (ug/g) (Amnesic shellfish poisoning (ASP)) among detected shellfish samples in BC (January to December 2017) (very few positive cases detected and no cases of above regulatory limits [These graphs are prepared to imply the trend, and should be interpreted with caution]

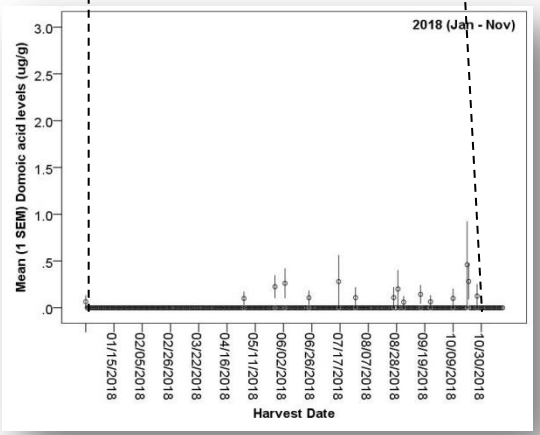
2017 (Jan to Dec)





2018 (Jan to Nov)





Bi weekly marine bio-toxin monitoring on the west coast of BC from Jan to Nov 2018

- ***Below*** regulatory limits Domoic acid [Amnesic Shellfish Poisoning] are relatively rarely detected. Among 2615 samples, Domoic acid was detected in 25 or less than 1%.
- No cases above regulatory limits were reported. As compared to Jan to Nov 2017, the values seem to be lower.

BCTOX's Marine Biotoxins Surveillance System in BC – Data from CFIA

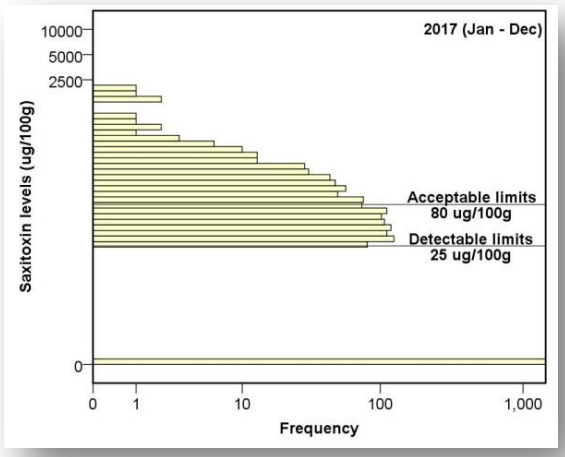
Shifting pattern of biotoxins on the west coast of Canada

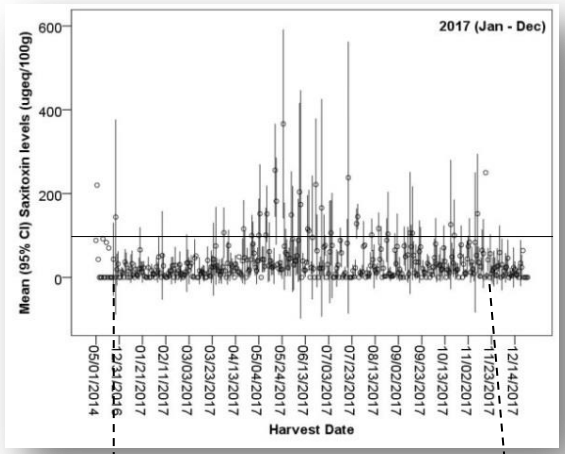
Frequency **Mean (1 SEM) concentrations**

2. *Saxitoxin*

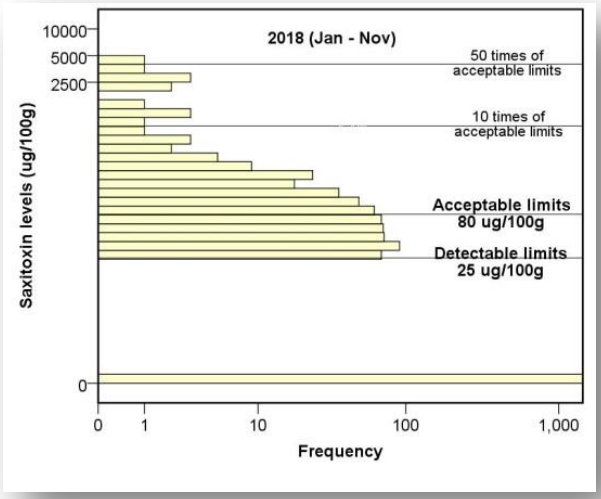
Saxitoxin (ug/100g) (Paralytic shellfish poisoning (PSP) among detected shellfish samples in BC (January to December 2017) (n=154 detected and 20 above the regulatory limit out of 1181 samples) [These graphs are prepared to imply the trend, and should be interpreted with caution]

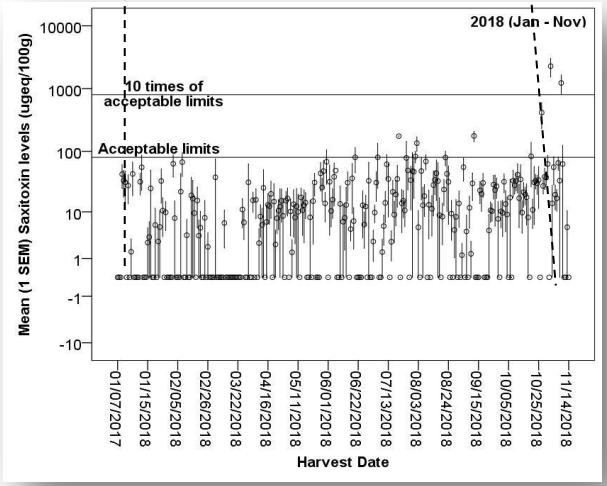
2017 (Jan to Dec)





2018 (Jan to Nov)





Bi weekly marine bio-toxin monitoring in West Coast BC from Jan to Nov 2018

- ***Above*** regulatory limits of Saxitoxin [Paralytic shellfish poisoning] concentrations were reported in 2018. Among 2615 samples, Saxitoxin was detected in 593 (19%), and above the regulatory limits in 117 (7%).
- ✓ The extent of the problem seems to be lower than in 2017.

BCTOX's Marine Biotoxins Surveillance System in BC – Data from CFIA

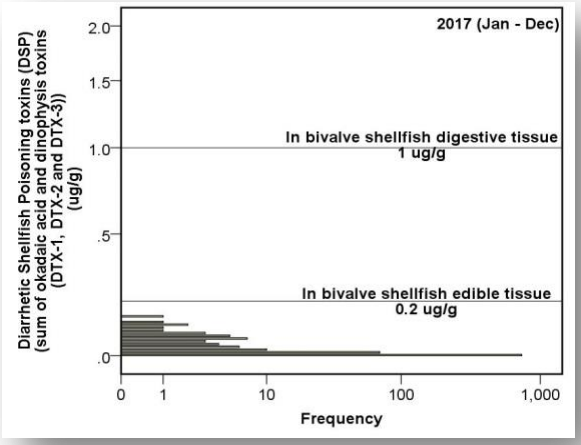
Shifting pattern of biotoxins on the west coast of Canada

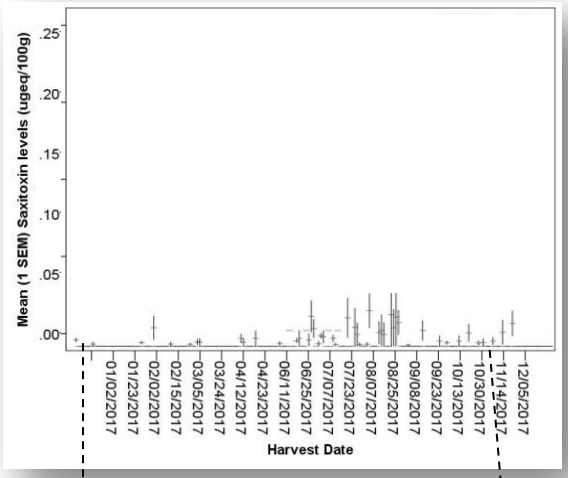
Frequency **Mean (1 SEM) concentrations**

3. Okadaic acid

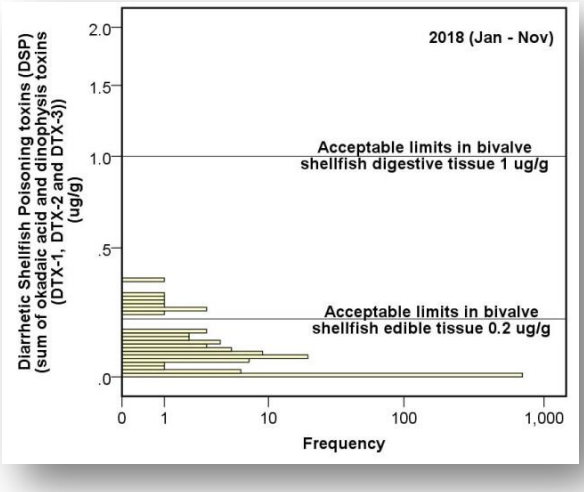
Okadaic acid (sum of okadaic acid and dinophysis toxins (DTX-1, DTX-2 and DTX-3) (Diarrhetic Shellfish Poisoning toxins (DSP)) among shellfish samples in BC (January to December 2017) (n=114 detected out of 735 sample) [These graphs are prepared to imply the trend, and should be interpreted with caution]

