

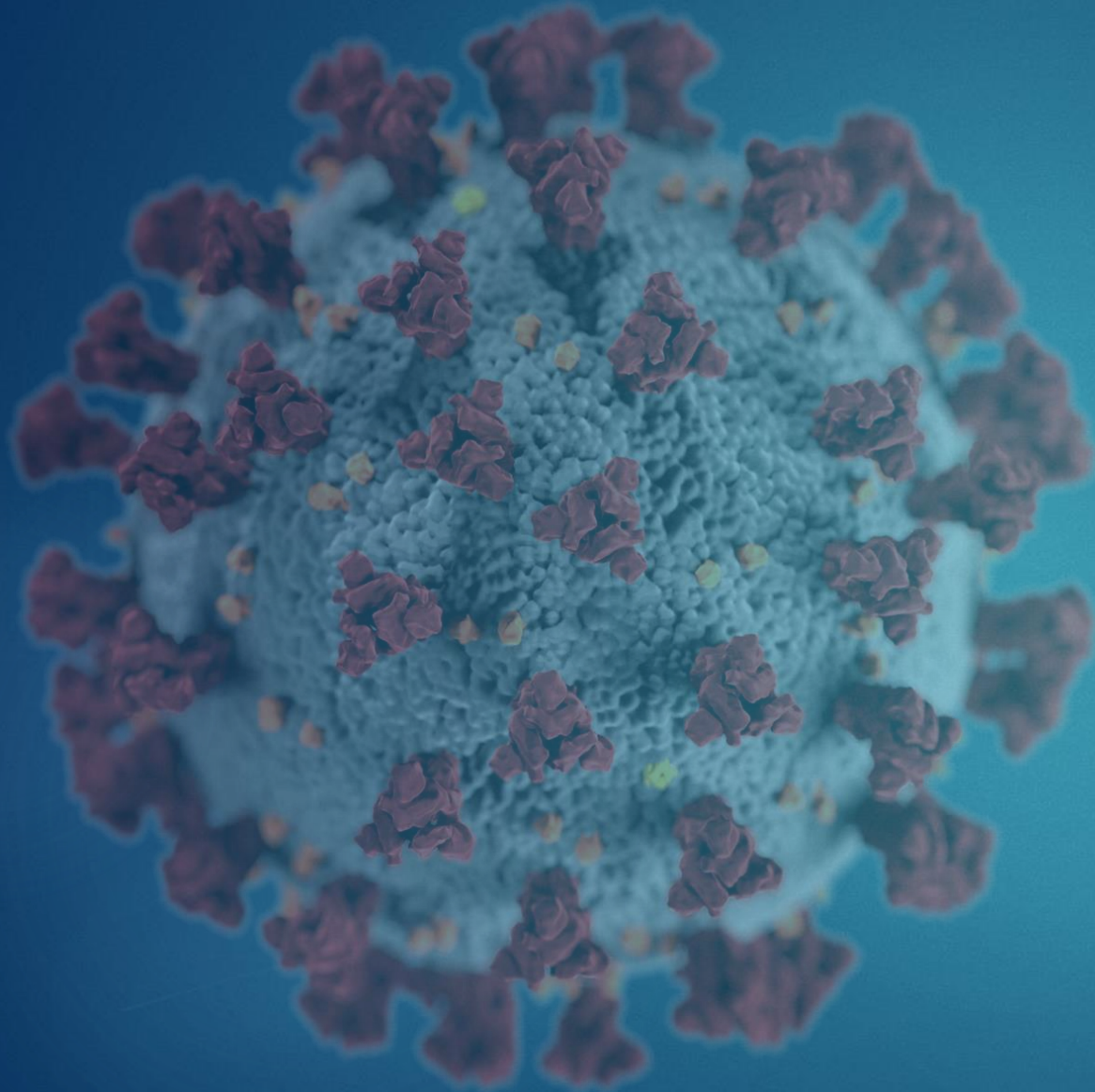
To view an archived recording of this presentation please click the following link:

https://www.youtube.com/watch?v=z5DsNaK_Zsw

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Gaming the Vaccine

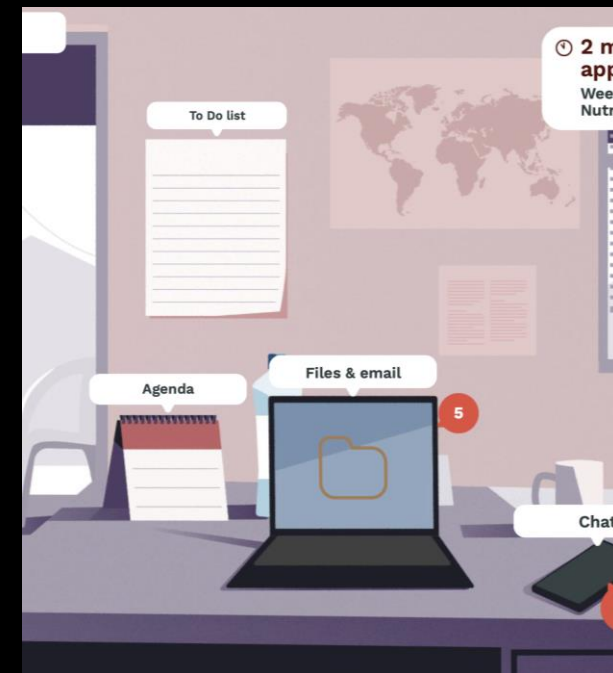
Using Red Teaming and Serious Games to Support Risk Assessment and Contingency Planning

Rex Brynen,
McGill University

Ben Taylor
Defence Research and Development Canada

Rex Brynen

- Professor of political science, McGill University
- Research and teaching on serious games, humanitarian response, intelligence analysis, and Middle East politics
- Serious game consultant to universities, government and UN agencies, NGOs
 - AFTERSHOCK: A Humanitarian Crisis Game
 - READY Initiative on serious game design
 - WHO Global Outbreak and Response Network working group on gamification
 - previous work on analytical gaming of biosecurity policy (African Swine Fever, Agriculture and Agri-Food Canada)

