Defence Research and Development Canada
Recherche et développement pour la défense Canada

Likelihood of undetected COVID-19 infection in a group

8 March 2021

Steve Guillouzic, Ramzi Mirshak, Steven Horn and Andrew Sirjoosingh

Centre for Operational Research and Analysis
Defence Research and Development Canada

DRDC | RDDC

Canada

Outline

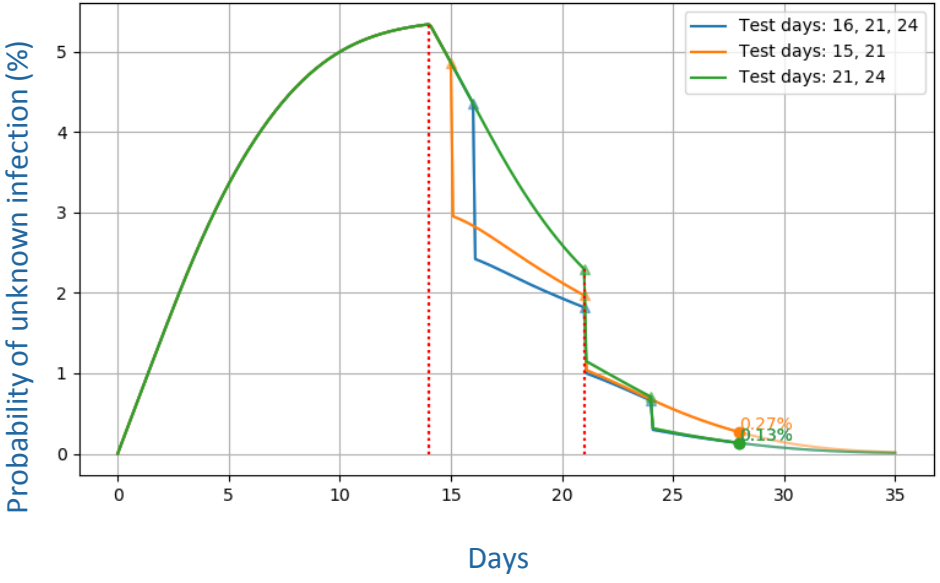
- Context
- Demo

Acknowledgements

- Dr. David Waller (DRDC)
- Dr. Steven Schofield (Department of National Defence)
- Mr. Michael Salciccioli (DRDC)
- Mr. Alasdair Grant (Department of National Defence)
- Dr. David Champredon (Public Health Agency of Canada)