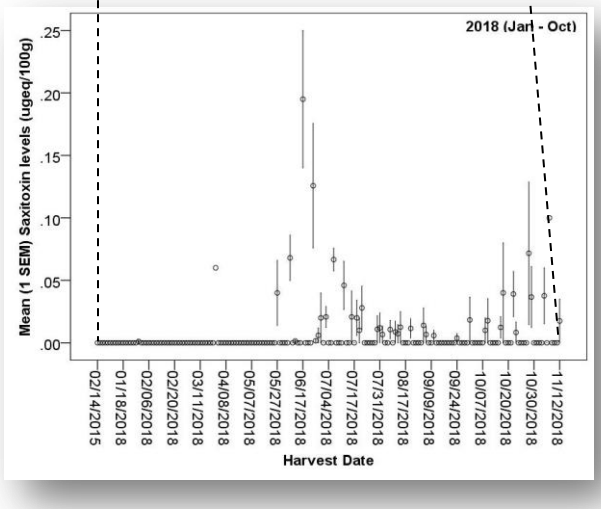
2017 (Jan to Dec)





2018 (Jan to Nov)





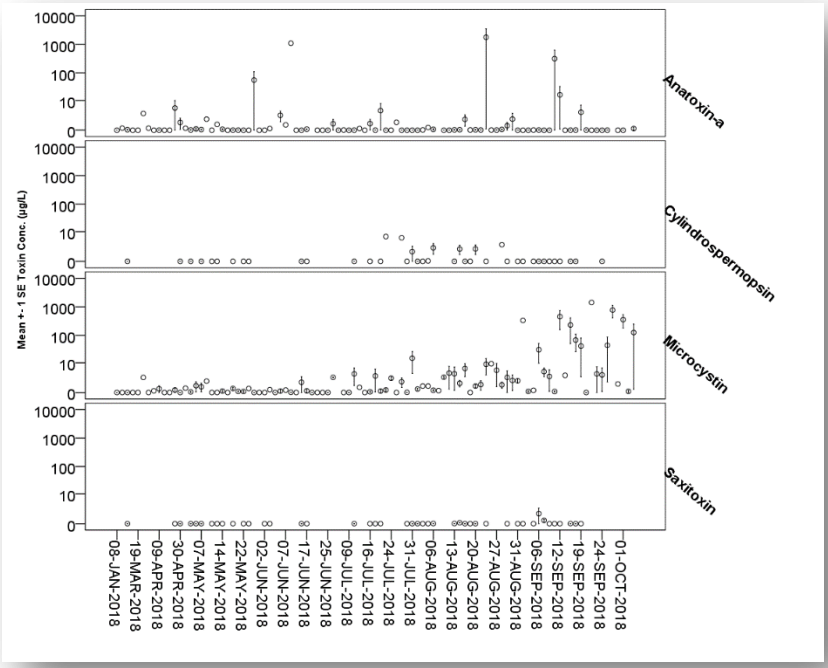
Bi weekly marine bio-toxin monitoring on the west coast of BC from Jan to Nov 2018

✓ ***Above*** regulatory limits of Okadaic acid and dinophysis toxins [Diarrhetic Shellfish Poisoning] were not reported in 2018. The extent is clearly higher than the last year. Among 776 samples, Okadaic acid was detected in 75 (10%).

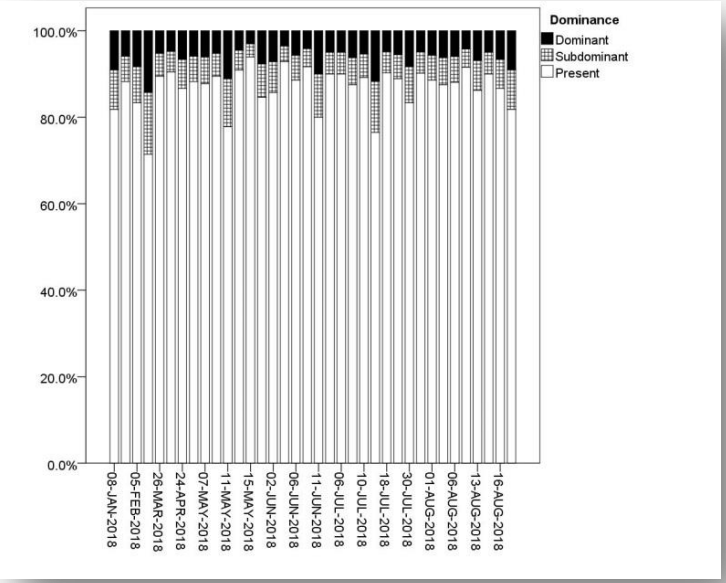
**BCTOX's Marine Biotoxins Surveillance System in WASHINGTON STATE –
Data from WASHINGTON STATE Toxic Algae** - Shifting pattern of biotoxins

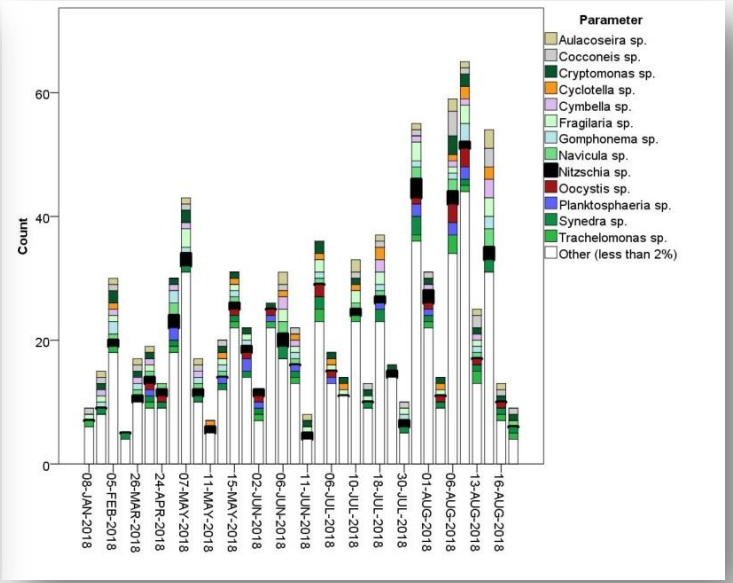
4. *Other Biotoxins*- WASHINGTON STATE *(2018 Jan to Sep)* --- Information from BC was not available.

Four types of biotoxins are monitored in Washington State Anatoxin-a, Cylindrospermopsin, Microcystin and Saxitoxin. The pattern is shown below. These data/information for BC were not available.



5. *Phytoplankton's* - WASHINGTON STATE *(2018 Jan to Sep)*[n= 995]





BCTOX's Marine Biotoxins Surveillance System in BC – Data from CFIA
Shifting pattern of biotoxins on the west coast of Canada

6. Other Marine Miotoxins

1- ***Algae bloom*** are simple plants that do not have ordinary leaves or roots. True algae (*green* algae) start to bloom in late spring and early summer in rather colder areas or near water.

--- They are the result of excess nutrients, particularly phosphates originates from fertilizers; also, excess carbon and nitrogen and catalyst residual sodium carbonate.

--- Algae are short-lived, and decaying dead organic matter consumes dissolved oxygen in the water, resulting in hypoxia and die off of plants and animals in large numbers.

2- ***Harmful algae bloom*** (or ***red tide***); involves toxic phytoplankton such as dinoflagellates of the genus Alexandrium and Karenia, or diatoms of the genus Pseudo-nitzschia. Such blooms often take on a red or brown hue. They produce natural toxins.

--- Reappearance of blue-green algae at Elk Lake that are lethal to dogs is a constant concern for water quality, prompting a CRD advisory notice (2018-11-20).[1]

2-1- *Saxitoxin*

Dinoflagellate Alexandrium fundyense produces Saxitoxin that causes paralytic shellfish poisoning

2-2- *Domoic acid*

Pseudo-nitzschia diatom produces Domoic acid that causes amnesic shellfish poisoning.

2-3- *Okadaic acid*

--- Dinoflagellates Dinophysis produce Okadaic acid (sum of okadaic acid and dinophysis toxins (DTX-1, DTX-2 and DTX-3) that causes Diarrhetic Shellfish Poisoning (DSP)

2-4- *Azaspiracid*

Dinoflagellate Azadinium spinosum produces Azaspiracid (a phycotoxin) and analogues. Azaspiracid can result in severe acute symptoms that include nausea, vomiting, diarrhea, and stomach cramps.

EU and FDA regulatory limit is 160 µg/kg (reports from Europe).

--- No information is available online from BC

2-5- *Brevetoxin*

Karenia brevis dinoflagellate produces brevetoxin that causes neurotoxic shellfish poisoning (common in Florida and the Gulf of Mexico).

