



2020

Planning Resilient Communities and Adapting Rural Health Services in British Columbia

*Responding to climate change and
ecosystem disruption*



CHAPTER 2

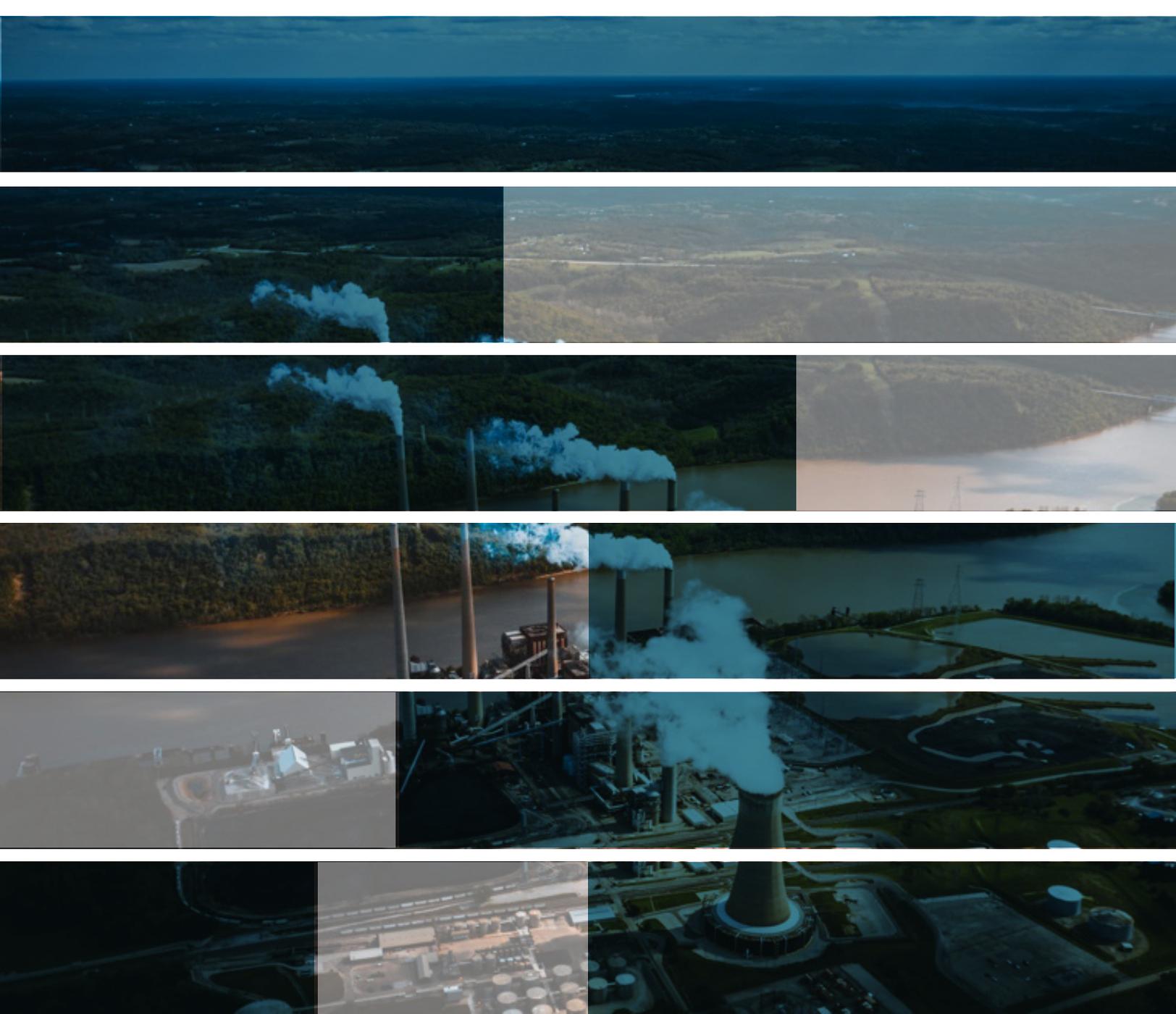
Climate mitigation and prevention strategies

The evidence for climate change is overwhelming and the recognition of the potential consequences of climate change have led to numerous meetings, agreements, promises and hopes for the future.

Chapter Two Highlights

- *The Canadian healthcare system is responsible for 4.6% of the national CO₂ emissions[15]. A median estimate of 23,000 disability-adjusted life years (DALYs) is lost annually from direct exposure to hazardous pollutants & environmental changes caused by pollution [29].*
- *187 of the 190 communities in BC have signed on to the BC Climate Action Charter to reduce or prevent the emission of greenhouse gases [20].*
- *Many health authorities have not yet identified climate change as a public health concern in the way that they do with other public health issues [25].*
- *The estimated annual decrease of CO₂ emissions for 2020 of approximately -7.5% will be the greatest ever recorded in history, and twice the amount of all past reductions since World War II [63]*

Photo by Chris Liverani (2020)



THE EVIDENCE FOR CLIMATE CHANGE IS OVERWHELMING and the recognition of the potential consequences of climate change have led to numerous meetings, agreements, promises and hopes for the future. After almost a hundred years of industrial activity and anthropogenic ecosystem disruption our attempts at prevention have only achieved minimal success. It is no longer a case for prevention but rather mitigation of further damage. Mitigation is essential and will become increasingly important as climate change effects and ecosystem disruption worsens. This chapter will summarize some of the efforts that have been made to prevent and mitigate climate change.