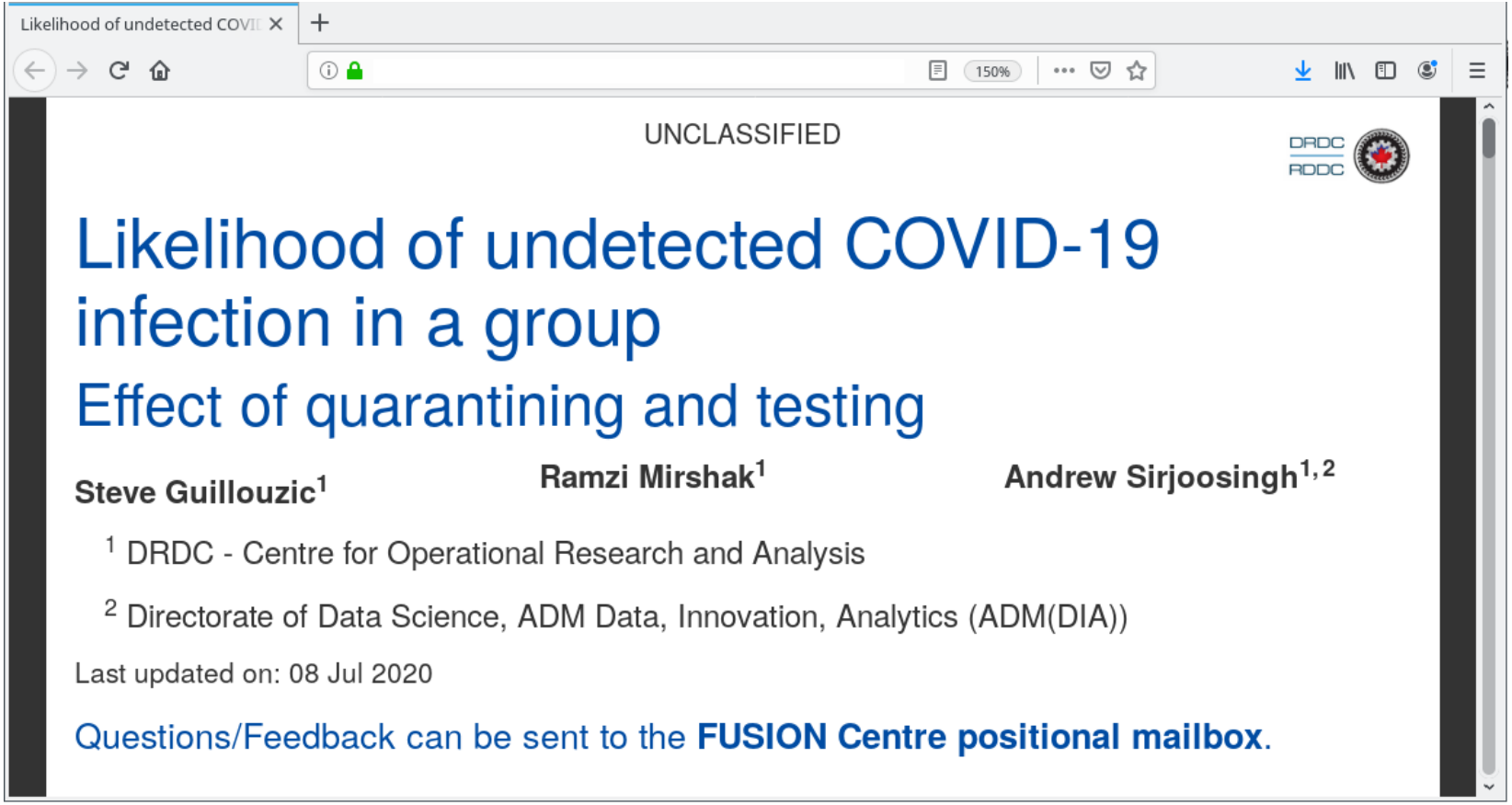
Early work

- Risk analysis used to inform continuity of operations at NORAD:
  - *How much quarantining and testing are needed to reduce likelihood of undetected infection to a level with which Commander is comfortable?*



- Canadian Forces Health Services requested an online calculator to provide a similar functionality across the Department of National Defence (DND) and the Canadian Armed Forces (CAF).

Online calculator for DND/CAF medical advisors (version 1)



