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Assessing Transformation of Optimizing Ambulatory Surgery Center Services with Telehealth

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ASSESSING TRANSFORMATION OF OPTIMIZING AMBULATORY SURGERY CENTER
SERVICES WITH TELEHEALTH

BY

Kevin Vince Allison Jr.

A doctoral project submitted to the faculty of the Medical University of South Carolina
in partial fulfillment of the requirements for the degree
Doctor of Health Administration
in the College of Health Professions

Abstract of Dissertation Presented to the
Medical University of South Carolina
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Kevin V. Allison

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Background: As technology advances and the ability to provide adequate and convenient surgical procedures improves; the usage of telehealth resources in an Ambulatory Surgery Center setting are evermore capable. The current environment of Ambulatory Surgery Center's provides a baseline of support to alleviate main operating volume and to absorb more of the outpatient procedures with support from technology and telehealth.

Objective: To understand how the telehealth abilities can enhance the efficiency and scope of service of Ambulatory Surgery Centers. To explore if telehealth resources can be utilized to strengthen, improve, and combine tasks that delay progress in the current model. To examine if as telehealth infuses with modern medicine, do the abilities make manual tasks obsolete given the transparent capabilities of telehealth resources.

Methods: Utilizing a Value System Map (VSM) model to examine the current state of an Ambulatory Surgery Center, highlights in process delays are discussed and substituted in a later, future state model. Through displaying current vs. future state, areas of improvement are highlighted that provide areas of improvement in an Ambulatory Surgery Center setting.

Results: In highlighting workflows with Ambulatory Surgery Center procedures, telehealth substitutions of current manual processes show promising improved efficiency with proper technology.

Conclusion: The utilization of telehealth in place of current Ambulatory Surgery Center processes has begun due to recent pandemic of COVID-19; in which support from telehealth capabilities have supported growth in the ASC setting for more comprehensive usages when used accordingly with corresponding telehealth resources.

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CHAPTER I INTRODUCTION

1.1   Background and Need

Ambulatory Surgery Centers (ASC) are freestanding facilities that specialize in surgical and diagnostic procedures that do not require an overnight stay. The ASC model originated in 1970 and has continued to receive outpatient support due to advancements in medical practice and technology that have reduced the need for overnight hospital stay (Healthcare Bluebook, Ambulatory Surgery Center Association, & HealthSmart, 2016). According to the Medicare Payment Advisory Commission (MedPAC), the number of Medicare-certified ASCs increased at an annual rate of 6.7% from 3600 in 2002 to over 5300 in 2011 (Mitchell & Carey, 2016). As of 2021, there are approximately 5,300 Ambulatory Surgery Centers, performing around 23 million surgeries annually. This growth is expected to continue, as the Center for Medicare & Medicaid Services (CMS) approves new procedures for the ASC setting every year (Association of Wisconsin Surgery Centers Inc., n.d). The most popular procedures performed at an ASC are Orthopedic, Ophthalmology and Endoscopy. In the ambulatory surgery setting, procedures are performed that allows patients and providers a same-day environment that foster ease of access and a procedural space that facilitates positive patient outcomes. Providing an arena that specializes in quick turnaround and relatively simplistic operating procedures aims to alleviate the need for hospital-based settings to conduct what is considered a simple or low acuity procedure.

1.2   Problem Statement

Two on-going transitions in health care are the shifts to Patient Centered Care and Value Based-Care. In Patient Centered Care, the patients' needs and health outcomes must be considered when making health care decisions (NEJM Catalyst, 2017). Value-Based Care

models reimburse providers and healthcare organizations based on patient outcomes, with the goal to provide higher quality care at a lower cost (NEJM Catalyst, 2017). In addition to increasing patient volumes for inpatient medical facilities, the escalating costs of the U.S. healthcare system yearns for a solution that optimizes available resources and utilizes low cost means to accomplish similar or improved patient outcomes to those traditionally conducted years prior during an inpatient stay. Access to healthcare is a constant conversation as scientific breakthroughs in the field occur that add to limited access to breakthrough treatments. Access to healthcare, can be refined as access to latest technology that has shown to generate better patient outcomes with potential benefits to recovery, cost, and related undiagnosed ailments. A great example is when a patient is undergoing an orthopedic repair of a knee and post procedure feels relief from back pain and can be independent with regard to assisted walking medical equipment. Therefore, access to medical procedures, which can be offered at a convenient time and location, while maximizing quality and lowering costs.

In addition, some patients are seeking lower acuity, cosmetic procedures; these procedures are desirable to the organization due to the avoidance of lengthy hospital stays and related expensive hospital bills. Additional factors that may drive increased demand for services in the ASC setting include: 1) 20 million uninsured Americans have been insured since the enactment of the Affordable Care Act (ACA); and 2) per National Health Statistics Report, Num. 102 emphasizes in 2010, 48.3 million ambulatory surgery procedures to hospitals and ASCs occurred; 22.5 million were performed at an ASC.

The increased demand for lower acuity procedures has driven the demand for ASC providers. To meet the increasing demands, ASCs must either increase their supply of physicians through additional Full Time Equivalent employees (FTEs) or enhance provider capacity through

increased efficiencies. By improving provider efficiencies, ASCs can avoid the barriers to hiring (e.g., provider shortages and increased labor costs). Instead, if providers are more efficient and productive, they can be capable of a higher case load. The support needed for increased provider success requires a response from supporting departments that partner with providers to be successful. When understanding a surgical outcome, there are several sponsored workflows that must also be revisited prior to the capability for an increased workload by a provider.

