


Telemedicine trends at a comprehensive cancer center during the first wave of the COVID-19 pandemic

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Abstract

Introduction: This article reports on the effects of an early outbreak during the COVID-19 pandemic on visit volume and telehealth use by various specialists at a comprehensive cancer center.

Materials and Methods: The number of on-site and telehealth visits (THV) for medical and surgical specialties were obtained from scheduling software.

Results: Total visits were most drastically limited in April 2020 to a low point of 3139; THV made up 28% of all visits. For head and neck surgery, THV made up 54% and 30% of visits in April and May, respectively. Other specialties, such as psychiatry and palliative care, had higher levels of THV. For most specialties, the rebound in June through September did not make up for visits lost during the outbreak, and fiscal year (FY) 2020 had a 9% loss from FY 2019 with 5786 fewer total annual visits across all specialties.

Conclusions: While telemedicine was a helpful part of this cancer center's response to the initial COVID-19 surge, it was not able to replace the in-person services offered at the same center. The main strategy of physicians at this cancer center was to defer care, with telemedicine being an auxiliary response.

KEYWORDS

COVID-19, otolaryngology, social distancing, telehealth, telemedicine

1 | BACKGROUND

Less than 3 months after China reported clusters of novel viral pneumonia cases, the World Health Organization declared coronavirus disease (COVID-19) a pandemic.^{1,2} Seven days after this announcement, the United States Centers for Medicare & Medicaid Services (CMS) called for all elective, nonessential medical, surgical, and dental procedures to cease to conserve personal protective equipment, hospital beds, and ventilators, as well as to encourage patients and staff to stay home to the furthest extent possible.³ This rapid change in guidelines meant massive disruption to the existing system of healthcare delivery and forced physicians to change how they practiced.

Without effective pharmacologic therapy or prevention for COVID-19 at the outset of the pandemic, public health strategy had to rely on other means to slow the spread of the disease, including hand hygiene, environmental sanitation, and the use of face coverings.⁴ Perhaps most relevant to cancer care was the emphasis on social distancing—keeping physical space between people to slow the spread of disease—which limited the capacity of healthcare providers to safely provide in-person services. As the pandemic evolved and the moratorium on elective surgeries was lifted, there is still great need for patients to avoid COVID-19 exposure to the greatest extent possible, and it may still be important to consider delaying surgical intervention in outbreaks where the rate of COVID-19 is so high that surgery becomes unsafe or infeasible.

For surgical care, the risk of exposure to COVID-19 goes beyond just the day of surgery; there is also risk with each clinical pre- and post-operative visit. Telehealth visits (THV) can be safer options for patients and healthcare providers by reducing the total number of potential infectious exposures. There is evidence that clinical outcomes and patient satisfaction are not affected by use of telemedicine for perioperative appointment, and that surgeons are able to use telemedicine to monitor patients for symptoms that other providers would miss.⁵⁻⁸ In response to the COVID-19 pandemic, the American Society of Clinical Oncology endorses the use of telemedicine in instances where physical exam is not required.⁹ Likewise, CMS approved broad implementation of telehealth services to patients who can remain in their homes, and many commercial payers followed suit.

To evaluate the impact of these emergency measures, we determined telehealth use by head and neck surgeons (HNS) and other specialists in a comprehensive cancer center in southeast Michigan when the region was a major epicenter of the first wave of the COVID-19 pandemic.

2 | PATIENTS AND METHODS

COVID-19 cases and deaths in Michigan were obtained from the state of Michigan COVID website.⁴ During the first surge of COVID-19 infections in southeast Michigan, the total visits and THV for HNS and different specialties were observed in a comprehensive cancer center clinic. A visit was considered to be a THV if video conferencing or audio call were used to complete and document a patient interaction. The number of on-site and THV for medical and surgical specialties were obtained using the scheduling software. The number of screening mammograms during this timeframe was also measured. These data were organized by fiscal year

(FY), which is October through September. Clinic visits with radiation oncologist were not measured.