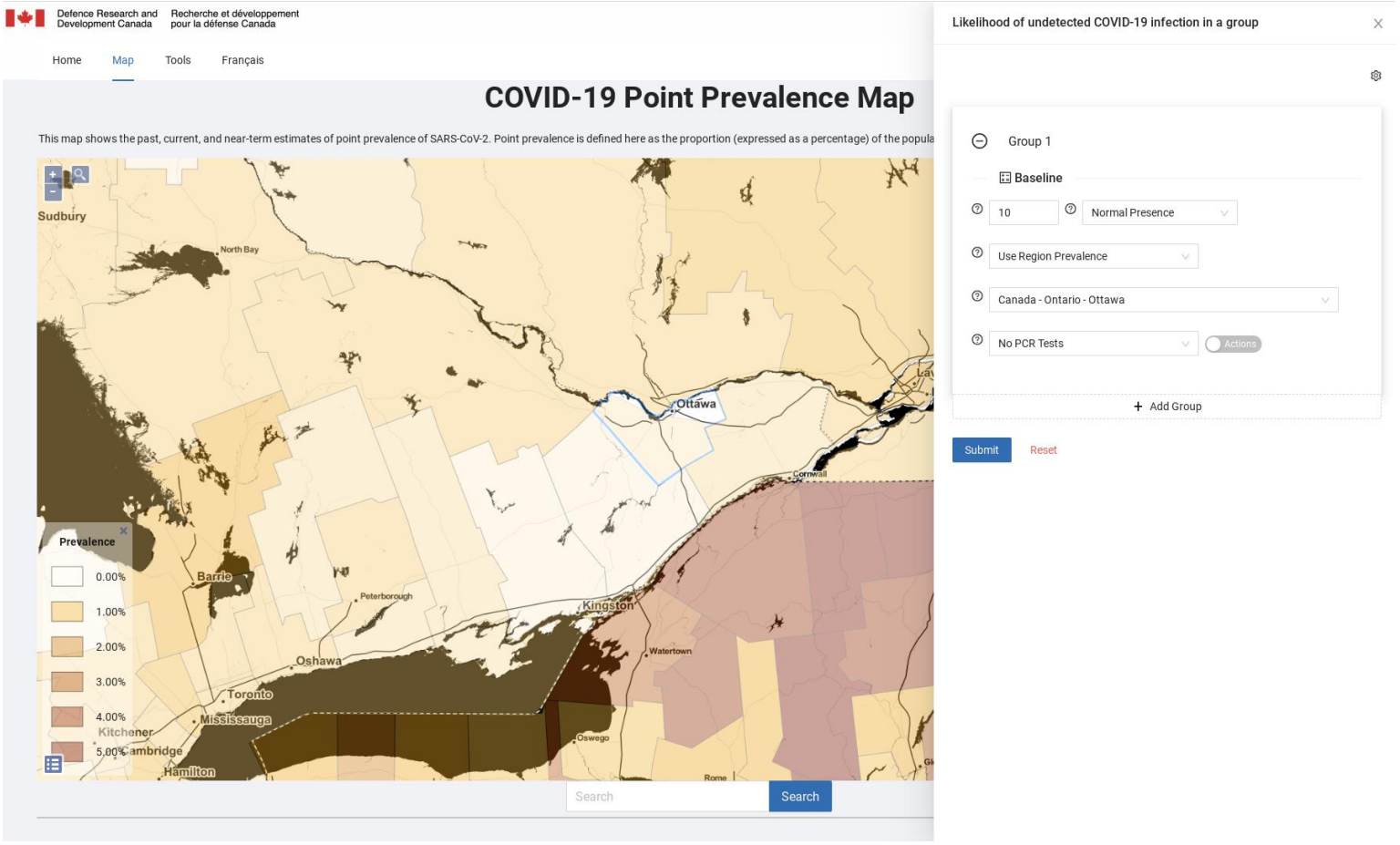
Subsequent developments

- 80% solution: a pretty good answer now is better than a perfect answer delivered after the decision has been made.

- Point prevalence had to be specified by the user:
  - Now inferred from case data using Bayesian inference with probabilistic programming and an SEIR model (susceptible, exposed, infectious, recovered), and displayed on a point prevalence map of the World

- Improvements in version 2:
  - Group members coming from multiple locations
  - Time-dependent test sensitivity and correlation between successive tests
  - Antigen tests

Demo of version 2, integrated with point prevalence map



Defence Research and Development Canada

Recherche et développement pour la défense Canada

DRDC | RDDC

SCIENCE, TECHNOLOGY AND KNOWLEDGE FOR CANADA'S DEFENCE AND SECURITY

SCIENCE, TECHNOLOGIE ET SAVOIR POUR LA DÉFENSE ET LA SÉCURITÉ DU CANADA

Canada