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What is climate mitigation?

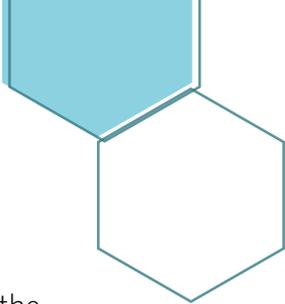
Climate mitigation refers to practices that reduce greenhouse gas emissions, in turn reducing the impacts of climate change [1]. Fossil fuel use is the largest contributor to anthropogenic greenhouse gas emissions. Renewable energy sources such as bioenergy, solar energy, geothermal energy, hydroelectricity, and wind energy can meet the energy needs of the world while minimizing greenhouse gas emissions; thus, renewable energy is an important consideration for climate change mitigation, including at the local decision-making level [2].

Overview of global mitigation initiatives



Figure 10. Photo by Pixabay via [Pexels](#) (2016).

As the greenhouse gases released by each country have a global impact, effective climate change mitigation will require a global effort. We have outlined global mitigation initiatives below:



United Nations mitigation initiatives

The United Nations is addressing Climate Change through multiple bodies, including the United Nations Environmental Program and the United Nations Framework Convention on Climate Change (UNFCCC) secretariat. Examples of mitigation initiatives created by the UN are listed below:

United Nations Framework Convention on Climate Change (UNFCCC)

Established in 1994, when there was less scientific certainty about climate change, the UNFCCC aimed to reduce greenhouse gas emissions to a level that did not threaten humans within a time-frame that would allow earth's food systems and ecosystems to adapt to a changing climate, while allowing for sustainable economic development [3].

The two key amendments to the UNFCCC include the Kyoto Protocol and the Doha Amendment. The Kyoto Protocol operationalizes the UNFCCC by outlining greenhouse gas emission reduction targets for industrialized countries. It has entered full force in 2005, with 192 nations signed [4]. Canada signed the Protocol in 2002, but withdrew in 2011 [5]. The Doha Amendment includes new commitments to the Kyoto protocol for the second period of the protocol (2013-2020), with new greenhouse gases that needed to be reported by signing parties, and addressing issues with the initial Kyoto protocol. The Amendment was adopted in 2012 but has not yet entered full force [4]. Canada has not signed the Doha Amendment [6].

The Paris Agreement

The Paris Agreement was reached in 2015 and builds upon the UN's Framework Convention on Climate Change, which aims to keep anthropogenic greenhouse gas emissions at a level that prevents harmful changes to the climate [1]. The specific targets set by the agreement are to limit the temperature increase to less than 1.5 degrees Celsius above pre-industrial levels as well as increase the capacity for nations to adapt to climate change impacts [7]. Mechanisms to support nations in achieving these goals include increasing transparency, and generating appropriate financial flows, technology frameworks, enhancing support for developing countries, and transparency structures [8]. The Agreement also includes Nationally Determined Contributions (NDCs) whereby each nation identifies its most ambitious effort to fulfill the Agreement, and reports on it every five years. Each consecutive NDC is more ambitious than the previous one. Canada's commitments under the Paris Agreement include [9]:

- Reducing greenhouse gas emissions by 30% below 2005 levels by 2030
- Aim for net zero emissions by 2050
- Pledging 2.65 billion CAD\$ in climate finance over five years to support climate action in developing countries



Figure 11. Prime Minister Trudeau signs the Paris Agreement at the United Nations in New York City. April 22, 2016 (2016). Retrieved from Justin Trudeau via [Flickr](#). No changes made. All rights reserved by [creative commons](#).

The Organization for Economic Co-operation and Development (OECD) climate policy and carbon tax instruments

OECD's Policy Instruments for the Environment (PINE)

The PINE database includes detailed information on qualitative and quantitative information on environmental policy tools such as taxes, fees and charges, and subsidies. Their tool includes policies from 90 countries that are members and non-members of the OECD, and allows for detailed comparisons between the policy instruments used by different countries [10].

OECD's green recovery in the time of COVID-19

The OECD has released a list of 25 climate actions that can be adopted to keep our planet on track for 2025 climate targets, based on the 5 sectors that produce the most emissions (agriculture, buildings, transport, electricity, and industry) and the 5 most effective policy instruments (invest, regulate, tax and subsidise, lead by example, and inform and educate). The OECD has identified COVID-19 and its subsequent governance disruptions as a unique opportunity for governments to implement green recovery plans and encourages governments to consider the 25 climate actions in their green reforms [11].

Canadian mitigation strategies

Canada in the energy sector

In 2018, Canada exported \$132.2 billion in energy products, with 89% of the products going to the US. It also imported \$50.5 billion in energy products, with 70% coming from the US. About 81% of Canada's greenhouse gas emissions come from the energy sector and 82% of



Canada is the...

6th largest **energy producer**,

4th largest in **crude oil producer**,

2nd largest in **uranium producer** and the

2nd largest **hydroelectricity producer**

... in the world.

Figure 11. Photo by Brett Sayles via Pexels (2018).

Canadian energy comes from non-greenhouse gas emitting sources, such as hydro or wind [12].

