



Heatwave in Western Canada

Ecem Budak

21703140

Eda Okay

21703698

Farid Sahabi

21500619

Contents

1

Overview

2

Precautions

3

Disaster Management

4

What was right/wrong?

5

Lessons Learned

6

Q&A

Overview of the Disaster

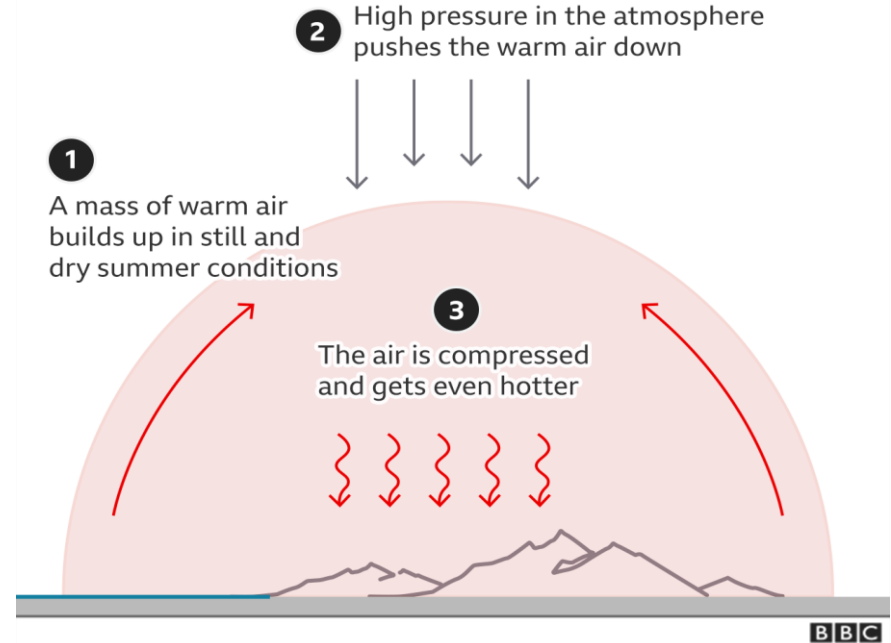


What is a Heatwave?

- A heatwave is an extended period of hot weather compared to the expected seasonal conditions of the area at that time of year.
- Heat domes were the primary reasons of heatwave.



How a heat dome forms



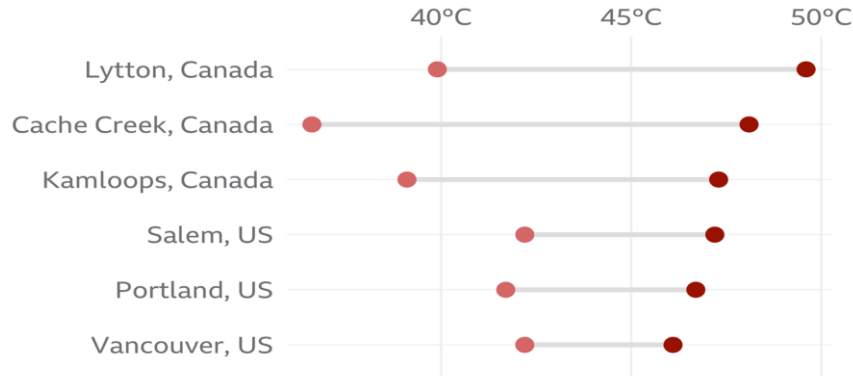
Overview of the Disaster



What Happened?

- A blistering heatwave hit Canada in June 2021.
- Temperatures increased to dangerous levels like nearly 50°C
- Temperatures had never passed 45°C before.

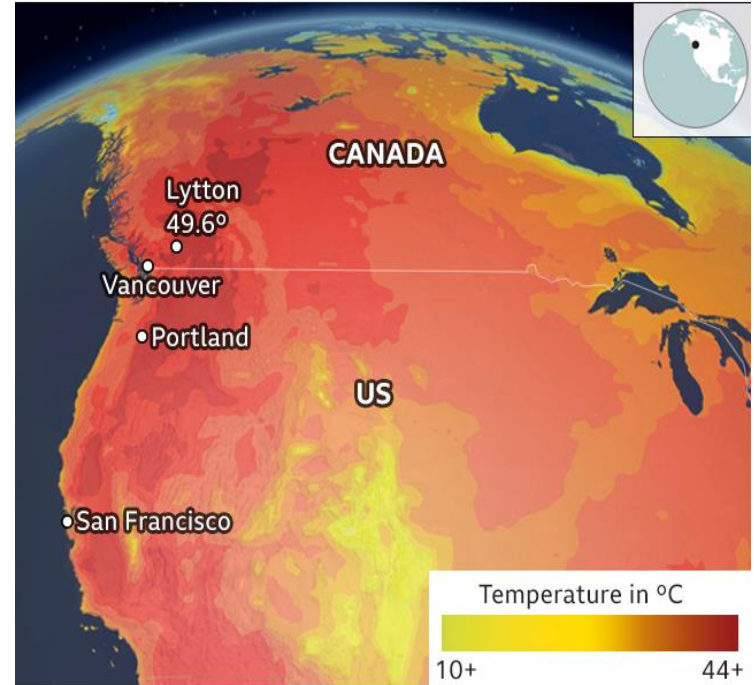
Previous record-highs compared to new record temperatures