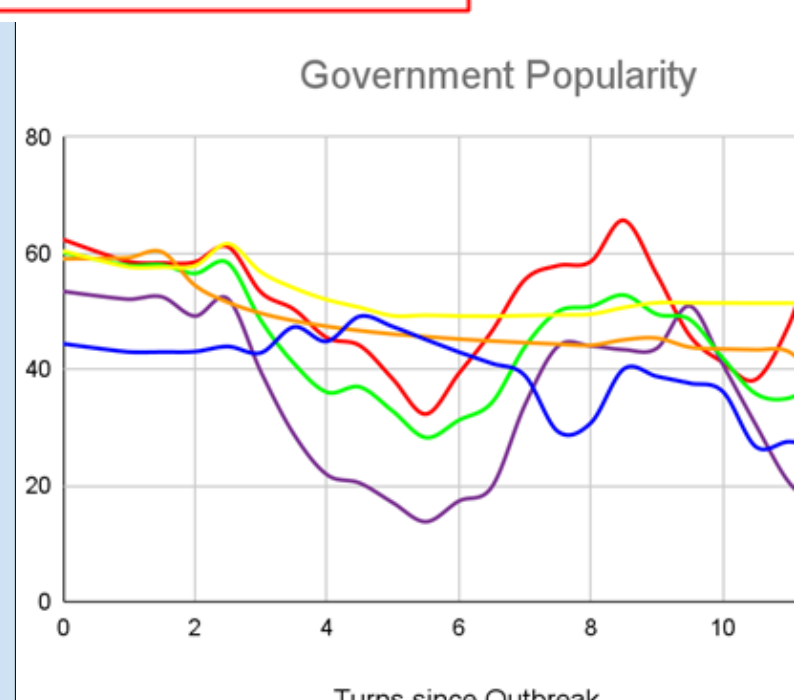
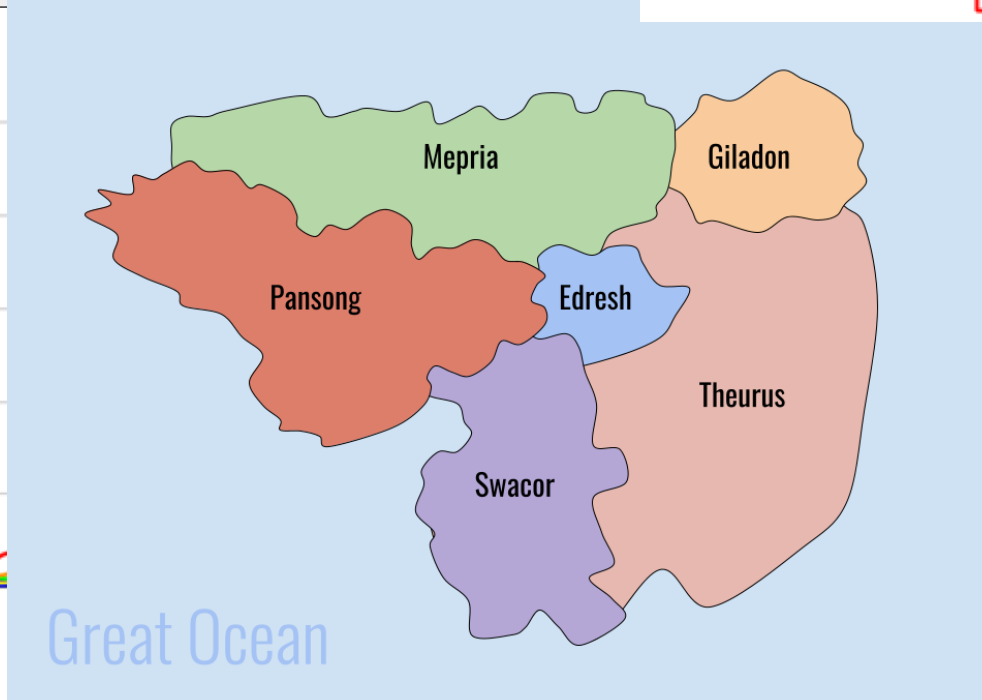
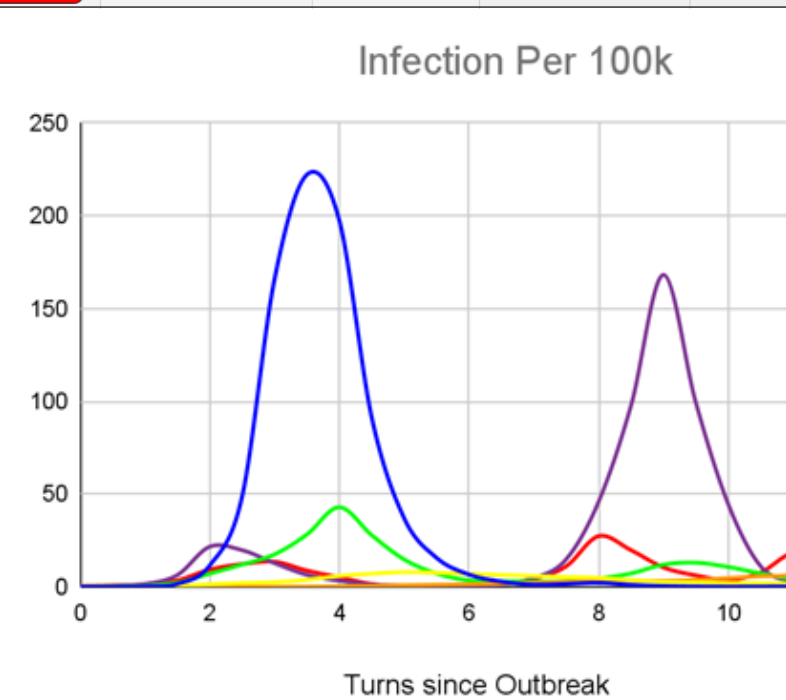
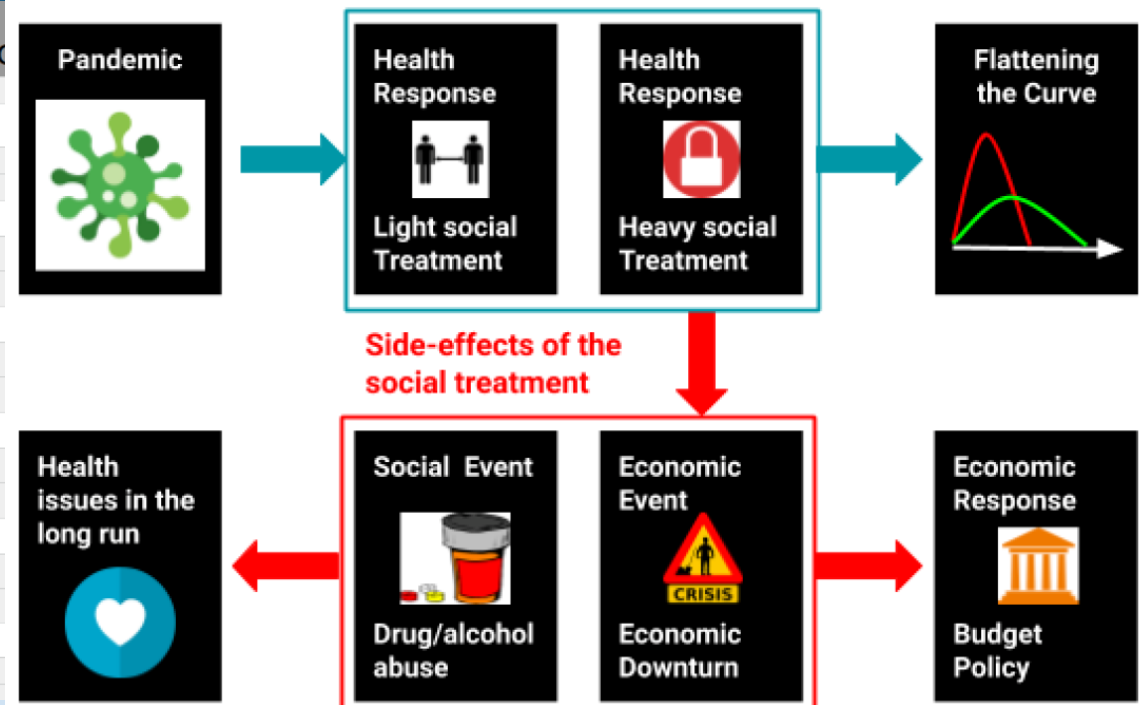