Climate and Clean Air Coalition (CCAC)

Canada is a founding member of the CCAC, a voluntary partnership of governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations that take action to reduce short-lived climate pollutants (SLCPs) to protect the climate and improve air quality [13]. Canada's efforts under the CCAC include reducing SLPCs in agriculture, heavy duty vehicles and engines, and municipal solid waste [14].

Federal-provincial-territorial dimensions

In 2015, in collaboration with provincial and territorial governments, the Federal government created the Pan-Canadian Framework on Clean Growth and Climate Change, which aims to generate economic growth while reducing emissions and building climate resilience [15]. Carbon pricing and reducing greenhouse gas emissions in the energy sector (responsible for 80% of Canada's emission) are key to this strategy. Provincially and territorially, climate mitigation strategies have been developed and/or implemented, including BC's carbon tax [16], Nova Scotia's Cap and Trade Program [17], and Manitoba's hydro power [18].

Climate mitigation in British Columbia

BC Greenhouse Gas Emissions

Total greenhouse gas emissions in BC have had small and variable changes in recent years. There was only a 0.5% reduction from the baseline level of 2007 compared to 2017. In contrast, the average greenhouse gas emissions per capita has steadily decreased since early 2000s. The Energy sector has historically produced significantly more greenhouse gases in BC than other sectors such as Waste, Industrial Processes & Product Use, Afforestation & Deforestation, and Agriculture. This trend is still apparent today. Within the Energy sector, the largest players of emission included road transportation, oil and gas extraction, and heating of residential buildings [19].



Figure 12. Photo by Tetyana Kovyryna via Pexels (2020).

BC Climate Action Charter

The BC Climate Action Charter is a voluntary agreement between the BC government, the Union of BC Municipalities, and local governments to address climate change through greenhouse gas emission reductions. Signatories commit to becoming carbon neutral in corporate operations, measure and report on their community's greenhouse gas emissions, and create more energy efficient communities [20].



Local government climate change mitigation

Climate change mitigation within this strategy is defined as efforts taken by local governments to reduce or prevent the emission of greenhouse gases. Local governments play an important role in the reduction of greenhouse gas emissions in BC, and 187 of the 190 communities in BC have signed on to the charter (mentioned above). Community specific initiatives include improved land use planning, and carbon neutral frameworks targeted at reducing greenhouse gases [21].

BC Healthy Communities Initiative: Planh

BC Healthy Communities is an independent non-profit that partners with local BC governments to help prioritize community health and well-being by improving the social determinants of health, including those impacted by climate change [22]. Planh is a BC Healthy Communities initiative works to develop and plan for healthier communities in partnership with the health authorities, the Union of BC Municipalities, and the Ministry of Health [23]. Planh provides recommendations for how the public health sector can contribute to local climate change mitigation agendas, for example by informing policy and planning, integrating public health and climate change messages into communications, and developing programs and protocols for emergency response [24].

Healthy Communities BC Initiative

BC Healthy Communities is an independent not-for-profit organization, in partnership with BC Ministry of Environment's Climate Action Secretariat and the BC Ministry of Health [25]. Main findings from this initiative:

- Many health authorities have not yet identified climate change as a public health concern in the way that they do with other public health issues [25].
- 80% of health authority leaders do not have an action plan for climate change adaptation/mitigation strategies in British Columbia, even though the WHO has encouraged public health officials to act as quickly as possible to reduce future adverse impacts of climate change [25].



Mitigation strategies for health services

Carbon footprint in health care

In 2014, the total CO₂ emissions from the health sectors of OECD countries (excluding

Chile), India and China were 1.6Gt. This is equivalent to 4.4% of global net emissions of the same year [26,27]. If the global health sector was an independent country, it would be the 4th in the world's CO2 emission ranks in 2016, below China, US, and India. Canada contributes up to 2% of the world's total GHG emissions and is one of the top emitters per capita along with China (28%), US (14%), and the European Union (10%) in 2016 [28]. The Canadian healthcare system is responsible for 4.6% of the national CO2 emissions. A median estimate of 23,000 disability-adjusted life years (DALYs) is lost annually from direct exposure to hazardous pollutants & environmental changes caused by pollution [29]. With increasing climate change-related health care demands, the health services sector must implement eco-friendly strategies in its delivery of care. Failure to do so will, paradoxically, exacerbate the negative health outcomes of climate change with its continuously growing GHG emissions.

General mitigation strategies in health care

Sustainability efforts in healthcare

Evidence shows the need to increase carbon literacy and numeracy in the health workforce [30]. In a study of health professionals' sustainability efforts, participants described a lack of exposure to related information, and suggest that professional development is needed for improved sustainability practices of clinicians in their workplace [31]. Another factor at play in the health sector is the lack of widely accepted metrics for measuring sustainability, which can manifest as a barrier to targeting and measuring mitigation efforts. This may include level of particulate matter, GHG emission by sector and institution, and waste production and treatment [32]. Without a tangible method to identify the gaps and process of improvement, it is difficult to operationalize and develop concrete plans. The lack of indicators is keenly felt in the evidence-based health care field, which values those which can be measured [31,33].

Mitigation Efforts

To address this issue, Health Canada has adopted the RETScreen technology, developed by the Government of Canada "to rapidly identify, assess and optimize the technical and financial viability of potential clean energy projects", and "easily measure and verify the actual performance of their facilities" [34,35]. This is an example of a government-level effort to effectively and systematically implement mitigation strategies in promoting sustainable practices in the national health care system. First made available in 1998, RETScreen technology is now widely implemented to broaden sustainable energy use across countries [36].

