University of Windsor

CROSS-BORDER INSTITUTE

Policy Note:

A Practical Approach to Easing Restrictions at the Canada-US Border in the COVID-19 Pandemic

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Background

The COVID-19 pandemic is not ending soon. Scientists warn that as long as most of the population is without immunity, many new cases are inevitable. How long it will take to develop a vaccine and to administer it broadly is still uncertain, as is the level and duration of immunity it will provide. If a safe, effective and long-lasting vaccine is not found, the COVID-19 pandemic will be with us for years to come.

In this sense, the "low-risk" strategy of delaying most economic activities as we await a vaccine is itself inherently risky. It risks the possibility that we will do irreparable damage to the economy. The challenge now is to find new ways to resume economic functions with an emphasis on safety but accepting the reality that we must operate in an environment of uncertainty. It is in this spirit that we address the problem of easing restrictions at the Canada-US border.

On March 18, Canada and the US agreed to a temporary program of reciprocal land border restrictions. Under the agreement, the movement of freight in trucks continues but the cross-border movement of people is limited to a relatively small number of essential workers. (In fact, travel at land border crossings is more limited than cross-border travel by air.) While the continued movement of trucks supports the operation of cross-border supply chains, the restrictions on people impose significant economic limitations and personal hardships. The agreement was originally for one month, but it has been extended a number of times with what most expect to be a loose target now set for sometime at the end of October, 2020.

The CBI has participated in discussions with various groups in the US and Canada and collectively, there is an eagerness to see a plan or an approach to easing restrictions on cross-border personal mobility in a way that protects public health during the pandemic. This eagerness is supported by greater knowledge about COVID-19 and how it spreads and also on the evolution of testing for the virus.

Our purpose in this policy note is to define the case for easing restrictions, to examine the challenges, and to propose practical steps toward that end.

At the outset, the following points describe the perspective and scope of our approach:

- We do not refer to “reopening” the border but rather to a phased program of easing restrictions. Reopening implies a return to the same border operations and rules that prevailed before the onset of the crisis. As long as the virus remains with us, extra precautions will be needed.
- Our focus is on land borders through which most Canada-US travel takes place. While many of the ideas we present are applicable at airports, we limit our scope in the interest of addressing practical implementation guidelines.
- While adopting new technology is crucial to improving border operations in the coming years, we recognize that easing restrictions over the coming months must be done within the limitations of the current border technology and procedures or with enhancements that can be implemented quickly.

- An approach that protects public safety must define criteria based on the best available data for when it is safe to relax border restrictions and when it may be necessary to reimpose restrictions.
- Changes to the border restrictions that are defined under the current Canada-US agreement must be reciprocal. An independent Canadian or American policy on easing border restrictions doesn't make sense.
- The Government of Canada currently allows cross-border trips in special circumstances with the requirement of a 14-day quarantine.[i] Since this is impractical for most business trips and many personal trips, a major objective is to find a safe alternative to quarantine in managing cross-border mobility.
- Our goal is to provide a general framework that can be realistically implemented, has the flexibility to respond to changes in the progress of the pandemic, and provides significant economic and social benefit without endangering public health. Various technical details are left open so that they can be addressed by appropriate scientists, health care professionals and public officials.

The fundamental proposition underlying our approach is as follows: the prevalence of the virus in people crossing the border should be no higher than the prevalence in the population into which they are crossing. As we will explain below, this is different from the proposition that no person should cross the border unless there is 100% certainty that they do not carry the virus.

By agreeing to allow cross-border freight movement, the governments of Canada and the US averted an economic catastrophe. Without that movement there would have been shortages of supplies that are critical for health care in the pandemic, gaps on supermarket shelves, and no hope to resume industrial production in automotive and other major industries. The continued operation of cross-border supply chains, however, can create a false sense of security. Keeping those supply chains running smoothly requires cross-border trips by people involved in equipment installation and maintenance, training, inventory management, logistics management, financial services and other occupations. Today's supply chains are the product of intense interpersonal cooperation and negotiation that occurred in the past. If those interactions are not happening now, there is likely to be less cross-border trade a year from now. Trade in services, which is the cutting edge of international trade, almost always depends on cross-border travel by either personnel or customers. Yet many of these people are not able to cross the border under the current restrictions. Zoom, Skype and similar technologies have been life-savers over the recent weeks, but there are limits to how well they substitute for face-to-face interaction. If direct, personal interaction is not important, why do we have trade missions, site visits or even the MaRS Discovery District?