Ben Taylor

- Senior Operations Research analyst at Defence Research and Development Canada
- Background is long term planning of national defence forces, but with an emphasis in the last decade of bringing serious games to bear in the field
 - Developed a global flu pandemic response game with Global Affairs Canada in 2018-19
 - Developed a classroom pandemic response game to support teaching at faculty of Health Sciences at Simon Fraser University
 - Current working on game designs as part of 'Pandemics and Borders' project with team at Simon Fraser University

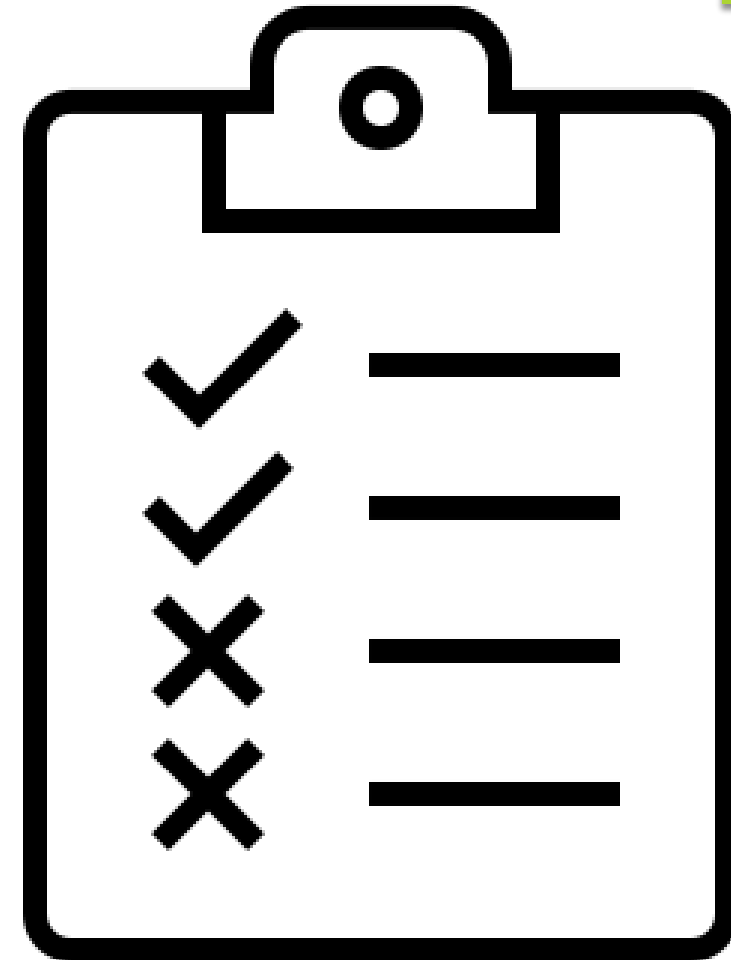
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Notes for Control:



And who are you?

- Primary professional role?
- Experience with exercises, red teaming, and serious gaming?



COVID-19 vaccine rollout challenge

- Canadian Armed Forces personnel were assigned to work with PHAC (and provinces/territories) to provide planning and logistics support for COVID-19 vaccine rollout under the auspices of the federal Vaccine Rollout Task Force (VRTF).
- 6 November 2020: drawing upon military planning best practices, the VRTF decided to “**wargame**” vaccine rollout

Wargaming is a common tool of military research, planning and education that explores the implications of choices through interactive gameplay.

Red teaming is a common technique in government and corporate planning, where a group of experts identifies potential challenges to, or weaknesses in, existing plans and capabilities.