Medical waste management

Hospitals generate a significant amount of non-recyclable disposable wastes such as masks, gloves, and syringes. In particular, approximately 35% of the total hospital waste



is produced by operating rooms alone [37]. Hospital wastes are often biohazardous and require careful disposal techniques. The production and management wastes significantly contribute to the overall healthcare sector's energy consumption and GHG emissions. Therefore, it is important that healthcare providers, and more importantly the manufacturers are educated and held accountable for environmentally-sustainable packaging, separation of non-recyclable from recyclable wastes, and disinfecting techniques for reusable medical instruments. In addition to effective waste management and reuse/recycling within the hospitals, but it is important to recognize that, as major purchasers of medical equipment, hospitals and health authorities should collectively demand manufacturers to use more sustainable materials and reduce overall packaging of medical devices.

Recent outbreak of COVID-19 increased daily usage of disposable personal protective equipment. Medical masks are made of plastic fibers such as polypropylene, which, when exposed to the environment as degraded microplastics, can severely affect ecosystems. It can also increase atmospheric carbon by interfering with oceans' capacity for carbon sequestration [38-40].

Mitigation efforts

For example, single-use packaging for sterile equipment generate significant amounts of plastic waste. Practice Greenhealth suggested implementing reusable metal sterilization containers, which not only generates less waste but offers greater protection from the environment and resilience to disinfecting procedures [41]. However, WHO recognizes the challenge of balancing environmental and safety requirements - for example, autoclaving, an advanced disposal process for infectious and hazardous materials, requires significant energy but is effective in minimizing environmental impacts of biohazardous equipment. It also reduces the risk of biohazardous exposure to patients and staffs [42].

E-waste management in health care

E-wastes are also significant contributors to climate change and should be a part of health care's mitigation efforts. E-wastes refer to disposed computers, servers and all other electronic appliances. When e-wastes are disposed, they release toxic chemicals such as polybrominated diphenyl ethers (PBDE) into the air, which not only accumulates to cause direct harm to human health, but also reacts with O₂ to produce CO₂ [43]. Health services produce a significant amount of e-waste annually due to continual upgrade of servers and health equipment, which is necessary to keep medical technology up to date.



Mitigation Efforts

One of the ways in which the health care sector can address this issue is through 'green IT' - that is, increasing the use of more energy-efficient systems such as virtual servers, data storage, and consultations/treatment (i.e. telehealth), and meetings. This not only reduces the number of servers required, hence the amount of equipment disposed of, but also reduces system management costs. Furthermore, server consolidation, the combining of multiple existing servers, can reduce e waste and may increase continuity of care as patient data will be available across provincial and regional authorities. However, this will require careful consideration of privacy and security [44].

Healthcare infrastructure

Hospitals operate 24/7 and require significant energy for their maintenance, such as heating/cooling, lighting, and powering the equipment. The WHO recommends that hospital architecture and building orientation consider the natural landscape and sunlight to allow for passive cooling/heating and lighting. Renewable sources of energy, such as solar, hydroelectric, and wind should be actively utilized in hospitals. A combination of natural and mixed modes of ventilation will not only reduce energy required, but allow for better air circulation which can effectively reduce the risk of airborne disease transmission [42]. In addition, the operating rooms are unoccupied for up to 40% of the time - controlling room maintenance during these periods can lead to significant energy savings [45]. It is also important to note that, compared to standard halogen lightings, replacement with LEDs show improved color representation for surgeons with up to 50% energy savings [46]. Cost reduction from optimized energy use can subsequently be allocated towards improving patient care. Alongside building maintenance, transportation is also a significant emitter of GHG. This includes but is not limited to ambulance and helicopter patient mobilization.

Mitigation Efforts

Currently, electric vehicles are not actively implemented in health care, due to the high initial costs, additional infrastructure required such as charging stations, longer time to full charge and the limited distance travelled with a single charge [47]. As electric vehicles become more common and technology improves, we hope to see its increased use in ambulance services.

Mitigation in the rural health context

In BC, climate change mitigation is operationalized similarly in urban and rural areas, with an emphasis on commitments to becoming carbon neutral, including new technologies that reduce energy consumption, implementing land use planning that reduces greenhouse gas emissions, and working with local businesses, industry and residents to manage energy use [21]. However, given the geographic vastness and extreme temperatures of these rural areas, these mitigation efforts may have a larger positive impact on rural communities. Examples of rural BC mitigation initiatives include:

- A biomass boiler installation in Golden and Lillooet. These plants are used to burn wood chips and pellets to generate energy for its regional hospitals and centres. Together, they have reduced annual carbon emissions by 658t and operational costs by \$250,000. Assessments for biomass boilers is underway for Dr. Helmcken Memorial Hospital in the District of Clearwater [48,49].
- An electrification project in Lytton. The Interior Health Authority has proposed to use abandoned well water systems to generate heat pumps for St. Bartholomew Health Centre. This project's focus is to replace propane gas with renewable and more affordable energy [48].
- An 18-month energy management project in Vanderhoof. The Northern Health Authority has proposed a series of changes to St. John Hospital that includes a new air to water heat pump and a new heat recovery coil to reduce greenhouse gas emission. This project is expected to reduce site-specific emissions by 30% and more than 1% of the total natural gas usage of the Authority [50].

