Public Health Agency of Canada | Agence de la santé publique du Canada

Canada

The need to evaluate existing data resources and knowledge gaps to support future needs for respiratory disease surveillance and modelling

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Acknowledgments

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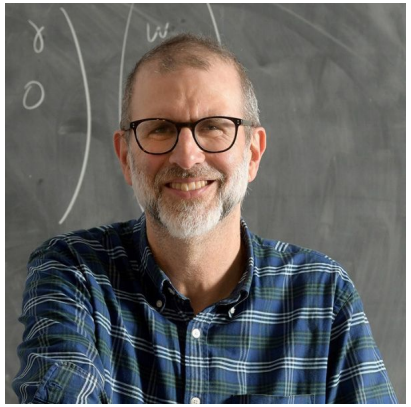

Nick Ogden Gordon Jolly
PHAC

Ben Bolker Jonathan Dushoff
McMaster University

Acknowledgments

You!

Thanks for your contributions in the pandemic and future collaborations.

Memory lane

1. Where were you in March 2020?
2. What were the questions you were asking in 2020; what do you want to know?
3. What were the data, surveillance and models used in 2020?

4. With your experience today if you can time travel back to 2020, does your answers change?

My Memory lane

1. Data are much better than past outbreaks
2. Testing/sequencing volumes
3. Wastewater
4. Public data and knowledge exchange
    a. We learned a lot and we also realized there are much more to learn.

The need for linked genomic surveillance of SARS-CoV-2

COMMENTARY

The need for linked genomic surveillance of SARS-CoV-2

Caroline Colijn[1]*, David JD Earn[2], Jonathan Dushoff[3], Nicholas H Ogden[4], Michael Li[5], Natalie Knox[6], Gary Van Domselaar[6], Kristyn Franklin[7], Gordon Jolly[8], Sarah P Otto[9]

Abstract

Genomic surveillance during the coronavirus disease 2019 (COVID-19) pandemic has been key to the timely identification of virus variants with important public health consequences, such as variants that can transmit among and cause severe disease in both vaccinated or recovered individuals. The rapid emergence of the Omicron variant highlighted the speed with which the extent of a threat must be assessed. Rapid sequencing and public health institutions' openness to sharing sequence data internationally give an unprecedented opportunity to do this; however, assessing the epidemiological and clinical properties of any new variant remains challenging. Here we highlight a "band of four" key data sources that can help to detect viral variants that threaten COVID-19 management: 1) genetic (virus sequence) data; 2) epidemiological and geographic data; 3) clinical and demographic data; and 4) immunization data. We emphasize the benefits that can be achieved by linking data from these sources and by combining data from these sources with virus sequence data. The considerable challenges of making genomic data available and linked with virus and patient attributes must be balanced against major consequences of not doing so, especially if new variants of concern emerge and spread without timely detection and action.

Affiliations

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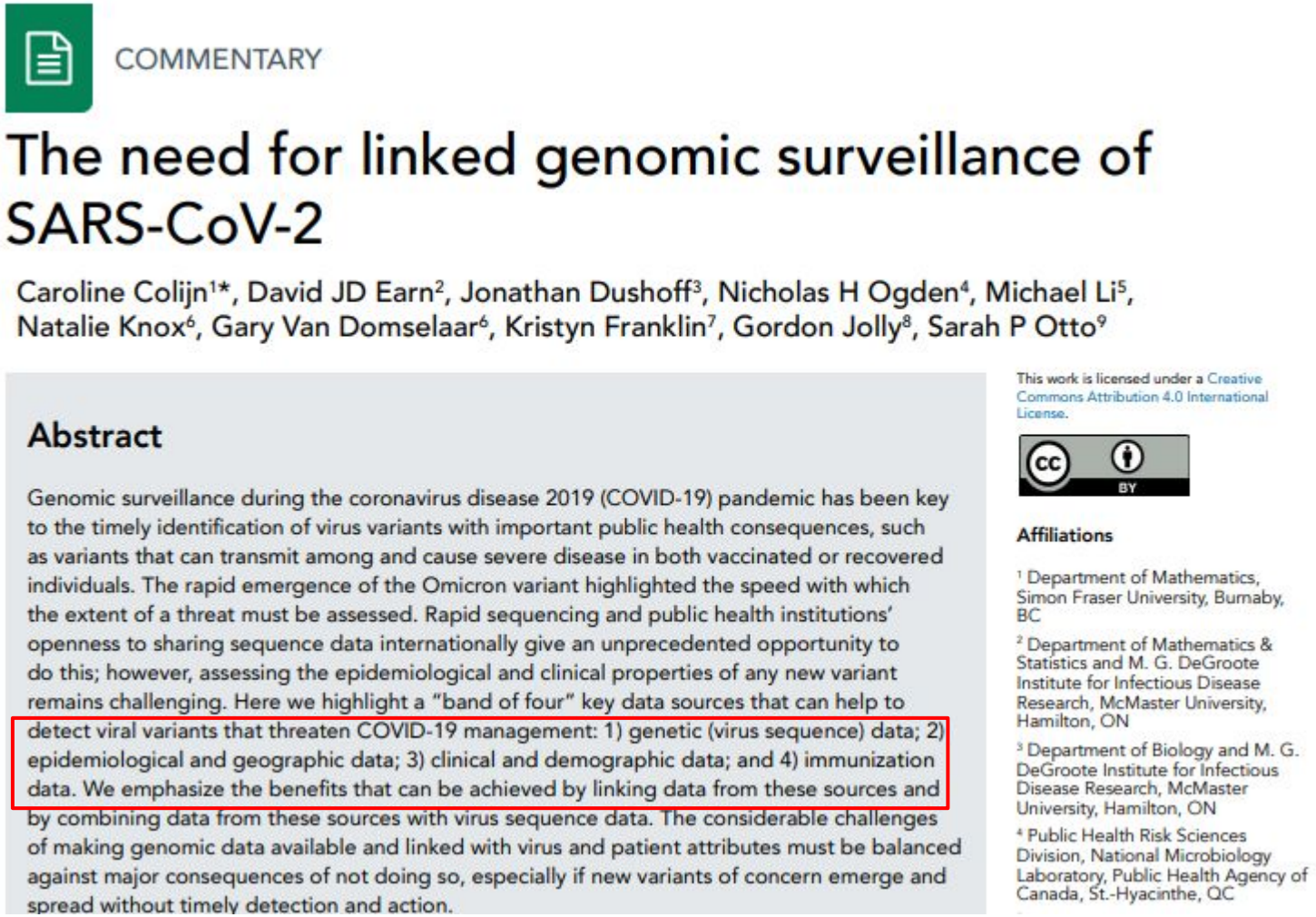
[2] Department of Mathematics & Statistics and M. G. DeGroote Institute for Infectious Disease Research, McMaster University, Hamilton, ON