The category of "essential workers" does not cover all the important interactions. Here are examples based on real cases we have encountered professionally or personally:

- A sales business development executive of an automotive parts supplier who is not required to have a work permit but who normally crosses the border under rules defined in NAFTA/USMCA to meet with potential clients or maintain relationships with existing clients. This function is critical in the automotive supply chain. Currently an individual in this role would not be considered an essential worker and would more than likely not be permitted to cross the border.
- An accountant who was required to cross the border to conduct a field audit, an inventory count or to collect data unavailable electronically but in a controlled physical environment would not be considered an essential worker and would likely not be allowed to cross the border.

There also many personal stories of people who can not cross the border to attend to their family under rules that currently require 14-day quarantine:

- A Canadian parent with minor children in the US would not be permitted to enter the US to see her children. Although the US children would be permitted to enter Canada as relatives of a Canadian citizen, unless they can be transported by someone who is a dual citizen (who would still have to quarantine for 14 days) those children and their mother are separated.
- A Canadian citizen with an elderly mother who was a US citizen would not be allowed to enter the US to see or care for his mother. The elderly mother who cannot drive is unable to get herself to Canada despite being allowed to enter as an immediate relative. An Uber or Taxi driver would not be an option because upon entry that driver would have to quarantine in Canada for 14 days and would not be able to survive financially.

Others have been isolated from professional and personal assets in which they have made large investments of time and effort:

- Many Canadians own personal and business properties in the United States, they are not permitted to enter the US and vice versa for US citizens who own personal and business properties in Canada. These individuals would not be considered essential workers and therefore would not be allowed to cross the border. This includes vacation properties like cottages, but it also includes commercial properties. These property owners, taxpayers and landlords are unable to maintain their properties.

Many communities in Canada have been built up economically based on North-South trade relationships and frequent local border crossings that are not permitted under the current agreement. For those people and those regions, prosperity and the quality of life has been severely impacted by the current border restrictions. This is especially true for communities where tourism is the main source of income. The question now is if, when and how those restrictions can be relaxed without accelerating the spread of infection.

Before we consider the relaxations of border restrictions, we start by asking what was the rationale for such restrictions in the first place? By what mechanisms does the cross-border movement of people accelerate the transmission of the virus?

If there is no difference in the prevalence of the virus in the populations on either side of the border, movement of people across the border would have no effect on the spread of the virus in either population.[ii] On the other hand, if there is a difference in the prevalence of the virus in the two countries, cross-border movement of people could result in increased infections in the low prevalence country. If there has been no community transmission in one country, the argument for closing the border is more compelling because only if a person with the virus enters from abroad can chains of transmission get started. Once community transmission is well established, the consequences of an infected person entering the national territory may be viewed as lower, but only in relative terms since such a person still might trigger a new chain of transmission. The current situation with the United States and Canada is that the prevalence of COVID-19 is higher in the US than in Canada and both countries are well into the stage of community transmission.

In determining Canada's border policy there are two important questions. First, if a Canadian encounters an American who has recently crossed the border into Canada, are they any more likely to get infected by that person than if they encounter another Canadian? Second, if a Canadian crossed the border into the United States and returns, are they more likely to become infected and pass the infection to other

Canadians than if they had not crossed the border. Without any policy intervention at the border, the answer to both questions is "yes." (Naturally both questions would be reversed if the prevalence were higher in Canada than in the United States.)

The answer to the first question can be "no" however if there is sufficient capability to screen people crossing from the US into Canada. No testing or diagnostics that is currently available can screen people to a level that guarantees that no one crosses the border while infected, especially given that a large proportion of infected people are asymptomatic. But we may be able to screen them down to a level where they are no more likely to have the virus than the average Canadian.