NSP is diagnosed with gastrointestinal and neurological symptoms: nausea and vomiting, paresthesias of the mouth, lips and tongue as well as distal paresthesias, ataxia, slurred speech and dizziness. Neurological symptoms can progress to partial paralysis and respiratory distress.[2]

--- No information is available online from BC

--- Officials in *Florida* say dolphins seem to be red tide's latest victims as more than 20 have washed up dead. Scientists attributed the deaths to brevetoxin (2018-11-27).[3]

2-6- *Cyclic imines*

"The dinoflagellates Karenia selliformis and Alexandrium ostenfeldii / A. peruvianum have been implicated in the biosynthesis of gymnodimines and spirolides, while Vulcanodinium rugosum is the producer of pinnatoxins and portimine."[4 5]

--- No information is available online from BC

2-7- *Palytoxin and analogues*

"Most incidents of palytoxin poisoning have manifested after oral intake of contaminated seafood. Poisonings in humans have also been noted after inhalation, cutaneous/systemic exposures with direct contact of aerosolized seawater during Ostreopsis blooms and/or through maintaining aquaria containing Cnidarian zoanthids."[6]

"Common symptoms include numbness, paraesthesia and swelling around the site of exposure (cutaneous exposure), rhinorrhea, cough, dyspnea (inhalational exposure), perioral paraesthesia, dysgeusia (oral exposure) and eye irritation (ocular exposure)"[7]

2-7-1 *Coral*

Toxic coral in aquarium sends Quebec family to hospital - Zoanthid corals can be toxic, be aware when handling them. (Global News)[8]

The green type Zoanthid coral is a common feature of saltwater aquariums, but can contain palytoxin (photo adopted from ([9] [10]))

--- Case report; Seven members of a family exposed to toxic Zoanthid coral (that may contain palytoxin) in their home aquarium. They bought the aquarium second-hand from a business where it had been on display and transported it with its contents to his home in Gatineau, Quebec. They experienced sneezing within minutes followed by chest pains, problems breathing, fever, shaking, and vomiting (2018-04-24).[10] [11]

--- Case report; While cleaning his fish tank in Oxfordshire, U.K. an aquarium owner scraped the coral's surface (pulsing xenia), and inadvertently a particular kind of deadly toxin known as palytoxin was released into the air.

--- The family went to bed, but became deeply sick the following day, experiencing acute breathlessness, coughing and other symptoms. All six people in the house were hospitalized, along with four firefighters and two dogs (2018-04-07).[12]

--- No information is available online from BC.

2-8- *Pectenotoxin*

--- No information is available online from BC

2-10- *Yessotoxin and analogues*

Abalone photo adapted from reference (2014-02-08).[13]

Lingulodinium polyedrum and Gonyaulax spinifera Dinoflagellates produced Yessotoxins that are related to ciguatoxins. Yessotoxins causes diarrhetic shellfish poisoning. [14]

EU regulatory limit is 1 µg of YTXs per g (1 mg/kg).

--- Case report; Thousands of dead red abalone washed up on the beaches of Sonoma County in Northern California in August 2011. Later scientists from the University of California found that a harmful algal bloom was to blame: the causative agent Yessotoxin (2014-04-17).[15]

--- No information is available online from BC

2-9- *Tetrodotoxin and analogues*

After ingestion of puffer fish. The flesh of the puffer fish (ie, fugu) is considered a delicacy in Japan.

"Paresthesias initially affect the tongue, lips, and mouth and progress to involvement of the extremities. Gastrointestinal symptoms may be seen and include nausea, vomiting, and less often, diarrhea. Muscle weakness, headache, ataxia, dizziness, urinary retention, floating sensations, and feelings of doom may occur. An ascending flaccid paralysis can also develop.

Other reported effects include diaphoresis, pleuritic chest pain, fixed dilated pupils, dysphagia, aphonia, seizures, bradycardia, hypotension, and heart block. Death can occur within hours secondary to respiratory muscle paralysis or dysrhythmias.

Clinical effects in the mildest of cases resolve within hours, whereas the more severe cases may not resolve for days. Treatment is supportive; there is no specific antitoxin. Patients who have progressed to having generalized paresthesias, extremity weakness, pupillary dilation, or reflex changes should be admitted to the hospital for observation until peak effects have passed. Those with respiratory failure should be intubated and placed on mechanical ventilation.

Vasopressor support may be necessary for hypotension refractory to intravenous fluids. Atropine has been used for symptomatic bradycardia."[16]

Image adapted from MedScape

Ciguatoxin

Ciguatera fish poisoning (CFP)

Ciguatera is caused by eating contaminated reef fish. Symptoms include diarrhea, vomiting, numbness, itchiness, sensitivity to hot and cold, dizziness, and weakness. Onset from half an hour to up to two days. Diarrhea may last four days. Certain symptoms typically remain for a few weeks to months. Heart difficulties such as a slow heart rate and low blood pressure may occur.[17] --- Recreational exposure to cyanobacteria can cause GI, pruritic skin rashes and hay fever. [18]

Scombroid Fish Poisoning: Histamine Poisoning

3- *Cyanobacteria (blue green algae)*

Cyanobacteria are aquatic and photosynthetic bacteria that live in the water, and can manufacture their own food.

Cyanobacterial toxins

Cyanotoxin – is not related to cyanide – contain neurotoxins, hepatotoxins, cytotoxins, and endotoxins. It causes rapid death by respiratory failure.

--- No information is available online from BC.

Anatoxin-a

It is produced by cyanobacters and causes loss of coordination, muscular fasciculations, convulsions and death by respiratory paralysis.

Cylindrospermopsin
Microcystin
BCTOXScope (CYANOscope)

BCTOX publishes your pictures of cyanobacteria samples found in BC with your name.

Email your image(s) to BCTOX@yahoo.com

--- Even if you are not sure that it is cyanobacteria, upload it please!

Make sure to include the date, geographical area and other relevant information.

Examples

Photo

Photo

--- Algae gallery by Washington State Toxic Alga is publicly accessible!

Decision Tree for Drinking Water: Cyanobacterial Toxins – Step Descriptions (No information is available online from BC)

STEP A: STEP A: Initial screening for suspected blooms: Examine the water for one or more of total nitrogen and phosphorus. Check for bloom formation.

STEP B: If yes to any of: nitrogen (N)>658 µg/L; phosphorus (P)> 26µg/L; an N:P ratio < 23; changes in secchi depth; or blooms observed, go to Step C. If no, return to Step A.

STEP C: Sample the raw water. Use a portable field kit to test for the presence of microcystins.

STEP D: If the presence of microcystins is detected (>1.0µg/L) with a field test kit, go to step E, and alert the health authority of a potential issue. If microcystins are absent, return to step A.

STEP E: Use a portable test kit to test the treated water supply for microcystins.

STEP F: If the portable test kit indicates microcystins are present (>1.0µg/L) in the treated water, send a sample to the lab for confirmation and immediately notify the health authority.

STEP G: If the lab results indicate the seasonal MAC of 1.5µg/L has been exceeded, immediately contact the health authority for consultation and decision making.

Others

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Toxic exposure mediated via FOOD in BC - BCTOX®
Nov 2018

Selected toxicant related food recalls in BC[1] Updated 2018-11-21

Dates	Food (Company / Firm)	Reason to recall	
2018-11-16	Food Recall Warning (Allergen) - Ottogi brand Jin Ramen Spicy and Jin Ramen Mild recalled due to undeclared egg	Class 1	BC +
2018-11-08	Updated Food Recall Warning (Allergen) - Schneiders brand Country Naturals Wieners recalled due to undeclared milk	Class 1	National
2018-10-24	Updated Food Recall Warning (Allergen) - Original Foods brand Marshmallow Brooms and MallowBats recalled due to undeclared milk	Class 1	National
2018-10-22	Food Recall Warning (Allergen) - Original Foods brand MallowBats and M'allows recalled due to undeclared milk	Class 1	National
2018-10-19	Food Recall Warning (Allergen) - Emborg brand Pizza Style Dairy Free Shreds recalled due to undeclared milk	Class 1	BC +
2018-10-18	Updated Food Recall Warning (Allergen) - Certain Nora's brand Dairy-Free Frozen Desserts recalled due to undeclared milk	Class 1	BC, AB
2018-10-17	Food Recall Warning (Allergen) - Schneiders brand Country Naturals Wieners recalled due to undeclared milk	Class 1	BC +

+; some other provinces.

