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## Access to surgery following centralization of breast cancer surgical consultations

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### ABSTRACT

**Introduction:** Timely access to breast cancer surgery is imperative for patient outcome. Building upon our previous model, 5 breast surgeons centralized all breast surgical referrals using principles of centralized intake and nurse navigator triage. The goal of this study was to investigate whether centralization can further improve access to surgery.

**Methods:** This study was designed as a before-after series, comparing wait times for breast cancer surgery prior to centralization and after. Primary outcome was wait time from diagnosis to surgery, and secondary outcomes included median wait time, days required for 90% case completion, number of available operating days, and number of patients who underwent breast reconstruction and neoadjuvant therapy.

**Results:** Overall, centralization of breast cancer surgical referrals reduced wait time from 47 to 41 days. The median wait time and time required for 90% of case completion was reduced, despite a 7% reduction in operating room availability. Fewer patients underwent neoadjuvant therapy and more patients underwent breast reconstruction following centralization.

**Conclusion:** Centralization of surgical referrals for breast cancer patients improved access to surgery.

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### Introduction

Breast cancer is the most common cancer diagnosis and the second most common cause of cancer death among Canadian women.<sup>1</sup> There has been significant advancement in the management of breast cancer in the recent decades, and caring for patients with breast cancer requires carefully coordinated care in a multi-disciplinary setting. Timely access to definitive care is a main priority for breast cancer patients, as it has been proven to be associated with patient outcome. Richards et al. performed a systematic review on impact of delay in starting breast cancer treatment on survival, and showed that delays greater than 3 months was associated with 12% lower 5-year survival.<sup>2</sup> Another study by

McLaughlin et al. showed that delay greater than 60 days between diagnosis and initiation of treatment was associated with worse disease-specific and overall survival among advanced stage breast cancer patients.<sup>3</sup> A seminal paper that studied SEER and the National Cancer Database (NCDB) in the US showed that delay to definitive surgery is associated with worse outcomes in breast cancer, as wait time longer than 60 days between diagnosis and surgery was associated with reduced overall and disease-specific survival.<sup>4</sup>

There have been a number of innovative care delivery models to ensure quality care delivered in timely manner, with several programs focusing on reducing wait time to breast cancer diagnosis. Streamlining the diagnostic process following abnormal imaging has shown to reduce time to diagnosis in screen-detected patients<sup>5,6</sup> as well as symptomatic patients.<sup>7</sup> Rapid Diagnostic Unit in Toronto was able to limit patient visits to two and was able to deliver results within 2–8 days from the date of referral.<sup>8</sup> Although they were able to significantly reduce time to diagnosis, they did not see a significant improvement on time to definitive treatment.<sup>8</sup> A new provincial program in Alberta explored the role of expedited

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biopsy and surgical referral with nurse navigation for patients with diagnostic imaging report that included a BI-RADS 5 lesion. Through this program, wait time to surgical referral and consultation was reduced significantly, with no significant difference in wait time to biopsy and pathology report.<sup>9</sup> Our group has previously studied a similar approach to improving the diagnostic process with the Rapid Access Breast Clinic (RABC). Patients evaluated through the RABC had shorter wait time to surgical consult for both screen-detected abnormality and breast symptoms.<sup>10</sup> Improvement in wait time through the RABC model was seen in patients with both benign and malignant diagnoses,<sup>11</sup> and RABC patients had shorter wait time to surgical consultation as well as definitive surgery.<sup>11,12</sup>

Increasing efficiency with breast cancer diagnosis, however, solves only a part of the puzzle for improving access to breast cancer treatment. This is of particular importance in the context of Canadian health care, with limited and uncertain nature of health care resources, such as operating room access. In order to directly target access to surgery for breast cancer patients, our group has proposed centralized intake for surgical referral and triaging to the first available surgeon for all breast cancer patients. This study looks at the impact of this process on reducing wait time to definitive surgery for patients with breast cancer.

## Material and methods

Providence Breast Centre (PBC) is a high-volume specialist breast centre located at Mount Saint Joseph Hospital (MSJ) in Vancouver, BC, Canada. In January 2018, all referrals to PBC was pooled into a centralized referral base between 5 breast surgeons. There were two intake streams – one stream of patients who underwent their diagnostic imaging at MSJ, and the other stream of patients who were referred in from the community. Patients were required to undergo all relevant investigations prior to being referred, and the nurse navigator reviewed all referrals and investigations in order to triage patients. Patients with benign diagnoses or patients requiring further assessment were triaged to be seen by breast physicians, and following breast physician assessment if the patients required an operation, they were then referred to breast surgeons. Direct referral to the first available breast surgeon was made for patients with invasive or in situ breast cancer diagnosis, or for high-risk lesions requiring surgical excision (Fig. 1). Nurse navigators referred patients to the breast surgeon with the first available operating time after their review, who was then booked in for a consultation with that particular surgeon. Patients who require medical oncology and radiation oncology were

referred to another institution with their own centralized intake process that are separate from our institution.

