COVID-19 IN BC

BC COVID-19 Go-Forward Management Strategy

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BRITISH COLUMBIA

Contents

The Context[1]

Pandemics of respiratory viruses, such as COVID-19, can be declared over when the proportion of the population that is immune is large enough that transmission between people is no longer sustained.

That can happen in two ways:

- after enough people have been infected and have recovered and/or
- when enough people have been immunized with a vaccine (this is most likely, but not definitely, up to 18 months away from development, to manufacturing, to mass immunization).

Both outcomes will likely happen, but both are going to take time. Until that time, our goal is to slow the spread of COVID-19, especially among those most vulnerable to severe disease, to provide time for development of a vaccine and to enable the health care system to respond to a moderate increase in demand. Without a vaccine or treatment, the only way to achieve this was through the public health measures we have seen imposed in BC, in Canada and around the world. All jurisdictions needed to act very quickly in the face of a great deal of uncertainty about the new virus. As a result, BC, along with many other jurisdictions, imposed, over a very short period of time, a full range of public health measures, including: isolation of people with symptoms, quarantine of contacts of people with COVID-19, closure of schools, closure of dine-in restaurants and bars, cancellation of mass gatherings, and restrictions on travel. Additional voluntary measures were taken by individuals, service providers and businesses. This approach worked and the COVID-19 epidemic in British Columbia is currently under control. The slowing of COVID-19 spread has also given British Columbia the ability to expand testing, public health and clinical capacity to respond to future increases in COVID-19 transmission. It has also given us the chance to learn more about how this virus behaves. We now know a great deal more about COVID-19 than we did only a few weeks ago. We know that 82% of people have a mild, self-limiting illness, and that severe illness and death are much more likely in the elderly and in those with chronic medical conditions. We also know that, unlike with influenza, children are much less likely to get sick or transmit the virus than adults. The virus is largely transmitted through close, prolonged contact in households or congregate settings, and it is not easily transmitted outdoors. Staying home when you are sick and washing hands frequently remain essential parts of prevention.

In this next phase of our response, this information will be critical to help us return to essential activities of society. During any pandemic, public health measures need to be re-evaluated in the light of new information, to determine how effective each measure is and if the benefits of each measure outweighs the harms.

1 A range of papers and think pieces have been used in preparing this draft exploring and discussing how best to move forward in managing the COVID-19 outbreak after the first wave of flattening the curve; including a thoughtful paper by Dr. Leung, an infectious disease epidemiologist and dean of medicine at the University of Hong Kong, which was shared by the PHO. In addition, we need to recognize the analysis and great work provided by the BCCDC.

While COVID-19 transmission is likely to continue to some degree, measures to limit transmission will aim to both protect people and ensure we have adequate capacity in our health system to appropriately care for infected people. However, since measures that limit transmission have substantial negative health, economic and social consequences, a strong imperative exists that reducing COVID-19 transmission must be done, while also resuming a healthy and safe level of social and economic activity. The current situation is neither sustainable nor healthy, bringing its own significant costs and damage to individuals socially, emotionally and economically.

Two sides will likely be debated as we move forward as a community:

1. Current lockdowns are becoming harmful in both social, economic, and health terms and need to be lifted, so as not to cause enormous damage to economies, civil society, and emotional and mental health well-being.
2. Current lockdowns are both needed and must be sustained for a significant period to protect a percentage of individuals within our communities from dying due to COVID-19 and to protect our health system from being overwhelmed (impacting our ability to care for both non-COVID-19 and COVID-19-related serious illnesses)

These two narratives are in fact two ends of a continuum, with a range of potential actions that government can take in between. In either direction, there is potential for significant human cost. There is an imperative to hit "just enough" restrictions to adequately slow transmission, but these actions do not outweigh the harms caused by those restrictions. Inevitably, it will be impossible to get this perfect, but step-wise lifting of restrictions with mitigation strategies in place is the most prudent way to go forward.

The current "lockdown" strategies implemented, predominantly starting mid-March, reflected the fact that our Province had to respond the rapid growth rate of transmission in BC That action worked. Our most recent modelling and analysis suggests we now have an opportunity to try to better manage the ongoing transmission and a potential wave two of the pandemic in the fall/winter by adopting a sustainable and more moderate public-health strategy to carry us through to "community" immunity, through either gradual infection and/or immunization by vaccine.

This situation is complex and without precedent in the modern age. We have never confined so many people and so, by definition, have never relaxed confinement of such a large number of people. This plan has been developed by public health and the Ministry of Health based on an evidence-based framework. It sets out what public health measures might be optimal to slow the spread and what steps the health system can take to be as robust as possible to meet possible total health care demand in the coming 12 to 18 months. It also sets out proposed requirements to safely optimize both economic activity and social activity.

This will require the full engagement of individual citizens, key institutions, and employers to hard wire these requirements in to day-to- day practice, starting in May, and then refining them over the next 12 to 18 months based on our go-forward experience of the pandemic. This will need to be done in collaboration with the Office of the Provincial Health Officer and broader government. The overall goal is to find the right balance for BC against five goals:

1. Protect lives by suppressing the transmission rate to the lowest rate possible for at-risk populations, until a vaccine becomes available. Ongoing monitoring and assessment of this possibility will be important, and our strategies will need to evolve based on what materializes or does not materialize over the coming 12 to 18 months.
2. Make sure the health system does not get overwhelmed to the point that it can't offer quality care to both non-COVID-19 and COVID-19 patients. This includes managing the transmission rate within the capacity of the health system until a vaccine is available.