BCTOX's Toxicology Surveillance in BC
Toxic Exposure Mediated via HEALTH PRODUCTS – Nov 2018 (selected items)

Selected Toxicological related product recalls / alerts [2] - Updated 2018-11-21

Date	Items --- Reasons to recall	Photos
2018-11	ADVISORY Unauthorized "21st Century DHEA" health product seized from Moose Jaw, SK, store is labelled to contain a controlled substance and may pose serious health risks (Read more)	
2018-11	ADVISORY XOFIGO® (radium Ra 223 dichloride) - Increased Incidence of Fractures and Trend for Increased Deaths with XOFIGO used in combination with abiraterone and prednisone/prednisolone (Read more)	---
2018-11	RECALL – Clinda-T Solution due to An unknown impurity is out of specification in the affected lot. (Read more)	----
2017-03-28	RECALL Adrenalin Chloride Sol 1:1000 AMP () Due to The content is out of trend during stability tests in the affected lot. (Read more)	
2017-03-24	RECALL Vita Health Products Recall due to Affected products recalled due to labelling issues related to misapplication of a release agent on the inside surface of the product's wrap around labels rendering certain information not to be accessible or readable by consumers. (Read more)	

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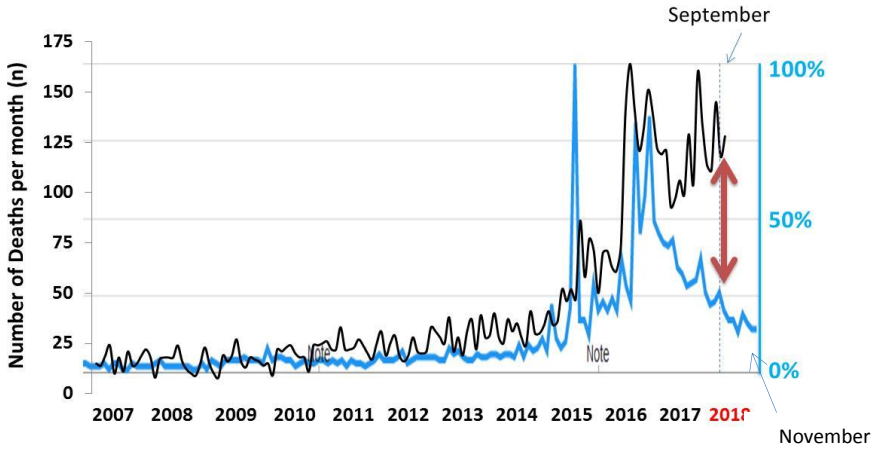
2. Recalls-and-safety-alerts. Recent health products recalls and alerts. Health. http://www.healthycanadians.gc.ca/recall-alert-rappel-avis/index-eng.php?cat=3&_ga=2.98691166.150723310.1501627009-1385356855.1486499691

BCTOX's Toxicology Surveillance of Drug Overdoses and Forensic Toxicology in BC
November 2018

Public interest in fentanyl is declining in BC; opioid overdose deaths are still high.

Reza Afshari



Opioid overdose deaths per month as compared to public sentiments from 2007 to 2018 in BC (graphs are superimposed).

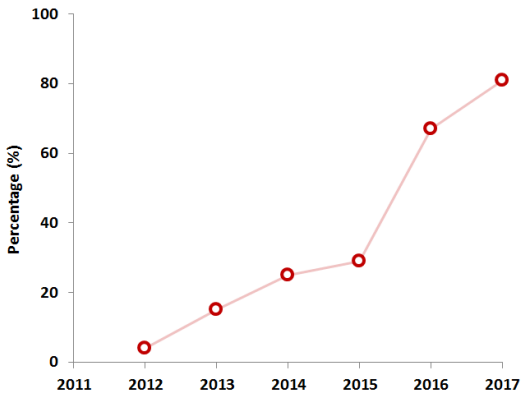
Opioid overdose deaths in BC (Jan 2007 to Oct 2018[last update]); suggests a sharp increase that has reached a plateau. Data from BC Coroners Service. --- Is this a new norm?

Public interest in fentanyl in BC's major cities (Jan 2007 to Nov 2018); suggests a sharp increase followed by a sharp decrease. Data from google trends. --- Is this social fatigue?

As can be seen, public are constantly less interested in fentanyl that may imply a decline in public outraged with the concept. This decline is despite the fact that opioid overdose deaths are still high. --- Intervention should be shifted to keep engaged the public with the dangers of opioid overdoses as a part of risk management.

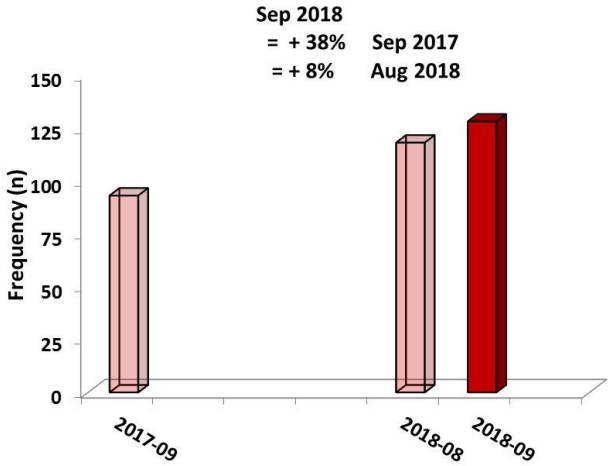
Fentanyl Detected Illicit Drug Overdose Deaths in BC (2012- 2017 July)

Data from (BC Coroners Service 2017-12-31) -] (accessed Feb 20, 2018) [BCTOX graph]



Estimation of Illicit drug overdose attributed deaths in BC in May 2018 (accessed Nov 21, 2018)

The number of Illicit drug overdose deaths in Sep 2018 was 128 (Data from the BC Coroners Service 2018-06-27), which is 38% higher than Se 2017, and 8% higher than last month [BCTOX graph]



Public interest in fentanyl in BC's major cities: Cumulative results starting from Aug 2018

Reza Afshari, Environmental Health Services, BC Centre for Disease Control, BC. Reza.Afshari@bccdc.ca

British Columbia as the ground zero of fentanyl overdose tragedy faced increased number of opioid overdose induced deaths in particular since 2015.[1]

Following the increase number of deaths, public health emergency was announced in Apr 14, 2016 in the province. The number of deaths dramatically increased during December 2016.

This short survey was performed to evaluate the public interest in fentanyl from Aug 2015 to August 2017 among different major cities in BC.[2]

Google Trends©(GT), an online tracking system of Internet weekly hit-search volumes (Google Inc.) were utilised to extract the data. GT collects, categorizes and connects data to a topic. Characteristics include real world based on search terms in categories of importance, interest by region, interest over time, removed personal information, eliminated repeated searches from the same person over a short period of time, unbiased random samples, and very low volume searches are counted as zero.[3]

Results are shown in figure 1. As can be seen, following publicizing fentanyl potential to kill among "teenagers" and due to "recreational use" of fentanyl in early August 2015, a dramatic increase in public interest observed. However for 7 months this interest was relatively focused in Vancouver alone (○; figure 1).

Later Surrey, Victoria and Burnaby joined the list of cities in BC in which searches for fentanyl passed 1% of all individual term searches. It is clear by overlapping the number of deaths in BC (----) on the original graph (figure 1) that Kelowna, Kamloops, Richmond and Coquitlam were joined the list of cities coincide with the sharp increase in December 2016.

Fentanyl popularised in searches in Nanaimo, Maple Ridge, Abbotsford, Prince George, North Vancouver and West Minister in the following months.

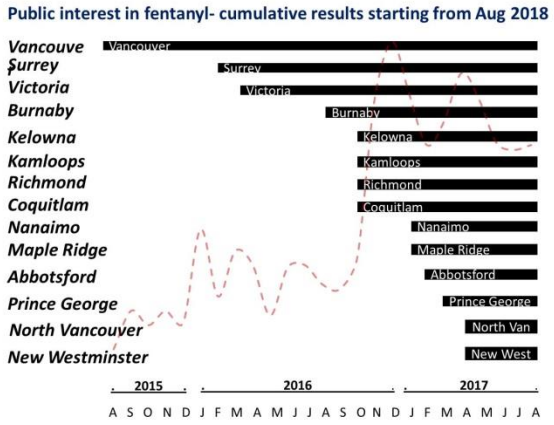


Figure 1. Public interest in fentanyl in BC's major cities: Cumulative results starting from Aug 2018 (data from google trends).

(----) Number of opioid overdose induced deaths in BC,

(▬) Search interests appeared in google trends. Results are relative to the highest point on the chart for the given region and time.

In addition, public interest in fentanyl gradually declined after a few months. Figure 2 compares the rank of searches in different cities. As can be seen, fentanyl popularity in Vancouver (○), Surrey (–) and Burnaby (--) have declined over this period.

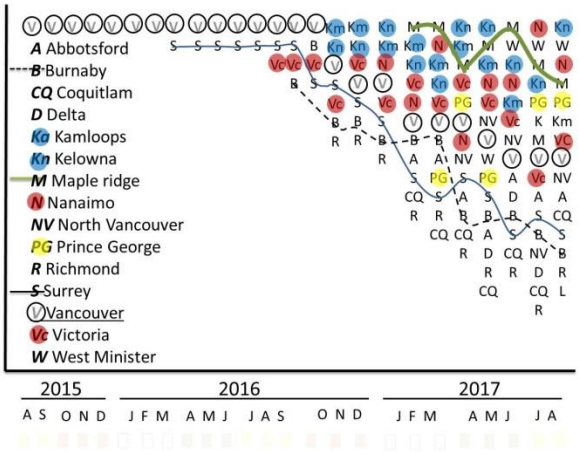


Figure 1. Public interest in fentanyl in BC's major cities: Cumulative results starting from Aug 2018 (data from google trends).