3 | RESULTS

Since the first COVID-19 surge (March–April 2020) in southeast Michigan was so deadly, mitigation strategies were imperative to reduce the burden of COVID-19 on the community (Figure 1). At the peak of the outbreak in April, Michigan had 1953 cases and 232 deaths per day.⁴ In subsequent months, the cases and deaths significantly declined, not peaking again until after FY 2020. To create a safe environment for patients at the Karmanos Cancer Center, only essential visits were allowed onsite. The state of Michigan forbid elective medical care during the surge. Although cancer treatment was considered to be essential and not limited by the state of Michigan, cancer surveillance visits, including screening mammograms, had to be delayed. These actions resulted in a significant reduction in total clinic visits and increased usage of THV.

Before COVID-19 was declared a Michigan state emergency at the end of March of 2020,¹ the number of visits to the Karmanos Cancer Center during FY 2020 were on track to match the number of visits during FY 2019 (Figure 2). The average number of monthly visits over the first 5 months were 5253 and 5242 in FY 2019 and FY 2020, respectively. In March, April, and May 2020 average monthly visits dropped by 24%, 46%, and 28%, respectively, as compared to FY 2019 levels. Total visits were most drastically limited in April to a low point of 3139, with THV making up 28% of all visits. The percentage of THV in April, May, June, July, August and September were 28%, 20%, 11%, 7%, 7%, and 7%, respectively, of the total visits. By June the average number monthly of visits to the cancer center had increased back to FY 2019 monthly levels.

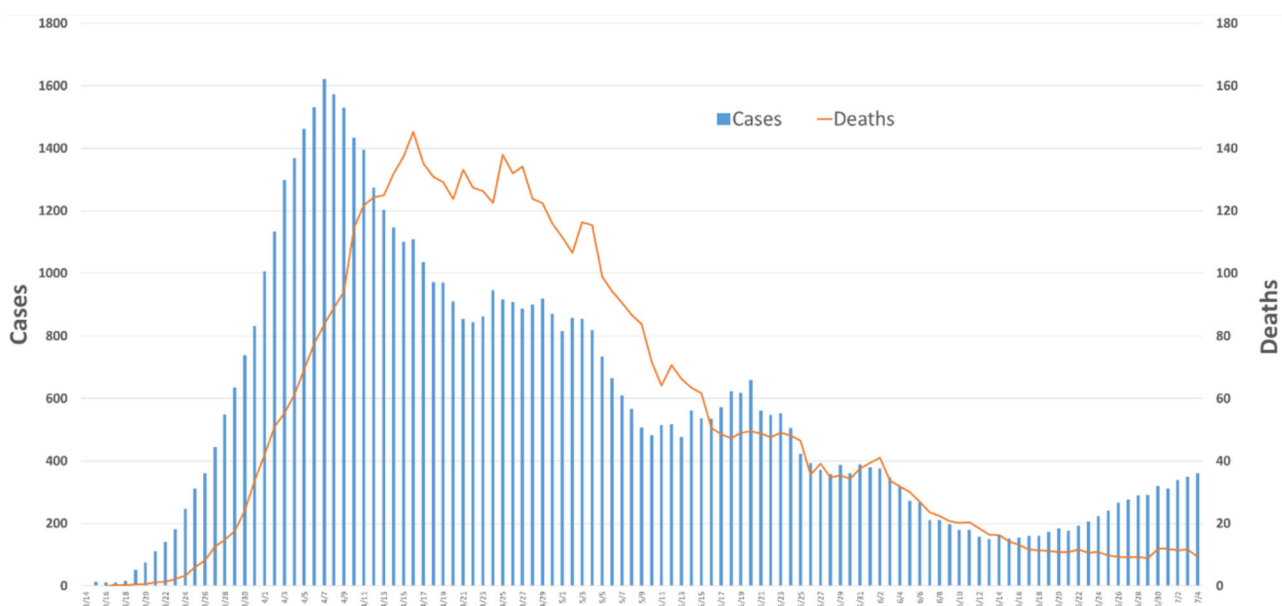


FIGURE 1 COVID-19 cases and deaths in Michigan (7-day rolling averages) through July 4th of 2020.⁴

