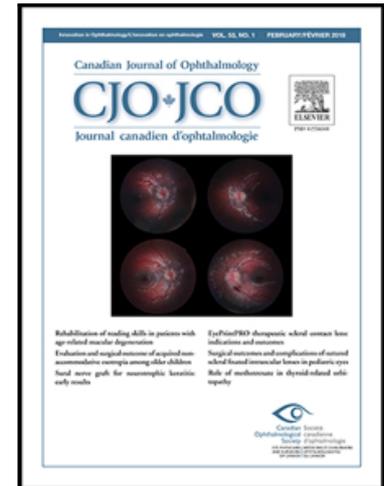


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## Impact of the COVID-19 Pandemic on Elective Cataract Surgery Wait Times

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### ABSTRACT

#### Introduction

Lengthy wait times for cataract surgery can negatively impact patients' quality of life and increase the incidence of falls and depression. The COVID-19 pandemic has presented significant challenges to the delivery of elective cataract surgeries. The effects of the COVID-19 pandemic on cataract surgery wait times in the Alberta Health Services' Edmonton Zone were studied by examining the wait times before and during the pandemic.

#### Methods

This study was conducted based on a retrospective population-based design. Data was compiled from a centralized database related to hospital-based cataract surgery (Royal Alexandra, Fort Saskatchewan, and Westview Health Centre) between April 2019 and March 2022 (i.e., three fiscal years).

#### Results

The average wait time for cataract surgery increased from  $14.4 \pm 1.4$  weeks in 2019/20 to  $18.2 \pm 2.7$  weeks in 2020/21 ( $p=0.005$ ) and then decreased to  $11.5 \pm 1.3$  in 2021/22 ( $p<0.001$ ).

The completed surgeries decreased from 13,103 in 2019/20 to 9,308 ( $p=0.09$ ) and 10,365 ( $p=0.1$ ) during the next two years. The annual operating room time for scheduled cases was reduced to 4,463 hours ( $p=0.42$ ) and 4,552 hours ( $p=0.15$ ) during the pandemic compared to 5,541 hours before the pandemic. However, the average waitlist size decreased from 6,629 at the end of 2019/20 to 6,122 ( $p=0.029$ ) and 4,011 ( $p<0.001$ ) during the next two years.

### **Conclusion**

The COVID-19 pandemic resulted in significantly increased average wait times for elective cataract surgery during the first year of the pandemic. Due to the reduction of the waitlist size, the wait times decreased during the second year of the pandemic.

## INTRODUCTION

In Canada, more than 1.1 million people aged 65 years and above (or 18.2% of the age group) develop visually significant cataracts. [1] While surgical treatment of cataracts can significantly improve patients' quality of life, lengthy wait times have been shown to negatively impact this and increase the incidence of falls due to decreased vision. [2] There is a strong association between the development of cataracts and depressive symptoms, which are relieved with cataract surgery. [3] As demands for cataract surgery are increasing, healthcare systems have been constantly working on controlling and reducing wait times for this procedure.

The World Health Organization (WHO) declared the coronavirus outbreak a pandemic in March 2020. As of March 2022, Albertans have experienced six waves of the pandemic since the beginning of the 2019/20 fiscal year. At the time of conducting the current study, more than 583,000 cases of COVID-19 have been recorded in Alberta and 4,558 lives have been lost. [4]

The global COVID-19 pandemic has presented significant challenges to the healthcare system in balancing the delivery of elective surgical procedures such as cataract surgery with managing the pandemic. This resulted in a postponement of elective surgeries around the world due to the COVID-19 pandemic. [5] COVID-19 has had a significant impact on the surgeries in Alberta as well. Along with the ongoing pandemic, Albertans have experienced an almost 242% increase in the postponement of the scheduled non-urgent surgeries (from 3,599 to 8,693). [6]