As pressure builds for provider success, supporting departments must also improve efficiency to reduce non-procedural delays in patient care, whether it is insurance verification, registration, physician referrals, patient education or scheduling. The supporting processes must advance to handle the increasing patient population, reduce backlog of patients requesting surgical procedure and support the provider to work at the top of his/her license.

Senior leaders are tasked with responding to higher patient volumes, limited provider resources and a need to decrease turnaround time of treatments while keeping a marginally low readmission rate to remain accredited by the governing bodies within healthcare. One possible solution to improving the efficiency of healthcare delivery within ASCs, while providing convenient access to care is telehealth. Telehealth has proven to be a valuable tool to increasing patient access to services and reducing costs while maintaining quality outcomes in many healthcare service delivery lines (Asiri, AlBishi, AlMadani, ElMetwally, & Househ, 2018). If certain processes within an Ambulatory Surgery Center, are replaced with telehealth, we hypothesize the costs of care to be reduced, increased access through the expansion of patient visits, and a streamlined process that is manageable for providers. Yet, the more research is needed to understand how telehealth can be efficiently utilized within ASCs.

1.3   Research Question

This paper will assess the potential transformation and optimization of ambulatory surgery centers with telehealth services. We will explore if a substitution of telehealth compatible services and processes, will increase patient capacity and reduce cost and task which extend non-clinical procedure activities. Telehealth can reduce time in between, initial appointment for a surgical procedure and patient discharge, post-procedure.

This study will address the following research questions.

1. What parts of the ASC process of service delivery are best suited for telehealth?

2. How can ASC processes be modified to utilize telehealth technology?

3. What costs and cost savings can ASCs anticipate when implementing telehealth?

CHAPTER II SCOPING LITERATURE REVIEW

2.1 **Telehealth Background.**

Telehealth can be defined as the communication of information through an electronic means with intent to impact patient care. Telehealth has been synonymous for telemedicine, telecare, and e-health; being widely interchangeable has provided a plethora of usages and benefits to all who find a way to take advantage of its capabilities. The origin of telehealth is inconclusive with no exact date, yet its inclusion begins in healthcare around the same time as radio waves and remote messaging transmissions of the early 1900s (Mohammadpour, Heidari, Mirghorbani, & Hashemi, 2017). The usage of telehealth can be credited with reducing the distance between professionals and information; whom provide advantages to time sensitive problems or simply barriers to issues. The value of connecting people and places with devices has been revolutionary and opens the door for enhanced patient care; relating to access to a rural patient base, seamless communication between practitioners and real-time communication of time-sensitive information for example. The benefits from utilizing telehealth have shown to reduce medical cost, access to care, and improve the continuum of care for enhanced patient outcomes. As we look to take advantage of telehealth in the future, focusing on barriers to increased patient capacity and reducing clinician burnout, favor utilizing telemedicine to alleviate patient demands.

In situations where there is a high demand for care and limited provider availability, the literature supports technology as a bridge to improve access. This is a huge barrier to access to overcome, as in the US, an estimated 25% of patients do not have a primary care provider or do not have complete access to one. This challenge is particularly difficult for patients in rural areas (Polinski et al., 2016).

Telehealth has been shown to reduce clerical time, patient travel time and redundancy as patient care, that otherwise would require in-person visits, can be conducted between patient and providers who are separated by a distance (Kruse et al., 2017). Reducing archaic processes is discussed to mirror current trends and take advantage of what the smartphone age has already done for patient privacy and patient comfort when speaking through a mode of technology (Mohammadpour et al., 2017).

Telehealth Cost Savings and Reimbursement.

In searching key words "tele cost, reimbursement telemedicine, and tele payor", the recent literature suggests that using telehealth services to support remote monitoring of high acuity patients as a response to intensivists shortages within the United States is ideal (Kumar, Merchant, & Reynolds, 2013). The current environment for reimbursement as it pertains to telehealth procedures are included in the ICD-10 codes and limits are only by the current procedures that are using the platforms. The expansion of telehealth to additional procedures will require a shorten timeline for implementation and early adaptation by insurance payors. The usage of telehealth seems to be limited by the reimbursement for procedures, in addition to skillset and equipment by providers. If providers are to take advantage of using telehealth for their patient benefit a wider "catch all" category in the coding matrix would aid in providers taking risk or using newer technologies to accomplish a more affordable and intuitive approach to practice.

The reimbursements for telehealth, need to add focus on supporting programs that are rural base and speak to a certain population for results that would aid in the larger push for telehealth adaption. In the United States, the population of baby boomers, disabled and rural individuals would provide an example sample to experience with telehealth technologies that

would illustrate the benefits of cost savings by using these services. The sample population for expanded coverage of telehealth reimbursement would see extreme upside to using a population that has limited travel capabilities, fixed incomes, high acuity diagnosis, and multiple comorbidities that impact the continuum of care.

As the overall population continues to age, the support for increased oversight of expanding patient capacity, mainly in ICUs, directly supports telehealth as a cost-effective way to manage such volumes. Continued focus on using telehealth as a way reduce intensivist and nurse "burn-outs and posttraumatic stress"; can also translate to that of an Ambulatory Surgery Center for expanded oversight of multiple cases that enforce "surveillance" as mentioned in the article "Tele-ICU: efficacy and cost effectiveness of Remotely Managing Critical Care". In understanding the extreme infusion of telehealth services in an ICU and a focusing on increased patient volume can result in a positive Net Present Value of $2.5M through a single additional patient per day into the ICU and through a reduction in length of stay (LOS) for patients. The complete extent of the study showed reduced costs per patient by 24.6 percent due to shorter LOS in the ICU and improved clinical outcomes (Kumar et al., 2013). The support for reimbursement of telehealth procedures will be a driving force for the adaptation of this service for Ambulatory Surgery Centers. In the article "Telemedicine Coding and Reimbursement – Current and Future Trends", it is highlighted how the current coding for Telemedicine is a modifier for visits. Telehealth visits are paid at the same rate as in-person visits as of March 13, 2020 (Abbasi-Feinberg, 2020). As telemedicine continues to show greater patient reach and less financial burden on health systems and providers, its increased adaptation will be infused as a norm that provides seamless transitions into virtual clinic arena.