We can illustrate this with an example. (These numbers are just for illustration.) Suppose that among the people who present themselves for entry to Canada there are a some who have been infected with the virus. 50% of people with the virus are symptomatic and 50% are asymptomatic. Now say that we can successfully identify 50% of the symptomatic cases but 0% of the asymptomatic cases. That means that we can successfully screen out only 25% of the infected cases. But if the US prevalence is less than 25% higher than the Canadian prevalence, we will have achieved the goal of reducing the prevalence among US visitors down to the level of Canadian population. Thus, even with a screening method with a very high rate of error we can create a situation where the cross-border flow of people does not increase the rate of transmission in Canada. (We will address methods of screening below.)

Turning to the second question, a Canadian crossing into the US will have a higher risk of exposure than if they had stayed in Canada. However, unless the person had been in the US for several days, a person who gets infected while in the US would almost certainly be asymptomatic when they return to Canada, which means that the effectiveness of screening would be lower for returning Canadians than for incoming Americans.

One approach may be based on the fact that the elevated probability of infection is an increasing function of the length of time that a Canadian remains in the US territory and that the cooperative entry-exit system recently developed by Canadian and US border agencies provides a mechanism for checking how long a Canadian has spent in the US. A simple policy would be to define a maximum time that a Canadian can spend in the US before they would be required to self-quarantine.

While this policy is relatively simple to implement it has a couple of drawbacks. First, allowing Canadians to travel to the US, even for a short period, implies the toleration of some small level of increased prevalence in returning travellers. Also, the strict time limit effectively places a geographical limit on travel into the US. For example, a 24-hour limit would accommodate travel by car from Toronto to Detroit or Buffalo but not to Chicago or Pittsburgh. Alternatively, Canadians returning from the US could be screened and subject to quarantine.

A conventional procedure of screening for an infectious disease at a border has two components: a questionnaire or interview to see whether a traveller has a high risk of exposure and an examination to detect symptoms. Often the first involves a few questions by a border official and the second involves detection of symptoms such as a cough that is self-reported or observed and the detection of fever using a no-touch thermal scanner.

Even a completely truthful traveller may be unaware of having been exposed to the virus and therefore unable to report an exposure. Less honest travellers can easily withhold information that might lead to

them being denied entry. Questioning about exposures is therefore an error prone tool for identifying infected travellers.

Detection of symptoms is also of limited use for identifying infected people because a significant share of people who carry the virus are asymptomatic at the time of travel. This is partly because some cases are subclinical, meaning they lack detectable symptoms throughout the period of infection, and partly because there is an incubation period of from several days to two weeks separating the initial moment of infection and the onset of symptoms. The sum of pre-symptomatic and subclinical people among those carrying the virus varies between 5% and 80%, according to studies of COVID-19 outbreaks.[iii]

A simulation study by a team of epidemiologists estimated that even under best-case assumptions, conventional screening misses more than half of infected people. Under less favorable assumptions, such as a high propensity for travelers to withhold information about exposure or use drugs to supress symptoms, the results are even worse. This does not mean that screening is useless. If the goal is to reduce the gap in prevalence between people crossing the border and the population into which they are crossing, screening out even a modest proportion of infected people may be adequate, or it may get you at least part way to the goal. A more effective screening, however, may need to go a step further by requiring people who wish to cross the border to submit to medical tests for the virus.

Incorporating COVID-19 tests into border screening

Tests for COVID-19 fall into two broad categories: diagnostic tests to identify the presence of the active virus and tests for antibodies that form in the blood of a person who has had the virus. Diagnostic tests identify people who need medical care and who are likely to transmit the virus to others. Antibody tests, which are often called serology tests because they are based on blood samples, are useful for tracking the progress of the disease in a population, but they have a couple of shortcomings. First, it is not possible at this point to say for sure that the presence of antibodies in a person's blood means that they are immune to COVID-19. Until this uncertainty is cleared up, the concept of the immunity passport," whereby people with antibodies are considered safe in risky environments, is premature. Second, antibody tests cannot substitute for a diagnostic test because there is a time lag between infection and the formation of antibodies, and it is not possible to determine whether a person has recovered based on these tests. A full assessment of a person's status in terms of illness, ability to transmit to others, and possible immunity would require both kinds of tests.