While this pattern may suggest a real sense of security due to declining the number of deaths in a particular geographic area and thus reflective of a real sense of security, it could suggest a diminishing public interest or fatigue in public.

These results have implication for risk management in public health.

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BC Toxicology News Monthly Bulletin
BCTOX 2018 Nov 11(3):382- 404

Ben Franklin's Adventures in Occupational and Environmental Toxicology

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This is the tercentenary of the commencement of Boston-born[i] Benjamin Franklin's (Figure 1) career as a successful colonial printer.[ii] He began his apprenticeship at twelve years old to his brother James, a local printer, and mastered one of the most lead-exposed trades of his day. In 1723 Franklin fled from his unhappy apprenticeship with his brother and ended up in Philadelphia where he found work in a printing house. In 1724 he went to London for 18 months where he learned the latest techniques in the printing trade.

When he returned to Philadelphia he worked for Samuel Keimer who was the publisher of the *Pennsylvania Gazette*. In 1728 Franklin set up his own printing house and soon bought the *Gazette* from Keimer, going on to become the official printer of Pennsylvania in 1730 and a prosperous leading citizen of Philadelphia.

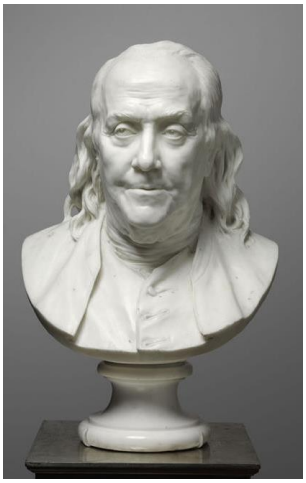

Figure 1. A bust of Benjamin Franklin by Jean-Antoine Houdon, 1779 adopted from *The Philadelphia Museum of Art*. [Free access] https://www.philamuseum.org/collections/permanent/90227.html

A nearly identical bust, c. 1800, in *Benjamin Franklin House*, London, is viewer-rotatable in 3D at https://benjaminfranklinhouse.org/the-house-benjamin-franklin/artefacts/ (go to "Franklin Bust") [Free access]

Franklin cultivated a wide circle of medical contacts in America, Britain, and Europe and although he had no education or training in medicine he had a keen lay interest in medical matters. He invented medical devices, helped fund and found the permanent Pennsylvania Hospital[iii] which opened in December 1756, consulted on medical issues[iv] with physicians and lay people, and was considered by many to be "Doctor Franklin."[v] His musings on lead toxicology may be of particular interest to the readers of *BCTOX*.

Franklin recalled that during his youth in Boston he heard comments "against New England rum, that it poisoned their people, giving them the dry belly-ache, with a loss of the use of their limbs. The distilleries being examined on the occasion, it was found that several of them used leaden still-heads [conical or columnar vapor traps] and worms [coiled distillate collection tubes], and the physicians were of opinion that the mischief was occasioned by that use of lead. The legislature of Massachusetts thereupon passed an act, prohibiting, under severe penalties, the use of such still-heads and worms thereafter."[vi] The distillery law referenced by Franklin was enacted by the Province of Massachusetts-Bay in New-England in 1723 and it was titled "An Act for Preventing Abuses in Distilling of Rum and other Strong Liquors, with Leaden Heads [covers] or Pipes [coils]."[vii] Whereas colonial New England rum production methods had introduced lead contamination into liquors and caused illness for many consumers, there were various even earlier examples of widespread adverse health effects from beers and wines that had been similarly adulterated with lead, often used as a sweetener.

François Citois, Cardinal Richelieu's physician, described an epidemic of colic in the province of Poitou in 1572 and recurrent outbreaks in that region and elsewhere became known as colica Pictonum.[viii] Similar cases were called entrabado in Spain and hütten katze in Germany. According to Eisinger, "the syndrome of symptoms of the colica Pictonum and those of the Devonshire colic, the bilious colic, the paralytic, spasmodic, or epileptic colic, the saturnine[ix] colic, the German"Grimmen", and the English and American "dry belly-ache", "gripes",


LIBELLUS
De
HARGYRII
FUMO NOXIO MORBI-
ejusq; metallico frequentiori
morbo vulgò dicto
Die Hütten Katze
Oder
Hütten Rauch
Cum
APPENDICE
de
MONTANO AFFECTU ASTHMA-
tico metallicidis familiari, quem Ger-
manicâ linguâ appellamus
Die Bergsucht oder
Berg Kranckheit.
AUTORE
SAMUELE STOCKHUSIO, M.D.
Illustrissimorum Ducum Brunsuicensium
& Luneburgensium, Imperialisq; Civitatis
Goslariæ MEDICO.
GOSLARIÆ,
Typis NICOLAI DUNCKERI.
ANNO M. DC. LVI.

Figure 2. The title page of Samuel Stockhausen's 1656 book "A Monograph Concerning a Harmful Litharge Dust Disorder as well as a Common Mining Disease Called The Hütten Katze or Hütten Rauch." Adopted from *Bayerische StaatsBibliothek* [Free access]

or "griping of the guts" are all the same, and written accounts differ only in emphasis. There can be no doubt that they are all the same disease, whose pathognomonic may be found in all important medical works until the eighteenth century."[x]

The injurious effects of adulterated wine were documented by Eberhard Gockel, city physician of Ulm, in 1696,[xi] after he had conducted a primitive case-control study of an outbreak of colica Pictonum in two monasteries, finding that those monks who were afflicted drank wine which was sweetened with "litharge" (PbO – lead oxide) but the monks without symptoms had not drunk such contaminated wine. Gockel then tried the contaminated wine himself and "was attacked by the most atrocious colic pains." Gockel was acquainted with an earlier book in 1656 by the German physician Samuel Stockhausen, in the mining town of Goslar, who had written about the role of lead in causing hütten katze or colica Pictonum in a work titled "Libellus de Lithargyrii Fumo Noxio Morbifico eiusque Metallico Frequentiori Morbo Vulgo Dicto Die Hütten Katze oder Hütten Rauch" (Figure 2).[xii]

The court physician to Duke Eberhard Ludwig of Württemberg had brought Gockel's findings on lead toxicity to the Duke's attention and Ludwig proclaimed an edict in 1696 which stated, in part, "we command all apothecaries and chemists among you not to sell such poisonous and dangerous substances as litharge to any persons who

wishes to buy them… All those who engage in wine correction contrary to our proclaimed prohibition will be dealt with most severely: the falsified wine will first of all be spilled on the ground and the falsifier will be punished with a fine of 100, 200 or more *Reichsthaler* and will furthermore forfeit, without reprieve, his body and his life, as a detestable example" (one such offender, Johann Jacob Ehrni, was publicly beheaded in Stuttgart in 1706).[xiii]

Despite Gockel's insight into lead contaminated wine his findings never received widespread reception possibly due to his obscurity far from a prominent medical school or university. Moreover, communication among the international medical community was undeveloped and local publications had very restricted distribution. Wine trading centres such as Ulm and the Duchy of Württemberg became concerned that undue exposure and publicity about their wine tampering practices would damage the local trade and economy. Duke Ludwig had ordered Gockel's findings to be made known to physicians within his rule but it appears that this report was suppressed and "the first treatise about the colica Pictonum which subscribed unequivocally to Gockel's findings was written by George Baker (figure 3), seventy years after Gockel's book was published.[xiv]

Meanwhile, the dry-gripes or belly-ache continued to be of considerable medical interest across the Atlantic, particularly by a long-standing physician friend of Franklin, Dr. Thomas Cadwalader (1708-1779). Cadwalader described colic associated with drinking rum or punch (fruit juice and rum) which were made by distillation through lead piping.[xv] It has been suggested that Franklin heavily edited Cadwalader's manuscript which was published by Franklin's press in 1745, since at that time "this was the printer's prerogative, for he acted not only as a publisher, but also as editor, or even re-write man."[xvi] In any case, Felton claims that the value of Cadwalader's book "lies in Franklin's recognition of the writing… as an early record of the toxicity to man of a metal in an absorbable state."[xvii]

Franklin lived abroad from 1757 to 1785 except for three years when he was back in New England. From 1757 to 1775 he resided at 36 Craven Street[xviii] in London and he served as the Pennsylvania colony's agent in England (he was back in America from 1762 to 1764). From 1776 to 1785 he was based in Paris as the first U.S. Ambassador to France at the court of Louis XVI. Franklin's time in both Britain and Europe brought him into close contact with some key medical figures there such as Sir George Baker.

