

Preparing for a Second Pandemic Wave

To: Chair and Members of the Board of Health

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Recommendations

It is recommended that the Board of Health:

1. Receive this report for information.

Key Points

- COVID-19 continues to have a significant health impact in Ontario and around the world. In Ontario, the rate of new cases peaked in March and April and has decreased in the subsequent months.
- Influenza pandemics over the past several centuries have exhibited multiple 'waves' of cases. This may also be true for a pandemic caused by a novel coronavirus.
- The rate of person-to-person transmission changes over the course of a pandemic, in response to active control measures as well as factors such as weather. These changes influence the broader course of the pandemic.
- Multiple future scenarios are possible, including one that features a larger second wave arriving in the fall or winter.

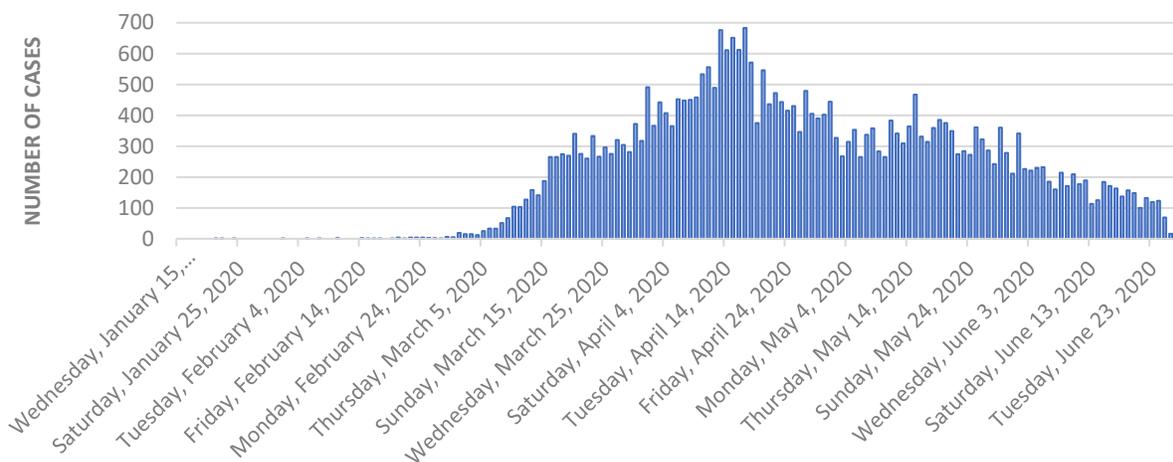
- WDGPH is using the coming months to plan for a possible second wave and ensure the Agency has appropriate capacity to respond.

Discussion

The global pandemic of COVID-19 continues to have a significant impact around the world. As of June 29, 2020, over 10 million cases have been documented by the World Health Organization.¹ The number of cases reported each day continues to rise as the pandemic reaches new parts of the globe.

COVID-19 reached Ontario on January 25, 2020 when the province’s first case was identified in Toronto.² Though early cases of COVID-19 were travel-related, ongoing chains of transmission within the community (‘community spread’) and within institutions led to growing case counts through March and April.³ Reported case data from May and June suggest that the number of new cases has decreased somewhat during these months. A similar trend has been observed within the Wellington-Dufferin-Guelph (WDG) Health Unit.

Figure 1: Count of COVID-19 Cases in Ontario by Episode Date³



WDG and Ontario are still experiencing this ‘first wave’ of COVID-19. However, experts and policymakers have already begun to discuss the possibility of a ‘second wave’ and the measures that our health system must undertake to prepare for such an event.⁴

Learning from Previous Pandemics

SARS-CoV-2, the virus that causes COVID-19, is the first human coronavirus to cause a pandemic in recorded history. Consequently, the best model for understanding how this pandemic may unfold is to look to previous influenza pandemics.

There have been at least eight (8) global influenza pandemics since the 1700s, with four (4) having occurred since 1900 (Table 1).^{5,6} All eight (8) pandemics were characterized by a second (and in some cases, third) wave of illness.^{5,7} Each subsequent wave represents a time period during which transmission and case counts increased – even after decreasing at the end of the first wave. In some instances, such as during the 1918 influenza pandemic, the second wave was more severe than the first wave.⁸

Table 1:
Characteristics of Influenza Pandemics after 1900⁵ and the COVID-19 Pandemic

Pandemic Name	Years	Pathogen	Approx. Number of Deaths
Spanish Flu	1918-20	Influenza H1N1	40-50 Million
Asian Flu	1957-58	Influenza H2N2	1-2 Million
Hong Kong Flu	1968-70	Influenza H3N2	500,000 – 2 Million
Swine Flu	2009-10	Influenza H1N1	Up to 575,000
COVID-19	2020-	SARS-CoV-2	499,913 as of June 29, 2020 ¹

Additionally, pandemic waves will have different sizes and appear at different points in time depending on location. The overall number of pandemic waves can also differ between locations; for example, the 1918 influenza pandemic had three (3) clear waves in England, but only two (2) in the United States.⁸

