SHIFTING FROM PANDEMIC TO ENDEMIC

Introduction

Over the past year and a half we have faced an extraordinary threat together. COVID-19 has required unprecedented measures that have saved lives and prevented our health care system from being overwhelmed.

Unfortunately, these measures also came with harms, and now having highly effective, widely available vaccines means we need to continually reassess the balance of direct harms of COVID-19 against the indirect harms of measures to prevent its spread at a population level.

We will not eliminate COVID-19, which means we need to learn how to live with it. This is why we have begun to shift our COVID-19 approach towards an enhanced version of the solid foundation of our systems to manage other respiratory viruses. Some changes have already come into effect and we anticipate moving forward with the remainder on September 27, provided the evidence, data and further monitoring confirm original expectations. If monitoring of the data warrants a change to recommendations, that will, as always, be considered. Here is some of the information public health experts looked at to initially make these decisions, compared with our current situation, to explain why we have temporarily delayed some measures.

Broader Impacts of COVID-19

The extraordinary measures put in place to manage COVID-19 have had direct and indirect individual and societal impacts. For example, there has been a significant shift in health human resources to respond to COVID-19, which has meant less ability to focus on other health priorities.

The measures themselves have also had direct and indirect impacts on Albertans' mental health. We will not fully understand many of the impacts for months or even years to come. In considering the timing of the shift towards living with COVID-19, the evidence and data that informed our recommendations included the continued social, mental and other societal impacts of extending the extraordinary measures above all other critical health needs. Ongoing deployment of health care personnel to large scale COVID-19 interventions limits the ability to redeploy staff to other areas of need that fall further and further behind.

Mental Health and Social Isolation

Measures needed to manage COVID-19 transmission have had impacts on our population's mental health and wellbeing. Social isolation measures have worsened mental health in those already most at risk while also limiting access to supports.[i,ii,iii] In particular, mental health in children has been impacted by isolation linked to loss of social interactions, made even worse when economic stress is present in their families.[iv] In Alberta in 2020, hospital admissions for anxiety for children between the ages of 5 and 18 were 19% higher than the previous five year average.[v]

A final example comes from the HQCA[vi] report from the fall of 2020, reporting that:

- over half of those surveyed reported not staying as socially connected as they were before the pandemic,
- almost one third of participants indicated that they had delayed seeking health care during the pandemic, and
- nearly 70% of participants reported feeling more stressed out during the pandemic with factors including difficulty maintaining relationships, difficulty sleeping, inability to exercise and loneliness.

Cancer Screening Rates

Cancer screening rates around the world have been reported to have been impacted by COVID-19 measures.[vii] In Alberta, from March to December of 2020, 189,500 women received a pap test, compared to 257,800 the previous year, a drop of 26%.[viii] Similarly, the number of women receiving a mammogram declined 25%.[ix] Early detection is key to the early treatment of cancer, which is dependent on cancer screening. To increase screening and catch up with the gap, time and human resources are needed.

Childhood Immunization Rates

During the COVID-19 pandemic, there has been a reduction in childhood immunizations across Canada as people kept their children home to adhere to COVID-19 restrictions and school-based immunization programs were interrupted. For example, in 2019, 73% of 12 year olds in Alberta were fully immunized for Hepatitis B. This dropped to just 28% in 2020.[ix] Catching up with routine childhood immunizations is a key priority for protecting children.

Syphilis

In 2019, Alberta declared a province-wide outbreak of syphilis, with 2,265 reported cases and syphilis rates at levels not seen since 1948. Untreated syphilis can cause blindness, paralysis, deafness, brain and heart disease, and mental health problems. Untreated syphilis in pregnancy can cause congenital syphilis in babies, leading to late-term miscarriage, birth defects and stillbirth.

