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THE BORDER DILEMMA:
How to Let People In, While Keeping the Virus Out

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Prelude

As summer heats up and social distancing requirements are relaxed, there is excitement that we can return to "normal". But at best we are talking about a "new normal", and at worst we risk a second wave of COVID-19 and re-imposed restrictions or a lock-down. The conventional wisdom is coalescing around a testing and tracing strategy to reopen the economy and society while preventing a second wave. This approach has been described in different terms as "Hammer and Dance" and "Whac-a-Mole", or fighting a forest fire. In the latter analogy, you first control the blaze and then focus on spotting and snuffing out the sparks the moment they appear. In our Test, Trace, Repeat paper we describe this as part of a comprehensive strategy to reopen more safely in the context of Nova Scotia, although it is equally applicable to other jurisdictions. But the Achilles heel of this strategy is the border. Why?

The threat of re-introducing COVID-19 comes when infected individuals travel and reignite the fire of community transmission. This creates a frustrating dilemma for places that have eliminated the virus – in order to reopen internally there must be strict border controls to mitigate the risk of re-introducing the virus. New Zealand is a case in point. They eliminated the virus within their border and were able to completely restore pre-COVID status—social gatherings, concerts, sporting events and all economic activity—but with mandatory 14-day *supervised* quarantine at government "isolation hotels" for all travellers, including returning residents. In addition, those in quarantine receive (RT-PCR) tests for the virus on the third and twelfth days of their 14-day isolation period.

New Zealand also provides a lesson with respect to the risk at borders. Two women from the UK were given compassionate leave to exit quarantine on their sixth day and before results of their test were known. They unknowingly entered the country, creating a risk of igniting community transmission. New Zealand's rigorous approach to testing and tracing will likely contain the virus so that doesn't happen, demonstrating the effectiveness of a Whack-a-Mole (WaM) strategy. But it also shows that until we have a vaccine, vigilance at the border is critical if we want to be open *within* the border.

This is an important lesson for Canada. In provinces where the daily number of new cases has been reduced to zero, or close to it, for at least two weeks—e.g. as Manitoba, Nova Scotia, Newfoundland and Labrador, New Brunswick, and PEI have already achieved – we can basically reopen everything without any social distancing restrictions provided we have a focused strategy to identify and immediately squelch the virus through enhanced border restrictions based on more detailed information complemented with a testing procedure. It is important to realize that the international and interprovincial border restrictions in Canada are *much* less

rigorous that those that are enforced in New Zealand. The federal government requires 14-day honour-system self-isolation for those coming from foreign jurisdictions, as do the Atlantic provinces for those entering from provinces outside the Atlantic group. Other provinces do not have restrictions or requirements for travel from other provinces. Because these approaches are not monitored or supervised (except in rare cases), they are likely too lax to prevent the virus from entering and spreading in our communities. On the other hand, a supervised quarantine like New Zealand's is likely too restrictive and would eventually become impractical in the many months before a vaccine is widely available. So how do we remove social distancing restrictions within our borders; permit more travel from outside; while also ensuring more safety and confidence?

The following paper describes a path where we can do this. We prepared it on our own initiative, and it is not a government document. It is put forward informally for discussion and refinement. Since this draft was completed, the Atlantic Provinces have announced that they will form a "bubble", effective July 3, that allows residents of those provinces to travel among them without a requirement for two-week self-isolation. The ideas advanced in our paper may provide a framework for allowing removal of all restrictions within Atlantic Canada if accompanied with a more effective border management regime than the present 14-day quarantine which significantly discourages entry to Atlantic Canada, but lacks an effective means of enforcement.

Introduction

Thanks to the success of Nova Scotia's response to COVID-19 the spread of the virus within the province ("community transmission") appears to have been eliminated. If so, the only way the virus could be reintroduced would be through one of a relatively small number of border entry points.[1] Maintaining COVID-free status therefore depends on securing Nova Scotia's border. Apart from air connections and the ferry from the US (which currently is not operating) all other entry points are via another Atlantic Province, all of which are also at or near COVID-free status.[2] This underlines the great advantage of close collaboration among the Atlantic Provinces to establish common procedures to secure their external borders with the rest of the world. As other provinces and international jurisdictions eliminate internal spread of the corona virus and adopt adequate border security measures, they should be included in a progressively larger "bubble" with the Atlantic Provinces. This document deals specifically with the Nova Scotia border, but if there were agreement to create a Maritime or Atlantic bubble, the same procedure could be applied at the bubble boundary.

