

Contents

BC Toxicology Pictures of the Month 80

About us 81

Summary of the month..... 82

Abstracts 83

- Antimicrobial Resistance 83
- Response to the Opioid Overdose 83

Lone Star tick bite 84

Picture gallery of July 84

Selected articles from BC 85

News from the Health authorities 86

Toxic exposure mediated via

- Air 87
- Wildfire 88
 - BCTOX recommendation for aftermath health management where fire retardants used ... 88
- Food 90
 - Food recalls
 - Marine biotoxins
- Soil 91
- Water 91

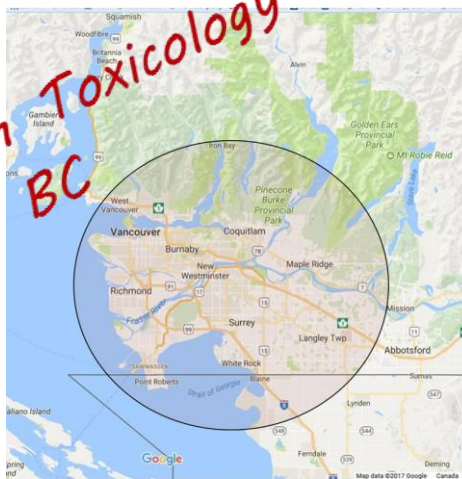
Occupational toxicology 91

Illicit drug overdoses (fentanyl) 92

Announcements 94

References 95

BC Toxicology Pictures of the Month



Equivalent area that burned in 2017 in BC

Since current fiscal year till July 25, - 377,800 hectares have been burnt in BC. The surface area is equivalent to the circle below extending from Vancouver west to Mission. [BCTOX graph]



Wildfire aftermath debris

In addition to air pollution---, ash, soot, long-term fire retardant and other pyrolyzed debris (Greek (Πυρόλυση); pyro means fire, and lysis means disintegration) are toxic hazards of wildfire. Photo adopted from [BC Wildfire Service @BCGovFireInfo](#) · Jul 12 (BC-Wildfire-Service 2017-07-12)

WILDFIRE MAY CAUSE TWO MAJOR TOXICOLOGICAL HEALTH PROBLEMS

EXPOSURE TO ACUTE AIR POLLUTION AND HEAT

EXPOSURE TO AFTERMATH DEBRIS ASH, SOOT, LONG-TERM FIRE RETARDANT AND OTHER PYROLYZED DEBRIS

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

Reza Afshari; Editor-in-Chief

Yasi Afshari; information gathering

Michael Jonasson; Editor of English language

Goran Krstic; Commentary

Contact Us

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

BC Toxicology News Monthly Bulletin could be reached at

West 7th Avenue, Vancouver, V5Z 1C2.

Tel: 604 999 6185

E-mail: Reza.Afshari@bccdc.ca BCTOX@yahoo.com

<https://plus.google.com/105713713266879554108>

New subscribers would 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.

Erratum

In June 2017 2(6) issue there was an error in defining overdose deaths in BC that is "illicit drug overdose deaths" was mistakenly reported as "fentanyl/opioid overdose deaths", thanks to the feedback by Dr Bonnie Henry.

Summary of the Toxicology News in BC (July 2017)

Reza Afshari*, Environmental Health Services, BC Centre for Disease Control, BC. Reza.Afshari@bccdc.ca [Editorial 2017-06-29]

Housekeeping notices BCTOX has been modified from its June issue. It is now accepting 400 word 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. From this issue, we will also have a section for **health authorities** to focus on more local news below the provincial level. More information is available in *Guide for Authors'* section. Any additional information could be obtained by direct communication with BCTOX's office. References are not given at the end of each issue to make BCTOX similar to a **review article**.

Mode of news Unlike the previous months, BC toxicology news in July was dominated by both wildfire exposure air pollution and fentanyl overdoses and deaths.

Major toxicological news in July included

- ❖ **129 illicit drug overdose induced deaths in BC (assuming July and May were similar)**
- ❖ **81 attributed premature deaths due to chronic exposure to air pollution in BC [see the assumptions inside] (This number is not derived from the recent wildfire)**
- ❖ **6 attributed past exposure to asbestos induced deaths [see the assumptions inside]**
- ❖ **The province was under two states of emergency including (1) public health emergency due to opioid overdose crisis (continued from April 2016) and (2) wildfire (announced and extended in July 2017)[Last time, it was in 2003 that wildfire state of emergency announced in BC]**
- ❖ **A total of 380,086 hectares of wildland forest area has already burned in the current fiscal year (up to July 27)**
- ❖ **Over 45,000 residents were forced to evacuate from their homes**
- ❖ **Ministry of Mental Health and Addiction was created by the BC new government**

Opioid (fentanyl) overdose crisis In May (last update), 129 cases died as a result of illicit drug overdoses in BC, which is almost three times higher as compared to the same month last year; however, it is 5% less than April 2017. The pattern of overdose deaths suggests that the sharp increase in deaths has reached a plateau, if not decreased in recent months. Northern Health is the only health authority reporting a reduction in the number of deaths so far in 2017.

When looking at data for the first 4 months of 2017 from Vancouver and BC, projections suggest that we are on track for more than 430, and 1,500 (i.e. 120 per month or 4 per day) deaths related to illicit drug overdose deaths in 2017. This is higher than last year.

Coastal health authority initiated a new warning system that aims to prevent overdoses, **Real-time Drug Alert and Response (RADAR)**. Information is gathered from drug users and relay it to their peers www.vch.ca/overdose or by texting (236)-999-3673.

The city's social-housing providers have essentially decriminalized drugs. Government partners integrate **injection-drug rooms into supportive-housing sites around Vancouver**.

Advocates seek Indigenous-focused addiction counselling centre for Vancouver. There is a need for culturally sensitive programming such as Indigenous healing practices and support from elders to complement Western addictions treatment.

Wildfire Since April 1, 2017 to July 26, 2017 (current fiscal year) 380,086 Hectares of wildfire reported mainly in Cariboo, Kamloops and Prince George. While we are still half way through the summer, total wildfire in BC has passed from the worst year since 2006. Frequent weather alerts and advisories were issued in July due to wildfire in this month.

BCTOX has provided a series of recommendation for aftermath health management where long-term fire retardants have been used, and evacuees are returning home. These recommendations are not official (see page 88).

Spill Studies have shown that oil by rail riskier than by pipeline: . Without new pipeline capacity, more oil will move by rail.

According to WorkSafeBC, compliance rate with combustible dust requirements is 98 per cent in BC.

Marine biotoxins in July in BC remained in acceptable levels in cases of DSP and Domoic acid (ASP) and relatively subsided in the case of Saxitoxin (PSP).

Lone Star **tick bite** that may lead to allergy to a carbohydrate known as alpha-gal, which is found only in meat was reported from Canada. This phenomenon could be related to the global warming that caused migration of these ticks from the south of US to Canada.

Published Research in BC in July

- ❖ **Spilled Oil from the MV Marathassa in Vancouver was evaluated.**
- ❖ **Sea surface salinity and freshwater discharge are the strongest predictor of paralytic shellfish toxins (saxitoxin) in both Strait of Georgia and the west coast of Vancouver Island geographical areas.**
- ❖ **The origin, distribution and leaching of nitrate (NO₃⁻) from coal waste rock dumps in the Elk Valley was evaluated.**
- ❖ **A Risk-Based Conceptual Framework for oil spills and marine mammals in BC was development.**

SOLA DOSIS FACIT VENENUM
Only the dose makes the poison!

Paracelsus (1493 – 1541 CE)

Abstracts

The Wicked Problem of Antimicrobial Resistance

Sean L Wachtel*, Visiting Researcher, University of Surrey, Guildford, UK. * sean.wachtel@gmail.com [Commentary; Accepted 2017-07-24]

Antibiotic resistance has been a growing problem since the discovery of penicillin¹; the recent warning by the World Health Organization about drug resistant gonorrhoea behooves the international community to act.¹

The mechanisms of antimicrobial resistance are:² 1. Enzymatic degradation of antimicrobial drug, 2. Alteration of antimicrobial targets within the bacteria (usually proteins) and 3. Changes in membrane permeability to antimicrobial drugs.

Antibiotic resistance can be either plasmid mediated – which can be transferred between bacterial species - or maintained on the bacterial chromosome. Despite popular misconceptions, the majority of antibiotic use is, in fact, veterinarian, not medical, with about 70 – 80 % of all antibiotics being used on animals⁴. This use is often for modest growth promotion purposes rather than treatment of infectious disease.

Antibiotic residues contaminate the environment from several different sources including disposal of excess from the manufacturing process, expulsion into the environment in the feces and urine of treated people and animals and from the discarding of unused medicines.³

The process of antibiotic degradation in the environment is complex; some antibiotics persist only transiently e.g. penicillin, whilst others have long half-lives and can accumulate to biologically important concentrations e.g. tetracycline & fluoroquinolones. The presence of pharmaceutical grade antibiotics in aquatic and land environments may drive selectively resistant strains of micro-organism that can then become clinically important and hard to treat.

Other factors that drive emerging antimicrobial resistance include changing human behavior, as illustrated by the spread of drug resistant gonorrhoea, thought to be due in part to changes in sexual behavior (e.g. the rising popularity of oral sex) leading to pharyngeal carriage of the bacteria and onward transmission through this route.^{5,6} Other factors include widespread antibiotic use, often for trivial medical complaints.

For practising clinicians, their role in limiting AMR is central and revolves around reducing unnecessary prescriptions for antibiotics (accountable prescribing) and making sure that each prescription is effective (appropriate prescribing).⁴ This process involves the simultaneous audit of clinical practice, the development of guidelines and regulations and robust surveillance systems. This may help to mitigate the multiple impacts on human and ecosystem health of environmental contamination by antibiotic compounds.

References: ¹ Antibiotic-Resistant Gonorrhoea on The Rise, New Drugs Needed. WHO News Release, 07 July 2017.

² Mechanisms of bacterial resistance to antibiotics. Dever & Dermody. Arch Intern Med. 1991 May;151(5):886-95.

³ Antibiotics in the environment. Larsson D.G. Upsala Journal of Medical Sciences. 2014; 119: 108–112.

⁴ The Antibiotic Resistance Crisis. Ventola, C.L. Pharmacy & Therapeutics, 2015 Apr; 40(4): 277–283.

⁵ Pharyngeal gonorrhoea: an important reservoir of infection? Weinstock H, Workowski KA. Clin Infect Dis. 2009;49(12):1798-800.

⁶ Treating uncomplicated Neisseria gonorrhoeae infections: is the anatomic site of infection important? Moran JS. Sex Transm Dis. 1995;22(1):39-47.