- There were 2,509 infectious syphilis cases in 2020[ix]

SHIFTING FROM PANDEMIC TO ENDEMIC

- There were 55 congenital syphilis cases in 2020 (compared to 25 in 2019)[x]
- As of August 17, there had been 1,655 infectious syphilis cases and 29 congenital syphilis cases (5 stillborn) so far in 2021[x]

Opioid Deaths

Alberta, like many jurisdictions, has seen deaths as a result of opioid overdose increase significantly when compared to pre-pandemic rates. There has been a monthly average of 109 deaths due to opioid overdose from March 2020 to May 2021 compared with a monthly average of 50 deaths in the 12 months prior to March 2020.[xi]

EMS Response Rates to overdose-related events have also increased significantly when compared to pre-pandemic rates. Provincial EMS responses rate to opioid related events were [xii]:

- 81.2 per 100,000 in 2019
- 117.4 per 100,000 in 2020

Surgical Backlogs

Surgeries delayed/postponed due to the pandemic have resulted in a total COVID-19 backlog of approximately 40,000 procedures.

Significant progress has been made to address the backlog, with nearly all of the COVID-19 delayed/postponed surgeries now rebooked. However, this has required a substantial focus of resources, with the province exceeding 100% of pre-COVID-19 surgical capacity to address this deficit.

COVID-19 Immunization Impact

Vaccines are a game-changer with COVID-19. We have the advantage of having wide access to highly effective vaccines that provide significant protection against infection and even greater protection against severe outcomes. While no intervention is perfect, Alberta data shows that, similar to results in other jurisdictions, two doses of vaccine are 85% effective against infection from the highly infectious Delta variant, and are even more effective against other variants.[xii]

While there is still work to do to ensure all barriers to vaccine access are minimized, vaccine uptake in Alberta has been higher than most US states, and more similar to the UK earlier this year. Therefore, looking at population comparisons of the impact of the Delta variant should take this specifically into account. At the peak of their Delta surge in late July, the UK had 53.6% of their total population fully immunized. In Alberta, as of August 18, we have 58.1%. This is not enough to keep COVID-19 from circulating in the province, and individuals, particularly those in older age groups who do not have vaccine protection, are still at risk of severe outcomes. However, at a population level, the risk of overwhelming the health care system has been greatly reduced by vaccines.

At the time of making a recommendation in early July, data from the UK was used to inform what we could expect to happen in Alberta. Countries such as the UK, with very high vaccination rates, are generally seeing much lower rates of hospitalizations and incidence of critical illness despite high case numbers.

Residual Sample Serosurvey

When considering the impacts of case detection from widely available PCR testing and contact tracing, we looked at data from monthly blood sample antibody tests done over the course of the pandemic.[xiii] These showed our PCR testing program detected only about 1 of every 4 cases when compared with antibody testing (when taking waning antibody levels into account). This is due in large part to the fact that not everyone goes for testing when ill or mildly symptomatic. More recent data supports this estimate showing that, as of the July 2021 serology sample, only 26% of those with antibody evidence of past infection had a previous positive PCR test.[xiv] Because we will have early transmission trend information available with expanded wastewater surveillance going forward, widespread PCR testing of mild cases of illness won't be needed to give early warning signs of increased virus levels in communities. This data will be used to inform local responses as required.

Our forward planning was also based on estimates of combined post-infection immune response and vaccine protection to determine levels of population protection. We calculated that we would reach an approximate level of 70% population protection in early July by looking at previous serology, diagnosed infection trends and expected vaccine uptake. The newly available serological data supports this estimate, calculating the population-adjusted overall antibody positivity of all Albertans in the first week of July, combining both vaccine and post-infection antibodies, at 70%.[xiv]

Post-COVID Syndrome and Children

Concerns have been raised about post-COVID syndrome (also called long COVID) in children, especially those under the age of 12 who are not yet eligible for vaccine. When looking at evidence on long COVID in children, it is important to look at studies with comparison groups to get an accurate picture of the impacts of this syndrome.