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[1] Halifax International Airport and the Sydney domestic airport, the highway entry at Amherst on the New Brunswick border, the ferry terminals at Digby (from Saint John, NB), North Sydney (from Port aux Basques, NLL), and Pictou (from PEI) and Yarmouth (from Maine, USA), or via a cruise ship. Via Rail service to Atlantic Canada is suspended until November. Other modes of entry are possible—e.g. via private plane, by fishing vessel, by foot—but would constitute a tiny minority of entrants.

[2] PEI and NLL have had no confirmed cases for many weeks while NB has experienced only one regionally-contained outbreak during the past two months.

The Challenge

At present, border security is implemented via a two-week, honour-system quarantine.[3] As the number of cases in the province declines to zero; as COVID "fatigue" sets in, and with summer weather upon us, this honour system inevitably becomes less and less watertight. To minimize the risk of reintroduction of the virus, Nova Scotia's management of entrance to the province will need to become stricter, but also much more finely tuned to balance risk against the economic and social consequences of restrictions. A two-week quarantine may pose only inconvenience for returning residents, or students, or long-term visitors, but it is unacceptable for tourists and completely impractical for business travellers. A quarantine requirement for *all* entrants therefore comes at very significant economic cost, particularly for the tourism-dependent economies of much of Atlantic Canada. This can be only partially offset by a complete reopening of activity within jurisdictional boundaries that have eliminated community transmission of the virus. In the longer term, pending widespread availability of a vaccine, a universal 14-day quarantine is unsustainable. It is therefore urgent to develop ways to make the border more transparent while keeping the risk of introduction of the virus to an acceptable minimum.

General Considerations

Following are the six principal factors to be considered.

- *Public Health:* Ideally, the border measures would provide complete certainty that the virus cannot be introduced. The present honour-system quarantine does not come close to that standard. There will inevitably be some trade-off between the severity of containment measures and their cost in terms of other objectives and practicalities. But state-of-the-art public health skills, information, and technology can be employed to increase security with little or no compromise of other objectives. In the inevitable event that new infections do occur, Nova Scotia must sustain the ability—through testing, contact tracing and case management follow-up—to squelch spread before it can become established. In other words, the better the capacity of the public health system to contain the cases that slip through, the less restrictive the border measures need to be, other things being equal.
- *Economic and Social Welfare:* Every modern economy depends on cross boundary flows of people; and the smaller the economy, generally the more dependent; and for a tourism-intensive economy like Nova Scotia's, the more dependent still.[4] While business travel has

[3] The federal government has also implemented a two-week period of self-isolation for entrants to the country. But for those without symptoms suggestive of COVID-19, there is little formal enforcement—it is essentially an honour system.

[4] The cost of the pandemic to the NS economy cannot yet be confidently estimated, but based on national and international estimates it might be in the 6-10 percent range in 2020 (and possibly greater) with weakness persisting into next year. A reduction of GDP by, say, 8% would represent about $3.7 billion in lost wages and profits, and

been sharply curtailed during the lock-down phase, it must eventually recover substantially, even if not to the former level. There are also psychological and many other non-economic costs when travel out of the province is severely impeded by the prospect of a two-week quarantine on return.

- *COVID Fatigue:* Nova Scotia's success in suppressing the corona virus inevitably leads to increasing complacency as new cases are kept to zero or very low numbers. The economic and psychological cost of continued restrictions, despite some relaxation, will appear to many to be no longer justified to curb a vanishing health threat. A two week self-quarantine in mid-summer will appear less necessary and compliance is likely to decline. A new approach to border management is therefore needed to respond to these new circumstances and to ensure that Nova Scotia's success in suppressing COVID-19 is sustained.
- *Collaboration:* The creation of a "bubble" within which there would be free movement among jurisdictions—certainly the Atlantic Provinces—has obvious benefits. But since the participants in a bubble have to agree collectively on the border security measures, the parties may need to accept less than what would be their individual preference. Again, trade-offs must be faced in the course of negotiation. The more parties to the bubble, the more challenging the trade-offs.
- *Public Confidence:* The public has been taught to have a mortal fear of the corona virus—as was necessary to secure acceptance of lock-down. But it is much easier to scare people than to un-scare them. Meanwhile the virus is still out in the world; the media still dote on the fear factor, emphasizing worst-case scenarios; infections are increasing in the US; and authorities warn of a fall wave. Thanks to government assistance a great many people have adapted well to restrictions—e.g., retired people on pensions may see relatively little benefit, compared with *perceived* risk, from a complete resumption of economic activity. There will be a daunting communications challenge to convince a significant fraction of the Nova Scotia population that reopening is safe, and to convince others who are eager to get back to normal that enhanced border vigilance is still necessary.
- *Operational Feasibility:* The border control measures will achieve their objectives depending on their reliability, ease of compliance, and speed of processing—three factors that are in tension and therefore present another set of tough trade-offs. Moreover, to save as much of the tourist season as possible, the procedures need to be up and running quickly. In our short season every day matters. Given what is at stake for the economy and safety, there is no room for bureaucratic inertia, turf protection or resource skimping.