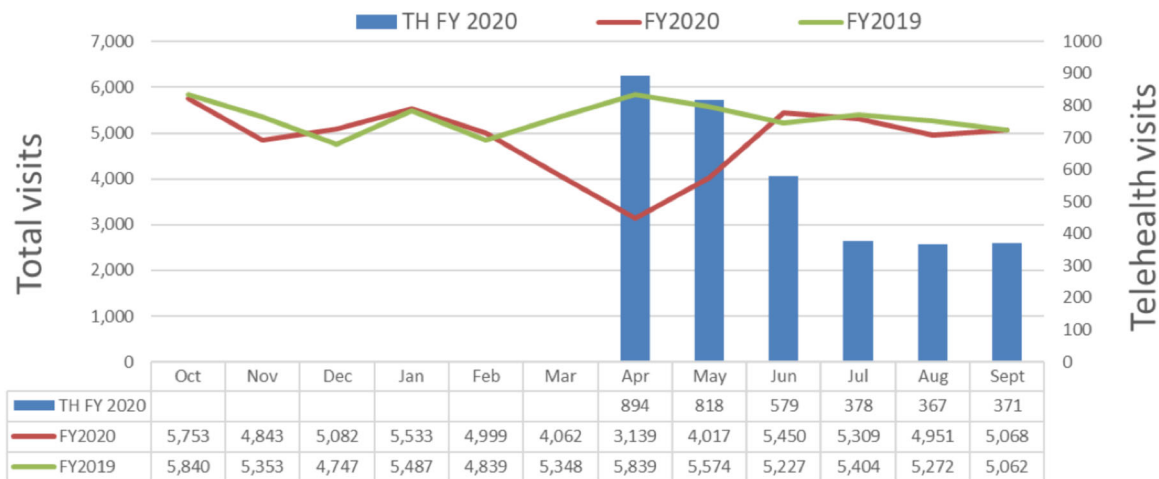


FIGURE 2 Total clinic visits and telehealth visits (THV) across all specialties for fiscal year 2020 and 2019. Fiscal year starts between September and October. THV were first offered in April 2020

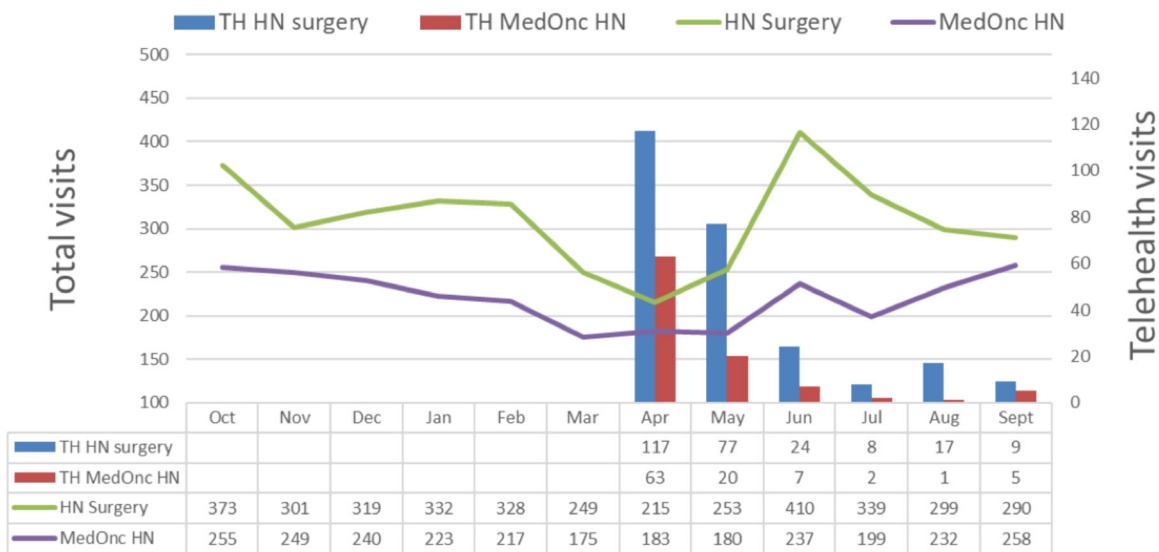


FIGURE 3 Telehealth visits for head and neck surgery and medical oncology, as well as with the total visits