SHIFTING FROM PANDEMIC TO ENDEMIC

For example, in Germany, a study looking at students in grades 8 to 12 showed no difference in the prevalence of long COVID symptoms between those who tested positive or negative for COVID-19 antibodies.[xv]

From the UK, a study looking at the prevalence of prolonged symptoms in children who had respiratory symptoms and were tested showed that the prevalence of prolonged symptoms was lower in younger ages, and only 1.8% of those who tested positive for COVID-19 had symptoms for longer than two months compared with 0.9% of those who tested negative for COVID-19.[xvi] Symptom severity was greater in those with prolonged symptoms who tested negative for COVID-19.

Modelling

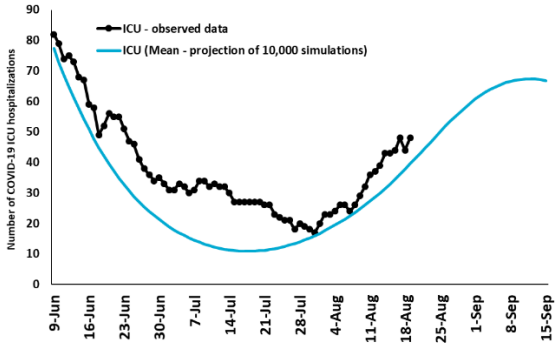
There is a tradeoff between continuing with an extraordinary response to COVID-19 or integrating our response with other respiratory viruses and reallocating some resources to other health priorities. Prior to broad immunization, an extraordinary response was required to prevent the health system from becoming overwhelmed, which would have led to untenable COVID-19 and non-COVID-19 impacts. With availability of vaccines and reduction of severe outcomes, COVID-19 will ultimately become one risk among many, to be managed in an integrated way with other respiratory viruses.

Given the impact of vaccination on reducing severe outcomes, the modeling included estimates of the number of anticipated hospitalizations (both ICU and non-ICU) and whether the expected peak was considered to be manageable within system capacity.

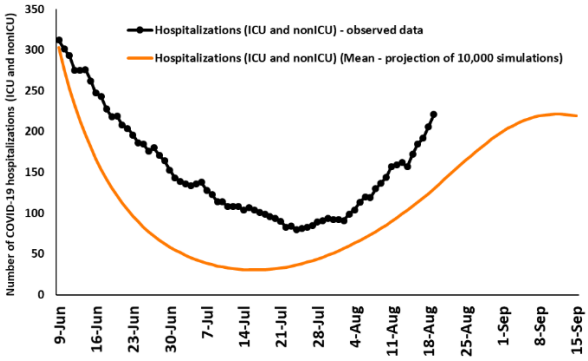
The model considered various factors such as the Delta variant and vaccination coverage. Based on available information in June, the most likely scenario at that time suggested that the peak number of ICU hospitalizations with COVID-19 would be around 70 early to mid-September. The most likely peak of total hospitalizations (both ICU and non ICU) was anticipated to be around 220. More details on the modeling are included in the appendix, and visualizations of the mean model predictions alongside actual data are shown as follows.

It should be noted that while the actual data was somewhat higher than the average modeled curve in late June through early July, the trends were tracking with what would have been expected. In early August, although the ICU predictions aligned closely with expected numbers, the non-ICU hospitalizations began to trend up and away from the average prediction. This led to a pause on any further changes, so additional monitoring and any necessary adjustments could take place.