Balanced against:

3. Meeting the very real, ongoing physical and mental health needs of non-COVID-19 patients and populations
4. Getting people back to work and rebuilding the economy
5. Optimizing the social fabric of our families and communities

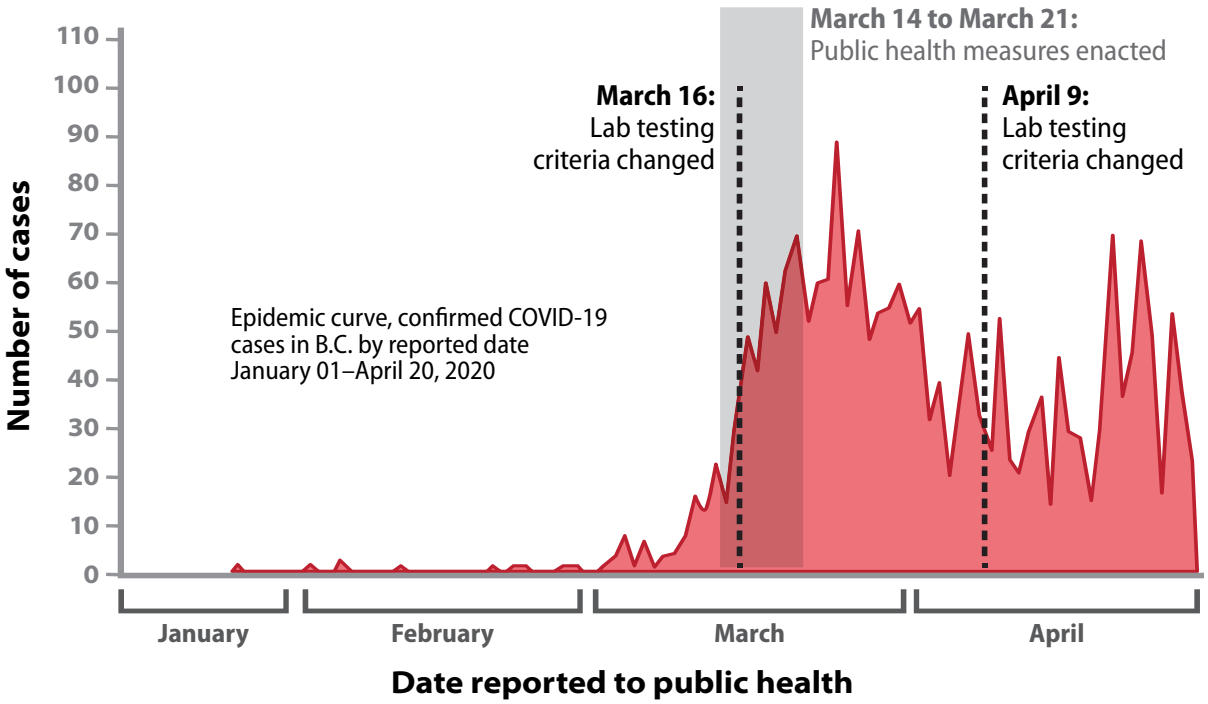
How to safely increase our opportunity for broader social interaction by carefully relaxing what are very taxing social-distancing measures. How to safely and sensibly reboot the economy as much as possible, while keeping people safe. This is not a simple trade-off, but an extremely complex exercise for all of us in optimizing the physical, mental, social, and economic health of the people of British Columbia in the face of an epidemic that is more challenging than we have seen in generations. Physical, emotional, social and economic health rise and fall together.

This plan sets out the proposed dimensions of this balancing act based on hitting a "sweet spot" using dynamic modelling based on BC data – moving from the current targeted lockdown restrictions resulting in approximately 30% of normal social interaction, toward a sustainable 60% of social interaction, with restated levels of targeted restrictions. Our dynamic modelling suggests that going above this level will result in a significant and unsustainable growth in transmission of the virus. These models give us an indication that there is room to move. Monitoring both infection rates, but also unintended consequences of measures, will be required to find the right balance in practice. As referenced by other jurisdictions, this will involve "turning the dial" or "adjusting up the dimmer switch", not flicking an "on/off switch".

Dynamic compartmental modelling of social contacts as the basis for moving forward

BC has pursued an evidence-based and transparent approach to managing the pandemic, with daily briefings and several detailed updates on our modelling and planning.

As demonstrated by the graph below, the significant and "stringent" (Oxford Stringency Index) measures taken by BC were both needed and are working in flattening BC's epidemic curve.



However, these measures have come with significant economic and social costs, which will have their own significant impact on the health of the population. The benefit at a population level is that these stringent measures have created hyper-awareness of COVID-19 transmission risks, which should provide a more secure platform for us to achieve a "new normal" to get us through the coming 12 to 18 months. In setting out this plan, it is worth restating the epidemiological evidence as we currently understand it and then to use this evidence to shape our actions moving forward.

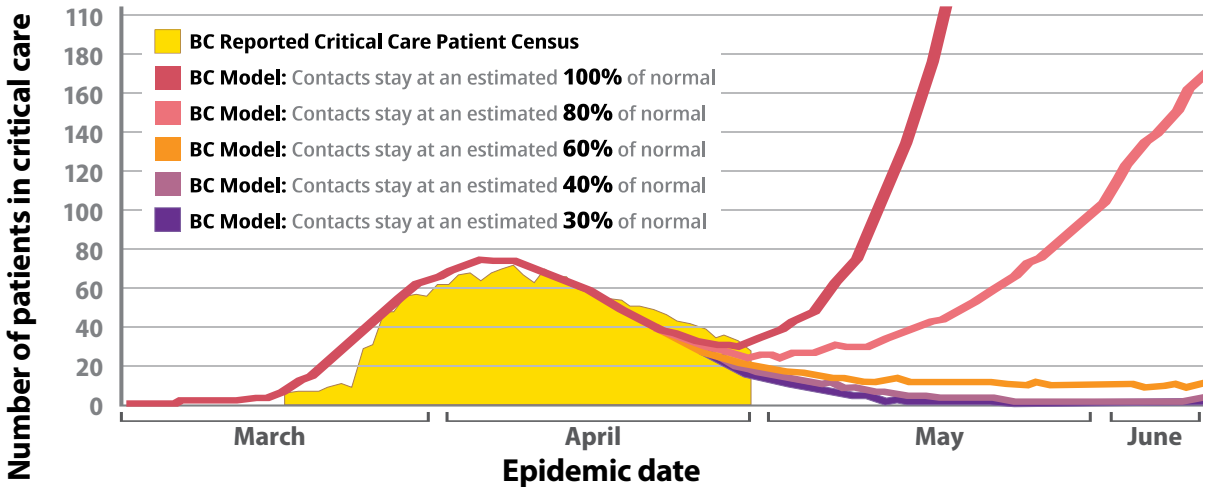
Rates of infection are very dependent on contacts between people. A dynamic compartmental model estimates the rate at which susceptible people transition to being infected and on to recovery or death. These transitions are determined by contact rates between people, which have been inferred directly from epidemiological observations in BC. The models are based on our own observed data. The models illustrate different possible future states for different levels of contact.