Diagnostic tests comprise two technologies: molecular tests and antigen tests. Molecular tests look for the genetic material of the virus. They include the familiar polymerase chain reaction (PCR) tests and are generally the highest standard for testing accuracy (see *Measures of Test Accuracy*), but because samples from these tests must be assessed in a lab setting it takes several days to get results. The delay is partly because of the assessment process and partly because of backlogs due to limited lab capacity, which is currently a significant problem in parts of the US. Additional demand for molecular testing for the purpose of border screening could exacerbate this problem.

Antigen tests look for proteins on the surface of the virus. While they have generally lower accuracy than molecular tests, they are less costly and return results much faster, sometimes in as little as 15 minutes. They can also be evaluated at the "point-of-care" rather than sent to a lab. FDA guidance from May 2020 suggested that positive results from antigen tests are reliable, but negative results should be confirmed with a PCR test. Given that the requirement is to screen out most, but not necessarily all COVID-19 cases, antigen tests may be adequate in the border context. Also, since antigen tests do not require some of the supplies and equipment that are currently in short supply, their increased use for border screening should not divert resources from medically necessary PCR testing.

A recent report from the Rockefeller Foundation called for a massive increase in antigen testing for the purpose of screening, as opposed to diagnosis. The focus of that report was on safely reopening schools, but increased availability of antigen tests would also provide valuable data for safely increasing cross-border mobility. Prominent US academics and governors of several US states have called for rapid development of inexpensive, point-of-care paper strip antigen tests that can be self-administered and provide results in minutes. The US federal government recently bought 150 million antigen tests from a major private lab. However, Canadian officials still express reservations about the accuracy and appropriate use of rapid tests. A prominent academic doctor, the premier of Ontario and others have recently called for Health Canada to accelerate the approval process for antigen tests. If this happens, the availability of rapid, inexpensive tests that can be used for screening purposes will soon increase on both sides of the border.

There are practical limitations to the use of all COVID-19 tests for screening at the border. Rapid, point-of-care tests can be usefully implemented in an airport but would be hard to use for full screening at a land border without causing major delays. Implementation of tests at the border could also pose health hazards for border service officers (BSOs) and other staff or the diversion of public health staff from other needs. An instant, self-administered test that could circumvent these problems is unlikely to be available soon.

Considering all this, the most effective way to take advantage of COVID-19 testing at the border is for travelers to present evidence of the results of recent tests conducted at other locations. For example, common facilities could provide point-of-care tests for screening in support of schools, workplaces, places of assembly and the border and provide electronic confirmation of the results within a few hours. Implementing such a testing scheme for border crossing will require Canada-US agreement on a set of acceptable tests, the shelf-life[iv] of a negative test result, and a rigorous certification procedure (see below.)

Overall, our conclusions on the role of testing at the Canada-US border are as follows:

- Even though testing cannot guarantee that 100% of people crossing the border are virus-free, it can play an important role by screening the cross-border flow of people sufficiently to ensure that they do not have a higher prevalence of the virus than the population in either country.
- In the coming months, we anticipate the availability of cheaper and faster tests that can support screening at the border and elsewhere without diverting resources from diagnostic purposes.
- Conducting tests directly at land border crossings is not practical. A better option is for travelers to present evidence of recent tests administered elsewhere. This will require Canada-US agreement on a list of acceptable tests and on methods to securely certify test results.

Diagnostic test results can be usefully employed at the border while antibody tests cannot, at least at the present time.