2.2   Telehealth and Ambulatory Surgery Centers

One study of Gastroenterology practices found that hospital-based practices were more likely to use telemedicine prior to COVID-19 (27.2% compared 12.1%, respectively); and video calls were the most common modality of telehealth. During the height of the pandemic nearly all centers utilized telemedicine, yet only 80% of ASCs plan to continue telemedicine, compared to 92% of hospital-based centers (Kushnir, 2020). This result in increased use, suggest the situational benefits of introducing telemedicine resources to achieve common goals within medical practices. As integration during COVID alluded to positive and safe outcomes the financial impact supports reduced clerical cost per patient and allows for greater patient volume.

Pre-operative Telehealth. The ability to conduct segments of the preoperative treatment via modes of technology to be conclusive in the necessary information for patient procedure is an area of opportunity for most practices. The usage of recording information across checklist and documents is mainly a manual, paper process that increases clerical errors with the transcription of patient personal information. The process often began with a patient or caregiver providing documented information into forms and require a great level of understanding on behalf of the patient or care giver. The ability to utilize a resource that electronically stores this information would reduce the dependency to regurgitate the medical information that often need bookkeeping suggestions to reduce misplaced or outdated information. The steps involved in the pre-operative process require education and assessments that guide an effective treatment plan for the providers.

*Pre-surgery Education***.** In providing patients with information regarding the pending procedure, preoperative education refers to any educational intervention delivered before surgery that aims to improve people's knowledge, health behaviors and health outcomes (McDonald et

al., 2014). The educational documents are delivered via pamphlet or hard copied documents. Medical professionals are responsible for providing the information and discussing questions with the patient during the visit.

In a study researching the impact of presurgical education in hip or knee procedures, in providing pre-education material there was a 10% improvement in postoperative anxiety and 9% improvements for pain; 15% improvement for overall surgical site function and a 2% decrease in overall side effects as a result of pre-education (McDonald et al., 2014)

Surgical Telehealth (provider to provider consultation). During surgical procedures, resources are introduced that allow for physicians to be separated from the patient and utilize remote monitoring of vitals, surgical devices and tools. The infusion of telehealth within the operating room itself, not only has increased case turnaround time, but also increases physicians being able to conduct procedures with highly specialized devices (Asiri et al., 2018)The DaVinci robot for example, a surgical device that allows practitioners to perform procedures with a high degree of precision that impacts the effectiveness of the procedure and has shown to reduce recovery time of the patient.

Provider to Provider Consultation. In modern practice, providers have the ability to consult other physicians and specialist to further diagnosis or interpret results of patients. The benefits of utilizing physician counterparts increases the accuracy of the care being provider as compared to a single physician alone; in this practice of consulting a provider to insert additional expertise is a viable resource that strengthens the usage of a telemedicine medium for success. In a large medical system, utilizing a single electronic medical record, EMR, increases the transparency of care and provides confidence to interpretation of results when utilizing a

provider-to-provider consultation. The methods that lead a provider to consult another physician or medical provider, are often done to enhance a decision or course of treatment. In utilizing a telemedicine resource, the attending provider can either connect real time with the referred party (Lou, 2021)

In a study, used to determine the impact of spinal treatment, physician-to-physician consults where used and patients reported an increase in outcomes, a decrease in worry and a reduction in readmission rates given the enhanced direction of the specialized provider being included in the patients' treatment early (Lou, 2021).

Post-operative Telehealth. The coordination of patient status after a scheduled procedure has been determined to be a norm for any surgical procedure and thus is a valued process for physician and patient relationship. In reference to Ambulatory Surgical Centers, follow up appointments for procedures are held in a recovery bay on a limited time scale and a lengthier appointment is normally scheduled approximately 2 weeks after the surgical procedure has taken place (Mihalj et al., 2020).

Patient Follow-Up. The importance of patient follow-up for post-operative care is to assure no complications have presented and to confirm the patient has followed the communicated instructions for a safe and beneficent recovery. A recent study on the implications for the use of telehealth in surgical patients for post-operative care, provide reassure to the benefits telehealth has had on clinical outcomes and a reduced time to post-operative complications. The complications that were discussed in this article provide contact on the reduced time for a physician or mid-level to determine the complexity of the complication due to telehealth resources, video conferencing and photo submissions of the affected area (Hakim,

Kellish, Atabek, Spitz, & Hong, 2020). As technology becomes a permanent tool for health monitoring engaging smart devices that allow for wound and complication monitoring shortly the response time from health care providers.

ASC Telehealth Reimbursement Policies. During the pandemic of COVID-19, CMS has approved the use of waivers for hospitals to utilize Ambulatory Surgery Centers as COVID-19 testing sites. The waiver allows for continued operations of hospital-based procedures while utilizing the ASC for testing. The usage of the lab in the ASCs provides a continued resource for reimbursement without the loss of treatment substitution or congestion of the main lab at a facilities main medical center (Igel & Barton, 2020). As perceived temporal responses occur because of the pandemic of COVID-19, increased utilization such as testing site utilization of Ambulatory Surgery Centers will provide a manageable norm for continued hospital expansion. The usage of ASCs as a Hospital Outpatient Department (HOPD) is a normal occurrence in the hospital setting to streamline reimbursement as a consistent medium for accounting records or benchmarking resources.