While all models are just that, we have some confidence in these simulations because:

1. They have accurately predicted trends in hospitalization, ICU visits and new confirmed infections over the last month.
2. The BCCDC works with several, quite different modelling approaches and these agree with each other.
3. BCCDC's general findings of increasing risk of rebound once a threshold of increased contact is reached are echoed in models from elsewhere.

Models help guide our thinking. They indicate that BC can move cautiously to lift restrictions, while maintaining enhanced surveillance and determining thresholds of actual hospitalizations, ICU, and ventilated cases, which might then require us to enhance efforts.

The modelling in the graph below points to the current level of social contacts being estimated at 30% of normal, based on the significant and targeted restrictions on social contacts following the partial lockdown measures implemented in mid-March 2020.



A model released by the BC government of how critical care cases for COVID-19 could develop over the coming months based on the level of social contacts. (BC Centre for Disease Control)

While a return to normal levels, or near normal levels, is predicted to radically increase transmission, the move to 60% of normal is forecast to result in a flat transmission rate, as indicated by the number of patients requiring critical care. This would be a "new normal" level for the coming 12 to 18 months while a vaccine is hopefully developed and deployed.

The challenge is to translate what is currently a theoretical space into a practical suite of actions. These actions are linked from a population health perspective to suppressing the rate of transmission or viral spread in the population, and from a health system perspective to its capacity to offer appropriate (1) public health capacity to detect, test, contact trace and therefore manage cases to prevent outbreaks in the community and (2) provide appropriate levels of hospital, critical, and ventilated care to patients with a more severe experience of the infection. Each of these will now be considered in sequence setting out the analysis and then proposed actions.

Managing transmission in organizational and specific settings

Key to deciding which actions to take is understanding the what, where, and how of virus transmission.

Coronavirus is transmitted via larger liquid droplets when a person coughs or sneezes, but also, potentially, when they are talking in very close proximity to another person. The virus in these droplets then can enter the body of another person when that person breathes in the droplets or when the droplets touch the eyes, nose or throat of that person. This requires you to be in close contact – less than the so-called social distancing of 2 metres. This is referred to as droplet transmission and is believed to be the primary way COVID-19 is transmitted.

In addition, droplet transmission is much more likely when in close contact in an indoor setting. COVID-19 can also be transmitted through droplets in the environment if someone touches a contaminated area, then touches their face or eyes without cleaning their hands. Unfortunately, humans touch their mouths, noses, and eyes with a very high level of frequency per hour. This speaks to the importance of regularly cleaning one's hands and also cleaning high-touch areas in the environment.

A key issue in transmission is the median incubation period (the time from infection to appearance of symptoms) and the serial interval (the time between successive cases) for the COVID-19 virus. The serial interval for COVID-19 virus is estimated to be 5-6 days. There are some emerging indications that there are people who can shed COVID 24-48 hours prior to symptom onset, but at present, the WHO suggests that this does not appear to be a major driver of transmission. However, we need to acknowledge that there is debate about this and that at this time we cannot be categorical.

The direction and measures set out in this paper focus on three areas: personal self-care; social interaction with extended family and friends; and social interaction in organizations and public institutions. Actions across all three areas will be critical to our efforts to continue to successfully suppress transmission.

REDUCING TRANSMISSION – *Core Measures for Personal Self Care*

This is the foundation to reduce transmission:

- No handshaking as the new norm.
- Practice good hygiene (frequent hand washing with soap and water and use of hand sanitizers; avoid touching one's face; respiratory etiquette; disinfect frequently touched surfaces).
- Maintain reasonable physical distancing as much as possible when outside the home and using a non-medical mask or face covering in situations where reasonable physical distancing cannot be consistently maintained, or engineering controls are not available (e.g. plexiglass barriers).
- If you have the symptoms of a cold, flu, or COVID-19, including a cough, sneezing, runny nose, sore throat, or fatigue, you must stay at home (not going to school/work) and keep a safe distance from others in your family until those symptoms have completely disappeared.
- A further consideration is for individuals at risk of a more severe illness (because they are over 60 years old, have compromised immune systems, or underlying chronic medical conditions) to properly inform themselves of risk, assess their own risk-tolerance, and think through extra precautions they may wish to take over the coming months.

REDUCING TRANSMISSION – *Core Measures for Managing Social Interaction with Extended Family and Friends*

Social interaction is critical to our individual well-being and health. Increased social interaction must balance this fundamental human need with key actions to reduce transmission. A further consideration are the extra precautions for those at increased risk of a more severe illness if they contract COVID-19, in terms of the older population and individuals with compromised immune systems or certain underlying medical conditions. In addition to the personal measures set out above, there are several additional measures that can be taken to reduce transmission:

- Maintain a zero-tolerance standard for yourself, family and close friends to not socialize when any of you have the symptoms of a cold, flu, or COVID-19, including coughing or sneezing.
- Maintain regular social contact with extended family or a small group of friends, but only get together in small groups (2-6 people) and maintain reasonable physical distance (cautiously expand our circles of social contact, while protecting those more at risk).