Measures of Test Accuracy

We have noted that a 100% guarantee that no infected person crosses the border is not possible, nor is it necessary to meet the goal defined earlier. The use of inaccurate tests, however, would only create a false sense of security. The two most common indicators of a tests' accuracy are called sensitivity and specificity. The sensitivity of a test is a measure of its ability to correctly identify people who have the virus. It is measured as a probability: 95% sensitivity means that 95% of the people who have the virus are correctly identified by the test. Specificity refers to the ability to correctly identify those people who do not have the virus. 95% specificity means that 95% of the people who do not have the virus will be correctly identified by the test. These indicators do not tell the whole story, however. In a population where the prevalence of the virus is very low, even a test with high sensitivity and high specificity is prone to generate many false positives.[v]

In screening for contagious diseases, it is better to have a lot of false positives than false negatives. (This is one of the arguments against widespread use of antigen tests.) On the other hand, for an antibody test being used in support of the immunity passport concept, the high proportion of false positives would be unacceptable because many of the people identified as "safe" would not actually have the antibody. This further diminishes the usefulness of antibody testing in border screening, at least at the present time.

Defining standards for easing restrictions and triggers for re-imposing them

Assuming we can accurately measure the prevalence of a virus in the Canadian and US populations, and we have a good estimate of the effectiveness or a screening program, we should be able to assess whether we meet the goal for safe movement of people across the border. If the prevalence of the virus is higher in the US it must be possible to identify and screen out a sufficient percentage of the infected people attempting to cross the border in order to ensure that the prevalence in the incoming flow of American visitors is no higher than the prevalence in the Canadian population. (The reverse is necessary if the prevalence should become higher in Canada than in the US.)

In reality it is not quite that simple. For one thing, national prevalence measures have little meaning because there are very large geographical variations in the virus for both countries. A regional approach, where border restrictions are only lifted at crossings with low prevalence on both sides of the border, would follow the model of lifting lockdowns first in regions with low case numbers. The problem is that people often drive long distances before crossing the border, so the prevalence of the virus in people using a crossing does not necessarily match the prevalence of the local population.

Furthermore, the prevalence among the people seeking to cross the border is not necessarily the same as in the general population because of differences in age and likely prior exposures. The first step is therefore to marshal as much data as possible on things like traffic flows and the demographics of border crossers to create crossing-specific estimation templates for the prevalence of the virus among border crossers. The template must be able to frequently update the estimate as new, geographically detailed data on infections becomes available. An additional template will be needed to estimate prevalence in the receiving population based on all available information on where border crossers tend to travel and geographically detailed data on new infections in the receiving population.

Border restrictions may only be eased if it is possible to implement a screening program that can conservatively close the prevalence gap between the crossing and receiving populations. Frequent

updating of prevalence estimates will make it possible to reinstate restrictions when the gap becomes too large to cover with available screening methods and technology.

This sounds rather complicated, but we are confident that it can be implemented by a research team with expertise in cross-border travel patterns, the effectiveness of screening technologies, the accuracy of tests and the rich data resources that are currently available. Once the initial effort is made to put estimation templates in place, they can be used throughout the COVID-19 crisis as well as for future viruses that may call for border management to control their spread.

Elements of a Canada-US agreement

Changes to the border restrictions that are defined under the current Canada-US agreement must be reciprocal. An independent Canadian or American policy on easing border restrictions doesn't make sense. Necessary elements of such a revised agreement to relax border restrictions through screening, including virus testing, include:

- Common acceptance of the criterion: crossings may occur if it can be demonstrated that the prevalence of the virus is no higher in the population of crossers than it is in the population into which they are crossing.
- A common method for determining whether the criterion is met[vi] and the conditions under which restrictions may be reinstated.
- A set of specific tests that are acceptable and the number of days after testing that the results are valid.
- Means of conveying test results to border agencies (see below.)
- How each country treats its returning residents (for example, whether each country could require a quarantine for returning travelers.)
- Whether all travellers are eligible to cross under the agreement or whether it is only applies to a limited group of people deemed essential or with compassionate reasons.

A note on the final point: This framework is designed to provide the opportunity for all travellers who are willing to undergo prescribed screening to cross the border without endangering public health. Given resistance to more border crossings among health care officials and the general public, both governments may choose to phase in the framework by initially restricting eligibility to categories of travellers based on need. This could include business need (a company representative providing services at a client's site) or compassionate need (an adult child checking on the wellbeing of an elderly parent.) The early phases of the implementation could be carefully monitored, and the policy could be terminated or expanded based on evidence of safety.