The average number of monthly visits over the last 4 months of the FY was 5241 and 5195 in FY 2019 and FY 2020, respectively. The rebound in June through September did not make up for visits lost during the outbreak, and FY 2020 had a 9% loss from FY 2019 with 5786 fewer total annual visits. Therefore, THV were not able to completely replace the lost in-person volume, meaning many patients went without care because of the pandemic.

HNS initially incorporated THV with 117 performed by HNS, and 63 THV performed by head and neck medical oncology (MedOncHN) in April (Figure 3). For HNS, THV made up 54% and 30% of visits in April and May, respectively. For MedOncHN, THV made up 34% and 11% of visits in April and May, respectively. This increased proportion of THV was not sustained for the subsequent months. Once the regional COVID-19 cases decreased, total visits

increased considerably, and THV made up only 5.9% and 2.4% of HNS visits and 3.0% and 1.0% of MedOncHN visits for June and July, respectively.

Like the cancer center at large, incorporating THV by HNS was not able to completely replace the lost in-person volume, and the number of total visits deviated far below prepandemic trends. However, unlike the cancer center at large, which returned to a prepandemic baseline number of monthly visits, HNS saw a sharp rebound of visits that surpassed prepandemic baseline levels in June (Figure 3). This drastic rebound nearly made up for the visits lost during the outbreak and brought the intra-outbreak monthly average near the prepandemic monthly average. The monthly average across March, April, May, June, and July was 293 HNS visits and 195 MedOncHN visits, compared to the prepandemic monthly

average of 330 HNS visits and 236.8 MedOnCHN visits from October, November, December, January, and February.

When comparing different surgical specialties, HNS initially had more THV volume than any other specialty but decreased rapidly after the first 2 months (Figure 4). Gynecology and genitourinary surgery services had high initial THV volume and was able to maintain higher volume over a longer period of time. On the other end of the spectrum, thoracic surgery had far fewer initial THV compared to other surgical specialties, and eventually stopped using THV altogether. Among medical specialties at the cancer center, gastrointestinal medical oncology used THV most frequently over the 6-month study period, especially in April, May, and June (Figure 5). Like its surgical counterpart, thoracic medical oncology had the least THV use among medical specialties.

Screening mammograms also saw a sharp regression during the first wave of the pandemic (Figure 6). There was a 52%, 96%, and 81% decline in the number of screening mammograms in March, April, and May, respectively, comparing FY 2020 to FY 2019. The annual total number of mammograms fell by 566, from 1984 in FY 2019 to 1418 in FY 2020. This decline is concerning because late detection and treatment of breast cancer has been shown to increase risk of death and increase complications from treatment.¹⁰

4 | DISCUSSION

In the midst of a pandemic, the benefit of surgical care was balanced with the risk of exposure to COVID-19. When the incidence of disease is unacceptably high, as with COVID-19 in March of 2020 in southeast Michigan, a cancer patient's risk by leaving home may be so great that cancer care should be deferred to a time in the near future when risk of infection is lower. Cancer patients are at a particularly high risk for nosocomial infections, and cancer centers must practice exquisite infection prevention to keep their patients safe.¹¹ This need has come under an intense spotlight in the midst of the

COVID-19 pandemic, especially since COVID-19 infection in patients with cancer has substantially worse outcomes when compared to patients without cancer.¹² Likewise, patients who become infected with COVID-19 less than 1 month after surgery are more likely to have severe clinical events than those who did not have surgery.¹³