Generalism and telehealth are also promising strategies in health care practices that can minimize GHG emission. We will discuss this further in Chapter 4 of this compendium.



Figure 13. Biomass boiler plant in Golden (2019). Retrieved by Interior Health Authority via [2019 Carbon Neutral Action Report](#). No changes made. All rights reserved. Generalism and telehealth are also promising strategies in health care practices that can minimize GHG emission. We will discuss this further in Chapter 4 of this compendium.

Physician role in mitigating climate change

Research evidence shows short-term health impacts following climate change-related extreme events such as forest fires and heat waves, which showed significant alternations in disease prevalence from the norm – i.e., increases in emergency department (ED) visits, mortality rates, and other morbidity [51,52]. However, there is limited systemic longitudinal data that correlates health outcome trends with climate change progression. Given that ecosystem disruption is a gradually evolving process, it has been challenging to grasp the bigger picture of its effects, including health outcomes. This makes it difficult for physicians and other health professionals to accurately predict and respond to community-specific risks. Operationalization of long-term data tracking will lead to better risk assessments and stronger coordinated forward planning [53].

Furthermore, capacity building for climate-related diseases is an essential preparation that needs to be planned for at local and regional levels. Climate change will impact various aspects of health disproportionately, such as mental health, cardiovascular, and pulmonary. Increases in hospital visits will occur in times of natural hazards like forest fires and heavy rain events [54–56]. Local health care facilities need to have adequate resources to accommodate increasing health needs in times of environmental stress. One of the most important considerations, aside from implementing new resources, is to maximize the use of infrastructure, knowledge, and experience present in the community. Local expertise in partnership with health system support may greatly enhance the resiliency of a rural community. The Canadian Association of Physicians for the Environment (CAPE) provides an overarching National physician presence with the potential of coordinating and supporting

local and regional activities. The BC Chapter has organized a virtual conference titled “The Climate Emergency”; Diagnosis and Treatment planned for the end of October this year, 2020.

For the public, climate change education needs to be provided at all levels including the community interface. Health care providers can offer important leadership in responding to the challenges of climate change. Studies show that increased patient trust results in greater adherence to physicians’ recommendations, including life style changes [57]. Many physicians and other health care providers believe that climate change will impact human health or report having observed the direct consequences of climate change on their patients. However, most also feel moderately overwhelmed in trying to respond at a personal level. There is broad support for stronger input of climate change into medical education throughout the physician life cycle [58].

Utilizing the unique position that they hold in the community, physicians can help build public awareness of climate change and guide behavioral changes for better health outcomes. An example of such is providing information on proper household practices such as safe food-handling during hotter weathers, preventative measures against water contamination during heavy rainfall, and enhancing UV protection [59]. In addition to general guides, physicians, being aware of patients’ circumstances such as age, occupation, family, and underlying health conditions, can identify particular risk factors not only specific to the community but to the individuals and advise accordingly [55,60].

Climate change health risks and outcomes varies across communities and regions in BC. Therefore, identification of the most relevant vulnerability factors at a local level is crucial for effective mitigation and prevention [51]. These factors include the demographic characteristics of the population, their health profiles and geographic location. Refer to Chapter 1 for more information on community-specific health outcomes of climate change. As such, it can be difficult for health authorities or the provincial government to capture the full effect of climate change or address different circumstances in an effective manner. Therefore, physicians should work to advocate to decision makers for the development and implementation of strategies that meet the needs of specific rural communities. This includes informing about the most vulnerable populations and ensuring that these groups are recognized in planning and emergency response policy making [60,61].

Climate change mitigation and COVID-19

Recent institutional and community responses to the COVID-19 outbreak proved our ability to effectively adapt to rapidly changing circumstances: school and workplace environments shifted online overnight; health services became readily available through telehealth; and communication across the world occurs from within our homes, eliminating much unnecessary travel.

As Dale Marshall from Climate Defense Canada puts, “bending the curve” for GHG emissions is no less different from doing so for COVID-19 [62]. The responses to the pandemic have shown that health and the environment are closely related, in which collective action to improve one may also significantly improve the other. The reduction in global GHG emissions during worldwide social distancing and lockdown is an example of such (Figure 14). International Energy Agency (IEA) reported that the average maximum daily reduction in CO₂ emissions for individual countries is approximately -26% between January to April 2020, relative to that of 2019. Global daily CO₂ emissions were comparable to 2006 [63]. The estimated annual decrease for 2020 of approximately -7.5% will be the greatest ever recorded in history, and twice the amount of all past reductions since World War II. The outcomes of reduced GHG emission were immediate, bringing noticeable changes throughout the world. For example, a clear view of the Himalayas, an extremely rare event due to air pollution, has been reported in April from Jalandhar after India had imposed a lockdown in March [64]. According to UN Environment Programme, this scale of reduction is what will be necessary every year for the next decade in order to limit temperature increase to 1.5°C,