Methods of conveying results of tests conducted at other locations must be included in the Canada-US agreement. Consideration include the possibility of fraudulent information and privacy concerns.[vii] Some possibilities:

- Confirmation of a negative test on a specific date could be conveyed directly from the testing centre to CBSA and CBP who will maintain a list of people who qualify with negative tests within a prescribed number of days.
- Test result data could be accessed through the traveller's NEXUS card or a special card issued for the purpose of confirming test results.

- Test results could be reported through a third party application, such as the World Economic Forum's CommonPass , which was developed as a neutral platform to convey testing data for use in air travel and at borders.
- Travellers could present some form of test result documentation at the border.

Expert consultation and implementation: Detailed technical specifications within the framework should be determined by scientists and medical experts, who place priority on protecting public health.

Implementation will require a high level of coordination between officials of both federal governments and likely require input from all departments/agencies with border responsibilities and possibly also state/provincial and local governments.

Concluding comment

Canada and the United States enjoy one of the most mutually beneficial relationships that has ever existed between two nations. We should not lose sight of the fact that at its core, the relationship between Canada and the United States derives from the many individual relationships between Canadians and Americans that grow and strengthen as we travel freely through each other's country, doing business, building trust and making friends. Restrictions on cross-border mobility persisting for many more months or even years could endanger this ongoing and special relationship to the detriment of everyone in both countries.

The COVID-19 pandemic has created an environment of profound uncertainty into which all the resources of government have been marshalled in the cause of saving lives and livelihoods. In the face of such uncertainty, blunt policy instruments such as lockdowns and comprehensive border restrictions are natural and prudent. As we learn more about the pandemic and its many impacts, however, it is time to find ways to live and prosper in a world where the threat of COVID-19 infection affects everything we do. The ideas presented in this research note are offered in this spirit. We welcome comment, debate and even criticism of our ideas. We only insist that the process of finding a way to safely and responsibly restore cross-border mobility must begin now.

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[i] Family reunification trips are currently limited to spouses, parents and children and require a 14-day quarantine. The group Advocacy for Family Reunification at the Canadian Border has called on the Government of Canada to extend the eligibility of this program to committed couples and adult children.

[ii] One possible qualification of this statement: if there is no difference between the two countries in overall prevalence but there are hot spots within both countries, public health officials may discourage movement over longer distances either domestically or internationally. Where any non-local movement has the potential to accelerate the spread of the virus, public health officials may adopt border restrictions as one of the few levers they have to prevent long distance travel.

[iii] Reasons for this very large variation remains unclear, but some factors have been identified. For example, the average time since infection is lower in a rapidly growing outbreak than it is in an outbreak with stable or declining new cases. The proportion of pre-symptomatic people is therefore higher during a period if exponential growth in infections.

[iv] For example, some tourist nations only accept a certified negative COVID-19 test up to 48 hours prior to arrival.

[v] This is best demonstrated with an example. Suppose we have a group of 2,000 people in which 100 are infected with the virus. That translates into a prevalence of 5%. Suppose our test has 95% sensitivity and 95% specificity. If the test performs consistent with those metrics, it will correctly identify 95 of the 100 people who are infected. It will also correctly identify 1,805 of the 1,900 people who are not infected. The remaining people will be incorrectly identified: 5 infected people identified as not infected (false negatives) and 95 uninfected people identified as infected (false positives). Overall, the test will identify 190 people as infected, only half of which are truly infected.

[vi] This includes an agreement on the measure of "prevalence" and what data are used to calculate it. The ratio of observed cases to population is not necessarily the most appropriate measure, since depends on the testing effort. Proxies such as the proportion of positive tests may be considered.

[vii] In the near future, test results may be integrated into smartphone based identification applications, such as the Known Traveler Digital Identity (KTDI). This technology uses principles of self-sovereign identity to protect privacy.