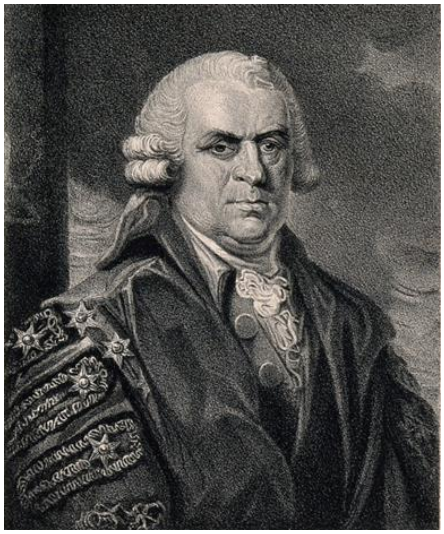

Figure 3. Sir George Baker, lithograph by G. P. Harding, 1837. Adopted from The Wellcome Collection, London. [Free access]

The English county of Devonshire (Devon) developed a greatly expanded orchard industry during the seventeenth century and produced vast amounts of cider which the inhabitants drank in large quantities. There were seasonal outbreaks of what became known as the Devonshire Colic and the first medical description of this condition was published in 1703 by Dr. William Musgrave (1655-1721).[xix] Musgrave was particularly interested in the association of colic and gout and he observed that "the gout is not infrequently produced from the colic." Dr. John Huxham (1691-1768) who lived in Plymouth later published his essay on the Devonshire Colic in Latin in 1739 and in English in 1759.[xx] Tony Waldron notes that "although his description of the symptoms of the Colic was an almost classic account of lead poisoning, Huxham did not consider this as a possible cause of the disease. Instead, he thought that the disease arose as a result of drinking the cider before it was properly fermented."[xxi]

Dr. George Baker was born in Devonshire in 1722, received his MD in 1756, and settled in London in 1761 soon after Franklin had arrived in that city. Baker and Franklin were both members of the Royal Society and the Royal Society Club and they had ample opportunities to converse about matters of mutual interest. Baker researched the Devonshire Colic and he gave five lectures about it to the Royal College of Physicians in London during the summer of 1767. It is clear that Dr. Baker had discussed his topic at length with Franklin since, in a lecture at the Royal College on July 13, 1767, he says that "my suspicions, concerning this subject, have been greatly confirmed by the authority of Dr. Franklyn (sic) of Philadelphia. That gentleman informs me, that, at Boston, about forty years ago, leaden worms were used for the distillation of rum. In consequence thereof, such violent disorders were complained of by the drinkers of new rum, that the government found it expedient to enact a law, forbidding the use of any worms, except such only as were made of pure block-tin… Dr. Franklyn (sic) likewise informed me, that the colic of Poitou is not so frequent a disease in any of the colonies, as it was formerly; and that the reason, commonly assigned, is that the people now drink their punch very weak in comparison with what they were formerly accustomed to."[xxii]

Despite fierce early opposition from many of his medical colleagues, Baker's explanation of the Devonshire Colic as a lead-induced disorder eventually prevailed among his own circle.[xxiii] However, Childs points out that "for whatever reason, Baker's brilliant and scholarly exposition of the true nature of the colic made almost no impression, unfortunately for Americans, on contemporary American physicians." She notes that in a new edition of a medical text on tropical diseases Benjamin Rush the editor stated that dry belly-ache "was a common disease in Philadelphia between the years 1760 and 1770… Its rare appearance has been ascribed to the disuse of punch and of late and heavy suppers, to the use of flannel next to the skin, and to the abolition of porches, which afforded a temptation to our citizens to expose themselves for several hours, in a state of inactivity, to the damp evening air."[xxiv]

In the same year that Baker published his "Essay Concerning the Cause of the Endemial Colic of Devonshire", Franklin visited La Charité hospital in Paris with Sir John Pringle and he described that visit to his friend Benjamin Vaughan, "when I was in Paris with Sir John Pringle in 1767, we visited La Charité, a Hospital particularly famous for the Cure of that Malady [Colica Pictonum], and brought from thence a Pamphlet containing a List of the Names of Persons, specifying their Professions or Trades, who had been cured there. I had the Curiosity to examine that List, and found that all the Patients were of Trades, that some way or another, use or work in Lead; such as Plumbers, Glaziers, Painters, &c."[xxv]

Franklin was himself afflicted with gout and a large bladder stone.[xxvi] It has been suggested that he likely had occupational lead exposure during his years of work as a printer and had further lead exposures with his enjoyment of foods from lead containers and frequently imbibing lead fortified wines especially Madeira. Franklin may well have developed "saturnine gout" - a painful legacy of his adventures in lead toxicology.

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What's Santa Claus poisoned with? --- For Christmas awaiting fans!

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Abstract: Santa Claus' universal fame and adoration comes with considerable health impacts for children. His image of an obese man that wears a fur-lined red suit, travels to cold and hot places and handles lots of physical work in a short period of time comes with a variety of occupational health hazards. Although rumors suggest he has quit smoking, photos of him with his famous pipe are still published from time to time. He enters millions of homes via chimneys that come with tar and soot exposure. He drinks brandy and seems to be a reckless persona, and walking with spatio-temporal gait characteristics. Apparently he is unemployed for majority of the year. He claims that he knows and sees every good and naughty child, meeting the criteria for hallucination!

I will try to examine his image through a health and toxicology lens here, and present it in a way that could be discussed at home with your children and grandchildren over the Christmas dinner as a sweet story to cheer every one up, with knowledge translation potential. Enjoy! --- We need to improve Santa's image in 21st century!

Introduction

Half a century ago when I was a kid, the world was a surreal mix of facts and fantasies that made it astonishingly beautiful. In particular, when each Christmas Papá Noel was coloring my world. I suppose this good memory goes for everyone.

Research has shown that Santa Claus's persona is universal, and despite the fact that some are not happy with his fantasy existence, he keeps many cheerful even just by given them the benefits of the doubt.

COGITO, ERGO SUM!
I think [I doubt] , therefore I am
René Descartes (1596 - 1650)

Today, we live in a more realistic post-Santa world, but this does not mean the end of great Santa's gifts!

First, Santa could be real. Who knows? No one has done a thorough study in this regard. In fact science by itself cannot disprove anything, but just provide or rule out evidence.

Second, even a doubtful Santa is good for us. Descartes explained we cannot *doubt* of our existence while we *doubt*! Santa's fantasy keeps some of us cheerful.

Third, The North American Aerospace Defense Command has openly admitted that Santa's December travels are tracked in 1955, indicating that Santa could be real [!?] (Figure 1);[1] a tradition that they keep continuing. Anyway, I would like to see it that way.

Figure 1. Colonel Harry Shoup, NORAD's First Santa Tracker (1917 – 2009). Adopted from reference ([1])

Who was Santa Claus?

Santa Claus is the most unmistakable Christmas iconography that even displaced Virgin Mary and baby in the modern era. He brings gifts to well-behaved children on Christmas Eve and in the early morning of Christmas Day (24 and 25 December).

The historic Santa figure was a bounty bishop named Nikolaus in Myra in Asia Minor, the present Turkey (then A Roman Territory) in the 300's CE and was canonized as Nicolas Nikolaus (Saint Nicholas or Santa Claus) after his death. Some claim that Santa still lives, others doubt it, but as long as there is doubt there is hope.

The modern Santa *Claus* is a discovery of recent era by Disney and cigarette manufacturers.[2] He:

- is a white old man with a big beard
- is recklessly obese with a large red nose and a big belly
- wears a bulky fur-lined red suit
- smokes
- walks with spatio-temporal gait characteristics
- enters homes via chimneys
- knows and sees every child and lists and double checks their behaviour to the minutiae

Have you ever wondered why he is depicted in this particular manner? Given his fame, he has considerable potential to affect individual and public health.[3]

What are Santa's health hazards?

A) Non toxicological health hazards

A-1) Obese role model

Cheerful Santa is impersonated with a rotund sedentary image. This life style jeopardises his health as well as his fans seeing him as a role model. In fact one study has shown a correlation between countries that venerate Santa Claus and those that have high levels of childhood obesity [!?].[4]

Although this association could be a simple coincidence, it could also be due to a causal relationship as a temporal pathway whereby "Santa promotes a message that obesity is synonymous with cheerfulness and joviality"![3] Please refer him to BCCDC's Healthy Eating & Healthy Weights service when he visits your home this year!

A-2) Reckless role model

Leaving Santa a cup of brandy, which is a tradition in many societies, could be perceived as a symbol of encouraging drinking. It is particularly important as Santa travels a lot and this may be perceived as drunk driving.[3] Research has also shown that although Santa Claus visits most of the paediatric wards in the UK, the odds of him not visiting wards are significantly higher for deprived areas! Apparently, his rewards for children are not based on how nice or naughty they have been in the previous year, but their backgrounds.[5]

A-3) Occupational hazards and health

Apparently, Santa is unemployed throughout the year, but during

B) Santa's toxicology related risks

Santa's toxidrome

an approximately 36-hour stretch during the Christmas period, his workload in very high and certainly exceeds a typical eight-hour work day.[6]

--- Santa's work is limited to Christmas Eve and the early morning of Christmas Day, let's say 12 hours on 24 and 25 December, and he works in 24 hour time zones that accounts for an overall period of work of 23 hours.

He is old and not retiring. It is not fair to him and his fans. What if he has an accident? Doesn't he travel too much? There were no occupational toxicology and safety regulations when he was young 1,700 years ago. Someone should let him know about the new regulations. I am not even sure whether WorkSafeBC covers him!