Design approach

- Rule #1 **Do No Harm***: The VRTF and other PHAC stakeholders were very busy working on critical tasks:
 - We had to design an approach that minimized impact on them.
 - However, they were the people who need to think the issues through – so they had to be engaged at some point for the outputs to have any credibility.
 - Our approach was to use non-PHAC Subject Matter Experts (SMEs) wherever possible, drawn from government and academia, as well as retired former officials.
- Also, given very tight timescales, everything would have to be done through structured judgement sessions.
- Everything had to be virtual.

* See: <https://paxsims.wordpress.com/2020/03/18/gaming-the-pandemic-do-no-harm/>

Architecture

Week 1

23-26 November 2020



Independent
Red Team

Week 2

2 December 2020



Tabletop
Exercise

Week 3

11 December 2020



Independent
Red Team

Distribution
Plan



Contingencies



Mitigating
Courses of
Action



Residual
Risks

Week 1: Red Teaming

- The Red Team was established using the professional networks of the authors. These included:
 - Retired senior public servants, police officers and military healthcare experts
 - Academic Public Health experts
 - Foreign Service Officers
 - Researchers in social media/misinformation
 - The team was taken through four sessions, each focusing on one of the four phases of the plan and challenged to identify things that could go wrong, how likely they were to happen, and how serious the consequences could be.
- Phase 1: Procurement of vaccines and delivery to Canada
 - Phase 2: Distribution of vaccines to provinces and territories
 - Phase 3: Ramping up vaccine administration
 - Phase 4: Transition to steady state

Week(end) 1: Building the TTX

- The authors established a set of contingencies - exemplars of things that could go wrong – from the red team outputs.
 - A careful balance of likely and disruptive, rather than outlier “worst cases”.
- Materials were put together to give us four sessions – one per phase.
- In parallel, the VRTF were establishing participant lists from across the federal, provincial and territorial governments.
 - We had over 150* registrants from eight federal departments and agencies, all ten provinces, the three territories, and the Canadian Red Cross - and all spread over six time zones
- Each session was designed to have 2-3 contingencies for the players to react to.

Week 2: TTX Execution

- The TTX was run in a single day, virtually:
 - Four sessions were played – each looking at a different phase of the plan.
 - Some participants only attended some parts, so each session needed to be self-contained so as to accommodate newcomers.
- Participants were pre-assigned to one of four breakout rooms:
 - This gave us four different conversations around each phase.
 - PHAC staff were assigned to facilitate and to record discussion in each session.
- The event was 100% virtual and conducted over WebEx, using well-established techniques for online meetings.
 - Senior facilitators and observers moved between breakout rooms as required.

TTX Execution – turn structure



Introductory
Context
Briefs

15 mins

Room1:
PHAC



Room 2:
Other federal



Room 3:
Provinces and
territories



Room 4:
Mixed group

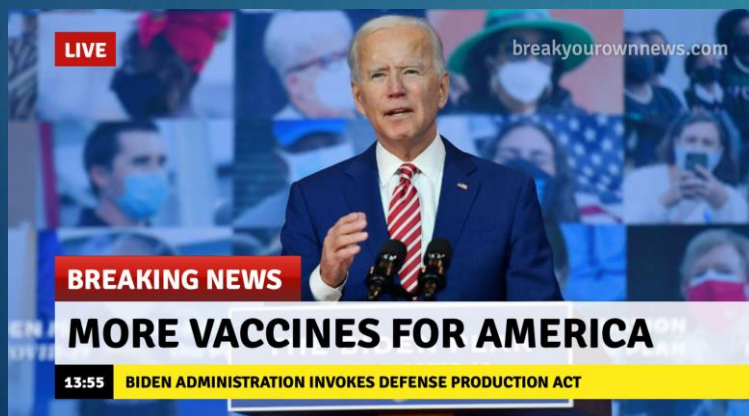
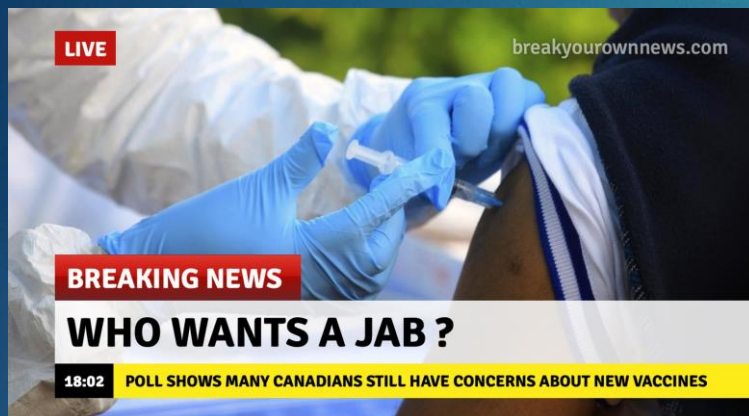