Options for Border Entry Control

Potential options range, in theory, from (a) *complete isolation*—essentially what New Zealand and Hong Kong have imposed, in which all entrants are tightly quarantined in government-

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likely more than a $500 million reduction in the provincial government's own-source revenue. Any measures that diminish these losses would have a very large payoff.

provided supervised facilities for two weeks, to (b) *uncontrolled entry*—except for those that are somehow known or suspected of being currently infected. Nova Scotia's present approach—a *de facto* honour system quarantine for entrants—is closer to the unrestricted end of the spectrum. A new procedure is needed that reduces the likelihood of reintroduction of the virus in a way that strikes the best balance among the six foregoing considerations. Following is an outline of one potential entry procedure—defined as a logic tree—which contains several parameters that would be determined so as to strike an optimal balance among the six considerations described earlier.

1. **ARRIVE AT BORDER CONTROL POINT AT THE BOUNDARY OF THE "BUBBLE"[5]**

2. If you are in a category that is **Exempt** from entry restriction (essential service provider), then pass through.

3. If **NOT,** do you have an *approved* **Entry Plan** as described below?

4. If you **DO NOT HAVE** an Entry Plan, can one be arranged on the spot while you wait? If **NOT,** do you agree to enter a **Designated Quarantine Facility**?

5. If you **AGREE** to be quarantined, you will be led to a provincially-designated facility and quarantined for 14 days, or possibly less if you are able to arrange for an Entry Plan that is approved, or undergo a testing regime as described below (see Option B). If you **DO NOT AGREE** to enter a designated quarantine facility**,** you will be refused entry.

6. If you **DO HAVE** a preapproved Entry Plan, or have been able to arrange one on the spot, then proceed in accordance with the Entry Plan.

An **Entry Plan** would provide three basic options:

A. Two Week Quarantine; or
B. Two Week Testing Schedule; or
C. Risk-based Waiver

Option A is the *status quo* shelter-in-place and the Entry Plan (outlined below) would provide all relevant details to permit follow-up monitoring by public health staff, usually through phone calls to check on the entrant's compliance—e.g. three times during the quarantine period.

Option B would *not* involve a quarantine but would require the entrant (including a returning resident) to provide the relevant Entry Plan which includes a commitment to report for COVID-19 testing at designated testing sites within 48 hours; and again between days "**x**" and "**y**" (e.g., days 4 and 5); and possibly again between days "**u**" and "**v**". The test schedule would be designed by public health authorities to maximize the probability that an *active* infection

[5] In the case of an Atlantic bubble, the boundary points would be, for example, any flight arriving from outside the Atlantic Provinces; highway entries to NB on the Quebec or Maine borders; ferry from Maine to Yarmouth (if operating); ferry from the Magdalen Islands to PEI; rail entry in NB (when resumed).

acquired prior to entry in NS would be detected as soon as possible.[6] Provided all tests were negative, the entrant would be considered cleared. The number of test sites in Nova Scotia should be substantially expanded and procedures implemented to ensure the quickest feasible collection of samples and return of results. A rapid point-of-care test would be ideal and might be trialled, with back-up by RT-PCR until proven reliable.

Persons choosing Option B might be required to download and keep activated an app that would employ GPS technology to record their movement and periodically report the information to the health authority. This should not be considered a violation of privacy since the choice of Option B would be made voluntarily with full knowledge of the condition.