He is apparently registered in Norway or somewhere else. I looked online for his name but apparently his business is not listed in Canada. The roles, rights, responsibilities, claim information, health and safety issues for workers are clearly explained on WorkSafeBC's website https://www.worksafebc.com/en [7]. Santa Claus faces an increased risk of falling when filling or carrying his Christmas sack with 20 kg of presents.[8] Someone tell him please!

I am also concerned about his loneliness! Apparently loneliness 'gets under the skin' and is associated with changes in inflammatory and metabolic markers.[9] Loneliness is also associated with increased risk of depression and dementia.[10] --- What if he forgets our home addresses? Please ask him to visit PHSA's Health Promotion Video Library if he is one of our staff.

A-4) Heat Stress

Santa Claus is acclimatized to the colder climate of the North Pole, therefore he may suffer from heat stress when delivering presents in warmer climates such as Australia in December![11] His high physical workload is also a heat stress hazard, and his fur-lined red suit does not help the thermoregulation. Heat stress and high workload is a cardiovascular risk factor.[11]

Aren't you worried about him? --- HealthLinkBC provides a very good source of information for Heat-related Illnesses . Although this particular issue should fall in the jurisdiction of Australian and New Zealand governments!

A-5) Travel concerns and jet lag

Santa travels and may act as a vector for diseases across the globe. It is expected that Santa would suffer from significant jet lag due to the amount of travel required to meet his December 25th deadline each year. Vaccination and prevention is needed to travel to some parts of the world. Vancouver Coastal Health – Travel Clinic could help him, I suppose (Ph 604 736 9244).

A-6) Santa's psychology profile

Absolute nostalgia; Do you remember? [11] [12]

Santa Claus is coming to town!
You better watch out,
You better not cry,
You better not pout,
I'm telling you why?
Santa Claus is coming to town!
He sees you when you're sleeping
He knows when you're awake
He knows if you've been bad or good
He's making a list, Checking it twice!

Santa's psychological profile is complex. Apparently, he is omniscient! He sees, knows and feels everyone. He documents the names of all children and even compulsively checks their names twice![11] These are not normal abilities. Could he be delusional?!

B-2) Nicotine, hydrogen cyanide and formaldehyde poisoning

Santa used to be portrayed as a figure who smokes. Fortunately, he was forced to quit smoking a couple of decades ago and pictures

In brief, Santa's toxidrome consist of a recklessly obese old male figure that walks with a spatio-temporal gait, smokes and drinks brandy and enters millions of homes via their chimneys. He is an obsessive person who claims that he can see everyone across the Globe, and lists their names. Apparently he can avoid sleeping and work hard across the Globe in a 36 hour period but is unemployed for majority of the year!

--- Does this sound familiar from a medical toxicological perspective!?

B-4) Toxic exposure due to passing through chimneys

Santa's route of entry into the homes of his clients is via chimneys.[11] This could be a major chemical hazard for him. In fact, the first cancer linked to occupational toxic exposure, squamous cell carcinoma of the scrotum, was described in chimney sweeps in 1775 in England by Sir Perivall Pott (1714 – 1788).[13] [14]

Soot, tar and Polycyclic aromatic hydrocarbons (PHAs) from gas of heat and coal ovens accumulate in chimneys that are still in use. These chemicals are well known carcinogens.[15] [16] [17] [18]

The scrotum is a seven-layer pouch which covers the testes, testicular adnexae, and distal spermatic cord[14]. In Chimney-sweep's Cancer, carcinogen soot, etc. accumulate in these cells.[19]

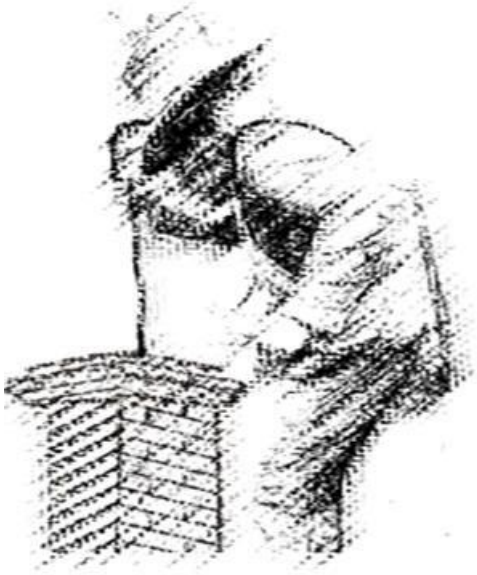

Figure 2. Chimney sweeps in 19ths century. RA©

Santa passes through millions of chimneys each year, and it is highly probable that he has already developed squamous cell carcinoma of the scrotum! This carcinoma is a rare disease these days, and is also associated with poor hygiene and chronic irritation.[14]

--- Why not ask him to ring the doorbell instead of sneaking into our chimneys? Also it is fair to let him know of the Men's Health Institute and clinics that are widely available these days!

Santa's obesity, smoking and drinking are also risk factors of squamous cell carcinoma.[20] [21] [22]

His reckless lifestyle and unemployment during the majority of the year may also increase the risk of cancer. His travels across the globe in warm weather with his fur-lined red suit while working hard lead to heat stress. Heat stress is another risk factor for cancer. [23] [24]

C) Real world Santa's health risks

Setting aside the fantasy Santa, we meet real Santas in shopping malls and celebrate Christmas with lots of delight every year. Santa is a source of food toxicity outbreaks In the real world. Numerous

that depict him smoking have been banned from advertising cigarettes. Unfortunately, his smoking portraits are still widely available on postcards and the internet![3]

Tobacco smoke is made up of thousands of chemicals, including 70 that are known to cause cancer. Smoking kills 8 million people a year worldwide. --- BCTOX has estimated that current and past exposures to tobacco smoking monthly cause 500 premature deaths in British Columbia alone. Tobacco that includes a mixture of toxic agents is by far the most important toxicants health wise.

Santa's long term smoking is probably a precipitating factor for chemical-induced cancer.[25 26]

In addition, Santa is portrayed walking with spatio-temporal gait characteristics[8], which could be related to [micro] strokes that are also precipitated by smoking.

B-3) Cadmium toxicity

If Santa smoked for 17 hundred years [--- bearing in mind that smoking was popularised after European discovery of the Americas], he is certainly intoxicated with - long term low exposure - cadmium. Smoking is the most important single agent of cadmium toxicity.[27 28]

In fact research has shown that age and smoking status are the greatest contributors of cadmium burden in Canadian population. [29]

Cancer High cadmium exposure may controversially [30 31] increase the risk of cancer.[32 33]

Osteoporosis Cadmium toxicity even at body burdens that do not need treatment causes osteoporosis and formation of renal stones. Toxicologists should refer Santa for measuring calcium in his blood and urine [34 35 36 37], and X ray studies for bone mineral density. [38]

Santa is old with high physical activity, alcohol use and frequent unemployment that also make him prone to osteoporosis, falls and bone fractures! What are we going to do if he falls and fails to show up one year?

Kidney problems Chronic exposure to cadmium can lead to kidney problems. To hasten diagnosis, one could monitor for renal function, proteinuria [39] and measure beta 2-microglobulin in urine, which is a nonspecific biomarker for kidney disease. [40 41 42]

B-4) Substance use

Santa smokes and drinks, he is reckless and unemployed for the majority of the year, which resembles stereotypic substance users! He is overweight which could be related to high alcohol consumption or even cannabis use which increases appetite![?]

His obsessive compulsive behaviour, manifested by listing everyone and double checking the names is seen in stimulant use. He works hard for 36 hours across the Globe on Christmas eve and day and does not sleep, which is also consistent with stimulants. However, stimulants usually decrease appetite.

Santa knows and sees everyone, with whom he has no physical contact. Isn't this the definition of visual hallucination? I bet this way of presenting Santa, hi might be accused of using some sort of hallucinogen/stimulant substances at around Christmas time!!

--- We really need to improve Santa's image in 21st century!

studies have shown food toxicities increase during Christmas time.

Christmas feasting comes with dangerous delights[43 44], high food intake and pet chocolate poisonings. [45] Accidental overdoses due to ingestion of white phosphorus firecrackers still kill hundreds of children in the developing world including the Philippines and south and central America. [46 47]

Santas in the real world are not tested for health issues, some with smell of smoke and some are coming into close contact with children while they have the common cold and influenza. "Santa is potentially a point source for infectious diseases outbreaks".[3]

Infectious mononucleosis due to kissing and influenza (Figure 3) due to close contacts are known examples. --- Real Santas are not subjected to health check, which is extraordinary taking the fact that they come to close contact with so many children.

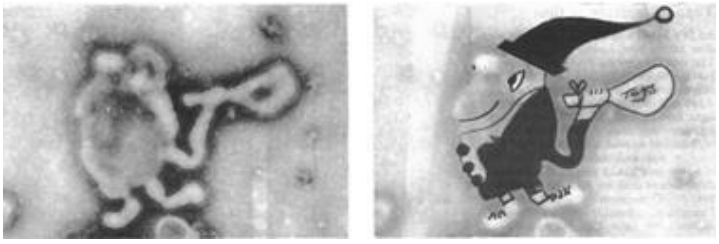

Figure 3. Resemblance of the influenza virus to Santa Claus. An electron micrograph of an influenza virus that resembles Santa Claus! Getty B. from Royal Liverpool Hospital reported in 1984 that Santa is not in the clouds of sky but under microscope! Adopted from reference [48] with permission, BMJ©) .