45 mins



Outbriefs and
Discussion

30 mins



Week 3: residual risk assessment

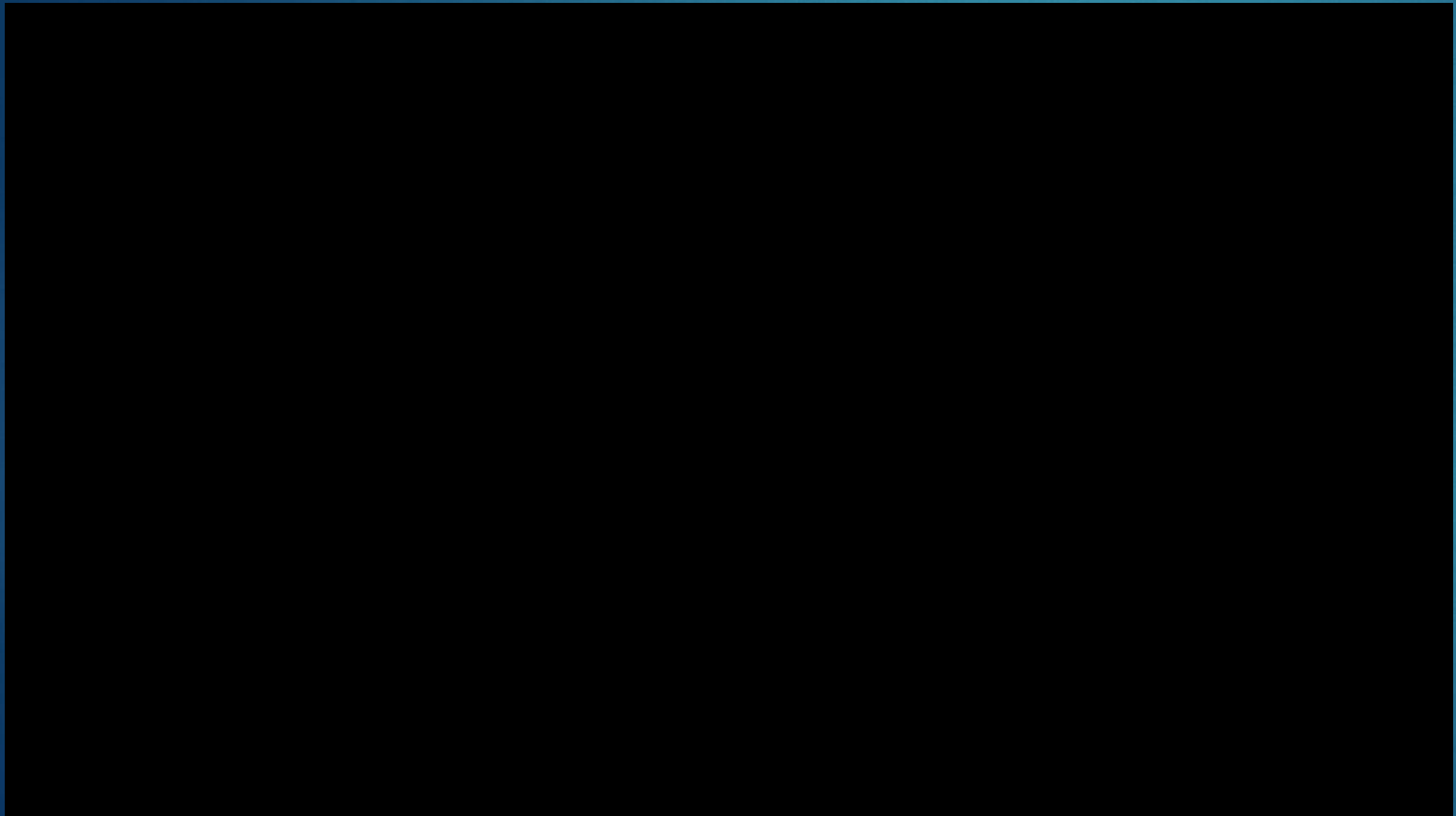
- A second red team, with many members common from the first, was convened the following week.
- They were asked to assess the likelihood and severity of each contingency before and after the mitigations proposed by the TTX.
- Participants were provided with word ladders to help standardize responses and provided their assessments through polling tools.
 - Allowing the rapid collection of everyone's perceptions.
- The results, highlighting the residual risks after mitigation, were reported to PHAC.

Impact

- The execution of the TTX was announced in a **national press briefing** the following day.
- Within government, a summary report of issues identified was first briefed to **PHAC senior leadership** and then to the **Prime Minister and members of the Federal cabinet**.
- The vice-chair of the cabinet COVID-19 committee later requested a follow-up meeting with one of the TTX organizers to discuss key findings.

Met the federal government's urgent need to indicate to Canadians that planning was well in hand, amid growing media reports on Canada's "slow" vaccine preparation.

Impact



CBC News, 3 December 2020

Fortin says military organizers have been working for months with government, scoping out the logistics that will be involved.

There have been discussions, “tabletop exercises,” and he said his team now is looking to “identify risks, discuss mitigations, look at decision points, and look at ways to ensure that we deliver vaccines as effectively as possible, as rapidly as possible. And as safely, more importantly, as safely as possible to all Canadians, including up to the remote and isolated communities.”

Toronto Star, 27 November 2020

“We know a lot about getting new aircraft and types of transport planes, trains and automobiles to these places, but doing it with vaccines that are somewhat fragile and need to be under certain conditions, warehousing them, making sure you’re keeping track of who’s getting it when, all of these things are things that right now are being laid out... They’re rehearsing tabletop exercises what this will look like as soon as we have access,” Lawson said.

CTV News, 28 November 2020

Fortin said there have been “tabletop” exercises to plan the distribution over the last weeks, including one on Wednesday that involved more than 150 people from all 13 provinces and territories, and eight federal departments and agencies.

The Canadian Armed Forces received formal orders last week to start planning for the distribution of COVID-19 vaccines, though the military’s top commander says preparations have been under way for longer.

Canadian Press, 3 December 2020

Impact

- The risk assessment undertaken encouraged PHAC to formalize **an internal process for risk-based analysis**.
- The TTX enabled a **nation-wide dialogue** among public health officials on vaccine challenges.
- Public health officials were **"immunized" by pre-exposure to contingencies and challenges** in the vaccine roll-out.

The approach taken in the Red Teams and TTX (coincidentally) aligned with the preference of the Privy Council Office (cabinet office) for risk-based analysis.

Impact

The really fascinating thing is that we set the stage for a risk-based assessment of the entire rollout. We knew that there was appetite from this particular government for risk-based planning.... The stage that we set up through the Red team and then through the tabletop exercise resonated to the point where we continued to run those kinds of facilitated “what-if” discussions throughout the entire roll-out and we’re still doing it.

*A lot of the risks that we identified at the very beginning through the red team were mapped out into a series of eight slides of collective risks.... **When all of those things came to fruition, because we had the really solid discussion at the red team level, and then working it through at the table level in the TTX, we already had the risk statement, the clear risk identification, the potential mitigation measures, and then the “so whats?” for the mitigation—which I think are the pieces we would have taken a lot longer to get to.... Had we not done it in a really controlled fashion before the doses hit the ground, when it all got really muddy—had we not done that before then, I think we would have been in a much more challenging space.***

I think what the red team allowed us to do was shine a light in some dark corners that maybe we wouldn't have gone to if we hadn't identified risks that were not within mainstream.