Visualizing the Public Health Response to the Opioid Overdose Crisis in BC

Jennifer Lee*, Jane Buxton. *MPH Candidate, University of British Columbia, Jennifer.Lee@bccdc.ca [Commentary; Accepted 2017-07-29]

The rate of overdoses and overdose deaths in British Columbia (BC) has been increasing since 2012, with an increase in the proportion of deaths where fentanyl is detected from 4% in 2012 to over 70% in 2017.¹ Illicit drug overdose deaths have surpassed 100 deaths per month since November 2016.² The crisis prompted the declaration of a public health emergency in April 2016. Several initiatives have been implemented to address the emergency including the scale-up of the BC Take Home Naloxone (THN) program and the enactment of the Good Samaritan Drug Overdose Act. The THN program distributes naloxone, which can reverse the effects of an opioid overdose. The Good Samaritan Drug Overdose Act protects people at the scene of an overdose from charges related to simple drug possession, encouraging calling 911.

While data intensive reports have been released with updates and responses to the emergency, little has been done to translate this knowledge for the public or, specifically, for people who use drugs. Keeping people who use drugs informed is highly important: not only are they the people most affected by the crisis and response efforts, but engaging people with lived experience of drug use is paramount in decision-making. Infographics were created to present information in a way that was attention-catching, easy to understand, and memorable. Projects included: (1) a primer on the opioid overdose emergency in BC and provincial responses,³ (2) a timeline providing history and context for the THN program,⁴ (3) a poster about the importance of providing information about when naloxone is used, and (4) a poster to inform people of the Good Samaritan Drug Overdose Act⁵. Sources of information for background research included publicly available data and reports,^{1,2,6-8} internal data and resources from BCCDC and the THN program, and personal communication. A range of stakeholders were consulted throughout the creation process, including people with lived experience of drug use, the BCCDC harm reduction team, regional harm reduction coordinators, Provincial Health Services Agency communications, law enforcement, legal services, and the Ministry of Health. To disseminate the materials created to people who use drugs, packages containing the materials have been distributed to approximately 560 THN program sites to share with clients. To make them publicly available, materials were posted online and through social media. The materials have been positively received by stakeholders, and the overdose emergency summary infographic has been shared provincially and nationally. *Feedback has suggested a need for further knowledge translation projects in harm reduction.*

References: ¹ BC Coroners Service. (2017). Fentanyl-detected illicit drug overdose deaths (2012-2017). Accessed from <http://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/death-investigation/statistical/fentanyl-detected-overdose.pdf> ² BC Coroners Service. (2017). Illicit drug overdose deaths in BC. Accessed from <http://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/death-investigation/statistical/illicit-drug.pdf> ³ BC Centre for Disease Control. (May 31, 2017). The opioid overdose emergency. Available from <http://www.bccdc.ca/resource-gallery/Documents/Opioid%20od%20emergency%2020170606%20-%20Colour.pdf> ⁴ BC Centre for Disease Control. (June 28, 2017). The history of Take Home Naloxone in British Columbia. <http://www.bccdc.ca/resource-gallery/Documents/THN%20timeline%2020170628.pdf> ⁵ BC Centre for Disease Control. (July 18, 2017). The Good Samaritan Drug Overdose Act. <http://www.bccdc.ca/resource-gallery/Documents/Educational%20Materials/Epid/Other/Good%20Samaritan%20Act%20poster%2020170719.pdf> ⁶ BC Centre for Disease Control. (2017). Overdose data & reports. Accessed from <http://www.bccdc.ca/health-professionals/clinical-resources/harm-reduction/overdose-data-reports> ⁷ BC Government. (2017). Factsheet: Actions to prevent overdoses in B.C. <https://news.gov.bc.ca/factsheets/actions-to-prevent-overdoses-in-bc> ⁸ Joint Task Force on Overdose Prevention and Response. (April 13, 2017). B.C.'s opioid overdose response one-year update. <http://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/overdose-response-one-year-update-april2017.pdf>

Lone Star tick bite that causes meat allergies has been reported in Canada

BCTOX [Commentary; Accepted 2017-07-28]

Lone Star tick (*Amblyomma americanum*) bite may lead to allergy to a carbohydrate known as alpha-gal, which is found only in meat. (CTV-News 2017-06-22) Any kind of mammal meat including beef, lamb and pork, but not poultry and fish, can cause the symptoms. (ACAAI) The insect, named for a white dot on the females' backs, can carry several diseases. (Huffpost 2017-07-25)(figure 1 and 2)



Figure 1. *Amblyomma americanum* (Lone Star tick) photo adopted from (US-CDC)

Lone Star tick bites used to be reported from the U.S. southeast, but recently cases are found further north. (CTV-News 2017-06-22) Lone Star ticks have recently been reported from Eastern Canada and Ontario according to Dr. Vett Lloyd from the University of New Brunswick. (Global-News 2017-06-27) A case of meat allergy which was attributed to a Lone Star tick has been reported. (CBC-News 2017-07-21)

Symptoms include skin rash, nausea, stomach cramps, vomiting, diarrhea, runny nose, sneezing, headache, asthma and anaphylaxis. Clinical manifestation comes hours after the meal, when the immune system begins to overreact during digestion. (ACAAI) (CTV-News 2017-06-22)

Treatment includes avoiding the trigger (meat consumption), controlling some symptoms with antihistamines and corticosteroids if needed and epinephrine for anaphylaxis. (ACAAI) (CTV-News 2017-06-22)



Figure 2. *Amblyomma americanum* (Lone Star tick) photo adopted from Wikipedia.

Picture gallery of July



Another busy day for the BC wildfire services

Photo adopted from [BC Wildfire Service](#) @BCGovFireInfo · Jul 08 (BC-Wildfire-Service 2017-07-12)



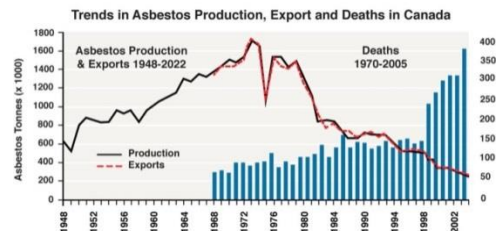
Wildfire and air quality

B.C. wildfire: Air quality in Kamloops, Williams Lake deemed 'very high risk'. Photo adopted from (Global-News 2017-07-17)



Bella sent BC Wildfire Service this card –

They say "thank you" back ☺ Photo adopted from [BC Wildfire Service](#) @BCGovFireInfo · Jul 12 (BC-Wildfire-Service 2017-07-12)



Asbestos Production and attributed deaths in Canada

Photo adopted from Canadian Environmental Health [Atlas](#)

Selected articles related to toxicological issues in BC from PubMed that published in July 2017

For articles to be more clear from a local point of view, citation of each article is reported based on the following order; correspondence author, BC resident author (multicentre articles), and first author. The real order of authors could be found from the references.

Sea surface salinity and freshwater discharge and paralytic shellfish toxins (Saxitoxin)

Sarah Henderson et al reported that sea surface salinity and freshwater discharge produced the strongest univariate models for paralytic shellfish toxins (saxitoxin) in both Strait of Georgia and the west coast of Vancouver Island geographical areas, which could help optimize biotoxin monitoring in BC.

They also analysed monthly sea surface temperature, air temperature, sea surface salinity, freshwater discharge, upwelling, and photosynthetically active radiation in their multivariable model. (Finnis, Krstic et al. 2017)

Marine pollution indicators in the North Pacific Ocean and guidance to inform mitigation and monitoring efforts of contaminants in the region

Brown and Takada discussed the following marine pollution indicators

(1) The use of mussels to illustrate spatial and temporal trends of a number of contaminants following the 2011 tsunami in Japan,

(2) the use of molecular marker (linear alkylbenzenes, hopanes, and polycyclic aromatic hydrocarbons) profiles to identify pollution sources,

(3) and the use of plastic resin pellets to illustrate spatial trends of petroleum pollution around the world,

(4) Stable isotopes were used to strengthen the utility of the Glaucous-winged gull (*Larus glaucescens*) as an indicator of marine pollution. (Brown and Takada 2017)

Oil Spills and Marine Mammals in BC: Development and Application of a Risk-Based Conceptual Framework.

Peter Ross et al. developed a conceptual framework to evaluate the impacts of potential oil exposure on marine mammals and applied it to 21 species inhabiting coastal BC.

Baleen whales due to blowhole breathing, surface filter feeding, and invertebrate prey, and sea otters (*Enhydra lutris*) were ranked as highly vulnerable due to their time spent at the ocean surface, dense pelage, and benthic feeding techniques.

In BC, vulnerability was estimated highest for Northern and Southern Resident killer whales and sea otters, followed by Bigg's killer whales and Steller sea lions (*Eumetopias jubatus*). (Jarvela Rosenberger, MacDuffee et al. 2017)

Identification of Spilled Oil from the MV Marathassa in Vancouver

Peter Ross et al. showed that oiled beach sediments had priority parent PAH concentrations during the MV Marathassa oil spill in Vancouver Harbour that are likely to harm marine life.

They also found that unlike other isomer ratios, alkyl polycyclic aromatic hydrocarbons (alkyl PAH) isomer ratios shows a clear distinction between the spilled oil and pre-spill samples, with the largest differences shown by isomers of the methyl fluoranthene/pyrene alkyl PAH series. (Morales-Caselles, Yunker et al. 2017)

Nitrate release from waste rock dumps in the Elk Valley, British Columbia

Mahmood et al. studied the origin, distribution and leaching of nitrate (NO₃⁻) from coal waste rock dumps in the Elk Valley, BC.

They found that aqueous phase NO₃⁻ from blasting residuals is present at highly variable initial concentrations in waste rock and the majority of this NO₃⁻ (>75%) should be flushed by recharging water during displacement of the first stored water volume. (Mahmood, Barbour et al. 2017)

Fit-for-purpose wastewater treatment: Testing to implementation of decision support tool

Chhipi-Shrestha et al. investigate FitWater, a decision support tool, has been implemented in a newly planned neighbourhood in the Okanagan Valley by developing 12 alternative wastewater treatment trains for water reuse in lawn and public parks irrigation.

Investigators showed that fitWater can effectively rank wastewater treatment train alternatives based on estimating life cycle cost, health risk, amount of reclaimed water, energy use, and carbon emissions.

They also showed that FitWater can be applied to identify a cost-effective, risk-acceptable, and energy efficient wastewater treatment train. (Chhipi-Shrestha, Hewage et al. 2017)a (Chhipi-Shrestha, Hewage et al. 2017)b

Low-Level Prenatal Toxin Exposures and Breastfeeding Duration

Bruce Lanphear et al. studied the effect of low-level prenatal exposures to common environmental toxins (tobacco smoke, lead, and phthalates) on breastfeeding exclusivity and duration.

Authors defined passive smoke exposure as cotinine levels of 0.015-3.0 µg/mL.

They found that serum cotinine concentrations were negatively associated with the duration of any breastfeeding, but prenatal levels of blood lead and urinary phthalate metabolites were not significantly associated with duration of any or exclusive breastfeeding. (Rosen-Carole, Auinger et al. 2017) [Data was not BC related]

News from the Health authorities (July 2017)

First Nations Health Authority

Only First Nations have the authority to evacuate their own territory. "My community has some really skilled firefighters, like a lot of First Nations reserves, and they came together and they stopped that wildfire from wiping out that whole community," *Chief Ryan Day* said.