In summary, there are many promising uses for telehealth to enhance the efficiency and accessibility of ambulatory surgical care. Yet, there is a lack of evidence and little guidance for those who develop and implement care processes. This study will further explore the opportunities for telehealth within ASC workflows.

CHAPTER III METHODOLOGY

3.1   Research Design

This project is aimed at informing professional practices by examining current standard practices to understand where telehealth can be implemented in workflows to improve care and reduce costs. We will utilize a process improvement framework to explore the following research questions:

1. What parts of the ASC process of service delivery are best suited for telehealth?

2. How can ASC processes be modified to utilize telehealth technology?

3. What costs and cost savings can ASCs anticipate when implementing telehealth?

Study Objective(s): To clearly define substitutable services within an Ambulatory Surgery Center that can be converted to a tele-medical modality to decrease patient barriers, increase net revenue and increase overall ASC capacity.

3.2   Data Analysis

The study will utilize process improvement methods. After a review of the literature to identify best practices for telehealth in surgical processes, the workflow of ASC service lines will be process mapped. Next, using Lean Methodologies and tools, such as root cause analysis, value stream mapping, and FMEA analysis, sections of the processes will be identified and adapted for telehealth. Finally, a review of average costs for in-person and telehealth delivery will be utilized to estimate the costs savings (or expended) due to implementation of telehealth in ASC.

In order to support intended assumptions, the below will be considered in financial analysis:

- impact on the cost for reimbursement (+/-)

- reduction in no call, no show rates

- increased patient compliance, pre/post procedure

    increase of daily patient volume

3.3   Data Sources

The following data sources will be utilized:

Average ASC Cost Data: This data provides estimates of ASC costs as well as estimated cost

savings if procedures are redirected from inpatient to ASC settings. (Ambulatory Surgery Center

Association, 2013)

Staff Wages: Provider and ASC staff wage data will be included in the model based on the

hourly cost determined from Glassdoor webpage, source information is referenced to State:

North Carolina.

Observation: Observation of the ASC Right-Hand Node Removal process and workflow was

conducted on October 6th, 2021

3.4   Expert Review

To enhance internal validity the ASC workflow models, and process maps were reviewed by two

content experts. One having expertise in ASC Management and Operations and one with

expertise in telehealth service development and implementation. Comments from the expert

reviews were incorporated into the final models.

CHAPTER IV RESULTS

This study explores the possibilities to develop and implement telehealth services within ASC to improve patient care and provider efficiencies.

The first step to anticipating demand for ASC procedures, is deciding which require an inpatient stay or which can be performed on an outpatient basis. In reviewing the successful procedures that have been transformed by technological devices (i.e. DaVinci Surgical Robots) to provide minimally invasive surgeries, it is important to prioritize the surgical location. Utilizing a medical center's main operating room, is a costlier expense as compared to that of an ASC. In choreographing the ideal balance for determining a response to high patient demand, the impeding volume suggest utilizing ASC's is appropriate and provides the best response, if utilized correctly. This study explores the ASC procedure of Right-Hand Node Removal as an exemplar case that can be completed within an ASC and illustrates a variety of processes within the ASC. The Right-Hand Node Removal was used given the most recent observations conducted on October 6th, 2021.

The Ambulatory Surgical Center provides accommodations suited for same day treatments and ease of access for providers. To reduce provider frustration and inpatient congestion due in-part to high volume, the outpatient setting provides relief for a highly sought inpatient operating room. The following results explore each step in the ASC care process under the traditional in-patient model. Value Stream Mapping tools are utilized to identify wastes in the process and to show where evidence-based telehealth processes can be implemented to improve efficiency.

4.1   Results/Findings

Value Stream Map (VSM)

The Value Stream Map (VSM), in Figure 1 displays a current state of a hand procedure conducted at an Ambulatory Surgery Center. In the VSM, a display of steps helps illustrate the contact points related to completing the procedure. The patient begins his/her interaction with the ASC through a referred physician. Then a series of in-person and telephonic visits occur, often to retrieve similar data; that if single source portals or medical records existed would either eliminate or reduce the need patient contact.

Value Stream Map (VSM): Current State

Procedure is referred to Surgeon. The initial step for conducting a procedure at the Ambulatory Surgery Center and notifies personnel to begin the series of steps that would allow for a procedure to be conducted by a visiting provider. The time between patient referral and the ortho appointment involves a primary physician's office, a surgical provider and office, insurance personnel, and support staff that handle appointments records management and scheduling of the patient. Within the step, a heavy influence of manual processes occurs that are documenting request and patient records for an orthopedic surgeon's support staff to provide the correct request to the correct patient for a discussion of the requested procedure. The involvement of more than one office can add for delays in updating records with manual data entry or mailbox specific request. The communication to the orthopedic surgeon is the response of receiving the request and confirming the correct information has been requested to perform the procedure.

Right Hand Node Removal Process in Ambulatory Surgery Centers. This procedure was selected

as part of interactions conducted as a patient. During this procedure, having communicated the

need for an outpatient surgical procedure due to series of prior appointments with primary care

provider. Through the interactions with provider and ambulatory surgery center able to assess the

communication and request made to conduct a surgical procedure.