MODELLING – ICU OBSERVED VS PROJECTION



MODELLING – HOSPITALIZATIONS OBSERVED VS PROJECTION



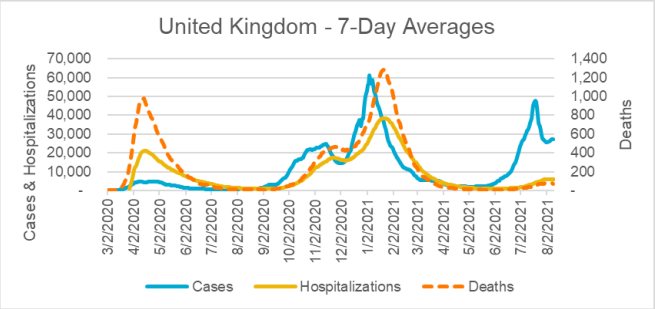
The Delta Variant – Severity and Children

Concerns have been raised about the potential for increased severity of illness, especially in children, due to the Delta variant. Recommendations made in the early summer regarding the path forward looked at the experience of the UK, where the immunization rate in the country decoupled cases from severe outcomes, and where the Delta variant did not cause a different experience in children than previous COVID-19 waves. Data on this experience is shown below.

The first graph uses publicly available data[xvii] and shows that despite a rise in cases with the Delta variant in the UK, hospitalizations remained manageable and deaths remained low.

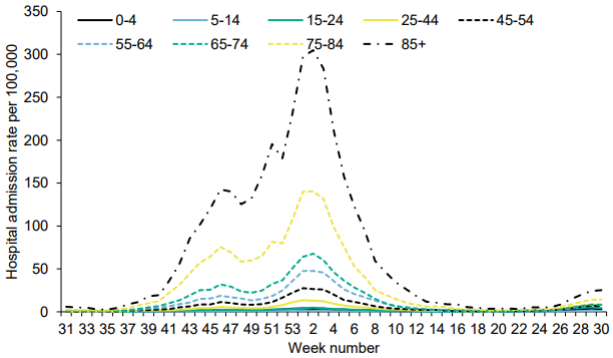
SHIFTING FROM PANDEMIC TO ENDEMIC

UNITED KINGDOM – 7 DAY AVERAGES



The second graph is from a UK report[xviii] with information on age-specific hospital admission rates for COVID-19 over time, showing that children under 15 remained at the lowest risk of severe outcomes from infection even with the Delta variant.

UK AGE-SPECIFIC ADMISSION RATES



Subsequent to the decision made earlier this summer, new evidence has begun to emerge from the US that did not align with experiences in the UK. In the US, hospitalizations in children have started to rise, most significantly in states with lower overall immunization rates.

The immunization rates in Alberta are higher than most of the US states that are experiencing surges of pediatric hospitalizations, which may mean our experience will be more similar to the UK than the US. However, this emerging evidence was another key factor informing the pause on changes to evaluate any need to adjust our approach.

APPENDIX A - Modeling detail

In June 2021, we used a deterministic model to assess the probabilities of certain outcomes such as the number cases and number of current hospitalizations (ICU and non-ICU) that were likely to be observed over the coming two months. This model used over 10,000 simulations to estimate these probabilities.

The model considered factors such as the Delta variant and vaccination coverage. In the most probable scenario, we assumed that the transmission of Delta cases was 1.2 to 1.5 times greater than the non-Delta variants and applied this to the known proportion of Delta cases observed at the time.

We also assumed that the maximum first dose coverage we would achieve this summer would be 63% of the total population (74% of eligible population). Maximum coverage for the second dose was assumed to be 60% of the total population (71% of eligible population).

The model assumptions and parameter values are as follows:

MODEL ASSUMPTIONS:

Model Assumptions	Implications
Homogenous Mixing: for e.g. vaccine coverage is equal across geographies	Communities with less vaccine coverage could be impacted differently than those with high vaccine coverage
Case detection at similar levels as before (testing and contact tracing)	This will reduce total cases observed when testing policies begin to change and increase exposure of unvaccinated to the virus.
Once case is confirmed (through identification), further transmission is negligible (i.e. quarantine/ stay home)	Increase of new infections can results if quarantine measures are altered for those that are confirmed cases and/or confirmed case and vaccinated
Did not include waning immunity of vaccines	Increase probability of more cases/hospitalizations
Did not include transmission interactions with those with partial doses and non-Delta variants	Potential increase in probability of more cases and hospitalizations among unvaccinated if vaccine effectiveness is over-estimated