According to *RCMP Staff Sgt. Annie Linteauif* for people who have the ability to make their own decision and they are over the age of 19, "we will not force them to leave the home." (Huffpost 2017-07-12)

First Nations population are five times more likely to overdose on illicit drugs and three times more likely to die from an overdose according and advocates seek Indigenous-focused addiction counselling centre for Vancouver. (CBC-News 2017-07-04)

Fraser Health Authority

Fraser Health Authority is concerned about overdoses and dehydration during major music festival as temperatures climb. To stay hydrated, be sun smart and chill out according to *Dr. Shovita Padhi, MHO*. (CBC-NEWS 2017-07-10)

Life expectancy is almost seven years less in the District of Hope than the City of Burnaby and well below the rest of the region according to a study.

Residents are more likely smoke in addition to other problems.

Fraser Health put up \$500,000 grant for community-led initiatives to be used for everything from a community garden program to initiatives that connect patients with health services. Among their activities an outpatient rehab service in Chilliwack was asked to help and they run their service two days a week elsewhere as well [*Dr. Petra Pardy*]. (CBC-News 2017-07-06)

Drug overdoses are projected to rise 500% in Langley City. Carfentanyl is now being reported in Langley. (Langley-Times 2017-07-11)

Interior Health Authority

"Our biggest focus is around community engagement," regarding clean water according to *Dr. Trevor Corneil, CMHO-IHA*. He focuses on the up-and-running website www.drinkingwaterforeveryone.ca, which dedicated to begin a dialogue and educate those who need education on what clean water is from a health perspective (Vernon-Morning-Star 2017-07-07).

Okanagan Lake residents and visitors are advised to be wary of the water.

Sandbag (flood barrier protections) recovery and debris removal is starting which could open up the potential for black water to spill into the lake. (Vernon-Morning-Star 2017-07-06)

Two dogs poisoned on Kelowna trail, as poisoned pieces of meat and treats were scattered throughout the trails according to a Kelowna dog rescue society. (Vernon-Morning-Star 2017-07-06)

The Ministry of Environment, in collaboration with the Interior Health Authority, has issued a Smoky Skies Advisory because of forest fire smoke that is covering the area (smoke concentrations will vary

widely as winds, fire behaviour and temperatures change). (Weather-GC-CA 2017-07-10)

Kamloops city council votes against controversial Ajax copper-gold mine that would operate just outside of the city limits.

City council is not the final decision maker, but hopes federal and provincial governments will take their position into account. (The-Global-And-Mail 2017-07-17)

Northern Health Authority

Northern BC has been mostly spared the opioid overdose epidemics as compared to the Lower Mainland.

20 fatal overdoses in the Northern Health authority and 11 people in the Northern Interior region have died from illicit drug overdoses in 2017. (My-Prince-George-Now 2017-06-30)

532 per 100,000 hospital admission related to alcohol use in Northern Health is the highest rate in BC. (PG-Citizen 2017-06-21)

The provincial and national average rates are 349 and 239 respectively (Northern Health is twice as high as the national average) [The highest in Canada is the Northwest Territories at 1,315 per 100,000] (PG-Citizen 2017-06-21)

Dust Safety Week 2017 (June 26 to 30) wrapped up after coverage on new developments and processes to help sawmills and pellet plants manage combustible dust. The Wood Pellet Association of Canada's safety conference took place in Prince George June 13 and 14. (Wood-Business 2017-06-27)

Vancouver Coastal Health Authority

Coastal health authority and BCCDC rolls out warning system that aims to prevent overdoses.

Information is gathered from drug users and relay it to their peers according to *Dr Mark Lysyshyn*, medical health officer at VCH.

People can contribute information anonymously to the Real-time Drug Alert & Response (**RADAR**) program online at www.vch.ca/overdose or by texting (236)-999-3673.

Involving drug users, who are the experts on issues directly affect them, is key according to *Dr Thomas Kerr*.

The data also help staff decide what action needs to be taken to prevent fatal overdoses based on *Sara Young* (Metro-Vancouver 2017-07-11) (Coast-Reporter 2017-07-15) (The-Global-And-Mail 2017-07-11)

Vancouver Island Health Authority

Despite a decline, we should only hope this trend will continue but still prepare for the worst according to *Dr. Richard Stanwick* CMO for Island Health.

26,900 visits by 970 people, response to 310 overdoses at the sites with no deaths have been the result of the Island's eight overdose-prevention sites. (Times-Colonist 2017-06-30)

Toxic exposure mediated via AIR

Premature deaths in BC due to air pollution

International Institute for Sustainable Development has estimated that air pollution in Canada results in 7,700 premature deaths each year and cost Canadians \$36B in 2015 due to premature death and illness. They measured the impact on families, businesses and governments. (IISD 2017-06)

Assuming the population of Canada and BC are 36.29 and 4.63 million respectively and a similar distribution exists, 982 premature deaths per year could be attributed to air pollution in BC. That is equal to 81 premature deaths in July alone.

The air pollution related premature deaths could be broken down to ischaemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), lung cancer and acute lower respiratory infections in children. (WHO 2014-03-25)

[This calculation was not derived from recent wildfire in BC]

State of emergency due to wildfire

BC declared a state of emergency after about 140 new fires broke out. The last time BC called a similar state of emergency was in August 2003. (Times-Colonist 2017-07-10)

Premier John Horgan has extended the provincial state of emergency for wildfires by an additional two weeks on July 19th. (Vancouver-Sun 2017-07-19)

Consequences of wildfire in July in BC

Firefighters and other support staff are working hard to bring the blaze of wildfire under control. (Vancouver-Sun 2017-07-01)

Provincial state of emergency announced and extended.

More than 45,000 people have been forced from their homes. (Vancouver-Sun 2017-07-19)

A health centre in Alexis Creek, hospitals in Ashcroft and 100 Mile House, and Williams Lake's Cariboo Memorial Hospital - but emergency room- have been closed. (Kamloops-This-Week 2017-07-11)

400 patients and 21 residents from an assisted-living complex have been moved due to fire and air quality according to Dr. Chris Mazurkewich. (Kamloops-This-Week 2017-07-11)

Canada Post issued a "red service alert", halting mail delivery due to poor air quality caused by forest fires. It was resumed after 1 day. (Kamloops-This-Week 2017-07-12)

British Columbia has been successful at putting out wildfires in recent decades. It has also created a situation where its forests are more prone to flames, says an expert.

Frequent air quality advisories issued

The Ministry of Environment, in collaboration with the Interior Health Authority, has issued a Smoky Skies Advisory because of forest fire smoke that is covering the area (smoke concentrations will vary widely as winds, fire behaviour and temperatures change). (Weather-GC-CA 2017-07-10)

An Air Quality Advisory (moderate zone) has been issued for parts of the eastern lower mainland and Fraser Valley due to high concentrations of ground-level ozone as a result of recent hot and

dry weather. (News1130 2017-07-06)

Wildfires lead to air quality (smoky skies) advisory for much of BC Interior. (CKPG-TV 2017-07-09)

Health risk Index (AQHI, which is scaled 1 to 10 as well as plus) from smoky air hit off-the-scale highs (rise to 36) in Williams Lake. (CBC-News 2017-07-11)

B.C. wildfires lead to air quality advisories even in Alberta. (660-News 2017-07-12)

After evacuees fled their homes following wildfire, they should call your insurance provider, still be reachable, Keep themselves updated on wildfire developments, and be prepared and Keep safety in mind when heading home. (Global-News 2017-07-11)

Scientific recommendations

Firefighting efforts over the last 100 years in BC have allowed for denser forests with a lot of dead material on the ground, which created a situation where its forests are more prone to flames according to Lori Daniels (Associate professor of forest ecology at UBC). (Times-Colonist 2017-07-10)

The fire season used to begin around the third week of July with the majority of fires starting in August, it is now beginning around earlier in July (climate change). (Times-Colonist 2017-07-10)

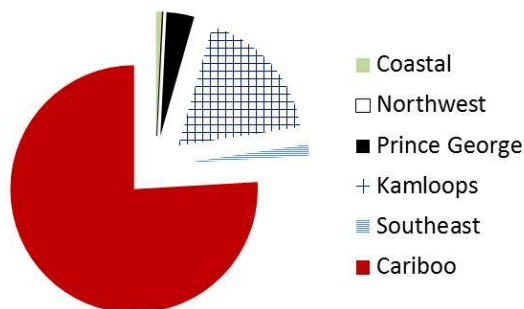
Dynamic mix of chemicals and particulate of fire smoke may impact the eyes, skin and respiratory systems of people in the region, particularly those with conditions like asthma and chronic obstructive pulmonary disorder, says Dr. Bonnie Henry. (Kamloops-This-Week 2017-07-11)

Everyone should avoid strenuous outdoor activities, but exposure is especially a concern for elderly, kids and infants or anyone with medical conditions in poor air quality. (iNFONews 2017-07-10)

Smoking

Don't support vaping! Marketing of e-cigarettes as a "safe" alternative to smoking, has led to use by adolescents who would not otherwise smoke according to Dr. Patricia Daly. (Squamish-Chief 2017-07-15)

Distribution of wildfire in BC



Current Statistics from BC Wildfire service shows that a total of 380,086 hectares burned from April 1, 2017 to July 26, 2017 (current fiscal year) in BC.

Distribution of wildfires in BC from April 1, 2017 to July 26, 2017 is shown in the figure. Source of data BC Wildfire Service [BCTOX Graph] (BC-Wildfire-Service)

Wildfires in BC since 2006

Mean (min - max) wildfire in BC from 2006 to 2016 are

- Total fires was 1844 (653 (2011) - 3064 (2009)),
- Total hectares 154944 (12604 (2011)-369 (2014))
- Total cost 182 (54 (2011) - 297 (2014)) millions dollars

Among them 39% caused by people and 61% caused by lightning.

Total wildfire from April 1, 2017 to July 26, 2017 (current fiscal year) in BC is 380,086 Hectares.

WHILE WE ARE STILL HALF WAY THROUGH THE SUMMER, TOTAL WILDFIRE IN BC HAS PASSED FROM THE WORST YEAR SINCE 2006.

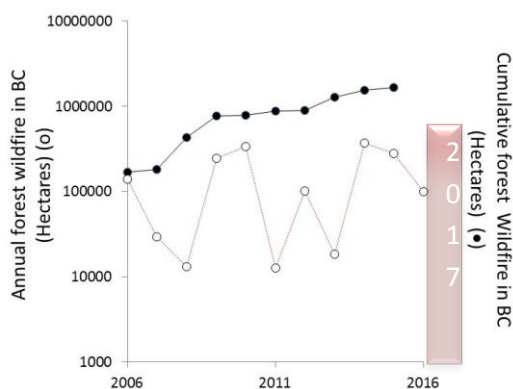


Figure. Annual and cumulative forest wildfire in BC (Hectares) (2006 to 2016). Depicts wildfire from April 1, 2017 to July 26, 2017 (current fiscal year) (380,086 Ha.) Source of data BC Wildfire Service [BCTOX Graph]

BCTOX recommendation for aftermath health management where long-term fire retardants (LTRs) have been used.---Reza Afshari

Environmental exposure and removal of LTRs

Buildings, cars and equipment may be adversely affected by fire retardants (Moffett PJ 2008)

Discard medicines, toiletries and toys that were exposed to LTRs (Seltzer JM, Miller M et al.)