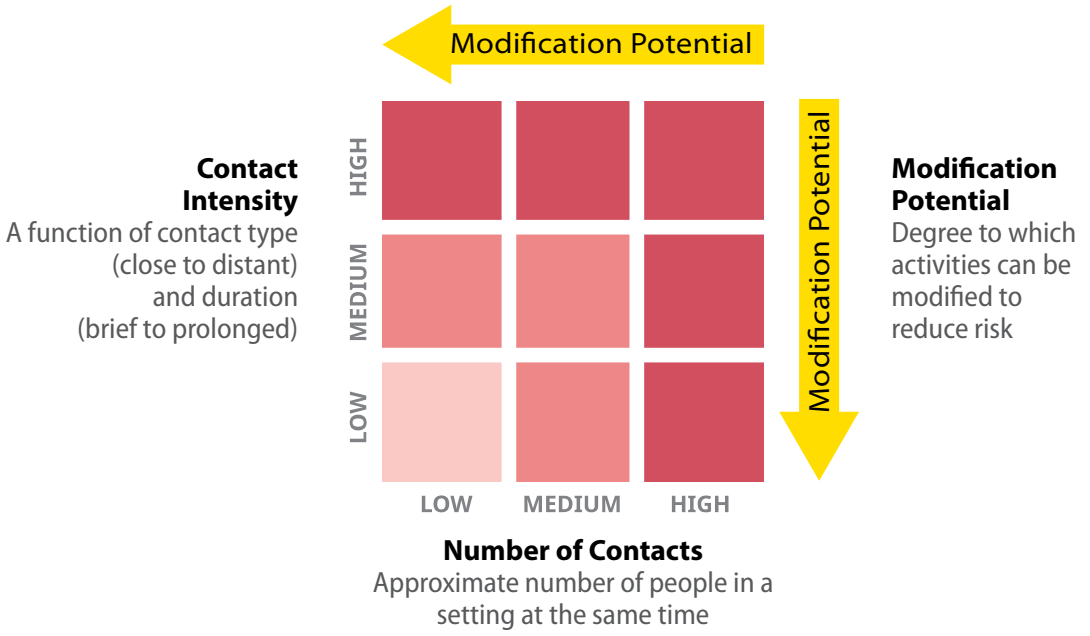
These measures require a sustained and strong in-group code of behaviour and then also across the multiple groups where you are a member.

REDUCING TRANSMISSION – *Core Measures to Implement Safe Practices in Organizations and Public Institutions*

Assessing the risk of transmission from social interaction in organizational settings and public institutions is a function of two variables (rated as low, medium, and high) supported by a range of actions you can take to further reduce the risk of transmission:

1. What is the contact intensity in your setting – the type of contact (close/distant) and duration of contact (brief/prolonged)?
2. What is the number of contacts in your setting – the number of people present in the setting at the same time[2]?

By completing these ratings, you can position your organizational setting on the risk matrix below:



However, the medium and high categories are also subject to potential modification or controls which can help you move to a lower risk category by taking a combination of actions:

- Physical distancing measures – measures to reduce the density (intensity and number of contacts) of people in your setting
- Engineering controls – physical barriers (e.g. plexiglass barriers; one-way systems for customer flow; physical space between seating)
- Administrative controls – rules and guidelines to reduce the likelihood of transmission in your setting (e.g. stay away if sick; hours of operation)
- PPE – use of non-medical masks

2 John Hopkins University, Bloomberg School of Public Health, Centre for Health Security April 2020

Using this assessment and applying the potential modifications or controls to further reduce risk of transmission, organizations (workplaces, retail outlets, public institutions, community organizations) are being asked to develop explicit plans for the measures they will implement and maintain over the coming 12-18 months. Specifically, they are being asked to apply a series of core measures across three areas (personal, social, organizational) that set parameters for the "new normal" in terms of formal and required actions that are the basis for workplaces and commercial businesses being in operation until the PHO lifts the public emergency requirements. This assessment framework combined with specific measures set out below will be used by organizations and public institutions to reduce the risk of transmission.

REDUCING TRANSMISSION – *Core Measures to Implement Safe Organizational Practices*

- Actively promote and monitor personal self care actions in your organization
- Actively promote and implement the core measures for managing social interaction in your organizational setting in congregate social settings (kitchens, staff room, canteens, shared public spaces)
- You **must** have clear policies to enable and ensure that **individuals who have the symptoms of a cold, flu, or COVID-19 including coughing or sneezing should not come into the workplace.** As part of opening your specific settings, you should implement sick day policies for the coming 12 months that actively work with individual staff being off sick more often or working safely at home during these illnesses. As employers you must take leadership in this regard with routine screening/questions of staff for symptoms checking.
- Require and sustain higher levels of **frequent cleaning of "high touch" areas** in workplaces and retail outlets throughout the day and availability of hand sanitizer stands at entrances or around workplaces and shops.
- Where appropriate and practical increase **use of temporary physical barriers** (such as plexiglass at service counters or checkouts)
- Focus on how you will **support and accommodate higher-risk populations** including those 65+ and those with underlying medical conditions. Workplaces, retail and personal service businesses are encouraged to exercise greater accommodation for these age groups in terms of work space, more flexible hours of work or shopping (earlier, later, mid-day) or working at home options.

Additional core measures specific to organizational settings (more will be developed as sectors are engaged and sector wide norms are adopted/required as set out later in this section):

- For **Office-Based Organizations**, where possible continue to encourage working from home part of the time to reduce "contact intensity" and "number of contacts" in the workplace. Where this is not possible or in addition to working from home policies, enable employees to have less contacts by using staggered shifts or work hours, creating smaller teams working together virtually; forgoing in person group meetings as much as possible.

- For **Retail Organizations** implement strategies that support sensible physical distancing (2 metres) and sensible volume of customers in the retail space based on the transmission fact basics.