AHS has had to postpone thousands of non-urgent scheduled surgeries at various points since the beginning of the pandemic to increase the number of beds, physicians, and staff required to take care of COVID-19 patients. As the surgical activity decreased from 2019/20 to 2020/21, the main operating room activity for all non-urgent surgeries was reduced by 7% (from 289,535 to 268,340). [6] About 25,000 non-urgent scheduled surgeries, from all disciplines including ophthalmology, were postponed during the first wave. In addition, there were approximately 5,000 postponements in waves two and three. It was also estimated that during the fourth wave, as of the end of Nov. 1, 2021, about 22,000 to 25,000 surgeries were delayed. [6,7]

The current study compares the effects of the COVID-19 pandemic on cataract surgery wait times in the Alberta Health Services (AHS) Edmonton Zone by examining the wait times before (i.e., April 2019 to March 2020) and during (i.e., April 2020 to March 2022) the pandemic.

## **METHODS**

The current study was conducted based on a retrospective population-based design. Cataract surgeries performed in the AHS' Edmonton Zone at AHS institutions (i.e., Royal Alexandra Hospital, Fort Saskatchewan Community Hospital, and WestView Health Centre) between April 2019 and March 2022 were compiled from a centralized database (LightHouse database). During the study period, 80% of the cataract surgeries in the Edmonton Zone were performed within these three AHS sites. The remainder of cataract surgeries were performed in

community non-hospital surgical facilities (NHSF). The study period spans three full fiscal years. Each fiscal year starts on April 1 and ends on March 31.

The data compilation was conducted by the AnalysisWorks group that is affiliated with AHS. The cataract procedures included only “cataract extraction by phacoemulsification with intraocular lens implant (0000125)”, “cataract extraction with IOL (10701416)”, and “phacoemulsification, cataract, with IOL insertion (10701477)”. The numbers in parentheses represent AHS procedure codes. All cases listed as urgent or combined with other procedures were excluded.

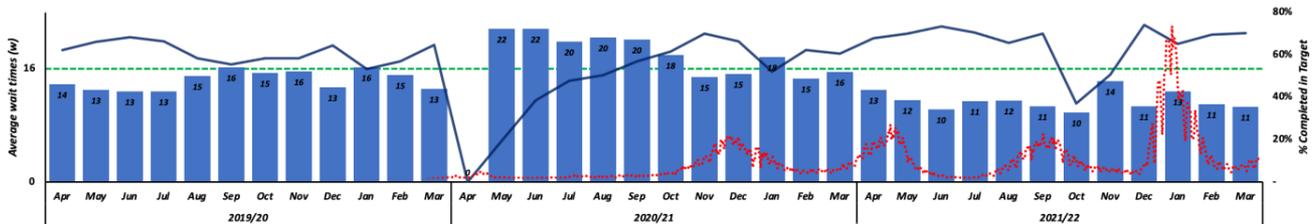
Wait time was measured and divided into in-target and out-target based on the Alberta coding access targets for surgery (ACATS). [8] The ACATS suggested wait time for elective anterior chamber cataract surgery (ACATS code: K7L3) is within 16 weeks from the “ready to treat” date. Patients are declared ready to treat from the date where they are medically, socially, and functionally ready to receive surgical treatment as determined by the surgeon’s office.

Statistical analysis was carried out using paired t-test (IBM SPSS statistics version 28.0.1.0). Results are presented as mean  $\pm$  SD.