Wash down LTRs from the outside siding and roof of the house by clean water. Dried residues may require using power washer, (Barkley Y and Fitzgerald S) and razor blade tool may be needed to remove sticky residue

Vacuum, sweep and dust dried LTR residues on household surfaces

Absorb standing water containing fire retardant materials with soil or sand

Do NOT air spray and blow to neighbor's house or other parts of the community (this action could be a violation of local

ordinances) (Moffett PJ 2008)

The iron oxide coloring agent can penetrate certain materials that may require additional solvents (Barkley Y and Fitzgerald S)

NEVER USE CHLORINE BLEACH OR CHLORINE BLEACH-BASED PRODUCTS DURING RETARDANT REMOVAL (Moffett PJ 2008) (Consumer Fire Products)

Long-term fire retardants contain one or a combination of monoammonium phosphate, diammonium phosphate, or ammonium polyphosphate salts of agricultural fertilizers as the main ingredient. (Government-of-BC) (US-DAFS 2007).

The active ingredient of chlorine bleach is Sodium Hypochlorite. Sodium hypochlorite reacts with ammonia. (Washington-State-Department-of-Health)

Trees, plants and food

Rinse retardant off vegetation to save the wildlife

Discard foods, fruits and vegetables that were exposed to LTRs (Seltzer JM, Miller M et al.)

Pets

Shampoo your pets if they were being exposed to LTRs

Ensure your pets do not ingest water from puddles containing LTRs

Keep pets away from any water pooling of clean-up process

Human exposure

If you have trouble breathing, seek medical attention promptly

If you experience respiratory symptoms such as coughing, move away from the area

Wash your eyes immediately with water if they come in contact with LTRs

Avoid touching LTRs, particularly the high concentrate spills (they are red colored in BC (i.e. Iron oxide)

Wear appropriate respiratory, eye and skin protections wherever exposure anticipated (Moffett PJ 2008)

Wash skin that comes in contact with the concentrated and diluted LTRs thoroughly with soap and water at the earliest convenient time and use skin creams to minimize drying and chapping (Moffett PJ 2008)

Clothes that come in contact with LTRs should be washed prior to reuse

Minimise exposure by washing hands often

Keep children away from any water pooling of clean-up process

Be aware that recently used LTRs increase surfaces slipperiness (USDA)

Do not use electrical appliances or powers that have come in contact with LTRs

When necessary, consult with your community or city health authorities (Moffett PJ 2008)

Type of Weather Alerts (ECCC 2016)

Type of weather alerts depends on the severity and timing of the event:

Special Weather Statements are the least urgent type of alert and are issued to let people know that conditions are unusual and could cause concern.

Advisories are issued for specific weather events (like blowing snow, fog, freezing drizzle and frost) that are less severe, but could still significantly impact Canadians.

Watches alert you about weather conditions that are favourable for a storm or severe weather, which could cause safety concerns.

Where more information as regard to wildfire available?

The following interesting list was provided by Times Colonist for more information. (Times-colonist 2017-07-18) [Ctrl Click]

“General information

- [B.C. Wildfire Service website](#)
- [B.C. Wildfire Service on Twitter](#)
- [B.C. Wildfire Service on Facebook](#)
- The BC government [list of resources](#)

Information on emergency alerts and evacuation orders

- [Emergency Info B.C.](#)
- [Emergency Info B.C. on Twitter](#)

Weather

- [Weather alerts from Environment Canada](#)

Traffic and roads

- Some highways are closed due to the fires. Check [Drive B.C.](#) for details
 - The [Transportation Ministry has a list of travel advisories](#)
- View [B.C. HighwayCams](#) to see current highway conditions”

Public Weather Alerts for BC

Public Weather Alerts for BC is an informative and user friendly site.

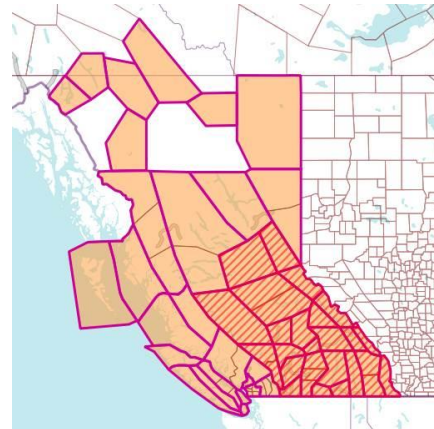


[Public Weather Alerts for British Columbia](#) -- days after evacuation issued]. (weather statements - gray areas) (Public-Weather-Alerts 2017-07-14) [figure adopted from GC.CA]

[Emergency info BC](#) [official] provides emergency alerts including Evacuation alerts, evacuation orders, and updates. (EmergencyInfoBC 2017-07-14)

Latest Special Weather Statement from Environment Canada

Latest Special Weather Statement could be obtained from the following website



Map Legend

- Subscribed Site
- Subscribed Sub-Zone
- Subscribed Zone
- Active Special Weather Statement
- Ended Special Weather Statement
- EC Sub-Zone Border

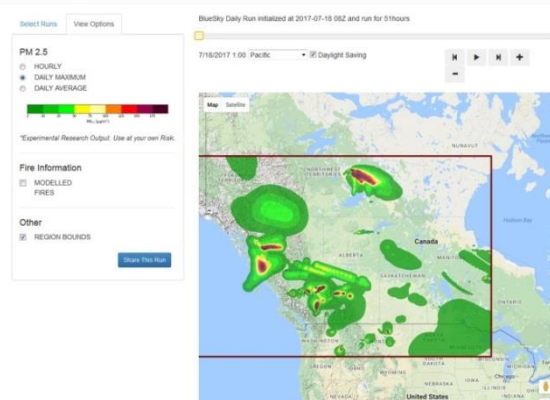
[Latest Special Weather](#) [Ctrl click] Statement: EC Alert (Issued on Friday July 14 - 12:25 PDT by Environment Canada)(Map adopted) (Alert-Environment-Canada 2017-07-14)

Forecast Wildfire Smoke in BC (FireSmoke Canada)

FireSmoke is another [experimental] website. Firesmoke forecasts smoke from wildland fires (ground-level concentrations of smoke particles PM_{2.5}) using the BlueSky Canada system and for up to 48 hours into the future--- subjected to uncertainties.

Predictions are experimental Research Output, and they suggested that they should be used “at your own Risk”. PM_{2.5} is forecasted Hourly and daily average and Maximum. (FireSmoke-Canada)

Smoke Forecasts



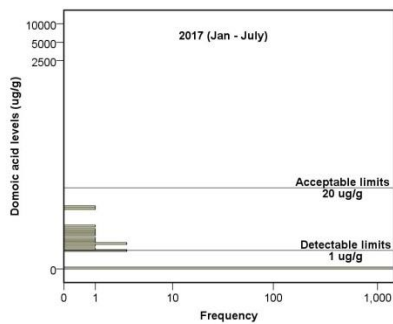
Toxic exposure mediated via FOOD

Toxicological related food recalls

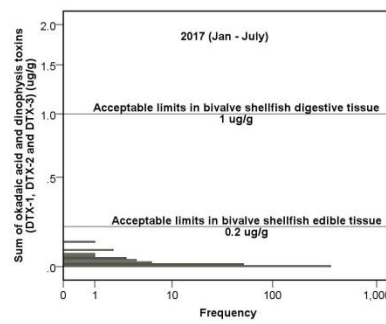
Dates	Food (Company / Firm)	Reason to recall	Class	Link
2017-07-19	Yoplait Minigo and Liberté brands yogurt pouches	Potential presence of pieces of plastic	3	National
2017-07-05	CLIF BUILDER'S brand Mint Chocolate Protein Bars	Undeclared peanuts, treenuts & coconut (allergen)	1	National

Marine biotoxins (January to July 2017) in BC

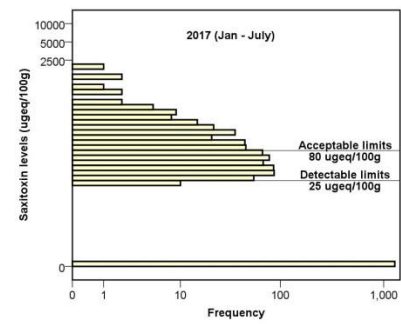
Domoic acid (ug/g) Amnesic shellfish poisoning (ASP)	Sum of okadaic acid and dinophys toxins (DTX-1, DTX-2 and DTX-3) (ug/g) Diarrhetic Shellfish Poisoning toxins (DSP)	Saxitoxin (ug/g/100g) Paralytic shellfish poisoning
---	---	--



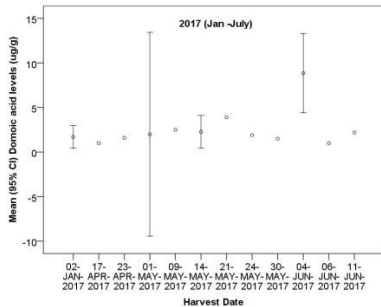
Histogram of concentrations of detected Domoic acid among [shellfish] samples in BC (January to July 2017) (n=18 detected out of 1764 samples) [BCTOX Graph]



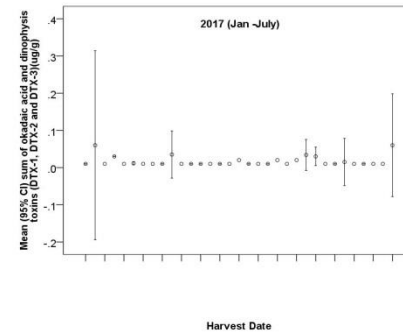
Histogram of DSP (sum of okadaic acid and dinophys toxins (DTX-1, DTX-2 and DTX-3) concentrations among [shellfish] samples in BC (January to July 2017) (n=70 out of 432 samples) [BCTOX Graph]



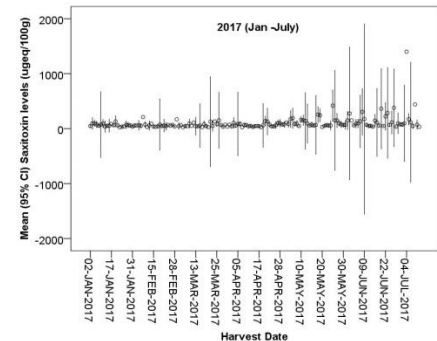
Histogram of Saxitoxin concentrations among [shellfish] samples in BC (January to July 2017) (n=1280 detected out of 1946 samples) [BCTOX Graph]



Mean (95% CI) concentrations of Domoic acid (ug/g) among detected shellfish samples in BC (January to July 2017) (n=18) [This graph is prepared to imply the trend, and it should be interpreted with caution] [BCTOX Graph]



Mean (95% CI) concentrations of detected DSP (sum of okadaic acid and dinophys toxins (DTX-1, DTX-2 and DTX-3) shellfish samples in BC (January to July 2017) (n=70) [This graph is prepared to imply the trend, and it should be interpreted with caution] [BCTOX Graph]



Mean (95% CI) concentrations of Saxitoxin (ug/g/100g) among detected shellfish samples in BC (January to July 2017) (n=601) [This graph is prepared to imply the trend, and it should be interpreted with caution] [BCTOX Graph]

Toxic exposure mediated via SOIL

The amount of contaminated soil found under the old F.H. Collins school has ballooned to 900 cubic metres, which was related to heating oil that leaked out of the school's old underground tank according to Environment Yukon. (BC-Local-News 2017-07-26)

Green MLA, Furstenau, is continuously campaigning to stop dumping five million tonnes of contaminated soil in her community's watershed. (The-Tyee 2017-06-29)

Toxic exposure mediated via [DRINKING] WATER

A Vancouver based global Mining Corporation has proven unable to prevent toxic waste flowing downstream into Lake Koochanusa (near Fernie). Lake Koochanusa fish have shown unhealthy levels of heavy metal. Pollution is causing deformities in fish and insects and perhaps birds. (FlatHeadBeacon 2017-07-05).