Orthopedic Appointment. **In-Person.** After a patient is referred to an orthopedic surgeon,

orthopedic appointment is scheduled. Prior to the appointment, patient information including

medical history and insurance information is collected by a receptionist via telephone. Once this

information is collected, it is viewable through an online portal. The receptionist contacts the

patient prior to the appointment as a reminder call, 1-2 days prior to scheduled appointment. The

goal of the orthopedic appointment is for the Surgeon to validate the referral request,

communicate concerns to the patient and gauge feasibility of the request. With the patient

present, a provider reviews the procedure and communicates success and failure rates of the

procedure, more importantly expected results of undertaking. The initial appointment as is

traditionally done in-person and mostly a verbal exchange. After the confirmation of the

necessity of the procedure by the provider, an appointment is scheduled with the Ambulatory

Surgical Center. The notification to the surgery center, by the Orthopedic office is made via

telephone by receptionist.

Anesthesia Assessment. **Via Telephone.** The confirmation of the orthopedic appointment sets in

motion an anesthesia assessment in which allows a provider to assess the medical capability of

the patient and their interaction with the routine medications used during the procedure. The

medical history is verbally discussed with the patient and a paper document is sent to the patient to provide past medical history and known allergens. This step requires the patient to recall this essential information.

COVID-19 Test. **In-Person.** The recent concerns related to this virus and current screen of the virus is required due to the potential for spread to medical professionals. The latency of the test is necessary for only a few days prior to surgery for an accurate read that will increase a low transmission rate to patients unable to use personal protective equipment. After the orthopedic office has scheduled the appointment with the surgical center, the COVID-19 test is requested by the surgical center. The surgical center coordinates the testing of the patient prior to day of requested procedure. The testing location is within the Ambulatory Surgery Center in a clerical space to allow for ease of access for patients being tested. The results of the COVID-19 are reported up to 36 hours post lab draw. The results are recorded prior to the approval of the surgical procedure, a positive COVID-19 test will postpone the surgical procedure for at least 14 days to adhere to the quarantine requirements for a positive COVID test.

Pre-Operative Assessment. **Via Telephone.** The prescreen assessment is to fact check the medical history, reviewing test results, medications, patient identify, implanted medical devices, obtaining treatment consent, and confirm the procedure being requested. Scheduling personnel are responsible for conducting this questionnaire and identifying then relaying concerns to the provider that may hinder a surgery. The communication is often dense and full of important information that a patient needs to understand for a successful procedure. The Pre-operative assessment is a verbal conversation and some instructions are mailed to the patient prior to

surgery. The trigger for a scheduler to call the patient with instructions is once a surgery date has been scheduled, anesthesia assessment completed and a negative COVID-19 test. The pre-operative assessment is a snapshot for patient's current medical status and is used to verify helpful patient information for the medical providers and care coordination team. This assessment is seen to be a final checks and balance system to assure correct and accurate patient safety practices.

Orthopedic Surgery. **In-Person.** After completion of the prior steps, the surgery can take place at the ASC. In preparing for a patient's surgery, providers are given all relevant information and are required to have the patient in the best condition for a successful procedure. In cases with unanticipated developments, such as abnormal cyst attached to a nerve ending, the surgeon may seek out a consult with other providers. A provider is able to contact an on-call provider via video conferencing, telephone or through supporting staff.

Post-Operative Appointment. **In-Person.** Best practices and evidence-based guidelines state. It is essential for patient monitor for issues from the procedure, follow post-operative instructions, and follow-up with the provider. The post-operative appointment is typically 14-days after the procedure. This in-person visit will serve as the first time a provider has seen the surgical site and based on this observation, they will gauge the success of the procedure. The success of this procedure hinges on the patient's comprehension of the recovery measures mentioned during the pre-operative assessment. Once a decision is made on the success of the procedure a provider decides the next course of action, and communicates instructions, and schedules the next visit.

The final conversations during this appointment are next steps and what to expect of the surgical site and what to do if plans go differently than anticipated.

6-Week Follow Up Appointment. **In-Person.** There is typically a 6-week follow-up appointment, however, the timeframe can vary based on the results from the in-person visit of the post-operative follow up. A provider uses this time as gauge on the true success of the procedure. In determining the success of the procedure is a combination of all steps before and patient comprehension of instructions. The adherence to the amount of information is critical for success and compliance in the plan of care. As a patient is provided instructions and expectations during this visit, this will conclude the referral component of this treatment and a patient is routed back to their respective primary care provider.

Table 1: Efficiencies and Wastes of the Current State Process

Step	Efficiencies/Strengths	Waste
Patient Referral	Coordinate procedure with respective provider	Availability of referral appointment for confirmation of patient acceptance
Ortho Appointment	In-person engagement between patient-provider; Ability to view facilities	Travel time and cost to patient; clinic space for visits;
Anesthesia Appointment	Ability to review medical record for potential	Collecting Duplicate Information from Patient; Possible Recall Errors;
COVID-19 Test	Aids to reduce spread of virus	Separate office visit for test, lasting less than 10-15 mins
Pre-Operative Assessment	Aligns case setup with patient preference to optimize surgical outcomes	Large amounts of information verbally communicated
Ortho Surgery	Confirms prior steps have been successfully completed	Necessary to collect information from various personnel; may lead to misinformation
Post-Operative Appointment	Gauges the success of the surgical procedure	Too much time in-between case and follow up appointment for update on surgical site success
6-Week Follow-up	Reassures patient provider understanding on post-op appointment; Ability to provide future expectations for surgical site	Limited updates communicated on surgical site progression, unless emergency

Reimbursement

The potential for a reduction in inpatient surgical cases with the improvement of ambulatory surgery center cases is unimpacted as the cases that are suited for same-day procedure are in queue for the ASC only. The natural progression of complex procedures being routed to an outpatient setting is due to the telemedicine resources that are robotics and improved surgical success strategy based. As a facilities ASC cases are refined for success, the organizational setup of an ASC as a hospital outpatient department or separate financial institution will provide a depth of impact as the expenditures are related to treatment cost guided

by reimbursement.