PHAC official

So, when people were saying "OK but what is this risk analysis based on?" I said, "Here, in the wargame." When people anchored that to the wargame they said "OK, that's good, that means this has been discussed, there's been a lot of eyes on this."

[The wargame and the brief] kickstarted a process... it became a weekly occurrence. They brought all of the other [Associate Deputy Ministers] in on that.

When we moved to the second phase, "The wargame was really good, it really let us visualize the plan, it really let everyone understand what was going on from all the different parts, so let's do it again."

The Red teaming portion of it was greatly [appreciated]. Everyone liked that, not because of any specific revelation... but because it seemed a good vector check by outside agents.... This is a good way to assure we're not falling for some sort of confirmation bias.... That was appreciated by a lot of the seniors.



CAF planner

Because as a red team we had talked through and identified those as real risks and then at the tabletop exercise we've gone through with the stakeholders ... what that did was allow us to set the stage that people didn't have to go through... certain stages of grieving when your plan doesn't work.

We didn't have to deal with that as much because they had already seen the risks that could come. And then as we hit the risks, it's like crap. Well, there it is. We talked about it now let's move on and do something about it, and so I think in that sense it was invaluable....



PHAC official

[Public health officials] are used to seeing tabletop exercises, but they're not used to seeing it in the kind of fashion that you put it forward and where you saw the increase in numbers in the PT [provincial/territorial] engagement—and not just in the numbers, but in the pure engagement and how much they wanted to talk, And how much they wanted to delve into some of the subjects—I think speaks to the fact that they didn't see it as a regular federal-provincial engagement....

We gave them, through the tabletop exercise and the planning and the documents, an opportunity to have those kinds of discussions that they never they've never had before, and then trickling down from that. What we've seen, and it's been interesting, the number of people who've commented on it: the level of collaboration.



PHAC official

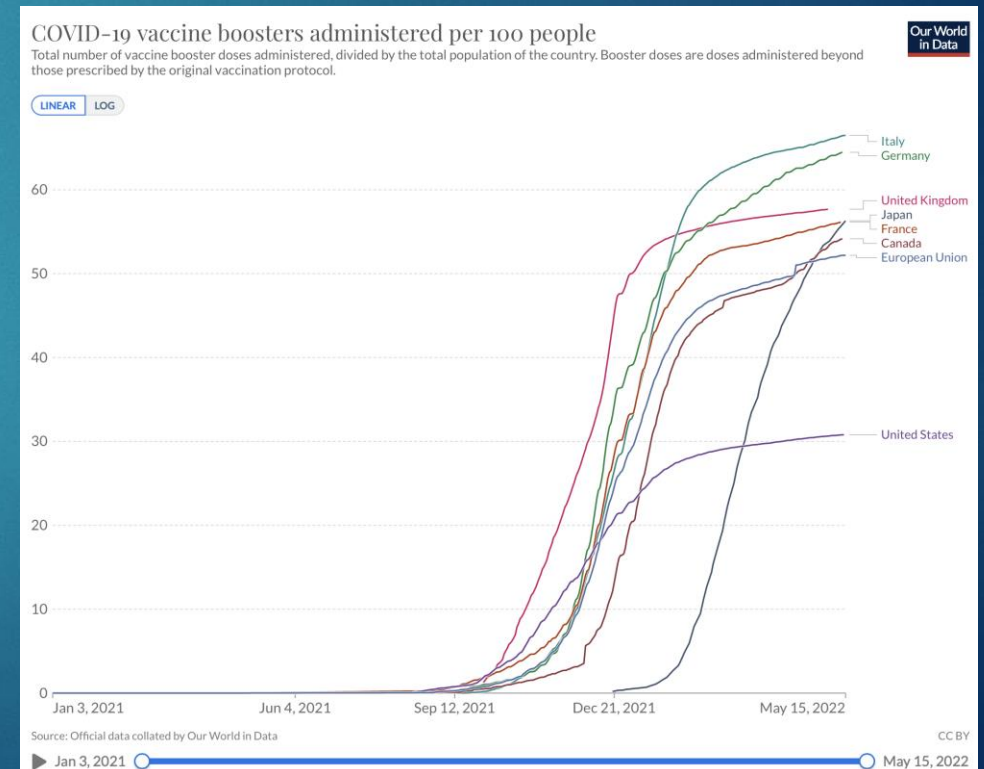
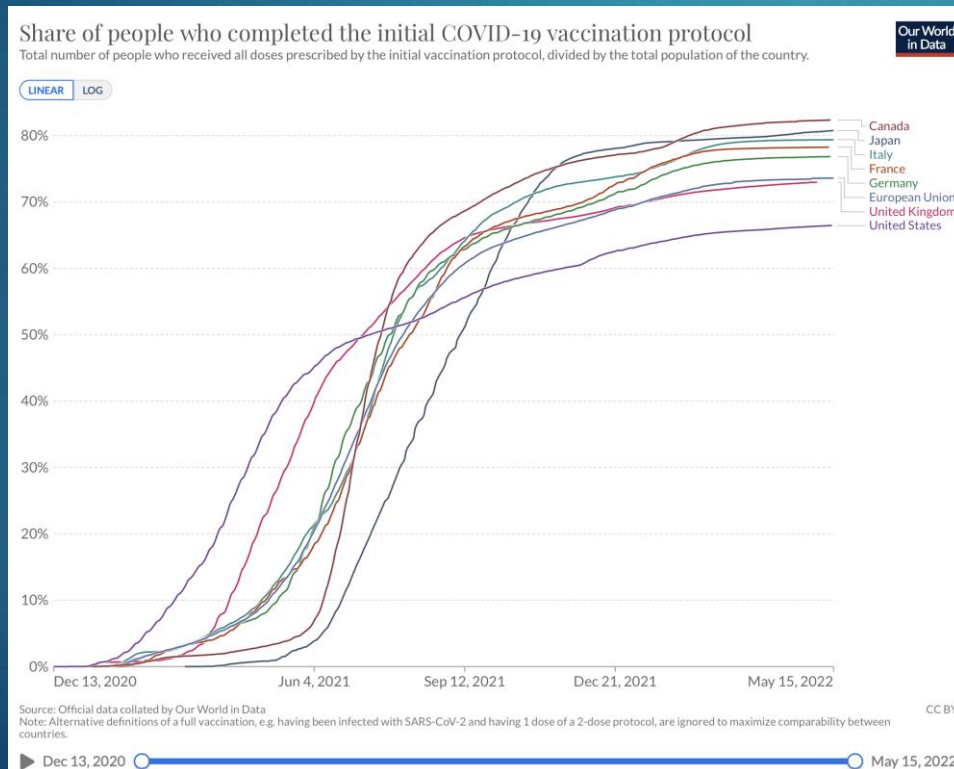
Impact

- Post-event (1 month and 1 year) surveys suffered from low response rates but were overwhelmingly positive.
- Post-event (1 year) qualitative interviews also indicated a very positive effect.