IHA suggest to use www.drinkingwaterforeveryone.ca, which dedicated to begin a dialogue and educate those who need education on what clean water is from a health perspective (Vernon-Morning-Star 2017-07-07).

[Rep] Okanagan Lake residents and visitors are advised to be wary of the water. Sandbag (Flood barrier protections) recovery and debris removal is starting which could open up the potential for black water to spill into the lake. (Vernon-Morning-Star 2017-07-06)

Other water related news:

The BC Coroners Service is advising people to be careful around waterways. Six people drowned in B.C. waters this past week. (CASTANET 2017-07-08) Several homes were evacuated after a water main burst in East Vancouver. (Global-News 2017-07-04)

Toxic Spills/Dumps

45 gallons in the drum of a flammable resin with a flashpoint of 27 degrees and strong odour spilled onto pavement on Avenger Way near Victoria airport. (Chek-News 2017-06-30)

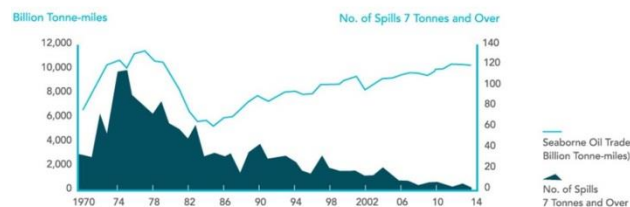
Boat's hull fills with fuel during refueling at Petro Canada station, leaked 100+ liters of gasoline. (Kelowna-Now 2017-07-09)

The Alberta Energy Regulator has laid charges against Nexen Energy for a pipeline spill two years ago that was one of the largest in provincial history. (BC-Local-News 2017-07-06)

On average 9.5 million litres of mixed fire retardant are dropped in BC to control wildfire. (Benson M 25.07.2017)

Oil by rail riskier than by pipeline: studies. Without new pipeline capacity, more oil will move by rail. (Business-Vancouver 2017-07-27)

Incidence of Spills Worldwide 1970 - 2015



Learn more at clearseas.org/tankers



Animal toxicities

[US] Marine Mammal Center rescued 20 sea lions from the Oceano

Dunes to Pismo Beach (US) in just three days, which is blamed on Domoic acid poisoning. Symptoms of domoic acid poisoning in sea lions include head weaving, lethargy, and abruptly looking skyward, and seizures. (KSBY 2017-07-20)

[US] Three states total market for Dungeness crab is 58 million pounds so far with a total value of \$180 million for this season. The total for the 2015-16 season was 42 million pounds and \$149 million. Despite the fact that they experienced a rocky start due to the presence of domoic acid and live market problems with China. (Sea-Food-News 2017-07-20)

Occupational

In 2014, asbestos-related disease resulted in 77 deaths which were 18 more cases than in 2013. Many of them are in older subjects. Fatalities resulting from occupational diseases accounted for more than half (57 percent) of all work-related deaths in BC. (Work-Safe-BC 2014) (This is equal to 6 deaths per months).

WorkSafeBC launches its young-worker safety campaign. Young workers can visit worksafebc.com/ListenToYourGut for tips on bringing safety concerns to their boss. This program discusses exposure to mercury, asbestos, pesticides and fumigants, biological agents, sunlight among others. (Voice-Online 2017-07-19)

The agency's Board of Directors approved amendments to the Occupational Health and Safety Penalty Amounts Policy D12-196-6, and the changes were effective July 4, 2017. The maximum penalty allowed is currently \$637,415.60, but it is adjusted on Jan. 1 of each year. (OHS-Online 2017-07-13)

WorkSafeBC has focused on verifying compliance with combustible dust requirements with formal inspection. In total, they performed 252 combustible dust inspections at 117 sawmill locations. Only six combustible dust orders were issued i.e. compliance rate of 98 per cent. (Wood-Business 2017-06-27)

A wheezy and frequently breathless case with 3 decade work in the forestry industry is now waiting to hear about whether his long-term disability claim with WorkSafeBC will be approved. Although 5% of tree fellers and mill workers develop asthma, only three claims for allergy (asthma) to red cedar dust have been accepted in the past decade. (The-Province 2017-06-27)

Dust Safety Week 2017 (June 26 to 30) wrapped up after coverage on new developments and processes to help sawmills and pellet plants manage combustible dust. The Wood Pellet Association of Canada's safety conference took place in Prince George June 13 and 14. (Wood-Business 2017-06-27)



Photo adopted from [Canadian biomass](http://Canadianbiomass.com). <https://twitter.com/canadianbiomass> (July 22, 2017)

Mould

Nearly 150 Balmoral Hotel residents forced to move, when city of Vancouver cited 'imminent danger' in June due to mould among other issues. Balmoral Hotel needs 'significant amount of work' to bring it up to code. (Global-News 2017-07-14)

Illicit drug overdoses

Epidemiology and statistics

Projection for BC Looking at data for the first 4 months of 2017 City of Vancouver and BC are on track for more than 430, and 1,500 (or 120 per month and 4 per day) deaths related to illicit drug overdose deaths in 2017. Among them, fentanyl was detected in 72% up a little from 68% (2016), 29% (2015), 25% (2014), and 15% (2013). (Straight 2017-07-04)

BC The risk of fentanyl overdose deaths remains extreme, the drug supply is unsafe, and casual and occasional users are at high risk of overdose due to their opioid naiveté according to chief coroner *Lisa Lapointe*. (Global-News 2017-06-30)

Projection for Langley City Drug overdoses projected to rise 500% in the current year compared to 2015 in Langley City according to City fire chief. (Addergrove-Star 2017-07-11) Carfentanyl is now being reported in Langley. (Langley-Times 2017-07-11)

Dawson Creek Opioid overdoses frequently happen in clustered together in Dawson Creek. (The-Mirror 2017-07-06)

Prescription overdose deaths There are 75 prescription overdose deaths a year in BC. Majority of them using other substances such as alcohol and antidepressants according to Dr Perry Kendall. However, as patients often die in their sleep, it can then be difficult to determine whether overdose was a factor. (CTV-News 2017-07-27)

Events

BC NDP leader John Horgan met with *Leslie McBain*, founder of Moms Stop the Harm and *Dr. Evan Wood*, director of the new BC Centre on Substance Use, where McBain was recently hired as family engagement lead. Drug-crisis advocate believes change in B.C. gov't may help slow agony. (Vancouver-Sun 2017-06-30)

Tall Tree Music festival No opiates, including fentanyl, were found on the site or in drug testing, nor was the harm reduction team notified of a drug overdose at Tall Tree Music festival. (VictoriaNews 2017-07-06)

Evolve Festival Moncton With fentanyl overdoses already happening in [New Brunswick], Evolve Festival Moncton has increased the number of naloxone kits it keeps on hand for the event, which starts later this month near Moncton.

Festival organisers are buying 10 times as many *naloxone kits* on site now as they did last year considering fentanyl overdose crisis (New Brunswick). (CBC-News 2017-07-11)

Hydromorphone versus heroin The new BC guideline for injectable-opioid treatment focuses on hydromorphone which is partly in response to the province's ongoing fentanyl crisis according to *Dr Cheyenne Johnson* from BC Centre on Substance Use. These guidelines put hydromorphone ahead of prescription heroin. (Straight 2017-07-11)

Scientific information

Equivalent doses The active dose for morphine, codeine, oxycodone and fentanyl are 5-10 mg, 100 mg, 10 mg and 25 micrograms respectively according to the Unit Chief for BC Ambulance in Dawson Creek. (The-Mirror 2017-07-06)

Driving accidents A man high on fentanyl or some similar powerful opioid caused a series of hit-and-runs on a [Calgary] expressway. There has been a big increase in drug-related driving offences, but the vast majority involve softer drugs such as cannabis according to the *Mothers Against Drunk Driving*. (News1130 2017-07-06)

First nation population and illicit drugs [Rep] Opioid crisis disproportionately affecting Indigenous people. First Nations people are five times more likely to overdose on illicit drugs and three times more likely to die from an overdose according to the health authority. (CBC-News 2017-07-04)

Strategies / Actions

[Rep] **Real-time Drug Alert and Response** Coastal health authority rolls out warning system that aims to prevent overdoses. Information is gathered from drug users and relay it to their peers according to *Dr Mark Lysyshyn*, medial health officer at VCH. People can contribute information anonymously to the Real-time Drug Alert & Response (**RADAR**) program online at www.vch.ca/overdose or by texting (236)-999-3673. Involving drug users, who are the experts on issues directly affect them, is according to Dr Thomas Kerr. The data also help staff decide what action needs to be taken to prevent fatal overdoses based on Sara Young (Metro-Vancouver 2017-07-11) (Coast-Reporter 2017-07-15) (The-Global-And-Mail 2017-07-11)

Real-time Drug Alert and Response MHOs in the Vancouver area are aiming to quickly warn drug users about clusters of overdoses and batches of contaminated drugs based on reports from people who use illegal substances, as a part of Real-time Drug Alert and Response [[Overdose prevention & response](#)]. (CFJK-Today 2017-07-11)

Broader use of naloxone for high-dose painkiller patients Dr. David Juurlink from [Toronto](#) is urging broader adoption of the life-saving antidote, naloxone. According to him, high-dose painkiller patients (fentanyl patches) should carry naloxone, as they could be at risk especially when the drug is combined with sedatives, sleeping pills or anxiety medication. BC is cautious in calling for expanded distribution of naloxone, and looks to better prescribing as the answer. (CTV-News 2017-07-27)

The city's **social-housing providers have essentially decriminalized drugs**. Government partners integrate injection-drug rooms into supportive-housing sites around Vancouver. Pretty basic. There is no camera in the actual room but they have one that looks at the door. They watch the camera and when they see that somebody is in here, they will come and do checks every 10, 15 minutes, just to make sure subjects are okay. (Straight 2017-07-13)

New supervised injection site opening in the Downtown Eastside. "It makes no sense to forbid other methods" says Dr Kendall supporting the issue. (News-1130 2017-07-27)