While reimbursement can vary based on payor type, typically the process for reimbursement is determined by HOPD versus ASC structure; and secondarily by procedure type. When coordinating a service, the office visit has been the main encounter point and focus of reimbursement as it relates to the procedure being requested. Individual billing takes place that single out the office visit and the surgical case separately; yet, there is a current push to expand coverage of bundled payments for ASC procedures to ease the attraction of procedures and providers conducting cases at an ASC (Dyrda, 2021). The expansion of bundled payments for ASC's will increase standard billing that will have less fluctuation based on procedure type. When looking at the costs of procedures in ambulatory surgery centers, our example is less complicated and less costly than the top 25 most expensive ASC procedures (Table 2). Therefore, if the process can be piloted streamlined in Hand Node Removal procedures, there are even greater opportunities to apply the changes to more costly procedures.

Table 2: Top 25 Most Expensive Ambulatory Surgery Center Procedures

HCPCS/ CPT Code	Description	Total Number of Procedures	Total Charges	Avg. Charge/ Procedure
S2067	Breast stacked " diep/gap"	109	$14,535,855	$133,356
C1882	AICD other than sing/dual	134	$14,899,027	$111,187
J7330	Cultured chondrocytes implnt	555	$47,451,368	$85,498
J1300	Eculizumab injection	273	$21,136,511	$77,423
C1722	AICD single chamber	69	$5,304,665	$76,879
Q2043	Sipuleucel-T auto CD54+	95	$7,264,735	$76,471
J0221	Lumizyme injection	24	$1,824,000	$76,000
C9733	Non-ophthalmic FVA	48	$3,600,000	$75,000
55970	Sex Transformation M to F	35	$2,561,500	$73,186
S2068	Breast DIEP or SIEA flap	641	$43,741,013	$68,239
J2350	Injection ocrelizumab 1 mg	494	$33,618,530	$68,054
33264	Removal & replacement of defibrillator generator; multiple lead system	986	$64,874,630	$65,796
J0202	Injection alemtuzumab	16	$948,000	$59,250
C1721	AICD dual chamber	138	$8,155,647	$59,099
33263	Removal & replacement of defibrillator generator; dual lead	670	$39,376,798	$58,771
33249	Insertion/replacement of permanent pacing cardioverter-defibrillator system with transvenous lead(s)	2968	$168,067,067	$56,626
L8614	Cochlear device	594	$32,521,724	$54,750
C9600	Percutaneous transcatheter placement of drug-eluting intracoronary stent; single major coronary artery or branch	371	$19,223,041	$51,814
69930	Implant cochlear device	1515	$76,613,993	$50,570
J3385	Velaglucerase alfa	147	$7,419,120	$50,470
L8687	Implant neurostimulator pulse generator dual array rechargeable	2318	$116,052,701	$50,066
33262	Removal & replacement of defibrillator generator; single lead	201	$9,935,101	$49,428
0375T	Total disc arthroplasty anterior approach	15	$648,868	$43,258
L8688	Implant neurostimulator pulse generator dual array non-rechargeable	727	$31,365,650	$43,144
L5856	Elec knee-shin swing/stance	16	$682,054	$42,628

Source: Definitive Healthcare https://www.definitivehc.com/resources/healthcare-insights/most-expensive-asc-procedures

Value Stream Map (VSM): Future State

The Figure 2 VSM illustrates the future state if telehealth was to be used in the same right-hand procedure. The future state Value Stream Map highlights a reduction in patient encounters and combines non-value adding encounters into a single interaction. The reduction in encounters, reduces the potential for error in data collection, reduced patient complications pre-surgery and increases transparency of medical recording for the patient. The impacted benefits to a patient limiting question response reduces variability and any substitution in responses as the procedural date approaches.

Patient is referred to Surgeon. The trigger for a surgeon to be notified can be enhanced with a transmission of patient record in electronic format that highlights habits and trends in the patients care. Being able to tailor an encounter to a patient's habits would increase patient comprehension and enhance patient outcomes. As the surgical office prepares for a new patient encounter, being able to track down as much redundant information as possible increases compliance of new request necessary to schedule and conduct the medical procedure. In adding a resource that transmits and request information of the patient would reduce calls asking to provide this information and extending the initial meeting. The transfer of information can occur electronically through email and electronic medical records. If the patient is not affiliated with the surgical site, the transfer of information will be through fax or email to communicate the necessary information. If the patient's referring provider is within network, the transfer of information can be conducted through electronic medical record that allows for the request for an orthopedic surgeon to occur via notification of request to providers supporting and scheduling staff.

Orthopedic Appointment. **Telehealth Visit.** The current state discusses the details of the visit and shortcomings of the patient experience. With an addition of a telehealth resource conducting the appointment using Direct to Consumer telehealth technology is possible. Direct to consumer telehealth technology can be purchased for low monthly fees ($30-$40 per provider per month), and would allow audio and video interaction, screen sharing, and document transfers (Doxy.me). For more complicated patients, the patient could consult with the surgeon from the Primary Care Provider Office, which would enhance care coordination. This telehealth interaction could utilize the same low-cost technology or if needed investments into more advance video and diagnostic telehealth equipment could be purchased.