Monitoring compliance with the test schedule agreed in the Entry Plan would be straightforward since the designated testing facility would have received a notification. (The location, but not the timeframe, could be changed subject to mutual agreement.) If the entrant violated the testing agreement, the first resort would be to consult the location app (if it had been downloaded and activated); and the next would be to attempt phone contact directly. Failing that, police could be notified.

(Persons without an Entry Plan who agree to enter a designated quarantine facility should be subject to the same test schedule as prescribed in Option B, and would be released if all tests were negative.)

Option C would not require the entrant to quarantine or to be tested while in Nova Scotia. This option would be available to those whose Entry Plan established a sufficiently low risk to justify waiving the conditions of Options A and B. Option C is designed particularly for business travellers and short term visitors (e.g. tourists intending to be in the province for a matter of days), although it would potentially be available for any other entrant. Option C would also be available to *residents of Nova Scotia* who re-enter the province, typically after a short absence on a business trip or for personal reasons. An Entry Plan based on Option C would permit *unrestricted* entry if the applicant:

a) had received a confirmed diagnosis of COVID-19 at least "**w**" weeks prior to entry and could thus be considered non-infectious and immune (with very high probability); or
b) was considered to be sufficiently low risk based on a defined set of considerations such as:
    i. intended length of stay (fewer days reduces transmission risk)[7]
    ii. province, region or postal code of residence (locations of low prevailing COVID incidence imply lower risk)[8]

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[6] The ability of the RT-PCR test to detect the virus varies over the course of infection and will vary somewhat from case to case. Two or more tests after entry can significantly reduce the likelihood of missing an infected person. Moreover, the probability of a false negative is very low in circumstances where the prevalence of the virus (as a percentage of the relevant population) is low, as will usually be the case. Nevertheless, the risk of missing an infected person who then goes on to infect others can never be completely eliminated. Contact tracing provides the back-up.

[7] In the case of a returning resident, the factors affecting risk would be those encountered while away.

[8] The prevalence of infection in the entrant's area of residence is a very significant indicator of risk but is obviously not definitive since infection can also be acquired in the workplace or in social situations outside one's area of residence. To apply the regional risk criterion, Nova Scotia will need to have up-to-date access to regionally-differentiated COVID-19 incidence data.

iii. intended purpose of stay (e.g. to attend a large public event or business conference would signal increased risk)
iv. a confirmed positive result on one or more approved antibody tests (increasing the probability of immunity)
v. agreement to install and keep activated a location tracing app (to increase assurance of compliance)

None of the foregoing criteria are definitive but, in some combination, they could indicate that the likelihood of transmission of the virus while in NS would be extremely low. The thresholds and weighting of these criteria would be determined so as to balance the six fundamental considerations noted earlier. A "score" that exceeded a certain threshold would permit entry under Option C. (Failing approval under Option C, a prospective entrant could be admitted under A or B depending on the Entry Plan.) Option C would require very little compliance monitoring since entry would have been pre-approved without further formal conditions. There is some risk that the applicant might provide false information on the Entry Plan, and end up staying longer than promised, or for a different purpose. Such risks are probably low and would be lower still if the entrant agreed to use a location tracing app while in Nova Scotia.

All Entry Plans, regardless of chosen Option, would require those with smart phones to download and keep activated the nationally recommended COVID Shield contact alert app which notifies users if they have been in recent close contact with another user who tests positive for COVID-19 and enters the fact in their phone. It is generally accepted that this app should not create privacy concerns and it therefore can be required of all entrants who have smart phones.

The Entry Plan

A prospective entrant from outside a bubble in which NS participates would submit by email (or fax or post) a documented plan, based on a template, which covers the time the entrant intends to be in NS—or in the case of a returning resident, the time away. The Entry Plan would have elements such as the following, the details of which need to be determined.

a. Standard personal ID including name, home address, phones, email, health card ID, perhaps driver's license ID and/or passport ID. (A photo might be required—easy for anyone with a smart phone.)
b. Preferred Option: A, B, or C (Depending on the option, the template could branch to somewhat different questions and detail requested.)
c. Intended date and place of entry as well as mode (e.g. auto, plane, train, vessel, foot/bicycle)
d. Intended length of stay
e. Intended itinerary: e.g., overnight locations; names of reserved places if known; names and contact info of friends/family with whom one intends to visit or stay (essential in Option A)
f. Intended purpose(s) of visit (perhaps based on a pre-loaded checklist)
g. Name and contact info of a person in your home community. (This could aid follow-up if the entrant were to "disappear")
h. COVID Status: official record of a confirmed diagnosis; official record of one or more serology tests; official record of most recent (viral) test, if any. (A very recent negative test would decrease the risk posed by the entrant.)