Reflections

- Canadian perceptions shifted from deep concerns about how Canada was lagging, to recognition that the vaccine rollout was a success, to complacency.



Reflections

- The only significant development in Canada with respect to the COVID-19 vaccination rollout that was not foreseen by the red team was the impact of the variants of concern and the potential for the virus to mutate so as to escape the vaccines.
 - Everything else of any significance has been an instance of one of the contingencies identified by the red team.
- There were also some contingencies that we were concerned about, but which haven't manifested to any significant degree:
 - Ultra Low Temperature distribution and storage.
 - Direct action by anti-vaccination groups.
 - Cyber disruption of healthcare systems.
 - Criminal exploitation of black market or counterfeit vaccines.

Lessons for Analysts

- The design, preparation, execution and reporting of all of the work described in this brief took place in a one month window.
- Success was built upon four key foundations:
 1. Having a "warm base" of tools and techniques to run virtual events.
 2. Senior staff having extensive personal networks and so able to reach the expertise needed very quickly.
 - Even the tasking to conduct the work was the result of an informal approach.
 3. Having a strong team with good interpersonal dynamics and a willingness to step up and get the job done.
 4. Having senior leaders prepared to let us run with this without bureaucratic oversight.

How does one promote "networked informality" in formal, hierarchical organizations?

Retired senior civil servants and officers proved to be a very valuable red teaming resource

DEFENCE RESEARCH AND DEVELOPMENT CANADA

DG R&D Science and Engineering

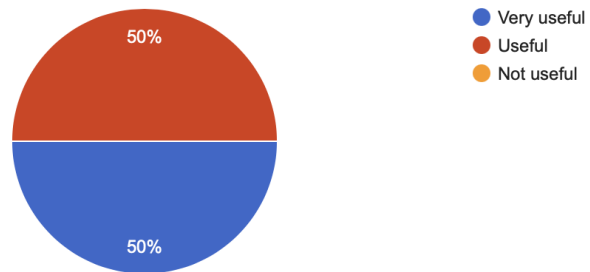
Questions?



Participant survey, December 2020

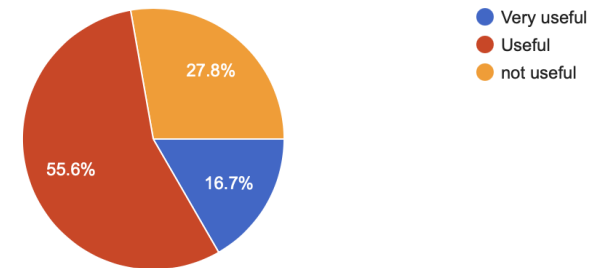
Was the TTX a useful way of exploring possible contingencies?

18 responses



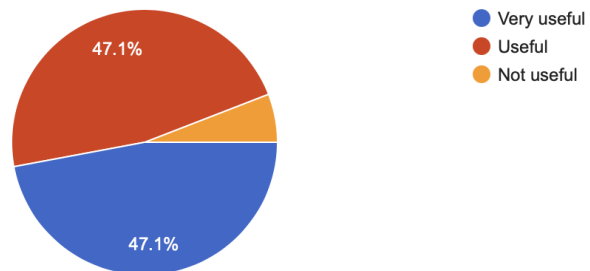
Was the TTX a useful way of building or expanding networks?

18 responses



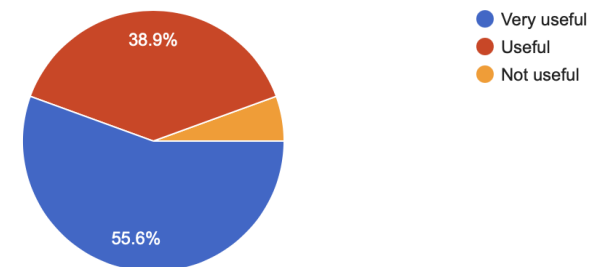
Was the TTX a useful way of sharing perspectives with other organizations ?

17 responses



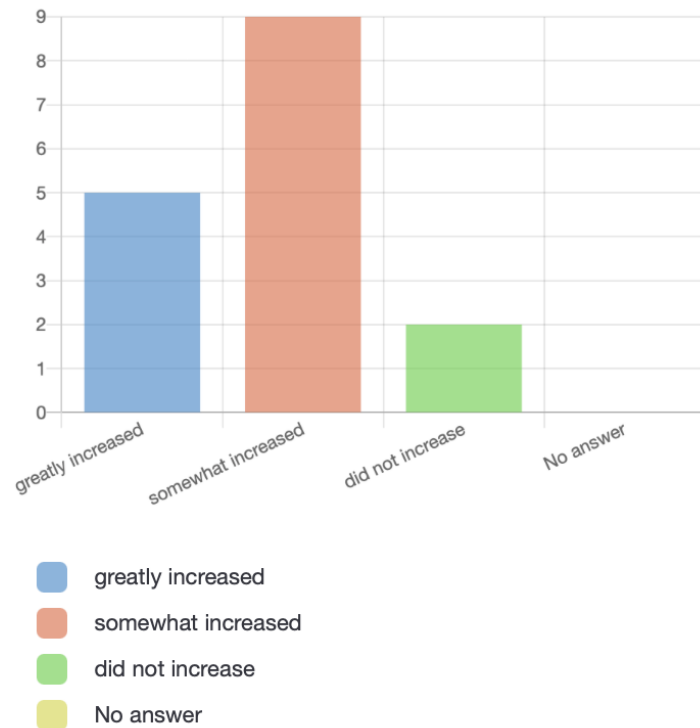
Was the TTX useful for gaining new information?