THV may be used to maintain contact, create care plans, and prepare for surgical intervention if treatment needs to be delayed to an outbreak of disease, as well as limit infectious exposures as patients and recover from surgery. But even with the best THV options, surgical intervention for cancer relies on person-to-person interactions and classifying surgeries according to acuity helps triage which cases should take priority. Surgeons can consider delaying cancer treatment in less aggressive cancers while prioritizing in-person services for patients with highly aggressive malignancy.¹⁴ The American College of Surgeons considers low-risk cancer to be intermediate acuity and recommends low-acuity cancer surgeries be postponed until conditions are safe and such surgeries would not detract from a hospital's management of COVID-19 patients.¹⁵

Evidence is mixed on exactly how long cancer care can be safely postponed and establishing a causal relationship between treatment delay and outcomes is difficult given the myriad reasons a patient's care was delayed in pre-pandemic studies. Some systematic reviews have concluded that most cancer surgeries, including those head and neck cancers, can be safely delayed up to 4 weeks without impacting patient survival or disease progression.^{16,17} Others found that even a 4-week delay in treatment is associated with an increase in mortality.¹⁰

For breast cancer specifically, secondary prevention with regular screening mammograms is an essential and has reduced breast cancer mortality by 25%–38% since the 1980s.¹⁸ Approximately 4 cancers are detected for each 1000 screening mammograms, so halting screenings for months at a time leads to many early-stage cancers being missed.¹⁹ The impact of interrupted screening protocols during the COVID-19 pandemic has already been observed; diagnoses for breast cancer fell by approximately 50% during the initial wave of the pandemic.²⁰ While it is important to minimize the overall frequency