Source: Meteorological Service of Canada, US National Weather Service



Temperatures in Canada and north-west US reached record highs on 29 June



Source: BBC Weather



Overview of the Disaster



Results of the Heatwave

- 815 sudden deaths were recorded in British Columbia.
- 570 of the sudden deaths were confirmed to be related to heat.
- 79% of the deaths were 65 or older.





Overview of the Disaster

Results of the Heatwave

- Residents in urban spaces and rural areas have been particularly affected by the high temperatures.
- Many residents have been forced to take refuge in cooling centres or air-conditioned buildings.
- Vaccination centres were forced to close or relocate.
- The heat buckled roads besides melting power cables.



Overview of the Disaster



Results of the Heatwave

- More than 180 wildfires occurred in British Columbia.
- A wildfire has damaged 90% of the village of Lytton. Residents in the village were forced to evacuate.



- 864,473 hectares of area burned.
- More than \$500M were spent for fighting against wildfires.

Precautions



Technical guidelines for healthcare workers and healthcare facilities in extreme heat events:

- Staff Education
- Extreme Heat Summary Advice for Medical Officers
- Management of Extreme Heat Events
- Long-Term Planning Advices for Health Centres



Ministry of Health published guidelines for citizens:

- Health Risks
- Sun safety tips
- First aid advice
- UV index and local forecast
- Brochures for risk groups

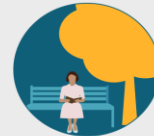
Tips for staying cool and safe



Drink water and eat foods with high water content



Wear loose-fitting clothing in breathable fabrics and a hat



Stay in the shade and limit travel and exercise



Use fans, ice and cool showers to reduce your body temperature



INADEQUATE PRECAUTIONS IN OPERATIONAL SENSE

Precautions



Municipalities' Cooling Centers



Disaster Management

1. Guidance

- Technical Guide for Health Care Workers
- Cooling Measures for Existing Buildings and Outdoor Spaces
- Considerations for Management of Staff and Supplies
- Considerations for Care Management During Extreme Heat
- Facility Emergency Plan Check List
- Planning for New Facilities and Renovations



CITY HEATWAVE GUIDE FOR **RED CROSS RED CRESCENT BRANCHES**



Disaster Management

2. Medical Care



Disaster Management

3. Cooling Centres and Facilities

- Shopping malls
- Movie theatres
- Libraries
- Community centres and gardens
- Swimming pools
- Beaches
- Splash pads
- Cool rooms within communal living facilities



Disaster Management

4. Volunteers



A woman who goes by the name ChillyBean hands out bottled water to residents in the Downtown Eastside neighbourhood in Vancouver on June 28. (Ben Nelms/CBC)

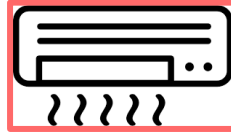


Eddy Norby, who lives in an RV, talks with volunteers from the Salvation Army Northwest Division who gave him bottled water during a heat wave, June 27, 2021. © Karen Ducey, Reuters

What was right or wrong?



**1. Insufficient
number of
medical
staff**



**2. Shortage of
air
conditioners
and fans**



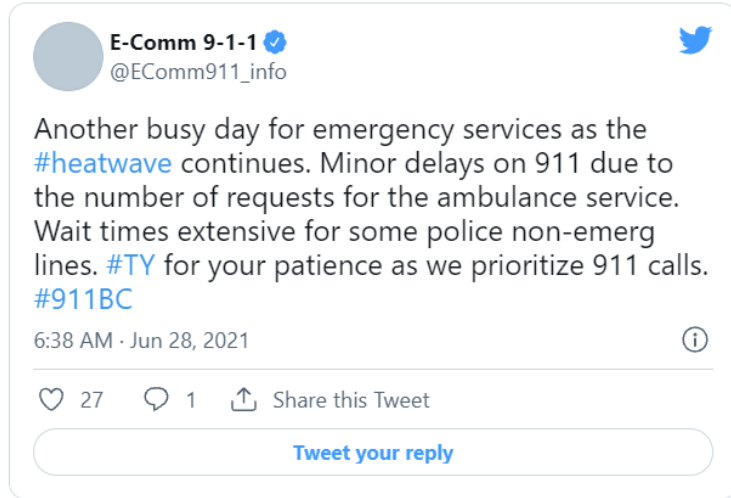
**3. Lack of
proper cooling
infrastructures
at homes and
hospitals**