This study is a before–after series comparing patients who were referred to PBC 1 year prior to centralization (2017) and 1 year afterwards (2018), with a retrospective review of a prospectively maintained database that includes all demographic, diagnostic and operative data. Adult patients who underwent surgery for invasive or in situ breast cancer between Jan 2017–Dec 2018 were included in this study. Patients with benign breast pathology including high risk lesions were excluded. Patients with recurrent cancer, prophylactic risk reducing mastectomy, or palliative disease were also excluded from the study. Breast cancer patients who underwent neoadjuvant therapy were excluded from wait time analysis, however the number of patients referred for neoadjuvant therapy was noted as a secondary outcome measure. Primary outcome of the study was wait time from diagnosis to definitive surgical management in two time intervals – date of diagnosis, as represented by the core biopsy date, to surgical consult, and surgical consult to surgery. Other secondary outcome measures included the number of patients who underwent breast reconstruction, the number of OR days assigned to general surgery at MSJ as well as the median wait time to surgery and time required for 90% case completion, which is a performance metric used by the Ministry of Health. In Canada, health care is delivered through the Ministry of Health at each province. The Ministry monitors quality indicators such as wait times to various treatments including surgical procedures. The British Columbia Ministry of Health tracks wait times to surgical consultation, and wait times to surgery. Wait time is reported by health authority, hospital, surgeon, and procedure group and is reported as 50th percentile (median) wait time and 90th percentile wait time. Wait time is assessed for every 3 month reporting period, and the median wait time represents the number of days that 50% of the patients had waited less than and half waited longer. Similarly, for 90th percentile wait time, it represents the number of days that the 90% of patients waited less than and 10% waited longer.<sup>13</sup> The median wait time to surgery and time required for 90% case completion are figures that are comparable across various provinces, and they are used often as a benchmark. Statistical analysis for wait times pre- and post-centralization was done using student's t-test with significance defined as  $p < 0.05$ .

## Results

Overall, a total of 616 patients in 2017 and 600 patients in 2018 were referred for a new breast abnormality or symptom. The overall volume of breast cancer surgeries as well as benign breast

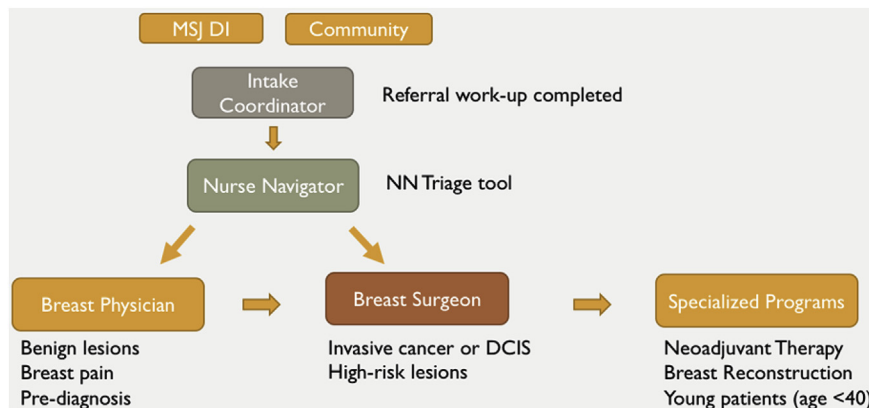


Fig. 1. Centralized intake and triaging for breast patient referrals.