  Note: Guidelines have been provided for retail grocery stores that will continue to be reviewed – lining up outside retail stores, especially in the rain or cold fall and winter months may not socially sustainable, practical or healthy. For all retail outlets density of customers needs to be considered – there appears to be confusion with respect to applying the "mass gathering" number of no greater than 50 people to a number of organizational settings. This was not the intent of that directive.

Best practice for the retail sector will be open to discussion as the sector develops its proposed plans. There are several actions the sector should think through in developing their proposed plans:

- Ability to increase throughput of customers and reduce line-ups by opening and maintaining a higher number of check-outs once physical plexiglass barriers are installed between checkouts
- Increased or continued encouragement of on-line shopping, deliveries, and/or pick-ups to reduce volume of visits
- Increasing hours of shopping to decrease density of customers throughout the day
- Encourage or require utilization of basic non-medical masks while shopping in the store to reduce the spread through individuals coughing, sneezing, or close interpersonal contact and therefore increase density
- Use of physical barriers such as plexi-glass
- Messaging re not shopping while sick (cold, flu, COVID-19 symptoms) and routine screening/questions of customers for symptoms checking

For **Personal Service Organizations** (barbers, hair salons, nail salons)

- Messaging about not accessing services while sick (cold, flu, COVID-19 symptoms) and routine screening/questions of customers for symptoms checking
- Manage in terms of physical distancing or eliminate waiting areas
- Require appointments or bookings to manage customer flow
- Use of non medical masks and maintaining distance between customers while being served
- Use of physical barriers such as plexi-glass where practical

For **Child Care Centres and Education Settings/Camps**

- Child care centres an important part of the social infrastructure to support parents returning to work.
- While it is well established that children are important drivers of influenza virus transmission in the community; for the COVID-19 virus, initial data indicates that children are less affected than adults and that clinical attack rates in the 0-19 age group are low. Further preliminary data from household transmission studies in China suggest that children are infected from adults, rather than vice versa. This is an important consideration with respect to school closures and reopening but is an area in which the evidentiary base will continue to develop.

- The evidence of the impact of COVID-19 on young adults appears to be evolving although the data to date suggests that they are very likely to experience mild symptoms.
- In general, educational settings are critical to a child's and youth's psycho-social development as well as learning but also for younger children, important to a parent's ability to maintain employment. Any actions taken in this area should take in to consideration all these dimensions.
- Recreation and involvement in sports are also important developmental activities for many children and young people.

CHILD CARES CENTRES

- Routine daily screening for all staff and students
- Routine and frequent environmental cleaning
- Explicit policy for children or staff who have the symptoms of a cold, flu, or COVID-19 with coughing or sneezing **not** coming into child care.

SCHOOLS (K-12)

- Routine daily screening for all staff and students
- Routine and frequent environmental cleaning
- Implement a range of options to reduce transmission including smaller class sizes; separation of desks; potential of differential school attendance on a routine basis each week; strong focus in the daily routine on frequent washing of hands and other hygiene practices; small group activities and wearing of non-medical masks for those group activities; no high contact sports; limit group sizes of extracurricular activities.
- Explicit policy for children, youth and staff who have the symptoms of a cold, flu, or COVID-19 with coughing or sneezing not coming into school or taking part in extra curricula activities and sports.
- Planning over the summer for increased use of remote online learning, especially for high school children.
- Early arrival and self-isolation for 14 days of international students.

POST SECONDARY INSTITUTIONS

- Routine daily screening for all staff and students
- Routine and frequent environmental cleaning
- Explicit policy for students and staff who have the symptoms of a cold, flu, or COVID-19 with coughing or sneezing not coming into classes or taking part in extra curricula activities and sports.
- Increased use of on-line learning balanced against the need of social interaction for learning and development
- Early arrival and self-isolation for 14 days of international students.

RECREATION/SPORTS/CAMPS

- Routine daily screening for all staff and participants
- Support low contact sports (especially outdoor). Identify high contact sports that should not take place during the pandemic.
- Explicit policy for participants and staff who have the symptoms of a cold, flu, or COVID-19 symptoms with coughing or sneezing **not** being engaged in recreation, sports, or camps
- Staff and participants at higher risk of experiencing severe illness should not take part in recreational, sporting, or camp activities.

These core measures, supported by the Public Health Officer, are helpful for government and its sector partners when thinking about resuming businesses and institutions. Decision to reopen businesses and institutions is based on a sector analysis done through multiple relevant ministries and partnership tables. It is intended to help each sector think through and plan a cautious return towards the 60% social contact maximum of the pre-COVID-19 normal. There will be review of plans by a cross ministry oversight committee supported by guidance and advice though the PHO/BCCDC and WorkSafe BC.

Key sectors that will need to work through in detail and then implement approved "new normal" practice standards include:

- Office Workplace Practice Standards
- Personal Service Workplace Practice Standards (hairdresser/barbers; spas)
- Retail Practice Standards (including grocery stores)
- Resource Sector Standards
- Restaurant and Food Service Practice Standards
- Hotels and Resorts (Including Camping) Practice Standards
- Child Care Settings Practice Standards
- School and Post Secondary Institutions Practice Standards
- Recreational Facilities Practice Standards
- Outdoor Recreational Setting Practice Standards
- Parks, Beaches and Outdoor Space Standards
- Bar, Casino, Night Club Practice Standards

To further assist organizations a COVID-19 site will be maintained to host all core measures and guidance; allow organizations to pose questions/receive answers, and curate a Q&A record for public access and information.

Beyond specific settings, BC will in the coming several weeks bring further clarity on its medium-to-longer-term position on several other areas for the coming 12 to 18 months on:

- Travel Management Measures will require careful consideration with no immediate change in the status of international travel measures. Other areas for further consideration will be Internal travel guidance in province particularly over the summer months; inter-provincial travel for family visits or tourism; international travel (outbound and inbound) for family visits; business; or tourism over the coming months
- Further consideration as to whether there needs to be formal enforcement or legislative provisions attached to some of the measures.