## RESULTS

The analyzed data only included scheduled cases completed in the data period. The average wait time for cataract surgery increased from  $14.4 \pm 1.4$  weeks in 2019/20 to  $18.2 \pm 2.7$  weeks in 2020/21 ( $p=0.005$ ). This significantly decreased in 2021/22 to  $11.5 \pm 1.3$  weeks ( $p<0.001$  compared to both 2019/20 and 2020/21). The number of total cataract surgeries

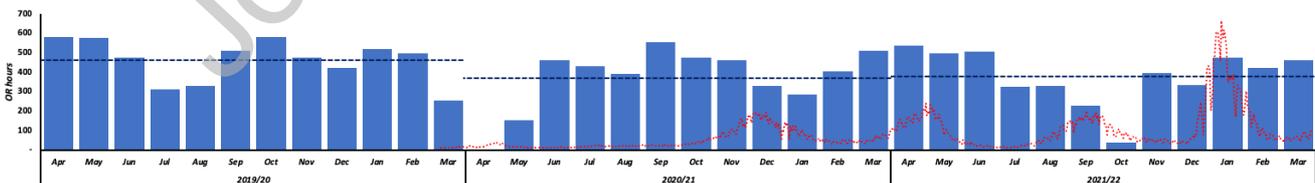
performed declined from 13,103 in 2019/20 (61% in-target) to 9,308 (56% in-target) ( $p=0.09$ ) in 2020/21 and then slightly increased to 10,365 (68% in-target) ( $p=0.1$ ) 2021/22. (Table 1; Figure 1)



**Figure 1. Average wait times for scheduled completions of the cataract surgeries**

Blue columns: average wait time (weeks); Blue line: cases completed in-target (%); Green dotted line: suggested ACAT's wait time for cataract surgeries; Red dashed line: active cases of COVID-19 pandemic over time in Alberta, Canada.

The operation room (OR) hours for scheduled cataract surgeries reduced from 5,541 hours in 2019/20 to 4,463 hours ( $p=0.42$ ) and 4,552 hours in 2020/21 and 2021/22 ( $p=0.15$ ), respectively. (Figure 2) There was no significant change in unscheduled OR hours between 2019/20 and 2020/21 ( $p=0.62$ ) and 2021/22 ( $p=0.75$ ). The unscheduled cases included emergent surgeries.



**Figure 2. Operation room hours for scheduled surgeries**

Blue dotted lines: average OR hours for each fiscal year; Red dashed line: active cases of COVID-19 pandemic over time in Alberta, Canada.

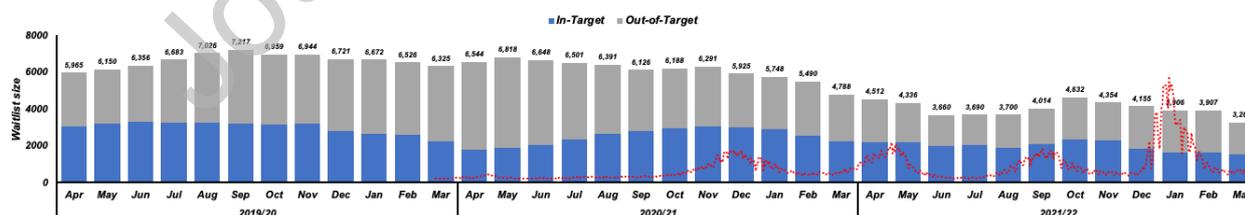
Net waitlist addition trends were calculated as **net waitlist addition = (additions – removals – completions)**. (Figure 3) Patients were removed off the waitlist if they had surgery outside the AHS sites (i.e., at the NHSF), declined surgery, or passed away. Average net waitlist changes in 2020/21 reduced by 324 (+170 in 2019/20 to -154 in 2020/21,  $p=0.001$ ) and by 5 (down to -159) in 2021/22.



**Figure 3. Additions, removals, and completion trends**

Net change = additions – removals – completions; Red dashed line: active cases of COVID-19 pandemic over time in Alberta, Canada.

Figure 4 represents the waitlist size trends as of the end of each month. The average waitlist size reduced from 6,629 in 2019/20 to 6,122 in 2020/21 ( $p=0.029$ ) and next to 4,011 in 2021/22 ( $p<0.001$  compared to both 2019/20 and 2020/21). At the end of each fiscal year's waitlist, 35% of the patients were still in-target in 2019/20, this increased to 47% at the end of both 2020/21 and 2021/22 fiscal years.