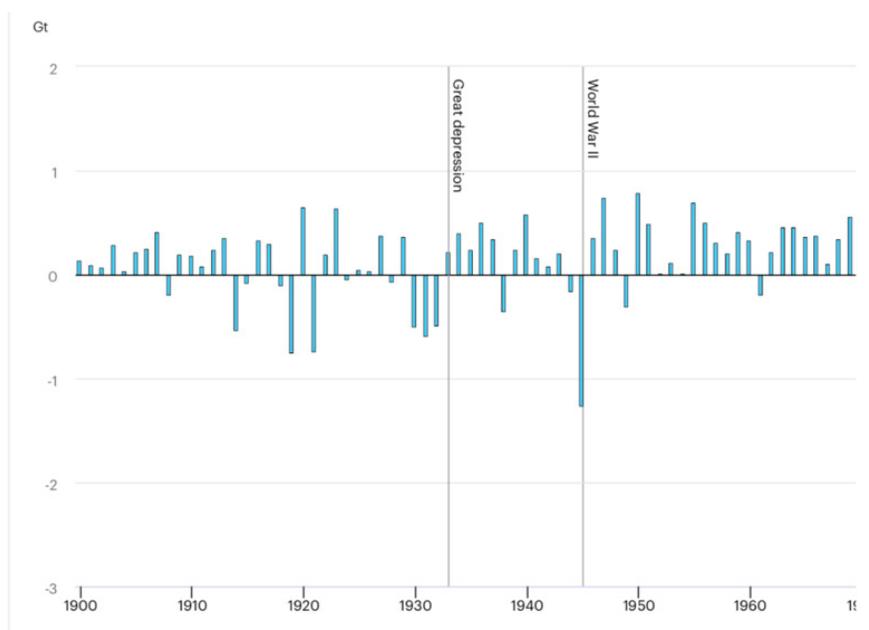


Figure 14. Source: IEA [Dave Turk, George Kamiya] (2020), Annual change in global energy-related CO₂ emissions, 1900-2020, All rights reserved.

in alignment with the Paris Agreement. This recognizes how far countries have been behind in meeting their climate mitigation goals [65]. In other words, countries must maintain the current GHG emission levels. However, IEA suggests that the current level of emission reduction is temporary and the rebound may be greater than the reduction [66]. According to a survey report published by the Canadian Centre of Policy Alternatives, the majority of British Columbians want the provincial government to focus on sustainable and equitable economic recovery rather than rebuilding the system from pre-COVID times [67]. Determined and timely actions by all levels of government is

required to ensure that, as we rebuild our economy, more sustainable measures are implemented. In keeping with this approach the International Institute for Sustainable Development has outlined seven key principles for a green recovery in Canada [68]:

1. Financial support to industry must include conditions for a zero-emission transition.
2. Apply strict financial conditions to increase financial stability, secure jobs, and incentivize low-carbon transition.
3. Ensure recovery is worker-focused and accelerates and enables a just transition.
4. Support the evolution and creation of the sectors and infrastructure of tomorrow.
5. Protect, follow, and strengthen environmental regulations and climate policy frameworks during recovery.
6. Ensure transparency and accountability.
7. Support must contribute to increased equity and well-being, leaving no one behind.

Challenges and gaps in global governance around mitigation strategies for climate change

Issues of accountability

From the Kyoto Protocol (2002) and Copenhagen Accord (2009) to the Paris Agreement (2015), Canada has historically failed to meet its goals for climate change mitigation. With fast-progressing impacts of ecosystem disruption, there is a pressing need for more active measures and adherence strategies. The federal and provincial governments have recently proposed several legislated accountability frameworks to communicate with the public and hold decision makers responsible for reaching the Paris Agreement goals by 2030.

Climate action accountability frameworks in Canada

Pan-Canadian Framework on Clean Growth and Climate Change (the Pan-Canadian Framework)

Objective

The Pan-Canadian Framework was developed in 2016 as the first nation-wide response for climate change resiliency and clean economic growth, aiming to meet the proposed 2030 Paris Agreement goals. As the standard for many Canadian climate change and sustainability plans, this framework has guided modification of the Canadian Environmental Protection Act and its regulations on industrial sectors such as oil and gas, transportation, and electricity [69].

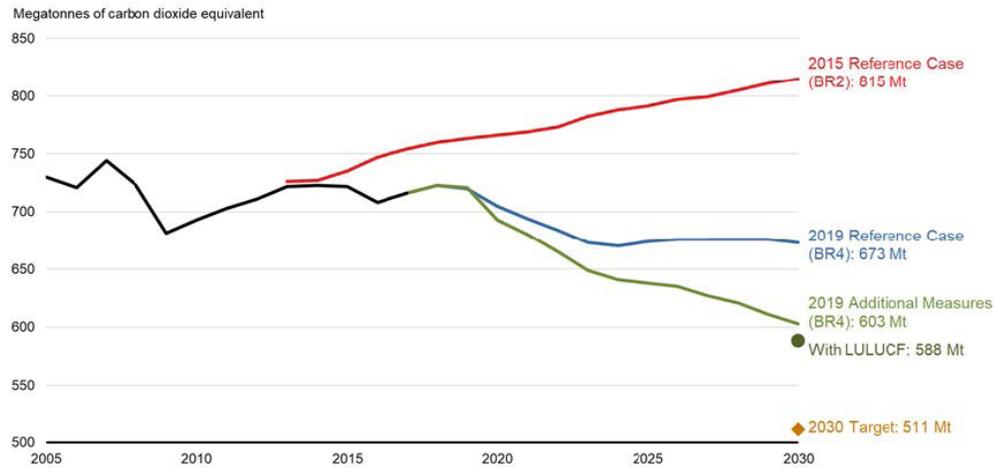


Figure 15. Historical greenhouse gas emissions and projections, Canada, 2005 to 2030 (2020). Retrieved from [Environment and Climate Change Canada](#). Data source: [National Inventory Report 1990-2017: Greenhouse Gas Sources and Sinks in Canada](#) (2019), [Canada's Fourth Biennial Report on Climate Change](#) (2020). All rights reserved by crown copyright.