Requests

Advocates seek Indigenous-focused addiction counselling centre for Vancouver. There is a need for culturally sensitive programming such as Indigenous healing practices and support from elders to complement Western addictions treatment. "Many Indigenous people turn to alcohol and drugs to cope with years of unhealed trauma, for example, from residential schools" says Kevin Barlow, the CEO of Metro Vancouver's Aboriginal Executive Council. (CBC-News 2017-07-04)

Quotes

Overdose crisis is "*our Ebola*", says Dr. Mark Tyndall. (CBC-News 2017-06-09)

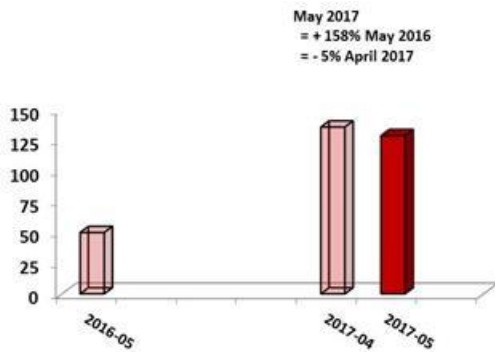
Russian roulette Drug users play Russian roulette with their life; “if you’re dope-sick and hurting and someone comes along with drugs and says there might be fentanyl in it — they’re still going to take it” according to Vancouver [Overdose Prevention Society](#). (The-Tyee 2017-07-11)

Other

Alcohol 532 per 100,000 hospital admission related to alcohol use in **Northern Health** is the highest rate in BC The provincial and national average rates are 349 and 239 respectively (Northern Health is twice as high as the national average) [The highest in Canada is the Northwest Territories at 1,315 per 100,000] (PG-Citizen 2017-06-21)



Surrey's supervised injection site on 135A Street (Courtesy Fraser Health Authority) Photo adopted from (News-1130 2017-07-27)

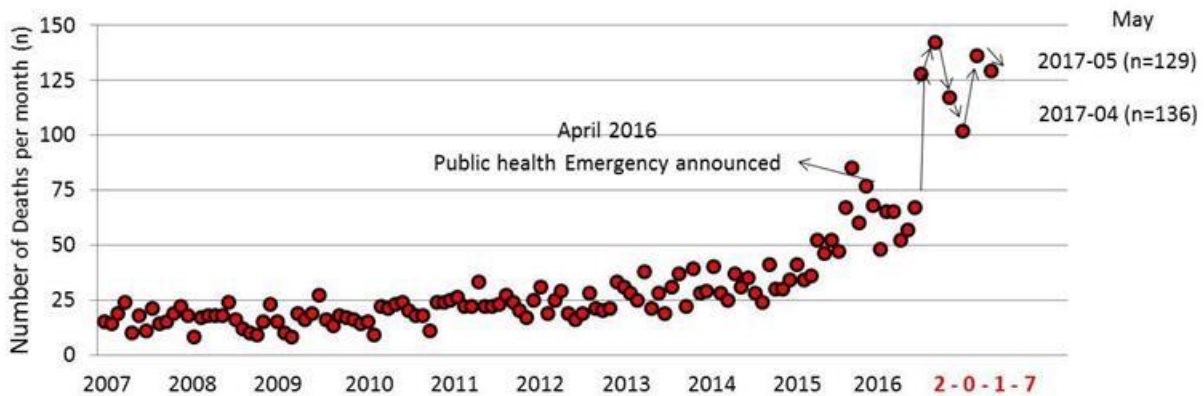


The number of Illicit drug overdose deaths in May 2017 was 158% higher than May last year and 5% lower than last month [BCTOX graph] [LAST UPDATE - [May](#)]



NDP Leader John Horgan stands with mental-health advocates after an election campaign announcement about mental health and addiction services, Coquitlam, B.C., on April 17, 2017. Photo adopted from (Huffpost 2017-07-25)

New mental-health ministry is nothing short of a miracle for B.C. (Huffpost 2017-07-25)



Illicit drug overdose deaths per month in BC (2007 to May 2017) [BCTOX graph] [LAST UPDATE - [May](#)]

Announcements

Leaking methane from shale gas basins

35% of BC's 11,000 active oil wells, abandoned wells and water injection wells in the northeastern part of the province are leaking 14.2 million Cubic metres (10,617 metric tonnes) of methane a year in BC. Methane emissions from BC's shale gas basins is estimated to be 2.5 times higher than provincial government estimates, which makes the oil and gas sector the largest source of climate pollution in the province ahead of commercial transportation. (The-Tyee 2017-07-05)

Voting against copper-gold mine

[Rep] Kamloops city council votes against controversial Ajax copper-gold mine that would operate just outside of the city limits. City council is not the final decision maker, but hopes federal and provincial governments will take their position into account. (The-Global-And-Mail 2017-07-17)

Canceling LNG project

Petronas, Malaysian state-controlled energy giant, cancels \$11.4-billion LNG project in Lelu Island near Prince Rupert. Have proceeded, they would have shipped 19 million tonnes a year of liquefied gas to Asia, while pumping more than five million tonnes of carbon dioxide into the atmosphere. (Vancouver-Sun 2017-07-25)

Spills can happen anywhere

The new leader, John Horgan's is staunchly opposed to the Kinder Morgan expansion project. The difference highlighted when he met Justin Trudeau.

Horgan raised his hand and accidentally knocked a glass of water by his side on the marble floor, clattering as its contents splashed the premier's lectern and spilled in front of the television cameras. "Spills can happen anywhere," Horgan said in reference to the potential for an oil spill with a pipeline! (Huffpost 2017-07-25)

A risk-based conceptual framework for oil spill in BC

A conceptual framework to evaluate the impacts of potential oil exposure on marine mammals suggest that Baleen whales due to blowhole breathing, surface filter feeding, and invertebrate prey, and sea otters are highly vulnerable to oil spills. Figure 1 indicates the probability of oil presence 15 days following a 15,000 m3 fall release of diluted bitumen. Figure 2 depicts the overall risk of marine mammal species to oil spills in BC.

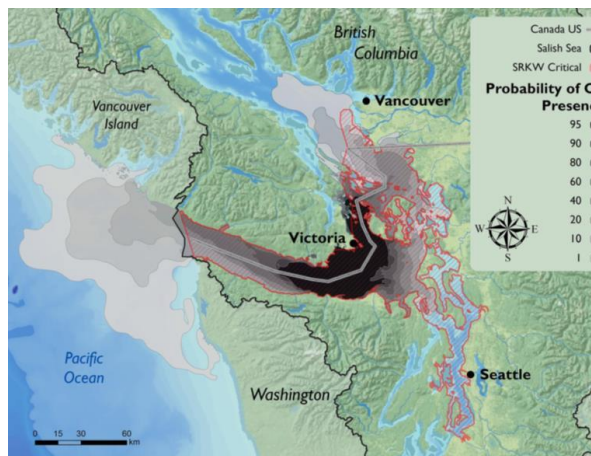


Figure 1. Black to grey shading indicates the probability of oil presence 15 days following a 15,000 m3 fall release of diluted bitumen at Arachne Reef innorthern Haro Strait, BC. Themodelled probabilities of oilpresence (EBA 2013) areoverlaid with the CriticalHabitat of Southern Residentkiller whales in Canada and theUnited States. Figure adopted from (Jarvela Rosenberger, MacDuffee et al. 2017)

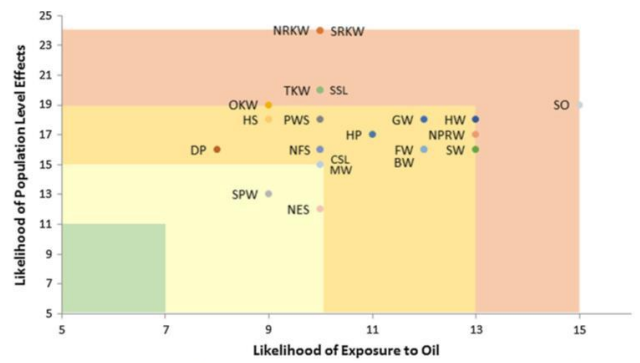


Figure 2. Overall risk of marine mammal species to oil spills in BC waters is depicted using species cumulative rankings for likelihood of individual exposure to oil (x-axis) and likelihood of population-level effects (y-axis) from an oil spill. This figure is broken into four categories. The green shaded area represents the lowest combined risk, followed by yellow (moderate), then amber (high), and then red is highest. HP harbour porpoise, DP Dall's porpoise, PWS Pacific white-sided dolphin, NRKW Northern Resident killer whale, SRKW Southern Resident killer whale, TKW transient killer whale, OKW offshore killer whale, MW minke whale, HW hump back whale, GW grey whale, SW sei whale, FW fin whale, BW blue whale, NPRW North Pacific right whale, SPW sperm whale, HS harbour seal, NFS Northern fur seal, SSL Steller sea lion, CSL California sea lion, NES Northern elephant seal, SO sea otter. (figure adopted from (Jarvela Rosenberger, MacDuffee et al. 2017)

Upcoming conferences and meetings

Vancouver Mycological Society meeting, Tuesday, July --

[44th Canadian Ecotoxicity Workshop](https://ecotoxcan.ca/registration), 2017-10-01/04 in Guelph <https://ecotoxcan.ca/registration>

[49th Annual Symposium of the Society of Toxicology of Canada](http://www.stcweb.ca/en/events.shtml), November 29 to December 1, 2017 in Montreal <http://www.stcweb.ca/en/events.shtml>

[North American Congress of Clinical Toxicology \(NACCT\) 2017](http://www.clintox.org/wp-content/uploads/2017/05/NACCT-BROCHURE-2017-FINAL.pdf) - 2017-11-29 to 2017-12-01 in Vancouver <http://www.clintox.org/wp-content/uploads/2017/05/NACCT-BROCHURE-2017-FINAL.pdf>

Toxicology jobs in BC

- Scientific Director, Provincial Toxicology Centre. PHSA-BCCDC - Vancouver
- Senior Human Health Risk Assessment Specialist, Ministry of Health.