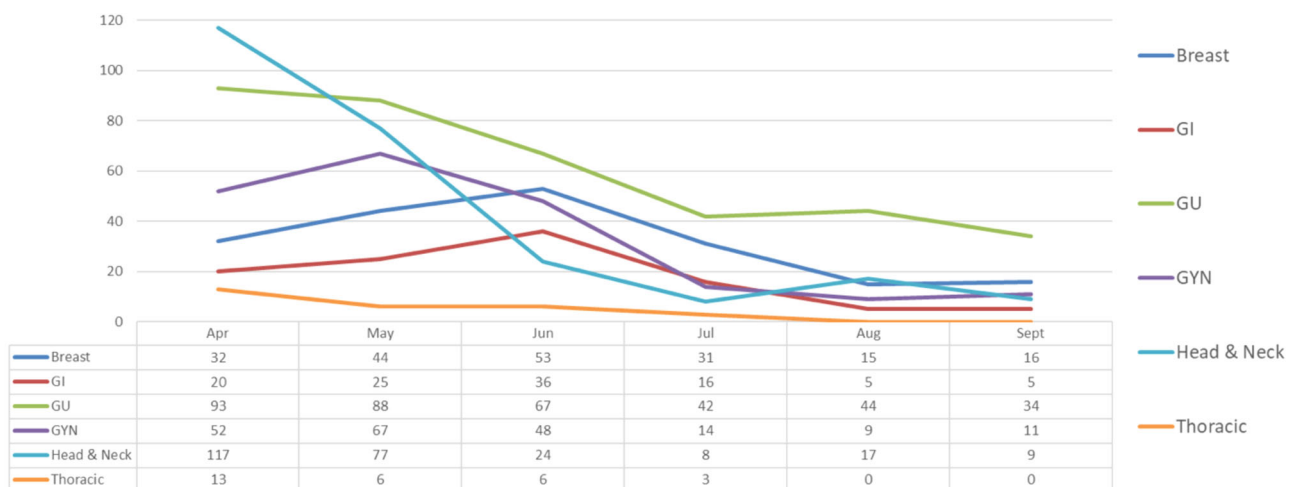


FIGURE 4 Telehealth visits for different surgical specialties

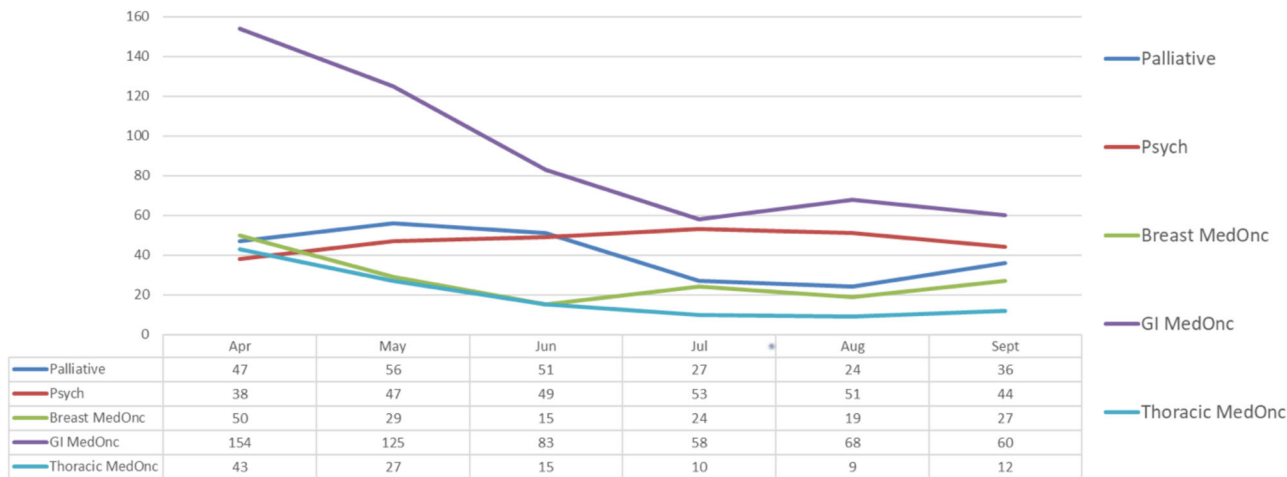


FIGURE 5 Specialties with significant number of telehealth visits

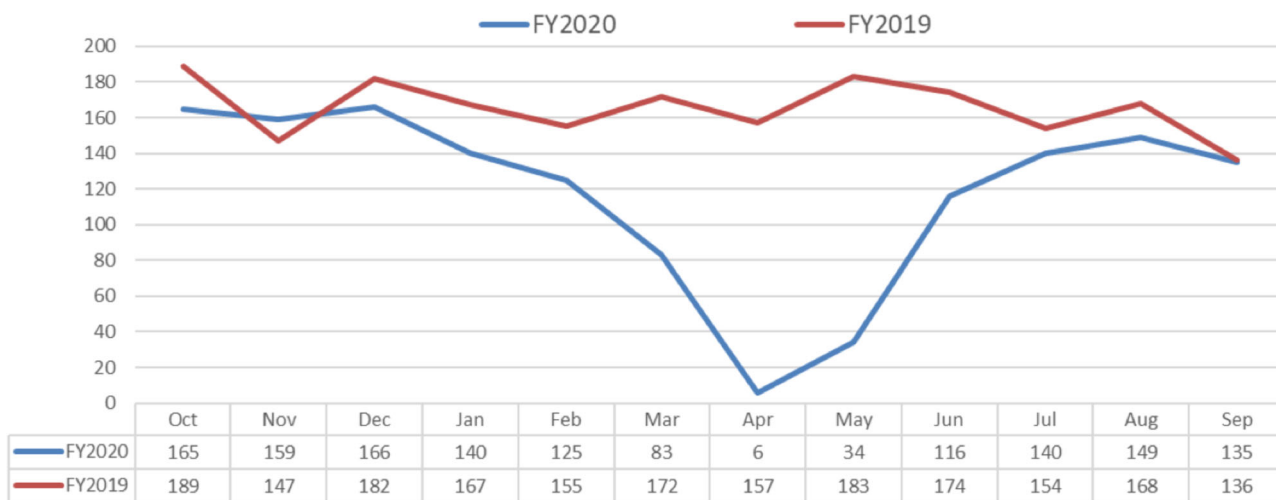


FIGURE 6 Breast screening mammograms

of community exposures to dangerous outbreaks when they occur, it is also crucial to recognize the public health cost of interrupted cancer screenings. These risks must be balanced, and systems must be quickly adapted so they can continue to provide these essential services in a high-risk environment.