Partnerships

The Framework involves joint and individual commitments between the federal, provincial, and territorial governments, as well as the Indigenous, businesses, non-governmental organizations and individuals [69].

Pillars/Actions

More than 50 action plans across the economic sectors are organized into four main pillars: pricing carbon pollution; complementary action to reduce emissions; adaptation and climate resilience; and clean technology, innovation, and jobs [69].

Planning/Reporting

For accountability and oversight of the progress, the federal, provincial, and territorial governments are committed to yearly reporting of the Framework implementation progress to the First Ministers and Canadians. This Pan-Canadian Framework Annual Synthesis Report started in 2017, and the latest report was published in 2020 [70].

Impact

With the full implementation of the Pan-Canadian Framework policies and additional measures, CO₂ emissions levels are predicted to reduce from 815Mt to 588Mt by 2030. This includes the Land Use, Land-Use Change and Forestry (LULUCF) sector regulations under the Pan-Canadian Framework, such as the Low Carbon Economy Fund (LCEF). Although this does not meet Canada's 2030 target of reducing CO₂ emissions to 511Mt, significant reductions are projected with full implementation of this Framework (Figure 15) [69].

2008 Federal Sustainable Development Act (FSDA)

Objective

The Federal Sustainable Development Act is the legal accountability framework for 3 year-period evaluations and development of the Federal Sustainable Development Strategy (FSDS), by the Minister of Environment and Climate Change [71].

Partnerships

26 mandatory federal organizations must develop each of their own action plans in accordance with FSDS, and 16 other organizations may participate voluntarily. Some of the major partners include Health Canada, Indigenous and Northern Affairs Canada, and Natural Resources Canada. The most recent strategy proposal, covering 2019 to 2022, supports the Pan-Canadian Framework and the UN Sustainable Development Goals while directly integrating citizen voices in its planning. Under the FSDA, FSDS must go through a public consultation for at least 120 days during its drafting process. Main partners that provide feedback during this period are the Sustainable Development Advisory Council and the public. Council members are representatives from each province and territory, and specific citizen groups such as the Indigenous, environmental NGOs, businesses, and labor representatives. The consultations are to be actively incorporated into the strategy development. For 2019-2022, feedbacks strongly supported the Paris Agreement targets with ambitious and timely action for climate change mitigation [71].

Pillars/Actions

13 main long-term goals for 2030 make up the basis for 2019-2022 FSDS, under which medium- and short-term goals are identified. The main themes include: effective action on climate change, sustainably managed lands and forests, healthy wildlife populations, and safe and healthy communities. For example, medium-term targets under safe and healthy communities consist of increasing percentage of Canadians living in areas where air quality standards are achieved, decreasing emissions of air pollutants, and taking risk management actions for substances that may harm the environment or human health [71].

Planning/Reporting

Publicly-available synthesis reports summarize public consultation feedbacks. FSDS progress reports are published every three years, outlining the progress of set goals using specific indicators [71].

Climate action accountability frameworks in BC

BC Climate Change Accountability Act (BC CCAA)

Objective

Formerly known as the Greenhouse Gas Reduction Targets Act, BC CCAA is a newly

modified provincial legislation under the CleanBC initiative that focuses on better accountability, transparency and more detailed GHG emission targets [72]. The Act, in alignment with the Pan-Canadian Framework, is committed to reducing BC's GHG emission to 40%, 60%, and 80% lower than the 2007 levels by 2030, 2040, and 2050 respectively, with shorter-term milestones in between. For this, the most noticeable changes in the legislation include annual reporting on mitigation actions and progress, and an independent advisory committee to direct government planning [73].



Figure 16. CleanBC plan to reduce climate pollution, build a low-carbon economy (2018). Retrieved from Province of British Columbia via Flickr. No changes made. Some rights reserved by creative commons.

Planning/Reporting

Annual reports

Starting October 2020, the Minister of Environment and Climate Change Strategy will be required to report on the progress of climate mitigation, such as current GHG emission reductions, estimate of future emissions, actions and expenditures from the past year and for following years. In addition to the government, other public sector organizations, including health authorities, are also required to produce annual progress reports. Sectoral targets are to be reviewed by the Minister every five years [72].

Advisory Committee

The advisory committee members are appointed by the Minister to provide advice to achieve mitigation targets, manage climate change risks, and create opportunities for sustainable economic development in a low-carbon industry. Half of the members must be women, and the committee must represent Indigenous groups, local governments, environmental organizations, academics, unions, rural and remote communities, and business

industries [73]. However, the Canadian Institute for Climate Choices points to the lack of independent oversight to ensure that the government's reports of progress is evidence-based and unbiased. They argue that while the advisory committee is mandated to provide advice, they do not actively monitor nor hold the government accountable for the progress thereafter [74].