References

- "Asbestos Production in Canada. Canadian Environmental Health Atlas. <http://www.ehatlas.ca/asbestos/trends/asbestos-production-canada-0> (accessed 22 July 2017)."
- "Flame retardants. Chemicals and product safety. Health, Government of Canada <https://www.canada.ca/en/health-canada/services/chemicals-product-safety/flame-retardants.html> [accessed July 13, 2017]."
- "PHOS-CHEK® WD 881 Class A foam environmental, safety & health issues. https://385xpfxe1e13almu7u8sj31b-wpengine.netdna-ssl.com/wp-content/uploads/2015/03/Tech-Tip-Class_A_Foam_Enviro_Q_A.pdf [accessed July 13, 2017]."
- "Reopening Your Child Care Facility After a Wildfire. Alberta Health Services. <http://www.albertahealthservices.ca/assets/wf/eph/wf-eh-reopening-child-care-facility-after-wildfire.pdf> (accessed July 17, 2017)."
- "Returning to Your Home. Alberta Health Services. <http://www.albertahealthservices.ca/assets/wf/eph/wf-eh-returning-to-your-home.pdf> (accessed July 17, 2017)."
- 660-News (2017-07-12). "B.C. wildfires lead to air quality advisories in Alberta. <http://www.660news.com/2017/07/12/b-c-wildfires-lead-air-quality-advisories-alberta/>."
- ACAAI "Meat allergy. American College of Allergy, Asthma & Immunology. <http://acaai.org/allergies/types/food-allergies/types-food-allergy/meat-allergy> (accessed July 25, 2017)."
- Alldergrove-Star (2017-07-11). "Drug overdoses projected to rise 500 per cent in Langley City. <https://www.alldergrovestar.com/news/drug-overdoses-projected-to-rise-500-per-cent-in-langley-city/>."
- Alert-Environment-Canada (2017-07-14). "Latest Special Weather Statement: EC Alert (Issued on Friday July 14, 2017 12:25 PDT by Environment Canada) https://ecalertme.weather.gc.ca/warning-latest_en.php?ualert_id=4117&alert_code=SPS (accessed July 14, 2017)."
- Barkley Y and Fitzgerald S "Wildfire Retardants. Extension. <http://articles.extension.org/pages/28011/wildfire-retardants> (accessed July 17, 2017)."
- BC-Local-News (2017-07-06). "Nexen Energy charged in 2015 pipeline spill. <http://www.bclocalnews.com/business/433039503.html>."
- BC-Local-News (2017-07-26). "Contaminated soil at F.H. Collins now tops 900 cubic metres. <http://www.bclocalnews.com/news/436813293.html>."
- BC-Wildfire-Service "Current Statistics. Government of BC. <http://bcfireinfo.for.gov.bc.ca/hprScripts/WildfireNews/Statistics.asp> (accessed July 27, 2017)."
- BC-Wildfire-Service (2017-07-12). "BC Wildfire Service @BCGovFireInfo. <https://mobile.twitter.com/BCGovFireInfo>."
- Benson M (25.07.2017). Wildfire retardants. uperintendent, Provincial Airtanker Program. BC Wildfire Service. Ministry of Forests, Lands and Natural Resource Operations. Personal (Reza Afshari) communication
- Brown, T. M. and H. Takada (2017). "Indicators of Marine Pollution in the North Pacific Ocean." *Arch Environ Contam Toxicol*.
- Business-Vancouver (2017-07-27). "Oil by rail riskier than by pipeline: studies. <https://www.biv.com/article/2017/7/oil-rail-riskier-pipeline-studies/>."
- CASTANET (2017-07-08). "Be careful on the water. <https://www.castanet.net/news/BC/201285/Be-careful-on-the-water/>."
- CBC-News (2017-06-09). "Overdose crisis is 'our Ebola', says Dr. Mark Tyndall. <http://www.cbc.ca/news/canada/british-columbia/overdose-deaths-fentanyl-w-18-centre-for-excellence-mark-tyndall-1.3624318>."
- CBC-News (2017-07-04). "Advocates seek Indigenous-focused addiction counselling centre for Vancouver. <http://www.cbc.ca/news/canada/british-columbia/advocates-seek-indigenous-focused-addiction-counselling-centre-for-vancouver-1.4188687>."
- CBC-News (2017-07-06). "How do you make people in Hope healthier? <http://www.cbc.ca/news/canada/british-columbia/health-hope-b-c-1.4193838>."
- CBC-NEWS (2017-07-10). "Doctor's warning to music festival attendees: 'Be careful in the heat. <http://www.cbc.ca/news/canada/british-columbia/fraser-health-music-festival-warning-1.4195897>."
- CBC-News (2017-07-11). "Evolve Festival ups its naloxone supply in light of fentanyl crisis. <http://www.cbc.ca/news/canada/new-brunswick/evolve-festival-ups-its-naloxone-supply-1.4198293>."
- CBC-News (2017-07-11). "Health risk from smoky air hits off-the-scale highs in Williams Lake. <http://www.cbc.ca/news/canada/british-columbia/wildfires-air-quality-williams-lake-1.4199903>."
- CBC-News (2017-07-21). "Aggressive tick whose bite makes people allergic to red meat is arriving in Canada. <http://www.cbc.ca/news/health/longe-star-tick-allergy-1.4215708> (accessed July 21, 2017)."
- CFJK-Today (2017-07-11). "B.C. overdose warning system aims to alert users about potentially deadly drugs. <http://cfjktoday.com/article/579137/bc-overdose-warning-system-aims-alert-users-about-potentially-deadly-drugs>."
- Chek-News (2017-06-30). "Hazmat crews cleaning up chemical spill near Victoria airport. <http://www.cheknews.ca/hazmat-crews-cleaning-chemical-spill-near-victoria-airport-342921/>."
- Chhipi-Shrestha, G., K. Hewage and R. Sadiq (2017). "Fit-for-purpose wastewater treatment: Conceptualization to development of decision support tool (I)." *Sci Total Environ* **607-608**: 600-612.
- Chhipi-Shrestha, G., K. Hewage and R. Sadiq (2017). "Fit-for-purpose wastewater treatment: Testing to implementation of decision support tool (II)." *Sci Total Environ* **607-608**: 403-412.
- CKPG-TV (2017-07-09). "Wildfires Lead to Air Quality Advisory For Much Of BC Interior. <http://www.ckpg.com/2017/07/09/wildfires-lead-to-air-quality-advisory-for-much-of-bc-interior/>."

Coast-Reporter (2017-07-15). "<http://www.coastreporter.net/news/local-news/pilot-project-aims-to-give-real-time-info-about-ods-1.21123725>."

Consumer Fire Products, I. "Foam - gel - fire retardant comparison chart. Consumer Fire Products, Inc. . <http://www.consumerfireproducts.com/foam-gels-and-fire-retardant.html> (accessed July 28, 2017)."

CTV-News (2017-06-22). "Carnivores beware: Meat-allergy-causing Lone Star ticks creeping north. <http://www.ctvnews.ca/health/carnivores-beware-meat-allergy-causing-lone-star-ticks-creeping-north-1.3471690> (accessed July 22, 2017)."

CTV-News (2017-07-27). "High-dose painkiller patients should carry naloxone: doctor. <http://barrie.ctvnews.ca/high-dose-painkiller-patients-should-carry-naloxone-doctor-1.3521772>."

ECCC (2016). "Public Alerting Program. Environment and Climate Change Canada. Date modified 2016-08-29. <http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=C9A8D735-1>."

EmergencyInfoBC (2017-07-14). "Emergency info BC. <https://www.emergencyinfobc.gov.bc.ca/>."

Finnis, S., N. Krstic, L. McIntyre, T. A. Nelson and S. B. Henderson (2017). "Spatiotemporal patterns of paralytic shellfish toxins and their relationships with environmental variables in British Columbia, Canada from 2002 to 2012." *Environ Res* **156**: 190-200.

FireSmoke-Canada "Smoke Forecasts. <http://firesmoke.ca/forecasts/viewer/run/ops/BSC-WC-01/current/> (accessed July 18, 2017)."

FlatHeadBeacon (2017-07-05). "B.C. Putting Our Waters at Risk. <http://flatheadbeacon.com/2017/07/05/b-c-putting-waters-risk/>."

Global-News (2017-06-27). "Lone Star ticks that cause red meat allergies are on their way to Canada. <http://globalnews.ca/news/3556940/lone-star-ticks-that-cause-red-meat-allergies-are-on-their-way-to-canada/> (accessed July 24, 2017)."

Global-News (2017-06-30). "B.C. overdose deaths — Drug supply is unsafe, don't take the risk of dabbling: Coroner. <http://globalnews.ca/news/3568547/b-c-overdose-deaths-drug-supply-is-unsafe-dont-take-the-risk-of-dabbling-coroner/>."

Global-News (2017-07-04). "Homes evacuated after water main burst in East Vancouver. <http://globalnews.ca/news/3573260/homes-evacuated-after-water-main-burst-in-east-vancouver/>."

Global-News (2017-07-11). "B.C. wildfire: What evacuees should do after they've fled their homes. <http://globalnews.ca/news/3590027/bc-wildfire-evacuees-what-to-do/>."

Global-News (2017-07-14). "City says Balmoral Hotel needs 'significant amount of work' to bring it up to code. <http://globalnews.ca/news/3600138/deadline-day-for-structural-support-work-on-disgusting-downtown-eastside-hotel/> (accessed July 22, 2017)."

Global-News (2017-07-17). "B.C. wildfire: Air quality in Kamloops, Williams Lake deemed 'very high risk'. <http://globalnews.ca/news/3605020/b-c-wildfire-air-quality-in-kamloops-williams-lake-deemed-very-high-risk/> (accessed July 24, 2017)."

Government-of-BC "Fire Response. Natural Resources & Industry Forestry Forest Stewardship Wildfire Management Response. Government of British Columbia. <http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/wildfire-management/wildfire-response/response/aviation> [accessed July 13, 2017]."

Huffpost (2017-07-12). "B.C. First Nations Evade Evacuation Orders To Fight Fires Themselves. http://www.huffingtonpost.ca/2017/07/12/b-c-first-nations-evade-evacuation-orders-to-fight-fires-themse_a_23027200/."

Huffpost (2017-07-25). "John Horgan's Water Spill Beside Trudeau Reflects Kinder Morgan Discord. http://www.huffingtonpost.ca/2017/07/25/john-horgans-water-spill-beside-trudeau-reflects-kinder-morgan_a_23047865/."

Huffpost (2017-07-25). "Lone Star Tick Bite Can Make A Person Allergic To Red Meat. http://www.huffingtonpost.ca/2017/07/25/lone-star-tick-bite-can-make-a-person-allergic-to-red-meat_a_23047534/."

Huffpost (2017-07-25). "New Mental-Health Ministry Is Nothing Short Of A Miracle For B.C. http://www.huffingtonpost.ca/ryan-painter/new-mental-health-ministry-is-nothing-short-of-a-miracle-for-b-c_a_23045331/."

ISD (2017-06). "Costs of Pollution in Canada. Measuring the impacts on families, businesses and governments. ."

INFONews (2017-07-10). "Lingering wildfires blow poor air quality across Southern Interior . <http://infotel.ca/newsitem/lingering-wildfires-blow-poor-air-quality-across-southern-interior/it44163#.WXJf7aQx8l>."

Jarvela Rosenberger, A. L., M. MacDuffee, A. G. J. Rosenberger and P. S. Ross (2017). "Oil Spills and Marine Mammals in British Columbia, Canada: Development and Application of a Risk-Based Conceptual Framework." *Arch Environ Contam Toxicol* **73**(1): 131-153.

Kamloops-This-Week (2017-07-11). "Full health effects of wildfire smoke yet to be realized. <https://www.kamloopsthisweek.com/full-health-effects-wildfire-smoke-yet-realized/> (accessed July 22, 2017)."

Kamloops-This-Week (2017-07-12). "Canada Post mail delivery resumes as skies clear in Kamloops. <https://www.kamloopsthisweek.com/canada-post-mail-delivery-resumes-skies-clear-kamloops/>."

Kelowna-Now (2017-07-09). "Boat's hull fills with fuel during refueling at Petro Canada station. https://www.kelownanow.com/watercooler/news/news/West_Kelowna/Boat_s_hull_fills_with_fuel_during_refueling_at_Petro_Canada_station/."