During the telehealth orthopedic appointment, the patient is communicated with initial on the concerns of the procedure but are also provided resources that would help digest this information and what to expect next. Educational videos and electronic can be shared with the patient for future reference. As pre-operative visits can be overwhelming for families and caregivers, providing a tangible resource whether an email or visual aids would improve the understanding of what is to come and how to best prepare for next steps. An application that reminds or requests information for the ensuing steps would reduce wait time and potential increase workflows that are awaiting a paper transmission. A comprehensive electronic health records system, such as EPIC Solutions, will have the ability to structure patient reminders as part of the system workflows for scheduled procedures. An additional software that can be paired with a simple computer software program, such as Solution Reach, will provide automated reminders to patients that will increase responsiveness of patient appointments.

Anesthesia Assessment. **Via Telehealth.** To fully reduce the delay associated with a medical professional requires access to be granted to the patient record and transcribing any concerns that may merit a follow up call to the patient. Having a telehealth resource that allows the medical provider the ability for electronic document transfer or an e-consult with the primary care provider's office, can eliminate the potential errors associated with relying on patient recall. This could also reduce the chances of delays and errors, as rejection of routine medicines by the provider would add tremendous consistency across the medical interaction. Utilizing a documented record of patient encounter, greatly reduces a lag in communicating important concerns related to a surgical procedure they may otherwise become evident later in the process. These late stage concerns can lead to a delay in the case and a waste of valuable surgical time.

COVID-19 Test. **In-Person.** The information presented as a result of the test is importance to reduce the spread of the virus; in terms of necessity for conducting a surgical procedure the respiratory concerns can be assessed in combination with the prior step to reduce travel and a medical encounter. Similar personnel are able to conduct the test as the prior listed assessment. In utilizing the COVID test appointment with the anesthesia appointment will reduce the need for an anesthesia work up if the patient fails the test. Having a resource that can dictate whether a patient is medically cleared for a surgical treatment needs to occur prior to a medical professional drawing up a medical panel for a pending surgery. The probability for a patient to be denied a procedure is an even split and should be a primary decision maker in the surgical process. In prioritizing the COVID-19 test, providers are able to save on work that medical professionals would utilize by preparing a patient for a potential procedure.

Pre-Operative Assessment. **Via Telehealth.** The pre-operative assessment is a vital step in the process and provides a plethora of important information that sets a patient up for a successful procedure. The telehealth interaction that is conducted by the scheduler is built on the information collected from the anesthesia assessment and the patients listed medical history as provided by the referring provider. In improving the transparency of the medical record to the surgery scheduler removes any informational blind spots that a patient may not deem valuable or important to mention during the verbal assessments. The usage of a digital health resource includes a comprehensive electronic medical record that increases single medical records that reduces redundancy in questionnaires and provides a sound medical history for the patient. In reviewing the noted jargon of prior providers, the surgery scheduler is more likely to understand verbiage of a medical associate, rather that of a patient in which the intended message may be lost in translation. An additional resource for use of a digital resources, benefit interoperability which is an exchange between to providers through an electronic system that allow for mutual benefits of each provider. The benefits of interoperability lead to reduced miscommunication, reduction in redundant testing and consistent treatment of care.

Orthopedic Surgery. **In-Person.** The success of the orthopedic surgery requires, a number of prerequisite steps from supporting staff that support the goal of a successful procedure; including scheduling, cleaning, known concerns and surgical site location. Many of the prerequisites require a comparison of records information from multiple outlets, in using a single telehealth resource a reduction of repetitive task that increase room for error are reduced. The ability for a surgeon to have the information that is a collection of all visiting in a resource undisturbed by non-perceiving professionals significantly increases the confidence in the validity of the medical

record. A reduction in the medical personnel workflow given the influx of telehealth resource

provides a substitution of duties and stronger trust in the resources used for patient perception for

surgical procedure. Also, if a situation arises when the surgeon needs to consult a specialist, the

e-consult visit can be used for provider-to-provider consultation where the consulting provider

can view the situation and any labs or images could be transferred for consultative purposes. As

e-consults are being discussed to be assigned their own CPT codes to manage reimbursement,

the ability the technology possesses impacts activities related to patient care that are in direct

correlation to a patient visit; for example Patient travel time per visit, which is a large component

for patients traveling to and from appointments that now allows patients to remove this activity

from their appointment with providers due to telehealth.

Remote Patient Monitoring During Recovery. **Telehealth** The importance of using a telehealth

resource, that allows a patient to send a daily photograph and verbiage on the perception of their

recovery are vital components in communicating understanding and compliance. HIPAA secure

apps and patient portals can provide the tool for this exchange; a consideration for using such

applications is the financial impact that can exceed $100M for some large healthcare systems

(Monica, 2017). The delay that currently exist provide a 2-week void of information to the

provider, unless pain is intolerable and can leave open extreme responses that could have been

avoided if regular and specific communication had been introduced. By providing patients with a

telehealth resource that provides record of healing and assurance into the recovery plan,

strengthen the road to recovery. The reduction in readmission rates is impacted if providers are

able to make corrections to flagged media provided by patients and the early onset of concerns

can be rerouted from an emergency department to a potential prescription or over-the-counter resource.

Post-Operative Appointment. **In-Person or Telehealth.** As a patient interacts with the provider for the first time since the surgery, instructions for success are communicated in partnership on expectations for the surgical site. Depending on post-surgical assessment and potential complications, the provider can determine if the post-operative appointment should be conducted in-person or via telehealth. Surgical sites can be viewed utilizing the direct to consumer camera.

6-Week Follow Up Appointment. **In-Person or Telehealth.** Again, based on the situation and patient needs, the 6-week follow-up appointment can be conducted in-person or via telehealth. The success of this surgical procedure is heavily relied on the memorization of the pre-operative instructions, reminders provided during the post-operative appointment and the adherence to all instructions by the patient. With the inclusion of a telehealth resource a patient is able to report concerns to the provider and view virtual instructions provided by their care team on what to be aware of during this time of recovery. The benefit of a telehealth resource improves patient compliance to the care of the surgical site and reduces delays in perceived concerns by the patient. It is vital to reduce delays that some patients may not think emergency room worthy and are able to notify a provider via a telehealth resource. The reduction in personnel necessary are clerical staff that spend time relaying messages to the provider and are reallocated to other office duties that remove involvement in the communication stream for provider follow up.