Partnerships

This framework will allow the government to “ensure a diverse group of independent voices to contribute to BC’s progress of climate change mitigation, according to Merran Smith, the former co-chair of Climate Solutions and Clean Growth Advisory Council [72]. The provincial government’s commitment to an effective and timely mitigation plan that includes rural and Indigenous communities suggest a hopeful narrative to BC’s climate change response. However, its implications on health services and outcomes should be investigated further, such as how reduction in GHG emission impacts health care practice for physicians and access for patients. Communities and institutions must work alongside the decision makers to explore rural health services strategies while meeting the milestones towards our 2030, 2040 and 2050 GHG emissions targets.

In addition to CCAA, the BC government has developed several climate action legislations that span across various economic sectors. For example, the Greenhouse Gas Industrial Reporting and Control Act (GGIRCA) came into effect in 2016. Under this act, industries with over 10,000t CO₂ equivalent emissions must report their pollution to the government, and if over 25,000t, they must have their emission reports independently verified. GGIRCA also allows administrative penalties for non-compliances. Other legislations include the Carbon Tax Act, Clean Energy Act, Greenhouse Gas Reduction Act [75].

Conclusion

Long-term structural and lifestyle adjustments are inevitable and it may take global efforts to build back a better future. However, experience of COVID-19 has allowed the world to see the powerful impacts on the environment we can achieve in even a short time, and how nimbly we can collectively respond to a global crisis once we work together. Perhaps one of the most remarkable consequences of humanity facing a global pandemic is enhancing our understanding of how we can mitigate climate change.

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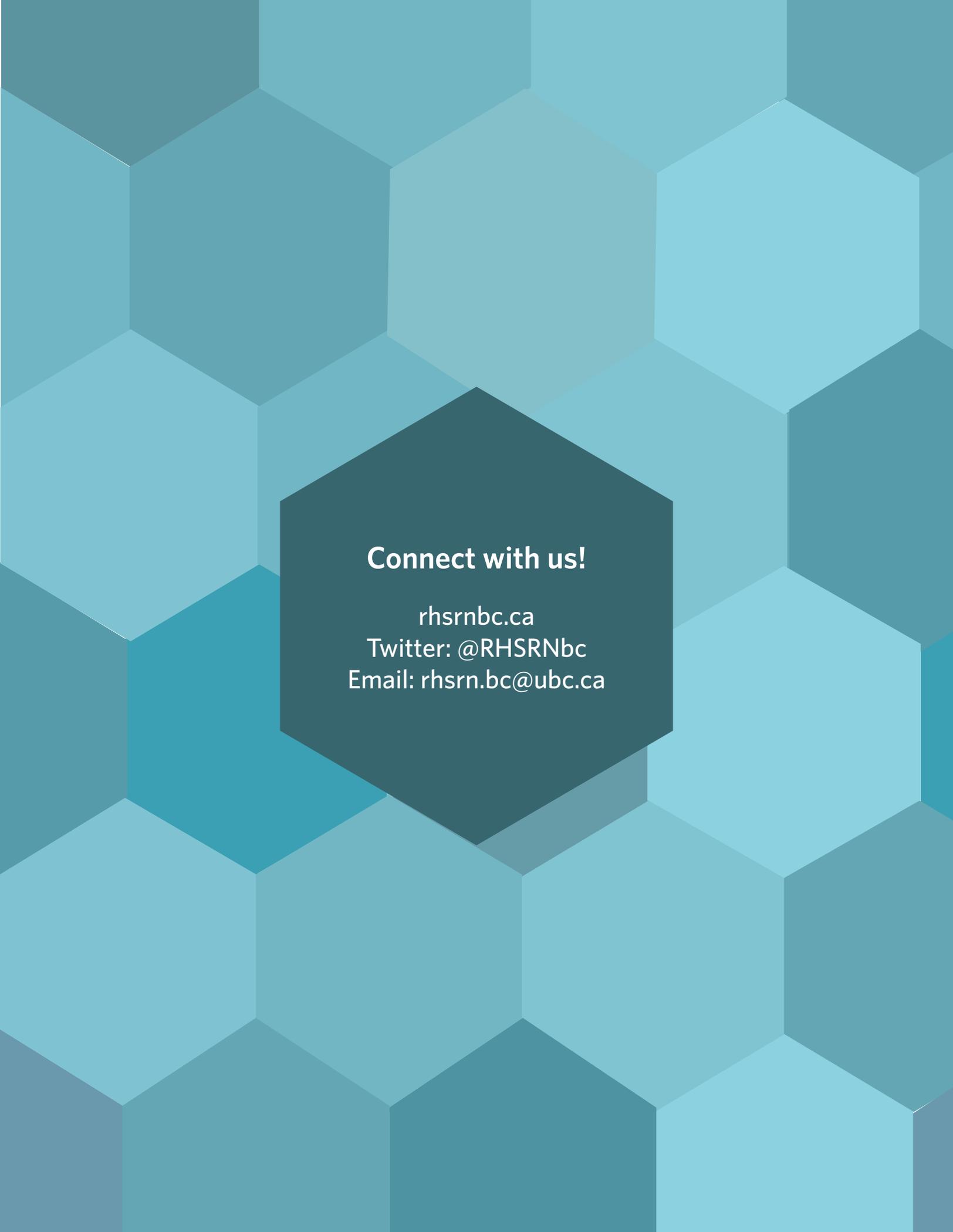
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