SHIFTING FROM PANDEMIC TO ENDEMIC

Did not include transmission interactions with those with complete doses and infectious people.	Potential increase in probability of more cases and hospitalizations among unvaccinated if vaccine effectiveness is over-estimated
Case detection is similar between unvaccinated and vaccinated (at baseline)	Increase probability of more cases and hospitalizations among unvaccinated
Static population size	Unknown and depends on vaccine status of those who move/leave Alberta Births increase susceptible population
Contact rates of unvaccinated and vaccinated are similar	N/A
Severity of Delta is comparable to what is currently observed in data on average (at baseline)	Increase probability of more hospitalizations among unvaccinated
Vaccination lagged by 14 days	Effective coverage is used to ensure people are not removed as susceptible to infection earlier than current recommendations
Did not account for potential large future events such as July 1 and Stampede	Average transmission values are used over time and changed based on the three stages as outlined in Alberta

KEY MODEL PARAMETER VALUES:

Description	Value	Reference
Transmission	Stage 1: 3.9e-8 – 4.4e-8 Stage 2: 5.5e-8 – 6.1e-8 Stage 3: 6.1e-8 – 7.9e-8	Informed from previous model fitting with historical data
Initial Delta cases	(75,150)	Based on Data & 1:4 – 1:8 case infection ratio
Initial Delta cases (Vaccinated)	(32,64)	Based on Data & 1:4 – 1:8 case infection ratio
Total Population	4,421,887	Data
First dose vaccine effectiveness against Delta	33% (20% - 40% sensitivity range)	https://www.gov.uk/government/news/vaccines-highly-effective-against-b-1-617-2-variant-after-2-doses
Waning immunity of recovered	(185,200)	Informed from age structured model simulations
Average non-ICU admission: vaccinated	0.039	7 week average (April 25-June 5)
Average ICU admission: vaccinated	0.008	7 week average (April 25-June 5)
Average non-ICU admission: unvaccinated	0.028	7 week average (April 25-June 5)
Average ICU admission: unvaccinated	0.010	7 week average (April 25-June 5)
Length of Stay (Non-ICU/ICU)	(8,8/12.42)	Observed Data
Second Dose Tapering Start	(July 1, 2021, July 7, 2021)	Based on when stage 3 starts and observations on Dose 1 coverage
Percent decline per week for second dose tapering	20% decline every 7 days	Assumptions and observing first dose coverage trends
Second Dose Vaccination Rate per day	(37K/day, 50K/day, 100K/day)	Data and sensitivity analysis
Total Simulations per scenario	10,000	N/A

SHIFTING FROM PANDEMIC TO ENDEMIC

[i] Usher, K., Bhullar, N., Durkin, J., Gyamfi, N., & Jackson, D. (2020). Family violence and COVID-19: Increased vulnerability and reduced options for support. *International journal of mental health nursing*, *29*(4), 549–552. Retrieved from: https://doi.org/10.1111/inm.12735

[ii] Hwang, T.J., Rabheru, K., Peisah, C., Reichman, W., & Ikeda, M. (2020). Loneliness and social isolation during the COVID-19 pandemic. *International psychogeriatrics*, *32*(10), 1217–1220. Retrieved from: https://doi.org/10.1017/S1041610220000988

[iii] Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., Weaver, M. D., Robbins, R., Facer-Childs, E. R., Barger, L. K., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. (2020). Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic - United States, June 24-30, 2020. *MMWR. Morbidity and mortality weekly report*, *69*(32), 1049–1057. Retrieved from: https://doi.org/10.15585/mmwr.mm6932a1

[iv] Ontario Agency for Health Protection and Promotion (Public Health Ontario). (2020). Negative impacts of community-based public health measures during a pandemic (e.g., COVID-19) on children and families. Toronto, ON: Queen's Printer for Ontario. Retrieved from: https://www.publichealthontario.ca/-/media/documents/ncov/cong/2020/06/covid-19-negative-impacts-public-health-pandemic-families.pdf?la=en