1. Insufficient number of medical staff

- The head of the province's emergency health service apologized after residents were made to wait hours for ambulances during the heatwave.
- The union representing emergency call operators says there simply aren't enough staff members to properly respond to incoming calls.
- There were waits of an hour or more for critical calls coming into the dispatch centre.



B.C. paramedics say staffing shortages led to long wait times for 911 calls during the recent heat wave. (Ben Nelms/CBC)



“The emergency communications centre responsible for 99% of 911 call-answer in B.C. received close to 8,000 calls on Saturday and more than 7,300 calls on Sunday. This is a historic **increase of approximately 55%** compared to a normal weekend in June,” said Jasmine Bradley with E-Comm.

Staffing shortages within the ambulance service has been an ongoing issue, meaning many of the emergency vehicles are left parked. Back in March, Clifford told NEWS 1130 there were 32 ambulances out of service in one evening due to staffing. At that time, BC Emergency Health Services admitted about **11% of the vehicles were sidelined** on a Saturday in Vancouver.



An ambulance outside St. Paul's Hospital in Vancouver. The province has seen a major spike in sudden deaths and emergency calls related to extreme heat, and paramedics are struggling to keep up. (Robb Douglas/CBC)

“Every paramedic I know does it because they want to help people. And when you can't help and you hear what's happening, it it breaks you a little bit inside.”

- B.C. Ambulance Service paramedic

2. Shortage of air-conditioners and fans

- When the record-breaking heat was forecast at least a week in advance, many people scrambled to purchase air conditioning units and fans.
- During heat wave, some B.C. residents resorted to buying AC units and new HVAC systems — but most were quickly sold out.
- There was nearly a **575% increase in calls and website visits** from people looking to install air conditioning since the temperatures began to climb.



Portable air conditioners are selling out almost as fast as they're coming in at this Canadian Tire in Mount Royal. (Axel Tardieu/CBC)

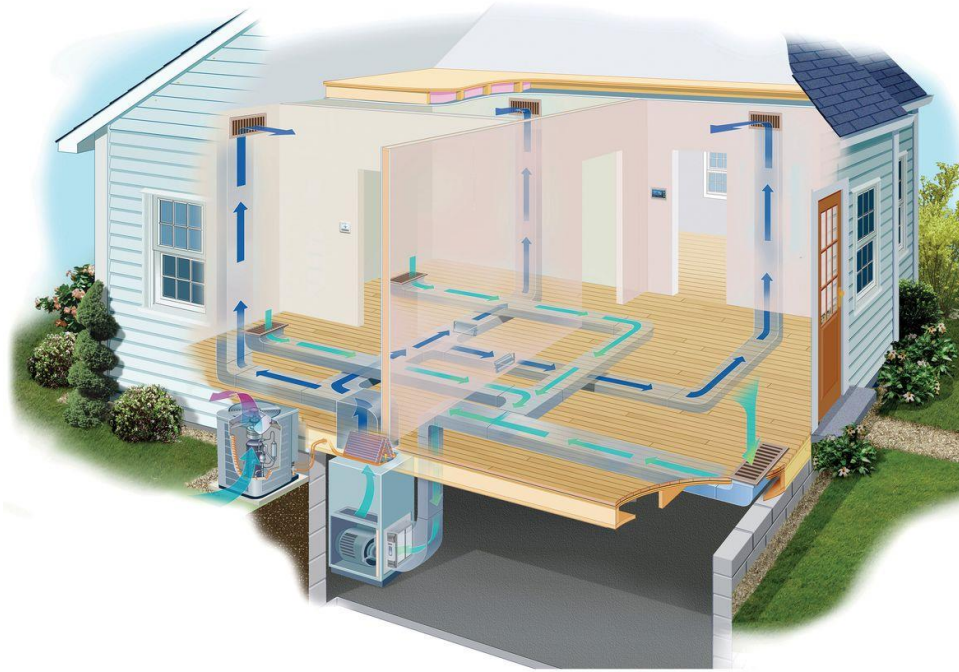


This Canadian Tire store in Vancouver was experiencing a shortage of air conditioners and fans this week amid the heat wave cooking Western Canada. Climate experts say that one extreme heat measurement we need to be thinking about is the wet-bulb temperature. (Ben Nelms/CBC)