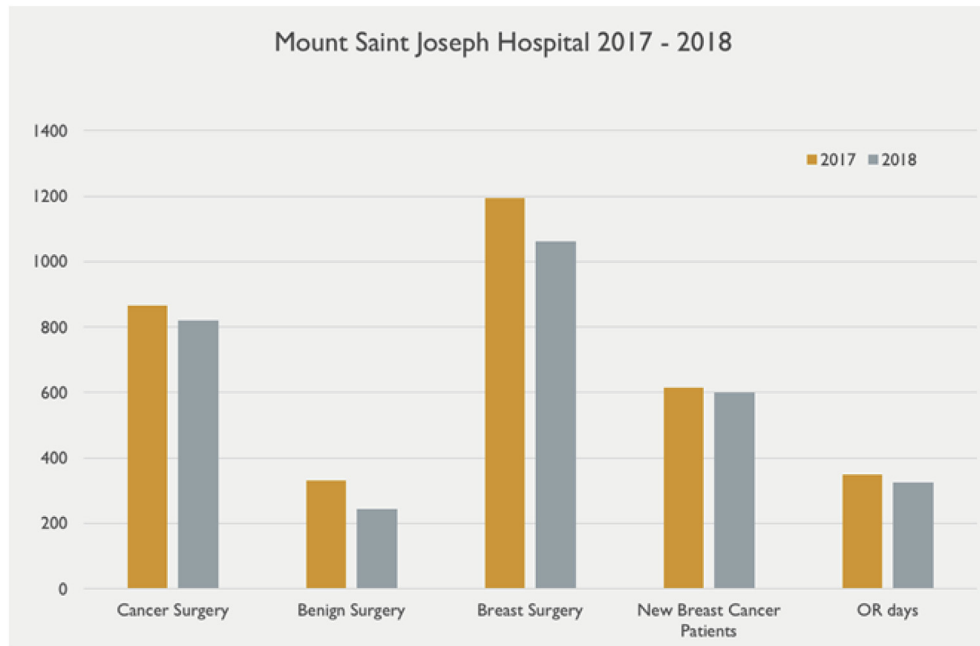


Fig. 2. Overall volume of operations, referrals, and available OR days in 2017 and 2018.

surgeries are shown in Fig. 2.

After applying our exclusion criteria, a total of 467 breast cancer patients were included in the pre-centralization cohort, and 486 patients comprised of the post-centralization cohort. Wait time from diagnosis to surgery was broken into two intervals – core biopsy date to surgical consultation, and surgical consultation to the date of operation. Overall, the average wait time from diagnosis to operation prior to centralization was 47 days, which was significantly reduced to 41 days post-centralization ( $p = 0.0008$ ). Time between diagnosis to surgical consultation was reduced by 4 days from 21 to 17 days ( $p = 0.0013$ ), and the time between surgical consultation and operation showed a trend towards reduction from 26 to 24 days ( $p = 0.06$ ).

The number of patients who underwent breast reconstruction was 78 pre-centralization, and this number increased to 116 post-centralization. Interestingly, the number of patients who underwent neoadjuvant treatment decreased from 79 to 56 post-centralization. Patients who have locally advanced breast cancer (operable or inoperable) as well as early breast cancer with favourable tumour biology to downstage are consistently referred for neoadjuvant therapy. The reduced number of patients who received neoadjuvant therapy may be a function of improved OR access, as in the past, patients who met borderline criteria for neoadjuvant therapy were referred for treatment as a bridge to surgery as they were facing long waits for definitive surgery. With improved access to surgery, patients who do not present with clear survival benefit for neoadjuvant therapy are appropriately treated with surgery first instead of having referred for neoadjuvant therapy, as they may have been previously when they were waiting for surgery for longer than desired.

The median wait time to surgery in 2017 was 37 days, with 90% of all procedures being performed within 81 days. Following centralization, the median wait time was 36 days and 90% of all cases were completed within 63 days. The number of operating days assigned to general surgery at MSJ was 349 days in 2017, and this had decreased to 324 days in 2018. This represents a 7% reduction in the key resource required for providing definitive surgical care. The number of new breast cancer patients requiring

operation had actually increased from 2017 to 2018, and despite a significant reduction in operating room access, we were able to achieve shorter wait time to surgery by employing the centralization process.

## Discussion

Improved efficiency with centralized surgical referral and triaging patients to the first available breast surgeon resulted in shorter time to surgery for breast cancer patients despite reduced OR access in our specialist breast centre. Wait time trends for breast cancer surgery has been previously studied using the NCDB data, which showed a steady incline from 2003 to 2011. This study revealed that between 2003 and 2011, the median wait time for lumpectomy was increased from 22 to 28 days, 24–32 days for mastectomy, and mastectomy with reconstruction was 33–42 days between diagnosis and surgery.<sup>14</sup> In Ontario, there was a similar trend towards increasing wait time between 2003 and 2009, with a significant increase in average wait time of 4.7 days.<sup>15</sup> The newly published Pan-Canadian Standards for Breast Cancer Surgery outlines the targets for wait time of abnormal imaging to diagnosis within 6 weeks, diagnosis to surgical consultation within 2 weeks and initial treatment to be started within 4 weeks from consult.<sup>16</sup> In a publicly administered health system such as the Canadian system, the amount of resource allocated to health care is unpredictable and often constrained. For example, access to the operating room is a significant cost to the health system, and the providers are often struggling to provide the best quality care to their patients with limited resources. Innovative solutions are required to ensure high quality and timely care for the patients. Through our centralized intake and triage process, we triaged breast cancer patients to be seen by the breast surgeon with the first available operating time following a review by the nurse navigator. Patients were then booked for a surgical consultation with the first available surgeon based on their operating time availability, not based on the next available appointment for surgical consultation, to prioritize the least wait to definitive surgery.