The Basic Reproduction Number

The rate at which a virus like SARS-CoV-2 spreads within a population depends on its basic reproduction number (R_0), which represents the number of new infections that each case is expected to generate when no one in the population has immunity.⁹ Early in the COVID-19 pandemic, estimates of R_0 typically ranged from 2-3 – meaning that each case was expected to produce 2-3 new infections.¹⁰

R_0 depends primarily on the duration of time that cases are infectious, rates of person-to-person contact, and the likelihood of transmission per contact. Accordingly, R_0 can change during a pandemic in response to factors such as:

- Changes to the infectiousness of the virus;
- Seasonal variation in transmission;
- Effectiveness of individual-level control measures (e.g. handwashing, masking);
- Effectiveness of public health control measures (e.g. case and contact management); and
- Effectiveness of community-level control measures (e.g. store closures, bans on mass gatherings).^{8,11}

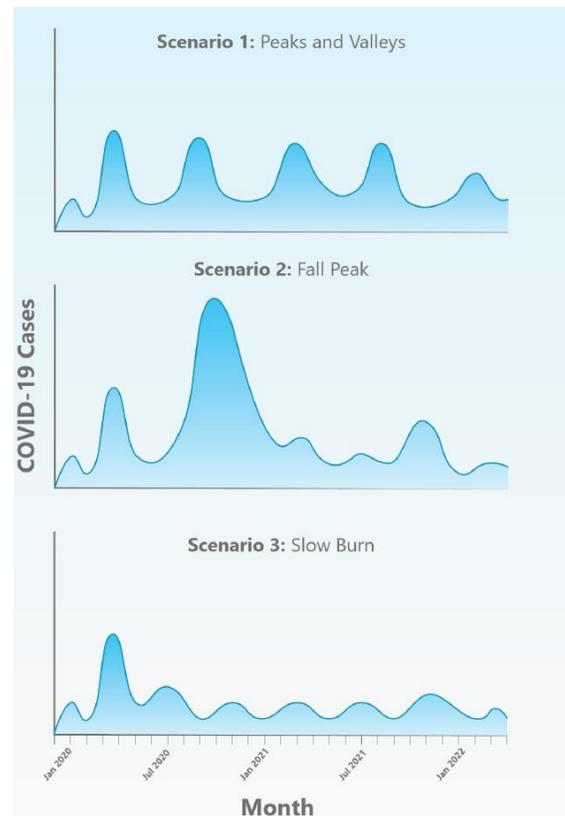
The strength and duration of immunity among those who have recovered from illness (or have been immunized) also plays a significant role in determining rates of transmission. Experts believe that those who recover from COVID-19 develop some degree of immunity, though its strength or duration is not well understood at present.

Possible Scenarios

The Center for Infectious Disease Research and Policy (CIDRAP) outlines several possible scenarios regarding the impact of COVID-19 over the course of the pandemic (Figure 3).⁵

1. Scenario 1: A first wave in spring 2020, followed by a series of smaller waves over the following 1-2 years.
2. Scenario 2: A first wave in spring 2020, followed by a larger wave in the fall/winter (similar to the 1918 influenza pandemic). This may be followed by smaller subsequent waves.
3. Scenario 3: A single wave in spring 2020, followed by ongoing transmission without a clear wave pattern. This remains possible, though it differs from what was observed during previous influenza pandemics.

Figure 3: Possible Pandemic Wave Scenarios for COVID-19⁵



Preparing for COVID-19 requires WDGPH to be ready for any of these scenarios. Scenario 2 would have the greater impact and is the greatest cause for concern.

How WDGPH is Responding

Over the coming months, WDGPH will be preparing itself for the possibility of a second wave of COVID-19 in the fall or winter. This includes taking the following actions:

- Developing a robust action plan that spans all parts of WDGPH's Incident Management System;
- Enhancing surveillance systems and identifying patterns that would alert the agency to when a second wave may arrive;
- Ensuring that WDGPH's case management and data entry teams are adequately resourced to manage higher case volumes;
- Changing internal processes in order to take advantage of new digital solutions such as COVID Alert, the new provincial exposure notification app;
- Migrating to the new provincial case and contact management system;
- Incorporating messaging about a second wave into WDGPH's public communications; and
- Supporting local partners with their preparedness efforts.

Congregate settings, such as long-term care homes, retirement homes and shelters were significantly impacted by the first wave of COVID-19. WDGPH established a Congregate Settings Team to support these facilities and ensure that they are adequately prepared for a second wave. This team works in conjunction with local partners including the Ontario Health Teams, hospitals and the Ministry of Long-Term Care/Retirement Homes Regulatory Authority.

Conclusion

The COVID-19 pandemic significantly impacted the WDG community when the first wave struck this winter. Though case counts are currently declining in WDG and across Ontario, a second wave of illness is a very real possibility. WDGPH and partners across the health system must prepare for this possibility in order to ensure the community is kept safe.