**Figure 4. Waitlist snapshot**

Red dashed line: active cases of COVID-19 pandemic over time in Alberta, Canada.

	<i>2019/20</i>	<i>2020/21</i>	<i>2021/22</i>
<b><i>Average wait time (w)</i></b>	14.4 ± 1.4	18.2 ± 2.7	11.5 ± 1.3
<b><i>Total cataract Surgeries performed</i></b>	13,103	9,308	10,365
<b><i>Operation room hours</i></b>	5,541	4,463	4,552
<b><i>Average net changes</i></b>	+170	-154	-159
<b><i>Average waitlist size</i></b>	6,629	6,122	4,011
<b><i>Year-end waitlist size</i></b>	6,325	4,788	3,260
<b><i>Year-end percent in-target</i></b>	35%	47%	47%

**Table 1. Summary of the results**

## DISCUSSION

The current study investigated the effects of the COVID-19 pandemic on cataract surgeries performed before and during the pandemic in AHS's Edmonton zone.

Our study showed that average wait times for cataract surgeries increased by about four weeks during the first year of the pandemic. The majority of this impact was observed following the first wave. While there were no elective cataract surgeries performed during April 2020, the average wait time stayed above ACATS' suggested wait time of 16 weeks throughout the next six months. There is a gap in the literature regarding the trends of elective ophthalmic surgeries following the first wave of the pandemic. Sanjay et al. [5] surveyed 1,207 ophthalmologists from different countries and found that about 46% of them ceased operating on their patients during the first wave of the pandemic (i.e., April 10 and April 30, 2020). They also showed that about 40% of the ophthalmologists performed less than 25% of their original surgical volumes during the same period. However, our study showed that surgeons significantly increased the number of surgeries from June 2020 until the second wave caused another reduction in the number of operations in December and January of 2020/21. This explains why, despite the temporary increase in OR times post wave one, the total surgery volume of 2020/21 was about

29% lower than the pre-COVID fiscal year. The reduced OR time was a direct consequence of the provincial postponements of elective surgeries.

Surprisingly, the average wait time for cataract surgeries decreased to about 11.5 weeks during the 2021/22 fiscal year. This could be interpreted as a positive finding for the healthcare system as it is more than 4 weeks below the suggested ACATS wait times. However, this might be to some extent because OR times did not drastically reduce during the third wave.

Additionally, while it was expected that the pandemic would also increase the waitlist sizes, they paradoxically decreased during this period compared to the pre-COVID year. This could potentially be explained by 1- increased OR to clinic time ratio among surgeons, 2- decreased additions to the waitlist, and 3- increased permanent removals off the waitlist.

Due to COVID-19 restrictions, physicians may have seen a lower volume of patients in clinic. In addition, some patients might have been reluctant to undergo a non-urgent surgery during an ongoing pandemic and have decided to postpone their cataract surgeries. This had a quite significant impact on net waitlist change during the first year of the pandemic where it decreased by 324 compared to the year before. Although, a recent study conducted by Sii et al. [9] found that the current pandemic did not significantly affect patients' decision to attend hospital for cataract surgery. In their study, about 83% of the patients indicated their willingness to come for cataract surgery.

One of the limitations of the current study is the lack of information regarding the details of permanent removals from the waitlist. Unfortunately, we were unable to access data regarding surgeries performed at the NHSF. Future studies could also further investigate the trends of the cataract surgery wait times during the post-pandemic times.

## CONCLUSION

Our study showed that the COVID-19 pandemic resulted in a significantly reduced volume of cataract surgeries performed in the Edmonton zone and increased the average wait times during the first year of the pandemic. However, waitlist size has been paradoxically decreasing throughout the pandemic likely related to fewer patients being added and/or patients having surgery in non-hospital settings and being removed from the waitlist.

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