[3] Department of Biology and M. G. DeGroote Institute for Infectious Disease Research, McMaster University, Hamilton, ON

[4] Public Health Risk Sciences Division, National Microbiology Laboratory, Public Health Agency of Canada, St.-Hyacinthe, QC

The need for linked genomic surveillance of SARS-CoV-2



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Band of four

1. Genetic (virus sequence)
2. Epidemiological and geographic
3. Clinical and demographic
4. Immunization

Quote

Quote

“One of the lessons we have learned in this pandemic is the recurring situation of saying:

If only we had done this X months ago, we would have had the data we need to make good decisions today.”

(2023)

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Quote

“One of the lessons we have learned in this pandemic is the recurring situation of saying:

If only we had done this X months ago, we would have had the ***info*** *we need to make good decisions today.”*

(2023)

Our focus should be on learning from data, not on the data itself. The key is not sharing data per se, but effective collaborations to obtain information from data – “data-info or data-knowledge sharing”.

Quote

“One of the lessons we have learned in this pandemic is the recurring situation of saying:

If only we had done this X months ago, we would have had the data we need to make good decisions today.”

Li (2023)

Your ideas, perspectives, and experience

We all see through different lenses
We all seek answers in different ways
We all see value our needs based on different criteria

The “PREP” Vision

The “PREP” Vision

Profiling

Identifying what “people” want to know and the bottlenecks.

The “PREP” Vision

Profiling	**R**eflection
Identifying what “people” want to know and the bottlenecks.	Evaluating existing resources used to seek answers.

The “PREP” Vision

Profiling	**R**eflection	**E**xploring alternative options
Identifying what “people” want to know and the bottlenecks.	Evaluating existing resources used to seek answers.	What can we do to work around various barriers?

The “PREP” Vision

Profiling	**R**eflection	**E**xploring alternative options	**P**roof of concept
Identifying what “people” want to know and the bottlenecks.	Evaluating existing resources used to seek answers.	What can we do to work around various barriers?	Validation of ideal world.

The “PREP” Vision

Profiling

Identifying what “people” want to know and the bottlenecks.

a. Who are the people who want answers? (E.g., public, local public health, science partners, hospital administrators, policy makers)
b. What are the questions these people want to know and what answers are they seeking?
c. What are the small incremental steps to get there?

- *Alignment of separate initiatives to identify synergies and ad-hoc collaborations*
- *Communications -> education -> collaboration*

The “PREP” Vision

Reflection

Evaluating existing resources used to seek answers.

a. What are our existing resources (i.e., data, knowledge, people, tools).
b. How much do we know about our resources and what can do or not do with our existing resources?
c. How sustainable are they?
d. How can we improve existing resources?

- *Risk*
- *data linkage*
- *Trust (i.e. public trust, scooping, usage and distribution)*
- *Cost of additional information*
- *Data integration*
- *What limitations have held you back in previous analyses? A diverse handful of such examples could be persuasive.*

The “PREP” Vision

Exploring alternative options

What can we do to work around various barriers?

a. If there are no change, what else can you do?
b. How do we frame questions to enable maximal use of de-identified data?
c. What happens when resources are not sustainable?

- *Collab without data: under-utilized mechanism for doing sophisticated analysis while respecting security and private data*
- *The basic idea is that people with clearance can co-operate with others to run high-resolution analyses and share the result.*
- *This method can be made more efficient if there is a parallel synthetic data pipeline that allows collaborators without access to real data to test and develop tools before they are applied to the real data*

The “PREP” Vision

Proof
of concept

Validation of ideal world.

a. How we can validate our ideal world is worth it?
b. If we could extract appropriate information from data, can we package it for use to ensure that the information had impact?
c. Would it be understood, would it be used the way we thought, would it be timely, would its errors be minor or catastrophic?

- *Tabletop exercise*
- *agent base model that can generate anything*
- *Involve modellers and non-modellers*

Conclusion

Profiling	**R**eflection	**E**xploring alternative options	**P**roof of concept
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“We need to talk.”	“We need to walk.”	“We need to talk the walk.”	

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“We need to talk.”	“We need to walk.”	“We need to talk the walk.”	“We need to walk the talk.”

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