Ontario Public Health Standard

Infectious and Communicable Disease Prevention and Control

- The board of health shall conduct population health assessment and surveillance regarding infectious and communicable diseases and their determinants.
- The board of health shall communicate, in a timely and comprehensive manner, with all relevant health care providers and other partners about urgent and emerging infectious diseases issues.
- The board of health shall provide public health management of cases, contacts, and outbreaks to minimize the public health risk in accordance with the Infectious Diseases Protocol, 2018 (or as current); the Institutional/Facility Outbreak Management Protocol, 2018(or as current); the Management of Potential Rabies Exposures Guideline, 2018(or as current); the Rabies Prevention and Control Protocol, 2018 (or as current); the Sexual Health and Sexually Transmitted/Blood-Borne Infections Prevention and Control Protocol, 2018 (or as current);and the Tuberculosis Prevention and Control Protocol, 2018(or as current)

WDGPH Strategic Direction(s)

- Health Equity:** We will provide programs and services that integrate health equity principles to reduce or eliminate health differences between population groups.
- Organizational Capacity:** We will improve our capacity to effectively deliver public health programs and services.
- Service Centred Approach:** We are committed to providing excellent service to anyone interacting with WDG Public Health.
- Building Healthy Communities:** We will work with communities to support the health and well-being of everyone.

Health Equity

COVID-19 poses a threat across the WDG community, but disproportionately impacts more marginalized groups. Emerging evidence finds that racialized and low-income

groups face greatest burden of infections, hospitalizations and death.¹² The pandemic has the potential to exacerbate existing health and social inequities.

In addition to addressing the direct impacts of COVID-19, WDGPH is working with community partners to identify, measure, and respond to secondary pandemic impacts. These include the outcomes that the COVID-19 pandemic causes indirectly, such as food insecurity or worsened mental health. These impacts may be exacerbated during a second pandemic wave.

References

1. World Health Organization. Coronavirus disease (COVID-19) Situation Report–161. [Internet]. 2020 Jun 28. Available from: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200628-covid-19-sitrep-161.pdf>
2. Government of Ontario. Ontario Confirms First Case of Wuhan Novel Coronavirus. Ontario Newsroom[Internet]. 2020 Jan 25. Available from: <https://news.ontario.ca/mohltc/en/2020/01/ontario-confirms-first-case-of-wuhan-novel-coronavirus.html>
3. Public Health Ontario. Ontario COVID-19 Data Tool. [Internet]. [Cited 2020 Jun 28]. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool>
4. Flanagan R. C'The second wave will come' and experts say Canada is not prepared. CTV News[Internet]. 2020 May 21. Available from: <https://www.ctvnews.ca/health/coronavirus/the-second-wave-will-come-and-experts-say-canada-is-not-prepared-1.4948733>
5. Center for Infectious Disease Research and Policy. COVID-19: The CIPRAP Viewpoint: Part 1: The Future of the COVID-19 Pandemic: Lessons Learned from Pandemic Influenza. [Internet]. 2020 Apr 30. Available from: https://www.cidrap.umn.edu/sites/default/files/public/downloads/cidrap-covid19-viewpoint-part1_0.pdf
6. Saunders-Hastings PR, Krewski D. Reviewing the History of Pandemic Influenza: Understanding Patterns of Emergence and Transmission. Pathogens[Internet].2016;5(4):66. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5198166/>
7. Miller MA, Viboud C, Balinska M, Simonsen L. The Signature Features of Influenza Pandemics — Implications for Policy. N Engl J Med[Internet].2009;360:2595-2598. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMp0903906>

8. He D, Dushoff J, Day T, Ma J, Earn DJD. Mechanistic modelling of the three waves of the 1918 influenza pandemic. *Theor Ecol*[Internet].2011;4:283-288. Available from:
https://www.researchgate.net/publication/225916784_Mechanistic_modelling_of_the_three_waves_of_the_1918_influenza_pandemic
9. Delamater PL, Street EJ, Leslie TF, Yang YT, Jacobsen KH. Complexity of the Basic Reproduction Number (R0). *Emerg Infect Dis*[Internet].2019;25(1):1-4. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6302597/>
10. Tuite AR, Fisman DN, Greer AL. Mathematical modelling of COVID-19 transmission and mitigation strategies in the population of Ontario, Canada. *CMAJ*[Internet].2020;192(19):E497-E505. Available from:
<https://doi.org/10.1503/cmaj.200476>
11. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*[Internet].2020;368(6493):860-868. Available from:
<https://science.sciencemag.org/content/368/6493/860>
12. Public Health Ontario. COVID-19 –What We Know So Far About...Social Determinants of Health. [Internet]. 2020 May 24. Available from:
<https://www.publichealthontario.ca/-/media/documents/ncov/covid-wksf/2020/05/what-we-know-social-determinants-health.pdf>

Appendices

N/A.