In our institution, operating room access is equal between

surgeons based on their full-time equivalent (FTE) status. Given that the surgeons in this group are breast surgeons who also have general surgery practice, each surgeon decides how much OR time they wish to assign for breast clinic patients. For example, a surgeon may decide to allocate 100% of their OR time available to be filled by breast patients whereas another surgeon may allocate 25% of their time for breast patients and fill the rest by general surgery patients, which are organized separately in their individual offices outside of the breast clinic. This information is then brought forward to the administrator at the breast clinic and all surgeons are able to fill their available breast OR time with patients who were referred to the centralized pool of referrals. Adopting this process was met with some hesitation in the beginning, however, every surgeon now feels satisfied with this process as it helps them utilize their OR time in an efficient manner and they do not feel overwhelmed or under-utilized as the cases are assigned according to their preferred caseload of breast patients. This model has allowed newer surgeons in the group to fill their operating time since all cases are pooled. Even if patients were directly referred to more established surgeons, all referrals were pooled and referring doctors were notified of our process. In our experience, patients and referring doctors prefer faster access to surgery with the first available surgeon and we so far have not experienced any patient who demanded to be seen by a particular surgeon if it meant that they had to wait longer.

An encouraging trend from our study showed that we not only reduced wait time to breast cancer surgery, but also increased the number of patients receiving breast reconstruction. Our group of breast surgical oncologists have had close working relationships with plastic surgeons who perform breast reconstruction for many years, and previously developed a combined breast surgery and reconstructive surgery resource to create the Immediate Reconstructive Swing Room, where the oncologic surgeon and reconstructive surgeon work side by side in two operating rooms that run concurrently.<sup>17</sup> The overall number of breast oncology cases as well as immediate reconstruction numbers both increased following the introduction of this model, and the wait time from core biopsy to surgery was also significantly reduced from 70 to 52 days.<sup>17</sup> With this experience, the nurse navigators identified patients who would require mastectomy as a demographic potentially interested in reconstruction, and we have recognized the triage tool to be highly predictive of identifying patients interested in reconstruction. These patients were then booked to see the surgeon with the next available OR date with reconstruction. This has improved access to breast reconstruction while reducing wait times. Prior to the introduction of the combined reconstruction days, patients may have declined breast reconstruction to avoid longer waits.

The European Society of Breast Cancer Specialists (EUSOMA) has been a leader in setting the requirements of specialized breast unit<sup>18</sup> as well as its quality indicators<sup>19,20</sup>, with multiple follow up studies looking at the impact of specialization on quality of care.<sup>21,22</sup> An early review by Grilli et al. highlighted mortality benefit for breast cancer patients treated by specialists or in specialist hospitals.<sup>23</sup> A few subsequent studies including a systematic review and meta-analysis showed improved survival after breast cancer surgery for those patients who were operated by high-volume surgeons.<sup>24</sup> High-volume hospitals providing breast cancer care were associated with higher rates of cancer diagnosis made by initial biopsy, negative surgical margins, and appropriate locoregional treatment, which could explain improved patient outcome at a high-volume centre.<sup>25</sup>

The premise of centralized intake and triage is that the quality of care that patients receive would be comparable between the breast surgeons included in this process. Modeling the breast centre after the requirements of specialist breast unit as outlined by EUSOMA, as well as consistent effort to monitor quality of care and quality

improvement initiatives such as surgeon scorecards has been crucial. Surgeon scorecard is a surgeon-driven initiative that annually reviews quality indicators to feel confident that all breast surgeons in the group are providing a similar level of care. This information is available to each surgeon and shows how they compare with the group anonymously. The indicators include rates of breast conserving surgery, rates of re-operation, rates of immediate reconstruction with mastectomy, and a few other quality improvement metrics to ensure that everyone is providing quality care. This process ensures that centralization of breast cancer patients does not compromise on the quality of patient care. Weekly breast surgery rounds include discussion of challenging cases, which helps to distribute knowledge and expertise in support of newer surgeons.

This study is an early analysis of our centralized intake and triage of breast cancer surgical referrals on wait time, therefore it did not include data on patient outcome or patient satisfaction. We did not include analysis on wait time to treatments other than surgery such as systemic treatments or radiation, as these treatments are administered by another institution and was not the focus of our intervention with centralization of surgical referrals. Other limitations include lack of stratified result according to patient demographics, disease stage or the type of operation performed. Future direction for our project includes looking into the impact of centralization on patient experience and satisfaction, as well as its impact on surgeon and referring physician experience, and ultimately, patient outcome. This study revealed that innovative solutions can lead to creating efficiency, which is required to deliver quality care with finite resources.

## Conclusions

Centralized referral for breast cancer surgical consultations and subsequent triaging to the first available breast surgeon led to shorter wait time to definitive surgery, despite reduced access to the operating room. Caring for patients with breast cancer should continue to prioritize timely delivery of care and the quality standards that have proven to improve patient outcome.

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## Declaration of competing interest

The authors of this manuscript declare no conflicts of interest for this publication.

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