A pedestrian carries a fan during extreme temperatures in Vancouver on June 28. (Ben Nelms/CBC)

3. Lack of proper cooling infrastructures at homes



- “Many buildings in British Columbia lack cooling due to the province's milder climate expectations.” - (Akua Schatz, a vice-president with the Canada Green Building Council, which focuses on sustainable building practices.)
- "So you end up with these, like, glass towers that are basically baking people, because they aren't designed to both have open airflow and really take in the heat," she said.

Lessons Learned

Staff

education

Develop and educate staff on heat emergency plans.

Information Dissemination

Districts to keep their inhabitants informed on the lethality of the heatwaves.

Preventive Measures

The government should rapidly reduce emissions and stop subsidizing fossil fuels. Develop a plan to reduce the carbon footprint

Educating the public

Inform and educate the public about precautionary methods and ways to stay healthy during the heat waves.

Infrastructural improvements

Improved cooling systems in personal homes and emergency response locations

Inventory-check

Ensure cooling equipment are available in stock during the summer season.

Needs Analysis for Vulnerable Groups

People with disabilities, elderly, Indigenous people, women, and children must be prioritised.



Q & A



01 **How hot is deadly for humans ?**

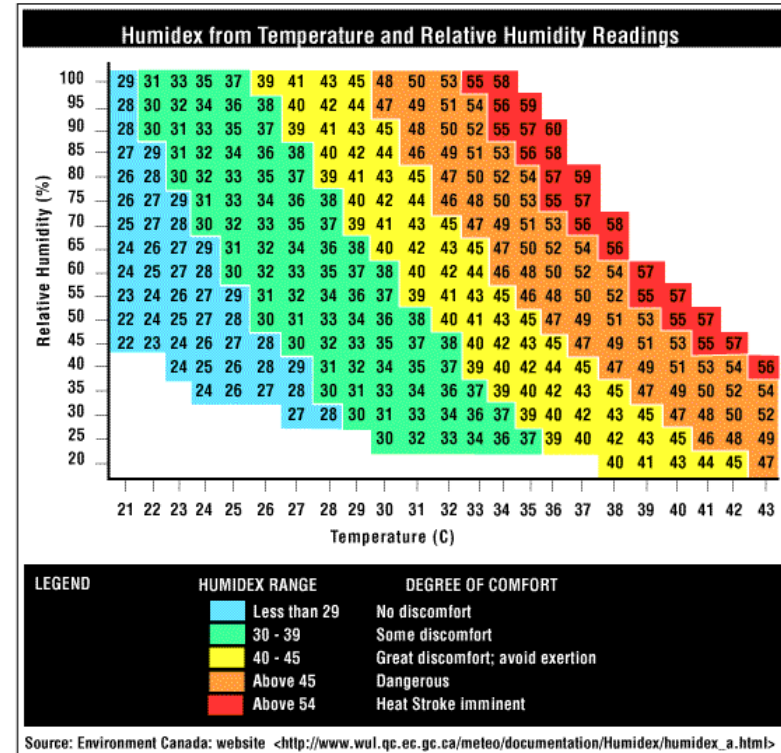


02 **Why are heat waves happening in locations that are generally known to be cold?**



How hot is deadly for humans?

- Wet-bulb temperatures are theoretical measurements that combine temperature and humidity into one value. it's the temperature at which water stops evaporating from a wet thermometer bulb, meaning it can no longer cool.
- For sweat to actually cool a person's skin, it relies on the process of evaporation to move heat away from the body. At theoretical wet-bulb temperatures, evaporation and cooling can no longer take place because the atmosphere is fully saturated with water.
- Other factors:
 - Altitude
 - Age
 - Income



Why are heat waves happening in locations that are generally known to be cold?

- Scientists in recent years have been developing models and experiments to figure out just how much humanity's hunger for fossil fuels is making individual disasters worse. It's part of a subfield of climatology known as attribution science, and extreme heat is the classical example.
- Climate change caused by greenhouse gases from burning fossil fuels is poised to make heat waves longer, more intense, and more frequent.
- **Simply:** The burning of fossil fuels adds greenhouse gases to the atmosphere, which traps more heat energy and pushes up average temperatures — which, in turn, also pushes up extreme temperatures.
- Atmospheric carbon dioxide concentrations recently peaked at 420 parts per million — heat waves are projected to become more frequent and more extreme.