One area where there will be no change in the immediate future are large scale public events. The PHO has restated total bans on mass gatherings and will maintain the direction on gatherings being of no more than 50 people with required physical distance and health hygiene practices for groups under that number.

Managing public health and healthcare service capacity

A key argument made in the response to the COVID-19 epidemic has been the need to protect the health system and health workers from being overwhelmed to the point of not being able to provide appropriate care to both non-COVID-19 and COVID-19 patients. This is linked to both the experience of the severity of the illness at a population level and the ability of the health system to respond to the volume of patients requiring care at any one point in time.

As noted earlier in the discussion paper, from a health system perspective we need to consider our capacity to offer appropriate (1) public health services to detect, test, contact trace and therefore manage cases to prevent outbreaks in the community and (2) provide appropriate levels of hospital, critical, and ventilatory care to patients with a more severe experience of the infection. This is against the backdrop of allowing non-urgent health care services to resume (such as scheduled routine public health functions; primary care; dental care; physiotherapy and chiropractic care; scheduled surgeries; outpatient clinics, screening, and imaging services)

Public Health Strategies, Safeguards, and Capacity

A number of articles and think pieces argue that the reality of the next 18 months (nominal time for a vaccine) will be characterized by a cycle of lockdowns and unlocking with restrictions partially relaxed for a period of a few weeks at a time on a geographical, age group, or other factors until infection rates start to climb again with clear messaging on this reality to the public and encouragement to stay with this challenge. Is this practical? Would this be managed at a geographical level based on a community level analysis? Public health leadership in BC is focussed trying to find a steady state "sweet spot" for the coming 12 to 18 months but will monitor transmission and hospital rates closely and take additional restrictive action if required.

Testing will remain an important part of the management strategy going forward. BC's testing strategy has evolved and changed over the course of the pandemic. Public Health has recently revised guidance for COVID-19 Testing by Nucleic Acid Tests (NATs) as follows:

1. Test all individuals with new respiratory or symptoms compatible with COVID-19, however mild. Symptoms may include fever, chills, cough, shortness of breath, sore throat, odynophagia, rhinorrhea, nasal congestion, loss of sense of smell, headache, muscle aches, fatigue, or loss of appetite.
2. Individuals in the following groups should be prioritized for testing :
    a. Residents and staff of long-term care facilities
    b. Individuals requiring admission to hospital or likely to be admitted, such as pregnant individuals near-term, patients on hemodialysis, or cancer patients receiving radiation or chemotherapy.
    c. Health-care workers

d. Individuals with a higher probability of being infected with COVID-19 such as contacts of a known case of COVID-19 and travellers just returned to Canada
e. Residents of remote, isolated communities, including remote and isolated Indigenous communities
f. People living in congregate settings such as work-camps, correctional facilities, shelters, group homes, assisted living and seniors' residences
g. People who are homeless or have unstable housing
h. Essential service providers, such as first responders

3. Health-care providers can order a COVID-19 test for any patient based on their clinical judgment.
4. COVID-19 testing is not recommended for individuals without symptoms.
5. The Medical Health Officer may recommend testing for others, such as those who are part of an investigation of a cluster or outbreak.

In public health, contact tracing is the process of identification of persons who may have come into contact with an infected person ("contacts") and subsequent collection of further information about these contacts. This will remain a key tool moving forward and it will be essential that we build up sufficient capacity to carry out this important measure.

Core Public Health Measures for the "New Normal"

- BC will make net new investments in Public Health/BCCDC capacity over the summer to ensure it is able to undertake timely testing, case tracking and contact tracing; as well as rapid response capacity for outbreak event management:
  - Adequate capacity for appropriate and rapid testing and laboratory capacity
  - Adequate capacity for contact tracing/self isolation
    - Build out adequate capacity to conduct contact tracing and analytics to support appropriate evidence based targeted actions to supress transmissions
    - Explore, develop and use technology to supplement traditional contact tracing:
    - Aim to selectively detect and isolate as many cases and contacts as possible whilst leaving everyone else to move around freely
- Is in process of validating and then will introduce serological testing
- Preparation and resourcing to quickly respond to outbreaks as required including using emergency powers as required:
  - A singular large public exposure
  - A wide spread hospital or long-term care facility exposure
  - A community based organizational exposure (e.g. workplace, church population)
  - Specific wide spread localized community spread virus activity
  - Novel clinical presentation

- Provide additional risk-based guidelines targeted at at-risk populations to help individuals and families think through how to healthily self manage over the coming 12 to 18 months
- Explore developing an APP and support materials as an Alert System (amber/red) signalling the need for individuals and organizations to take immediate social distancing measures.(see for example New Zealand's Alert System – *https://COVID19.govt.nz/alert-system/COVID-19-alert-system/*)
- A sustained public communication strategy
- Net new investment in Provincial Health Services Authority and BCCDC for data analytics, modelling, and reporting