Using the 12-month average from FY 2019 as a reference point for expected April visit volume, the cancer center in this study only lost 25% of April's total volume (Figure 2). This shows that most of the services provided at this center could not be done via THV, either because of lack of familiarity with and accessibility to a THV platform, or because the services being provided were incompatible with THV. By June, the total visit volume had recovered, but THV visits were trending downward, demonstrating telemedicine was not a preferred alternative for most of the visits. This is not to say that this cancer center has abandoned the use of THV, as THV visits have consistently made up an average of 7.3% of total visits for the center over July, August, and September.

For head and neck surgery in particular, the number of in-person visits rebounded sharply after the height of the outbreak, achieving a

12-month high, while the number of telemedicine visits fell precipitously (Figure 3). These trends demonstrate that the HNS THV were not a replacement for in-person services, but a way for HNSs to defer care until a later date. If THV had been a true replacement for in-person appointments, there would not have been a backlog of in-person appointments to work through once the risk of COVID-19 infection fell again. This trend makes sense as the HNS specialty is very dependent on physical examination, both for initial treatment planning and for oncologic surveillance. Compared with other surgical specialties, HNS was the most enthusiastic to implement THV, but the monthly number of HNS THV eventually stabilized to be similar to THV rates of other specialties (Figure 4). This pattern could reflect a willingness within the field to embrace new technologies when a situation calls for rapid adaptation.

The outbreak data used in this paper covers a narrow range of dates to provide context to the changes in visit patterns observed in Figure 2. When compared with further tracking data from the Michigan Department of Health, it might seem that periods after April had higher rates of COVID-19 infection during FY 2020. However,

this finding is likely an artifact of poor testing infrastructure early on in the pandemic when testing was restricted to symptomatic individuals. When adjusting for initial challenges with widespread testing, Michigan likely had 12 undetected cases per confirmed case in mid-April.²¹ This means that even though there were spikes in confirmed cases throughout the summer of 2020, the worst part of the COVID-19 pandemic in Michigan during the timeframe of this study took place during April. This assumption is supported by Michigan's daily death rate from COVID-19 which peaked in April and had no other peaks through the rest of FY 2020.⁴

This assessment of trends in THV use during the COVID-19 pandemic was affected by the rapidity of the switch to telemedicine. These data may have looked different if more robust telemedicine infrastructure had existed before the pandemic, or if patients and providers already knew how to use telemedicine platforms. Many patients lack technical skills, hardware, internet connection, visual or hearing requirements to navigate THV. Likewise, many providers lacked the training, support staff, and technology to provide the best possible THV care. Lessons learned from this pandemic will undoubtedly influence the practice of medicine, increase familiarity with THV, and prepare health systems to adapt to similar challenges in the future.

5 | CONCLUSION

As the world responded to the COVID-19 pandemic, changing the structure of appointments had a great impact on the accessibility of care for cancer patients. Disruptions to cancer treatment can allow for further disease progression and worsen outcomes, but acquiring an infection after being exposed to infection in a healthcare setting also carries serious risk of morbidity and mortality. This article highlights the differences between specialties real-life incorporation of telehealth services into practice, with the specific observation that high volume of telemedicine was not sustainable for head and neck surgery. When faced with dangerous levels of COVID-19 spread in the community, the main strategy of this cancer center was to defer care, using telemedicine only as an auxiliary response.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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REFERENCES