18 responses

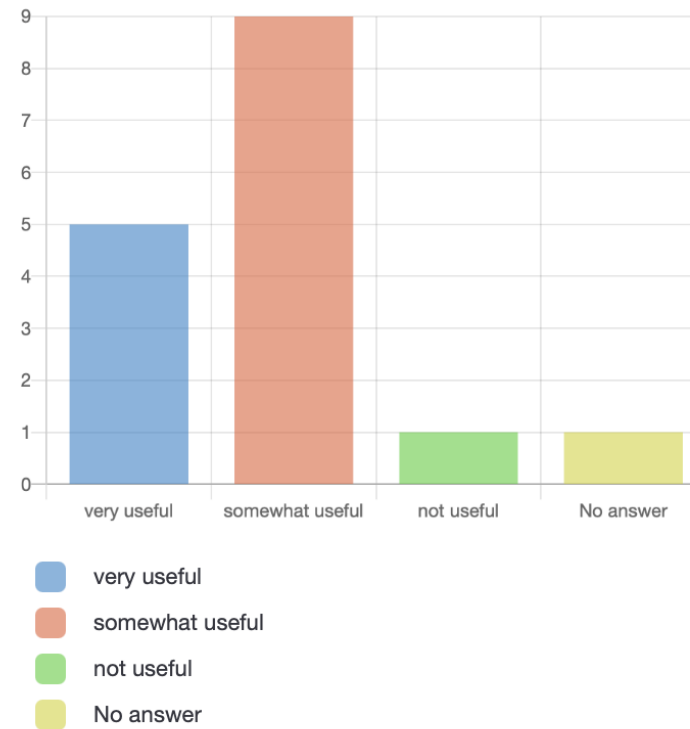


Participant survey, September 2021

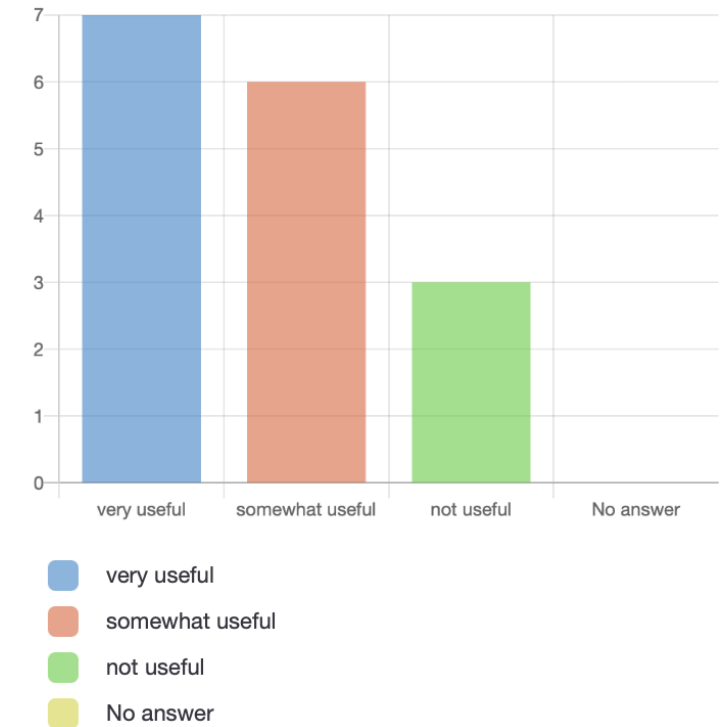
To what extent did the December 2020 tabletop exercise increase your knowledge of the vaccine rollout?



How useful was the tabletop exercise in allowing you to share insights and perspectives with other officials (in different jurisdictions or with different areas of responsibility or expertise)?

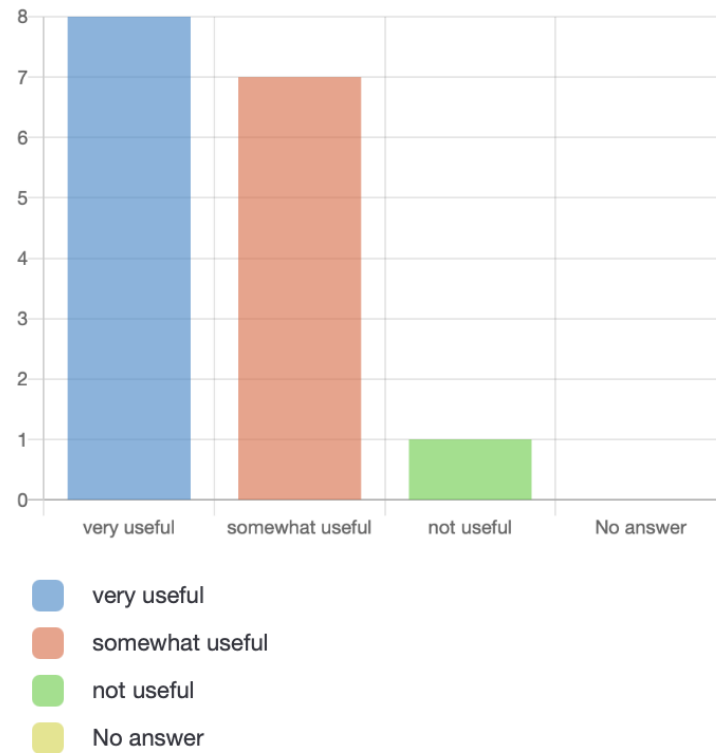


How useful was the TTX in helping to anticipate major challenges in Canada's vaccine rollout?



Participant survey, September 2021

Was the December 2020 tabletop exercise a useful expenditure of your time?



Should similar exercises be used more often in preparing for, or responding to, major public health challenges or other emergencies?