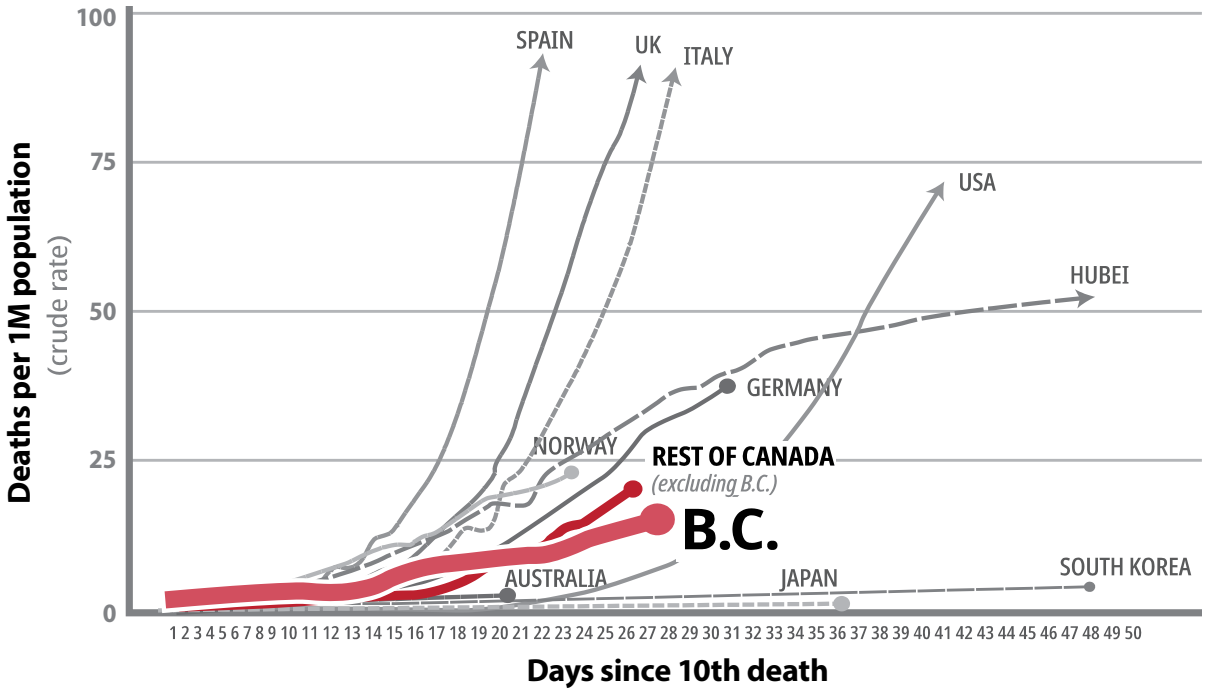
Health Service Strategies, Safeguards, and Capacity

For COVID-19, data to date suggest that 80% of infections are mild or asymptomatic, 15% are severe infection, requiring oxygen and 5% are critical infections, requiring ventilation. BC clinical experience has been slightly different in that 22% of infected patients have been assessed as benefiting from hospitalization, 11% have been provided critical care and 9% have been ventilated. For COVID-19, our current understanding remains that older age and underlying conditions increase the risk for severe infection.

The experience of the pandemic in BC aligns with the broader experience of the severity and impact of the disease impacting the older population. As of April 14, 2020, the median age of people who have died in BC was 86 (in total only one person died in the 40-49 age group and two people died in the 60-69 age group). As reported earlier in the pandemic, the data from China reported that percentage of people with an underlying condition or disease diagnosed with COVID-19 who died (from China CDC February 2020) was as follows:

- Cardiovascular disease – 10.5%
- Diabetes – 7.3%
- Chronic Respiratory Disease – 6.3%
- Hypertension – 6%
- Cancer – 5.6%
- No Health Condition – 0.9%

The researchers found that the crude mortality ratio for those with an underlying health condition is much higher than for those without. By comparison, the crude mortality rate was only 0.9% – more than ten times lower – for those without a pre-existing health condition. In BC we are still at the early stages of analysis but have reported that 35.8% of 707 cases reviewed to date had at least one chronic condition (cancer, diabetes, cardiac disease, liver disease, neurological disorder, renal disease, or respiratory disease). There is little that can be concluded from this at this time but as the analysis advances it will better inform our understanding of the severity of the disease for classes of the population. In particular we need to determine the underlying illnesses and age for hospitalized, ICU, and ventilated patients and deaths.



In broader terms, there are significant difference in the rates of death per million population across jurisdictions, which may be linked to the ability of a health system to respond in a timely and appropriate way to the progress of the illness in a subset of the population who become more severely ill. This likely relates to the capacity of the health system at the time of the surge in the pandemic to provide access to critical care and ventilated critical care. By continuing to flatten the curve we save lives today and tomorrow, by protecting the capacity of the system and postponing exposure until better treatments and vaccines become available.

The capacity of the health-care system is referenced as critical to considerations of how to respond to the pandemic. If there are more critically ill people than there are intensive care facilities and ventilators, people will die who otherwise might not have. This requires close monitoring of hospitalization, ICU, and ventilator utilization that the health system can handle without becoming overwhelmed:

Underpinning this consideration is the transmission rate that BC can manage. Transmission ideally should be understood in terms the COVID-19 real-time, effective reproduction number, or its actual ability to spread at a particular time. The rate at which a virus is transmitted – known as the R-naught (R0), or basic reproductive number – refers to the average number of people to whom an infected person passes on the virus in a population with no pre-existing immunity. The R0 can vary from place to place because of the population's age structure and how frequently people come into close contact with each other. The "effective" version of that number, the Rt – or the reproductive number at time "t" – is the virus's actual transmission rate at a given moment. It varies according to the measures to control the epidemic – quarantine and self-isolation protocols, travel restrictions, actions to reduce transmission – that have been put in place and the level of immunity gradually building in the population post-infection and recovery.

At this stage of our pandemic BCCDC suggests this is not possible to get an accurate timely estimate of Rt and as such it is proposed that we use hospitalization and in particular critical care census data for COVID-19 and non-COVID-19 patients as a practical and easily measured/reported reference point linked to our capacity in any community or region.

We must determine the real-time effective number that the BC health system can appropriately manage given our hospital (medical in-patient bed) and critical care capacity that includes both COVID-19 and routine inpatient demand for these services. There will need to be conservative thresholds for numbers in critical care that would trigger rapid review and action as any measures taken will take up to fifteen to twenty days to have an impact as we saw after our interventions in March.

Based on the BC experience and that of other jurisdictions one of our most vulnerable populations is our citizens in long-term care (LTC) and to a slightly lesser extent assisted living (AL). Several measures have been taken to provide greater protection to these individuals and better manage an outbreak when it occurs. These measures will need to continue to evolve over the coming weeks and months. Other populations include older individuals (60+ and especially in to late 70s+) and individuals with underlying medical conditions (cardiac; diabetes; chronic respiratory illnesses; compromised immune systems).