- Organization WH. WHO Director-General's opening remarks at the media briefing on COVID-19 March 11. WHO.int 2020.
- Organization WH. Pneumonia of unknown cause - China. WHO.int 2020.
- Services CfMM. CMS Releases Recommendations on Adult Elective Surgeries, Non-Essential Medical, Surgical, and Dental Procedures During COVID-19 Response. CMS.gov 2020.
- Coronavirus. State of Michigan. Accessed July 10th, 2020. <https://www.michigan.gov/coronavirus>
- Cremades M, Ferret G, Parés D, et al. Telemedicine to follow patients in a general surgery department. A randomized controlled trial. *Am J Surg*. 2020;219:882-887.
- Hwa K, Wren SM. Telehealth follow-up in lieu of postoperative clinic visit for ambulatory surgery: results of a pilot program. *JAMA Surgery*. 2013;148(9):823-827. <https://doi.org/10.1001/jamasurg.2013.2672>
- Asiri A, AlBishi S, AlMadani W, ElMetwally A, Househ M. The use of telemedicine in surgical care: a systematic review. *Acta Inform Med*. 2018;26(3):201-206. <https://doi.org/10.5455/aim.2018.26.201-206>
- Moentmann MR, Miller RJ, Chung MT, Yoo GH. Using telemedicine to facilitate social distancing in otolaryngology: a systematic review. *J Telemed Telecare*, 0(0):1357633X20985391. <https://doi.org/10.1177/1357633x20985391>
- A guide to cancer care delivery during the COVID-19 pandemic. ASCO special report: American Society of Clinical Oncology; May 19, 2020.
- Hanna TP, King WD, Thibodeau S, et al. Mortality due to cancer treatment delay: systematic review and meta-analysis. *BMJ*. 2020; 371:m4087. <https://doi.org/10.1136/bmj.m4087>
- Thom KA, Kleinberg M, Roghmann MC. Infection prevention in the cancer center. *Clin Infect Dis*. 2013;57(4):579-585. <https://doi.org/10.1093/cid/cit290>
- Robilotti EV, Babady NE, Mead PA, et al. Determinants of COVID-19 disease severity in patients with cancer. *Nature Med*. 2020;26(8): 1218-1223. <https://doi.org/10.1038/s41591-020-0979-0>
- Liang W, Guan W, Chen R, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol*. 2020;21(3): 335-337. [https://doi.org/10.1016/s1470-2045\(20\)30096-6](https://doi.org/10.1016/s1470-2045(20)30096-6)
- Gosain R, Abdou Y, Singh A, Rana N, Puzanov I, Ernstoff MS. COVID-19 and cancer: a comprehensive review. *Curr Oncol Rep*. 2020;22(5):53. <https://doi.org/10.1007/s11912-020-00934-7>
- COVID-19: Guidance for Triage of Non-Emergent Surgical Procedures. American College of Surgeons; 2020.
- Turaga KK, Girotra S. Are we harming cancer patients by delaying their cancer surgery during the COVID-19 pandemic? *Ann Surg*. 2020;10:9000. <https://doi.org/10.1097/SLA.0000000000003967>
- Graboyes EM, Kompelli AR, Neskey DM, et al. Association of treatment delays with survival for patients with head and neck cancer: a systematic review. *JAMA Otolaryngology-Head & Neck Surgery*. 2019;145(2): 166-177. <https://doi.org/10.1001/jamaoto.2018.2716>
- Oeffinger KC, Fontham ET, Etzioni R, et al. Breast cancer screening for women at average risk: 2015 guideline update from the American Cancer Society. *JAMA*. 2015;314(15):1599-1614. <https://doi.org/10.1001/jama.2015.12783>
- Lee CS, Bhargavan-Chatfield M, Burnside ES, Nagy P, Sickles EA. The National Mammography Database: preliminary data. *Am J Roentgenol*. 2016;206(4):883-890. <https://doi.org/10.2214/AJR.15.14312>
- Kaufman HW, Chen Z, Niles J, Fesko Y. Changes in the number of US patients with newly identified cancer before and during the coronavirus disease 2019 (COVID-19) pandemic. *JAMA network open*. 2020;3(8): e2017267. <https://doi.org/10.1001/jamanetworkopen.2020.17267>
- Wu SL, Mertens AN, Crider YS, et al. Substantial underestimation of SARS-CoV-2 infection in the United States. *Nat Commun*. 2020; 11(1):4507. <https://doi.org/10.1038/s41467-020-18272-4>

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