References

- T. V. J. Team, "US-Canada Heatwave: Visual Guide to the causes," *BBC News*, 02-Jul-2021. [Online]. Available: <https://www.bbc.com/news/world-us-canada-57665715>. [Accessed: 17-Oct-2021].
- "Majority of sudden deaths during B.C. heat wave were due to extreme temperatures, coroner confirms | CBC News," *CBCnews*, 29-Jul-2021. [Online]. Available: <https://www.cbc.ca/news/canada/british-columbia/bc-heat-dome-sudden-deaths-570-1.6122316>. [Accessed: 17-Oct-2021].
- J. Muhammad, "Canada battles more than 180 wildfires with hundreds dead in heat wave," *NPR*, 05-Jul-2021. [Online]. Available: <https://www.npr.org/2021/07/04/1013026434/canada-battles-more-than-180-wildfires-with-hundreds-dead-in-heat-wave>. [Accessed: 17-Oct-2021].
- "Health Facilities Preparation for extreme heat - Canada." [Online]. Available: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/climat/health_facilit-instal_sante/health_facilit-instal_sante-eng.pdf. [Accessed: 17-Oct-2021].
- "Paramedics call for action from employers, province over long wait times during Heat wave | cbc news," *CBCnews*, 01-Jul-2021. [Online]. Available: <https://www.cbc.ca/news/canada/british-columbia/paramedics-burnout-b-c-1.6086347>. [Accessed: 17-Oct-2021].
- "B.C. Paramedic says people are waiting hours in sweltering heat for help after calling 911 | CBC radio," *CBCnews*, 02-Jul-2021. [Online]. Available: <https://www.cbc.ca/radio/asithappens/b-c-heat-wave-paramedics-overloaded-911-1.6086555>. [Accessed: 17-Oct-2021].
- "How to outfit buildings to better handle hotter temperatures | CBC news," *CBCnews*, 13-Jul-2021. [Online]. Available: <https://www.cbc.ca/news/canada/british-columbia/heat-wave-infrastructure-ac-1.6099694>. [Accessed: 17-Oct-2021].
- J. Murphy, "How North American cities are bracing for more heatwaves," *BBC News*, 11-Aug-2021. [Online]. Available: <https://www.bbc.com/news/world-us-canada-58015089>. [Accessed: 17-Oct-2021].

References

- "Hundreds died during B.C.'s heat dome. who is responsible for deaths caused by extreme heat? | CBC News," *CBCnews*, 08-Jul-2021. [Online]. Available: <https://www.cbc.ca/news/canada/british-columbia/heat-death-accountability-1.6093966>. [Accessed: 17-Oct-2021].
- N. Wires, "Heatwave in western US, Canada sends temperatures soaring to record highs," *France 24*, 28-Jun-2021. [Online]. Available: <https://www.france24.com/en/americas/20210628-heatwave-in-western-us-canada-sends-temperatures-soaring-to-record-highs>. [Accessed: 17-Oct-2021].
- *CityNews*. [Online]. Available: <https://www.citynews1130.com/2021/06/28/bc-heatwave-911-ecomm/>. [Accessed: 17-Oct-2021].
- "Air conditioners sell out and installers swamped as heat wave sends Calgarians into 'panic' mode | CBC news," *CBCnews*, 28-Jun-2021. [Online]. Available: <https://www.cbc.ca/news/canada/calgary/calgary-heat-wave-air-conditioner-1.6083111>. [Accessed: 17-Oct-2021].
- H. Canada, "Government of Canada," *Extreme Heat and COVID-19 - Canada.ca*, 30-Jul-2021. [Online]. Available: <https://www.canada.ca/en/health-canada/services/sun-safety/extreme-heat-covid-19.html>. [Accessed: 17-Oct-2021].
- U. Irfan, "How heat waves form, and how climate change makes them worse," *Vox*, 23-Jun-2021. [Online]. Available: <https://www.vox.com/22538401/heat-wave-record-temperature-extreme-climate-change-drought>. [Accessed: 17-Oct-2021].
- E. and C. C. Canada, "Government of Canada," *Canada.ca*, 03-Mar-2021. [Online]. Available: <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/progress-towards-canada-greenhouse-gas-emissions-reduction-target.html>. [Accessed: 17-Oct-2021].
- "How hot is too hot for humans? let's look at wet-bulb temperatures | CBC news," *CBCnews*, 05-Jul-2021. [Online]. Available: <https://www.cbc.ca/news/science/how-hot-is-too-hot-for-humans-understanding-wet-bulb-temperatures-1.6088415>. [Accessed: 17-Oct-2021].