Unintended consequences:

Measures we have taken have unintended health, social and economic consequences, which must be balanced against risk of COVID-19. We have a responsibility to monitor these consequences over the coming months and adjust our strategy accordingly. Two strategies are being developed to achieve this:

- A population health survey, which can be repeated as necessary to understand the effect of COVID-19 and the measures used to control the pandemic
- Establishment of an unintended consequences working group to monitor health and social consequences of public health measures.

In summary:

- Maintain infection rates at a low level that is manageable in terms of providing optimal ICU and ventilator care to a sub-group of patients who experience a severe form of the illness – it won't be zero;
- Focus on protecting our citizens who are most vulnerable to a severe form of the illness
- Establish an upper limit on ICU cases at a low level to protect some surge capacity;
- Understand that an outbreak could take off in a few days and that responsive measures could take 15 to 20 days to have an impact and so will need ongoing vigilance and nimble responses.

Core Health System Measures for the "New Normal"

- PHSA/BCCDC to fully complete **modelling** to establish sustainable hospitalization rates for the BC system to be able to manage inclusive of normal demand. This modelling will also include potential transmission, in hospital bed, critical care thresholds that would be used to trip review and action for increased public health measures.
- Continue to operationalize **urgent and primary care centres** as a key service element to reduce pressure on ERs and to respond to COVID-19 testing and care in the community. These could be used as separate "respiratory care centres" for the coming fall/winter flu/COVID-19 season. Continue implementation of Primary Care Networks with enhanced access to the **virtual care initiatives** initiated in the early stages of the pandemic crisis in BC
- Safely **reboot key areas of the health-care system** including clinic based medical and dental care; out patient care; scheduled surgeries. A high level of attention and care will need to be given to the re-densification of hospitals and with that both the contact intensity and number of contacts in key hospital settings. Health Care Settings Practice Standards will be fully developed and implemented over the coming month.
- Continue focused efforts to maximize safety of individuals in **LTC and AL settings**
  - Ongoing daily monitoring and strong policies in place for staff and visitors with respiratory illnesses not working at or visiting facilities.
  - Ongoing appropriate use of PPE in these settings
  - Supporting employers by continuing single site working directive and better structuring contracts through a template contract creating equitable funding structures and clear requirements for quality, including safety. This direction will remain in place as a permeant policy both during and after the COVID-19 epidemic.
- Continue focus on health and safety for individuals more likely to experience a serious form of the illness; care being provided in community service setting; homeless and vulnerable populations.
- Expedite operationalization and build out of the proposed **"hospital at home"** model (adopted from Australia) for implementation in fall and winter of 2020/21 across BC to reduce pressure on hospital in-patient medical beds. This involves identifying which sub-group of patients that are currently cared for in a hospital setting might be cared for at home by a team of outreach hospitalists and nursing staff providing daily care and monitoring to a virtual "community ward".
- Continue to build out **ICU, HAU, ventilator capacity** (including building out urgently health care professional capacity required) over the balance of spring and summer based on modelling
- Move ahead with repatriation of cleaning and food services over the coming 12 months.
- Securing **PPE supplies and capacity** for the immediate and potential needs through the fall and winter and focus on ongoing training and support to staff in the appropriate and safe use of PPE.
- Refresh health system budget for consideration, review and approval of Treasury Board.

Conclusion and next steps

British Columbia, like all other jurisdictions, will likely face a potentially challenging transition from a virus-related lockdown to carefully restarting social and commercial life balancing warnings from public health officials of health risks with other warnings of the significant potential damage to economic and social life.

The challenge is a three-way balancing act between combating the disease, protecting or rebooting the economy and keeping society on an even keel. This requires carefully thinking through trade-offs that are proportionate as government works though decision making aligned with the legislated role of the Provincial Health Officer. The overall goal will be to make decisions about the trade-offs and consequences of those decisions:

The overall goal is to find the right balance for BC against five goals:

1. Protect lives by suppressing transmission rate to lowest rate possible for at-risk populations until a vaccine becomes available (ongoing monitoring and assessment of this possibility will be important, and our strategies will need to evolve based on what materializes or does not materialize over the coming 12 to 18 months)
2. Make sure the health system does not get overwhelmed to the point that it can't offer quality care to both non-COVID-19 and COVID-19 patients. This includes managing the transmission rate within the capacity of the health system until a vaccine is available

Balanced with:

3. Meeting the very real ongoing physical and mental health needs of non-COVID-19 BC patients and populations
4. Getting people back to work and rebuilding the economy
5. Optimizing the social fabric of our families and communities.

British Columbia should not implement an "all at once, everywhere and for everyone" lifting of restrictions but rather a step wise process based on the measures set out in this paper. The "unlocking and partial reboot" phase will need significant coordination between different parts of government, the business sector, and civil society supported by a significant and consistent communication strategy. There is no right or wrong answer about the best way to respond to a threat as great and as complex as this pandemic, but individuals, institutions, and government will be judged on the outcomes. The BC government will establish a number of "multi-sector partnership tables" to monitor and further fine tune response for the coming 12 to 18 months.

Overall, the go-forward management plan must remain flexible enough to allow the Province to fine-tune our interventions quickly enough to stay ahead of the outbreak's trajectory. This can be done through either an acceptable steady state (contemplated by the <60% social interaction modelling) and/or a series of moderate "lift and suppress" policies and actions – cycles during which restrictions are relaxed and then reapplied in ways that can keep the pandemic under control but at an acceptable economic and social cost.

Notes

Practice physical distancing

Clean your hands

Stay at home if you're feeling ill - no exceptions

Increase cleaning at home and at work

Stay informed

Cover your cough

Minimize non-essential travel

Make spaces safer

BRITISH COLUMBIA