KSBY (2017-07-20). "20 sickened sea lions rescued from SLO County beaches in past 3 days. <http://www.ksby.com/story/35936879/20-sickened-sea-lions-rescued-from-slo-county-beaches-in-past-3-days> (accessed July 21, 2017)."

Langley-Times (2017-07-11). "Drug overdoses projected to rise 500 per cent in Langley City. <http://www.langleytimes.com/news/drug-overdoses-projected-to-rise-500-per-cent-in-langley-city/>."

Mahmood, F. N., S. L. Barbour, C. Kennedy and M. J. Hendry (2017). "Nitrate release from waste rock dumps in the Elk Valley, British Columbia, Canada." *Sci Total Environ* **605-606**: 915-928.

Metro-Vancouver (2017-07-11). "Health authority rolls out warning system that aims to prevent overdoses. <http://www.metronews.ca/news/vancouver/2017/07/11/health-authority-pilots-warning-system-to-prevent-overdoses.html> (accesses July 21, 22)."

Moffett PJ (2008). "Containment and removal of fire retardants settled on buildings, contents and land. Environmental Management & Engineering, Inc. http://www.genesisrestorations.com/support-contact/resources/Fire_Retardant_Removal-4.pdf (accessed July 17, 2017)."

Morales-Caselles, C., M. B. Yunker and P. S. Ross (2017). "Identification of Spilled Oil from the MV Marathassa (Vancouver, Canada 2015) Using Alkyl PAH Isomer Ratios." *Arch Environ Contam Toxicol* **73**(1): 118-130.

My-Prince-George-Now (2017-06-30). "Illicit drug overdoses more than double between May 2016 and 2017. <http://www.myprincegeorgenow.com/52920/illicit-drug-overdoses-double-may-2016-2017/> (accessed July 22, 2017)."

News1130 (2017-07-06). "Air Quality Advisory issued for parts of BC. <http://www.news1130.com/2017/07/04/bulldozer-scrapes-chicken-innards-from-highway-after-spill/>."

News1130 (2017-07-06). "Use of super-powerful opioids by drivers a growing concern in some areas. <http://www.news1130.com/2017/07/06/use-of-super-powerful-opioids-by-drivers-a-growing-concern-in-some-areas/>."

News-1130 (2017-07-27). "New supervised injection site opening in the Downtown Eastside. <http://www.news1130.com/2017/07/27/new-supervised-injection-site-opening-downtown-eastside/> (accessed July 27, 2017)."

OHS-Online (2017-07-13). "WorkSafeBC's New Penalty Changes Now in Effect. <https://ohsonline.com/articles/2017/07/13/worksafebc-new-penalty-changes-now-in-effect.aspx> (accessed July 22, 2017)."

PG-Citizen (2017-06-21). "Report blames booze for unnecessary hospitalizations. <http://www.princegeorgecitizen.com/news/local-news/report-blames-booze-for-unnecessary-hospitalizations-1.20708838> (accessed July 22, 2017)."

Public-Weather-Alerts (2017-07-14). "Public Weather Alerts for British Columbia. Watches and Statements. Alerts Warnings. Weather information. Environment and natural resources. Government of Canada. https://www.weather.gc.ca/warnings/index_e.html?prov=bc (accessed July 14, 2017)."

Rosen-Carole, C. B., P. Auinger, C. R. Howard, E. A. Brownell and B. P. Lanphear (2017). "Low-Level Prenatal Toxin Exposures and Breastfeeding Duration: A Prospective Cohort Study." *Matern Child Health J*.

Sea-Food-News (2017-07-20). "West Coast Dungeness Crab Season: Rocky Start, Good Markets, High Value. <http://www.seafoodnews.com/Story/1069310/West-Coast-Dungeness-Crab-Season-Rocky-Start-Good-Markets-High-Value>."

Seltzer JM, Miller M and Seltzer DL "Guidance for Health Professionals. Information on Health Risks of Wildfires for Children (Aftermath). Fact Sheets for Health Professionals. Pediatric Environmental Health Specialty Units (PEHSU). http://www.pehsu.net/HealthProf_Wildfires_Aftermath_.html (accessed July 17, 2017) "

Squamish-Chief (2017-07-15). "LETTER: Don't support vaping — Vancouver Coastal Health. <http://www.squamishchief.com/news/local-news/letter-don-t-support-vaping-vancouver-coastal-health-1.21118495>."

Straight (2017-07-04). "Eight scary takeaways from B.C.'s June 2017 update on illicit-drug overdose deaths. <http://www.straight.com/news/932266/eight-scary-takeaways-bcs-june-2017-update-illicit-drug-overdose-deaths>."

Straight (2017-07-11). "BC guidelines for injectable-opioid treatment put hydromorphone ahead of prescription heroin. <http://www.straight.com/news/935231/bc-guidelines-injectable-opioid-treatment-put-hydromorphone-ahead-prescription-heroin>."

Straight (2017-07-13). "Government partners integrate injection-drug rooms into supportive-housing sites around Vancouver. <http://www.straight.com/news/936596/government-partners-integrate-injection-drug-rooms-supportive-housing-sites-around>."

The-Global-And-Mail (2017-07-11). "Vancouver warning system aims to alert users about overdoses. <https://www.theglobeandmail.com/news/british-columbia/vancouver-warning-system-aims-to-alert-users-about-overdoses/article35655145/> (accessed July 22, 2017)."

The-Global-And-Mail (2017-07-17). "Kamloops city council votes against controversial Ajax copper-gold mine. <https://www.theglobeandmail.com/news/british-columbia/kamloops-city-council-votes-against-controversial-ajax-copper-gold-mine/article35715320/>."

The-Mirror (2017-07-06). "Fentanyl is back, did it ever really leave? Dawson Creek unit chief weighs in on a seven overdose cluster in one day. <http://www.dawsoncreekmirror.ca/dawson-creek/fentanyl-is-back-did-it-ever-really-leave-1.20946668>."

The-Province (2017-06-27). "B.C.'s official tree is a source of health problems for many in forestry industry. <http://www.theprovince.com/health/local-health/official+tree+source+health+problems+many+forestry/13564328/story.html> (accessed July 22, 2017)."

The-Tyee (2017-06-29). "'Words Aren't Enough': Green MLA Who Fought Soil Dump Reflects on Liberals' Behaviour. <https://thetyee.ca/News/2017/06/29/Green-MLA-Soil-Dump-Liberals-Behaviour/>."

The-Tyee (2017-07-05). "One-Third of BC's Oil and Gas Wells Leaking Significant Levels of Methane, Study Finds. <https://thetyee.ca/News/2017/07/05/BC-Oil-Gas-Wells-Leaking/>."

The-Tyee (2017-07-11). "Drug Overdoses Kill Four a Day in BC, and Inaction and Apathy Are to Blame. <https://thetyee.ca/Opinion/2017/07/11/BC-Drug-Overdose-Apathy-Inaction/>."

Times-Colonist (2017-06-30). "Risks 'remain extreme' as overdose crisis worsens in Victoria. <http://www.timescolonist.com/news/local/risks-remain-extreme-as-overdose-crisis-worsens-in-victoria-1.20861445> (accessed July , 22, 2017)."

Times-Colonist (2017-07-10). "Past firefighting efforts have made B.C. forests more fire-prone: expert. <http://www.timescolonist.com/past-firefighting-efforts-have-made-b-c-forests-more-fire-prone-expert-1.21028148>."

Times-colonist (2017-07-18). "B.C. wildfire roundup: interactive map, fire danger rating, road closures. <http://www.timescolonist.com/news/b-c-wildfire-roundup-interactive-map-fire-danger-rating-road-closures-1.1992958> (accessed July 19, 2017)."

US-CDC "Lone star tick a concern, but not for Lyme disease. <https://www.cdc.gov/stari/disease/index.html> (accessed July 24, 2017)."

US-DAFS (2007). "Long-Term Retardant, Wildland Firefighting. US Department of Agriculture Forest Service. Specification 5100-304c. <https://www.fs.fed.us/rm/fire/wfcs/documents/304c.pdf> (accessed July 19, 2017)."

USDA "Long-Term Retardants. Fact Sheet. https://www.fs.fed.us/rm/fire/wfcs/documents/Ret_FactSheet_2017-0503.pdf (accessed July 17th, 2017)."

Vancouver-Sun (2017-06-30). "Drug-crisis advocate believes change in B.C. gov't may help slow agony. <http://vancouversun.com/news/local-news/more-than-four-people-a-day-on-average-die-in-b-c-from-illicit-drugs-coroner/>."

Vancouver-Sun (2017-07-01). "B.C. crews battling wildfire near Harrison Hot Springs. <http://vancouversun.com/news/local-news/b-c-crews-battling-wildfire-30-kms-north-of-harrison-hot-springs/>."

Vancouver-Sun (2017-07-25). "Petronas cancels \$11.4-billion LNG project near Prince Rupert. <http://vancouversun.com/news/local-news/petronas-cancels-11-4-billion-lng-project-near-prince-rupert> (accessed July 25, 2017)."

Vancouver-Sun (2017-07-19). "Premier John Horgan extends state of emergency as B.C. deals with wildfires. <http://vancouversun.com/news/local-news/live-video-premier-john-horgan-extends-state-of-emergency-as-b-c-deals-with-wildfires> (accessed July 27, 2017)."

Vernon-Morning-Star (2017-07-06). "Dogs poisoned on Kelowna trail. <https://www.vernonmorningstar.com/news/dogs-poisoned-on-kelowna-trail/>."

Vernon-Morning-Star (2017-07-06). "Water warning in effect. <https://www.vernonmorningstar.com/news/water-warning-in-effect/>."

Vernon-Morning-Star (2017-07-07). "IHA engaging on drinking water. <https://www.vernonmorningstar.com/news/iha-engaging-on-drinking-water/>."

VictoriaNews(2017-07-06)"No fentanyl found at Tall Tree Music festival.<https://www.vicnews.com/news/no-fentanyl-found-at-tall-tree-music-festival/>"

Voice-Online (2017-07-19). "WorkSafeBC launches young-worker safety campaign. <http://www.voiceonline.com/worksafebc-launches-campaign/> (accessed July 22, 2017)."

Washington-State-Department-of-Health "Dangers of Mixing Bleach with Cleaners. <http://www.doh.wa.gov/YouandYourFamily/HealthyHome/Contaminants/BleachMixingDangers> (accessed July 29, 2017)."

Weather-GC-CA (2017-07-10). "Public Weather Alerts for British Columbia. Government of Canada http://weather.gc.ca/warnings/index_e.html?prov=bc."

WHO (2014-03-25). "Media Centre. 7 million premature deaths annually linked to air pollution. <http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>."

Wood-Business (2017-06-27). "WorkSafeBC shares numbers on combustible dust initiative. <https://www.woodbusiness.ca/sawmilling/health-safety/worksafebc-shares-numbers-on-combustible-dust-initiative-4308> (accessed July 22, 2017)."

Work-Safe-BC (2014). "2014 Statistics. 2014 Annual Report and 2015-2017 Service Plan: Statistics 2014. ."