Some information, such as COVID status, might require scanned images to be submitted. The plan would be evaluated on the assumption that the information was correct. As an incentive to provide valid information, applicants would be informed that there would be spot checks and any false information would automatically result in denial of entry. The plan could eventually be evaluated by software, but initially evaluation would be manual according to well-defined criteria to decide "accept/reject" or "require more information". The applicant would receive a decision by email within "**x**" days.[9] Each Entry Plan would have a unique identifier and would be sent to the stipulated entry point and, in the great majority of cases, would permit a very rapid pass through.

Ideally, airlines would agree to deny boarding to passengers entering from outside the bubble who do not present approved Entry Plans. At the very least the ticketing web sites should warn would-be entrants that they will be refused entry or quarantined if they do not have an approved Entry Plan.

For residents of Nova Scotia the Entry Plan would actually be a Re-entry Plan. Options A and B do not distinguish between a visitor and a returning resident, whereas the risk assessment in Option C may be somewhat less stringent for a resident since their information and compliance may be more easily verified. For short trips at least, the Re-entry Plan would be approved before departure and risk would depend largely on the destination, purpose of the trip and length of stay. If a plan requesting Option C were refused, Option A (quarantine) or Option B (a testing schedule) would always be available as alternatives.

Further Issues

The foregoing border procedure is presented for discussion and refinement. There will be many issues of detail that have not been anticipated in the outline—e.g. how to deal with an Entry Plan for a group travelling together and whether or not to require a testing regime for children under a certain age. Operational considerations will loom large, especially in the early days before information systems can be implemented to enable automation of most aspects of evaluation. Streamlining would be needed if provincial border control were to be in place for many months.[10] The immediate objective is to get something in place as quickly as possible. Human resources and turf fights should not be allowed to become a constraint. There will be learning by doing. Public health vigilance will be relied on to ring-fence any mistakes that slip through.[11]

In conclusion, several further considerations will need to be addressed:

- Although Options A, B and C have been presented separately, some features might be mixed and matched—e.g. Options A and/or C might require a test in at least some situations. For

[9] Special arrangements will be made for those without access to email, but the lead times would need to be greater.
[10] It is hoped that other provinces will soon be able to eliminate community transmission, in which case all of Canada could become a bubble and border measures would thereafter be implemented federally.
[11] Continuing innovation in the health system (better tests, better treatments) and in technology applied to contact tracing, may enable life to return to normal well before a vaccine is broadly available. If so, even international border measures may be relaxed much sooner than it now appears.

example, Option C with one post-entry test would diminish risk and increase the likelihood of approval of such an Entry Plan.

- As the Canada-US border is opened for family reunification, there will be international entry to Nova Scotia, or to a larger bubble. Will the provincial procedure to secure the border supersede the existing federal 14-day quarantine rule? (It appears that the relevant federal quarantine order allows a Province to substitute its own procedure.) Interprovincial entry restrictions also raise jurisdictional issues that need to be identified and resolved. And there may be legal issues raised by enforced quarantine in provincially-designated facilities.
- The border management procedure needs to be further developed and then managed by some designated body—a Task Force that is created for the purpose. Because the challenge is novel and time is *urgent*, the task cannot be delegated to an ad hoc interdepartmental group. A full-time commitment of the best talent that can be assembled, including communications specialists, is necessary.
- A multi-province bubble obviously requires agreement on a common border procedure.[12] This implies as well that the implementing Task Force must include representatives of the participating jurisdictions. There is a risk this could become bogged down in turf battles and disagreements over cost-sharing. The stakes are much too high to allow that to happen.
- The border plan will need to be communicated to the public so as to retain trust and confidence. This will be an exceptionally challenging task that will require great professionalism in its design and unquestioned credibility in its delivery.
- If Nova Scotia—or preferably the Atlantic Provinces—succeed in implementing a border plan that prevents a recurrence of community transmission of COVID-19 while restoring normal life, the benefit will accrue not only to this region but will be an example from which all Canadians can benefit through emulation.

[12] It is possible that small differences in the procedures of Provinces inside a bubble may still be consistent with allowing unrestricted entry within the bubble provided any added risk was judged to be acceptably small.