[v] Alberta Health Epidemiology and Surveillance

[vi] Health Quality Council of Alberta. (2020). COVID-19 Experiences and Impact Survey: Voices of Albertans, May-June 2020. [Powerpoint Presentation]. Retrieved from: https://www.hqca.ca/wp-content/uploads/2020/09/COVID-Report-09_16.pdf

[vii] Alkatout, I., Biebl, M., Momenimovahed, Z., Giovannucci, E., Hadavandsiri, F., Salehiniya, H., & Allahqoli, L. (2021). Has COVID-19 Affected Cancer Screening Programs? A Systematic Review. *Frontiers in oncology*, *11*, 675038. Retrieved from: https://doi.org/10.3389/fonc.2021.675038

[viii] Alberta Health Epidemiology and Surveillance

[ix] Alberta Health Interactive Health Data Application. http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectCategory.do

[x] Alberta Health Epidemiology and Surveillance

[xi] Government of Alberta. (2021). Substance use surveillance data: reporting the prescribing patterns, use/misuse, drug overdoses and deaths related to fentanyl and opioids in Alberta. *Substance use surveillance data.* Retrieved from: https://www.alberta.ca/substance-use-surveillance-data.aspx#jumplinks-0

[xii] Government of Alberta. (2021). COVID-19 Alberta Statistics: Interactive aggregate data on COVID-19 cases in Alberta. Retrieved from: https://www.alberta.ca/stats/covid-19-alberta-statistics.htm#vaccine-outcomes

[xiii] Charlton, C.L., Nguyen, L.T., Bailey, A., Fenton, J., Plitt, S.S., Marohn, C., Lau,C., Hinshaw, D., Lutsiak., C., Simmonds, K., Kanji, J.N., Zelays, N., Lee, N., Mengel, M., & Tipples, G., Pre-Vaccine positivity of SARS-CoV-2 Antibodies in Alberta, Canada during the first two waves of the COVID-19 pandemic. *Microbiology Spectrum 9*:e00291-21. https://doi.org/10.1128/Spectrum.00291-21.

[xiv] Alberta Precision Laboratories. Personal communication

[xv] Blankenburg, J., Wekenborg, M.K. Reichert, J., Kirsten, C., Kahre, E., Haag, L., Schumm, L., Czyborra, P., Benrer, R., & Armann, J.P. (2021). Mental Health of adolescents in the pandemic: Long-COVID19 or Long-Pandemic Syndrome? *medRxiv Preprint.* Retrieved from: https://doi.org/10.1101/2021.05.11.21257037

[xvi] Molteni, E., Sudre, C.H., Canas, L.S., Bhopal, S.S., Hughes, R.C., Antonelli, M., Murray, B., Kläser, K., Kerfoot, E., Chen, L., Deng, J., Hu, C., Selvachandran, S., Read, K., Cpdevila Pujol, J., Hammers, A. Spector, T.D., Ourselin, S., Steves, C.J., Modat, M., Absoud, M., & Duncan, E. (2021). Illness duration and symptom profile in a large cohort of symptomatic UK school-aged children tested for SARS-CoV-2. *medRxiv Preprint.* Retrieved from: https://www.medrxiv.org/content/10.1101/2021.05.05.21256649v2

[xvii] Public Health England. (2021, August 23). Healthcare in United Kingdom. *GOV.UK Coronavirus (COVID-19) in the UK.* Retrieved from: https://coronavirus.data.gov.uk/details/healthcare

[xviii] The Immunisation and Countermeasures Division, National Infection Service, Public Health England. (2021, August 05). Weekly national Influenza and COVID-19 surveillance report: Week 31 report (up to week 30 data). Retrieved from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1008921/Weekly_Flu_and_COVID-19_report_w31.pdf