In fact, Christmas comes with many other health risks including lower media activity that limits public communication with health messaging and alerts[49]; furthermore, suicide and parasuicide rates change during the Christmas holidays. [50 51]

Santa Claus as well as Christmas could be health risks.[4] Santa in particular should be studied more rigorously!

Conclusion

Santa Claus, in the way he is presented, is not a good role model in the 21st century due to smoking, obesity, reckless behaviour and passing through chimneys!

When some turned Saint Nicholas to fantasy Santa Claus, they cheered up many generations. We have to be grateful to them. It is now time to modify his image to a healthier persona. New Santa should be a more well-rounded and healthy person, sometimes young, female and African American that leans toward the less advantage part of the societies!

What do you think?

--- What toxic hazards Santa is exposed to?

--- What poisonings (above or below treatment levels) could he have?

Take a guess, and email back your response to be entered in the BCTOX drawing for $20 gift card. --- There is no right or wrong answer for this competition. You may select a given diagnosis or provide a new one. **(Deadline December 23 2018)**

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Active and passive smoking increase blood cadmium concentrations in Canadian newcomers and Canadian-born participants; a preliminary report.

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Introduction

High cadmium exposure is a population health hazard, which may cause a decrease in long-term bone mineral density and act as a risk factor for osteoporosis.[1-4] Moreover, a high cadmium body burden is associated with increased excretion of beta 2-microglobulin from urine, which is a nonspecific biomarker of future kidney disease.[5-7] Finally, zinc[8-11] and iron[12,13] absorption have shown to be negatively affected by cadmium, and conversely could affect the rate of cadmium absorption.

Smoking has been attributed to cadmium exposure.[19] Moreover, recent reports suggest smoking is a greater contributor for Cadmium exposure in First Nations communities of Canada, versus consumption of cadmium-accumulating organ meats.[20] Cadmium concentrations were positively associated with the number of cigarettes smoked daily.[21]

In this study, we hypothesized that smoking would increase the bodily cadmium burden, and that Canadian newcomers may harbour different heavy metal concentrations, in comparison to the Canadian-born population, leading to health inequities across the nation.

Methods

Data from the Canadian Health Measures Survey was used to examine groupings of newcomers (Caucasian (CN) and non-Caucasian (NCN)) and Canadian-born (CB) participants. Smoking, as one of the sociodemographic variables, was assessed to examine the influence of exposure on heavy metal burden within the body. Smoker type (e.g., never, daily), and whether or not there were daily smokers within the home, categorically characterized participant smoking exposure. Finally, time since quitting daily smoking was additionally examined as a continuous variable. Canadian newcomers and Canadian-born were compared.

Results

Active smoking

- **Cadmium**

Smoking significantly increased cadmium concentrations for both CN and NCN ($p<0.0001$), and CB ($p<0.0001$).

Smoking elevated concentrations of cadmium for all subgroups.

Passive smoking

- **Cadmium**

Having smokers inside of the home significantly increased cadmium, as well, for both CN (0.0002) and NCN (0.0002) newcomers, and CB ($p<0.0001$).

Living with members that smoke inside the home elevated cadmium for all subgroups.

Lastly, all significant associations of metal concentrations and time since quitting smoking daily were negatively directed ($p<0.0001$).

Quitting daily smoking reduced cadmium for all subgroups.

Discussion

This study found that both active and passive smoking is related to increased body burden of cadmium that could be a risk factor for osteoporosis and kidney diseases. These findings are consistent with similar studies.[19,21-23]

We also found that newcomers have higher total blood cadmium levels, in comparison to CB participants, which NCN exhibiting the highest cadmium levels. The observation of elevated metal concentrations in newcomers, compared to native-born individuals, is consistent with prior research conducted on this topic.[24,25] And more specifically, differing exposure concentrations between CN and NCN is also consistent with prior studies conducted where the researchers found regional variations in the dioxin and the aflatoxin exposure burden [26], similar to our results on metals.

Although cadmium can be measured in blood, urinary cadmium levels better reflect total body burden.[14-17] Normal urine levels should generally be less than 1 mcg/g of creatinine.[18] If higher levels are observed, long-term exposure to cadmium is likely. The limited access to urinary cadmium is a limitation for this study.

Conclusion

The results of this investigation suggest that active and passive smoking are both a predictor of elevated blood cadmium, supporting the concept that smoking is detrimental to health.

The strength of the association between, both, active and passive smoking is a relationship that smokers should be aware of. Smokers, or those exposed to second-hand smoke frequently, may require lifestyle advice on preventing other risk factors of osteoporosis and kidney diseases, such as mobility. They may also require awareness towards diet modifications, and supplementation, to minimize risk of cadmium exposure.

Moreover, this study provides insight on the necessity to identify important distinctions amongst newcomer subgroups when examining health, allowing us to move past the Canadian-born/newcomer dichotomy. Because of the lengthy half-lives of particular metals such as cadmium, it is expected that mono tonic and non-monotonic health burdens may persist for an extended period of time amongst heavily exposed newcomers.

The results of this investigation are unique and have provided a starting point for the development of forthcoming targeted interventions and risk management strategies for particular subgroups, disproportionately exposed to cadmium.

Acknowledgments

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Announcements - November

WHO Housing and Health Guidelines ---- released Nov 2018

Improved housing conditions can save lives, reduce disease, increase quality of life, reduce poverty, help mitigate climate change and contribute to the achievement of a number of Sustainable Development Goals, including those addressing health (SDG 3) & sustainable cities (SDG 11).

Housing is therefore a major entry point for intersectoral public health programs and primary prevention.

Dr Tedros Adhanom Ghebreyesus
Director-General
World Health Organization

Read more https://bit.ly/2Sf3WMQ

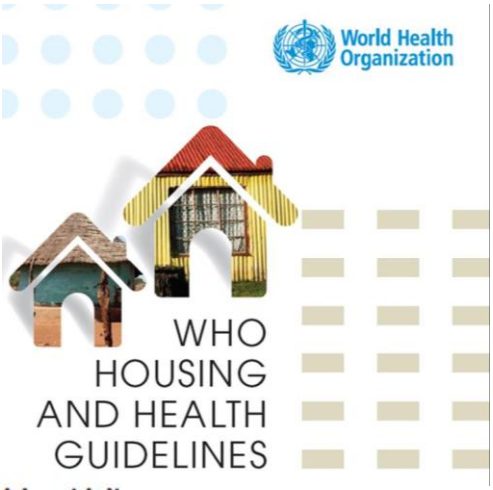

Table 1 Recommendations of the WHO Housing and health guidelines

Topic	Recommendation	Strength of recommendation
Crowding	Strategies should be developed and implemented to prevent and reduce household crowding.	Strong
Indoor cold and insulation	Indoor housing temperatures should be high enough to protect residents from the harmful health effects of cold. For countries with temperate or colder climates, 18 °C has been proposed as a safe and well-balanced indoor temperature to protect the health of general populations during cold seasons.	Strong
	In climate zones with a cold season, efficient and safe thermal insulation should be installed in new housing and retrofitted in existing housing.	Conditional
Indoor heat	In populations exposed to high ambient temperatures, strategies to protect populations from excess indoor heat should be developed and implemented.	Conditional
Home safety and injuries	Housing should be equipped with safety devices (such as smoke and carbon monoxide alarms, stair gates and window guards) and measures should be taken to reduce hazards that lead to unintentional injuries.	Strong
Accessibility	Based on the current and projected national prevalence of populations with functional impairments and taking into account trends of ageing, an adequate proportion of the housing stock should be accessible to people with functional impairments.	Strong

Poland hosts climate change conference

Poland Dec 1, 2018

---- Read more in the next issue!

Climate change is already "a matter of life and death" for many countries…. the world is "nowhere near where it needs to be" on the transition to a low-carbon economy. (BBC)

Antonio Guterres,
UN Secretary-General

"Climate change is humanity's greatest threat in thousands of years… that it could lead to the collapse of civilisations and the extinction of much of the natural world". (BBC)

Older generations have "messed up the planet", letting down younger people, who are "angry" about it and want it to stop, British naturalist David Attenborough said on Monday." (Reuters)

--- He said: Betrayal of the young generation left him with a sense of "misery". (Reuters)

Sir David Attenborough,
The climate change conference in Poland

A recent study showed "CO_2 emissions are on the rise again after stalling for four years." (BBC)

"Representatives from around 200 nations have gathered for the UN climate talks in Poland.

The summit comes against a backdrop of dire environmental warnings and a call for action against the threats posed by climate change. See more

Goals (DW English)

1- Seeking ways of implementing commitments made in the 2015 Paris treaty to limit the rise of global temperatures.
2- Despite the fact that the city of Katowice is playing host to the most important talks on global warming in years, Poland itself is still committed to using fossil fuels such as coal.