Table 3:Efficiencies and Barriers to Future Telehealth State

Step	Efficiencies/Strengths	Barrier

Patient Referral	Pre-loaded list of providers and availability for easy access by patient/scheduler	Cost of Patient Portal and EHR technology; Interoperability; Data breach
Ortho Appointment	Cost savings in travel time for patients;	Connectivity/Internet issues for rural patients.
Anesthesia Appointment	Reduced information gap for health questionnaire	Lack of history for new patients, would require contact via telephone
COVID-19 Test	Transmission of results occur faster	In-person visit required; results dictate scheduled surgery
Pre-Operative Assessment	Ability to use gathered information and complete medical history	Connectivity/Internet issues for rural patients; Data breach
Ortho Surgery	Verified medical history, confirmed by multiple practitioners prior to procedure	Costs of e-consult/document sharing technology
Post-Operative Appointment	Enhanced data sharing and monitoring of complications	Connectivity/Internet issues for rural patients.
6-Week Follow-up	Enhanced data sharing and monitoring of complications	Connectivity/Internet issues for rural patients.

Value Stream Map (VSM): Breakdown Current v. Future

Through examining the waste in the current process and identifying opportunities to utilize

technology to enhance the ASC procedure process, multiple opportunities for improved

efficiency and patient centered care. If financial barriers of purchasing the technology and

training staff on the new workflows can be overcome, research shows patients and providers are

supportive of the convivence of telehealth, in such a study found 95% satisfaction of patients

preferred using telehealth (Asiri et al., 2018) For Direct-to-Consumer telehealth most Americans

(97%) have access to a smart phone that would allow for audio and visual communication with

the provider (Pew Research Center, 2021). Contrary to popular belief, elderly patients have

access to and will adopt technology for telehealth services. One unfortunate barrier is many rural

areas may lack access to stable internet for a telehealth video visit. This concern is heightened as

rural patients are the population who would most benefit from reduced travel times and increased

access that a telehealth workflow would provide through reducing the number of times the patient would have to travel to the ASC. One work-around is to establish relationships with the rural referring primary care providers, as offices typically have internet access. In office consultation, while taking more collaboration effort, would enhance care coordination.

The modern influence of applications and shared information supports a reduction in personnel to not only secure data breaches and faults caused by human error. In the times, of scan and upload to a mobile mailbox reduced incidents that have plagued many burnt-out workforces. As devices become ever merged into our everyday lifestyles, substituting the clerical questionnaires, phone screens, insurance verifiers and document scanners are practical reductions that are a necessary evil in times of instant access and infinite algorithms to combat unnerved workflows.
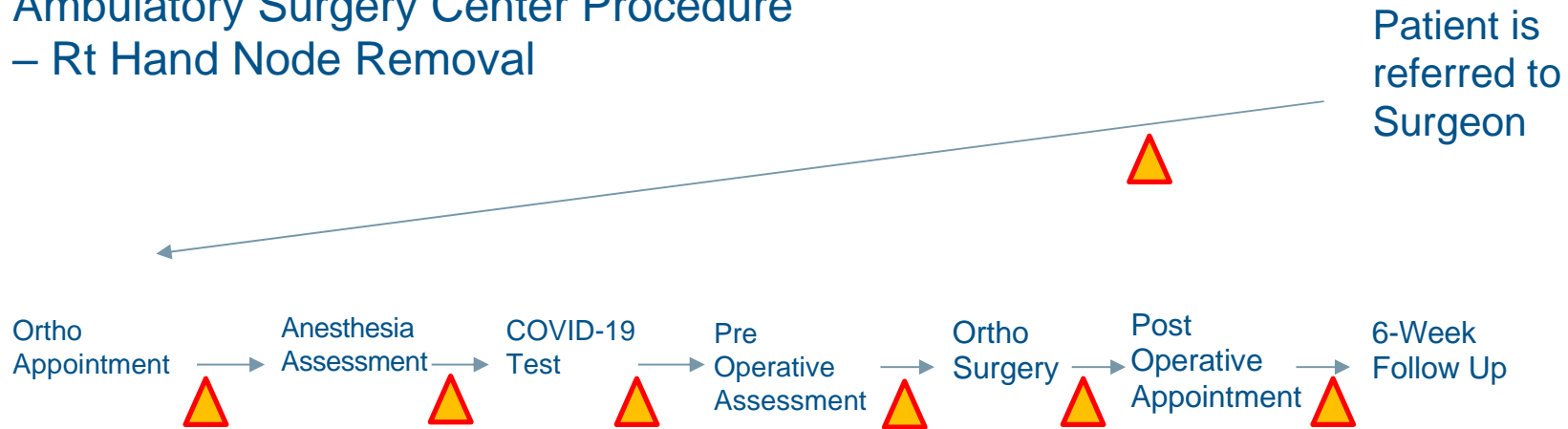
Table 4 demonstrates the substitution of in-person or telephonic activities with a telehealth resource, capable of performing the task. It is noted in the breakdown of future v. current state table that the surgery itself is not an activity that is substituted with telehealth as robotic procedures are likely, yet the information discussed does not list this activity, while applicable for the subject. The table breakdown of a future state versus current state highlights the potential for an increased financial impact that would provide support for further implementation of telehealth resources. The results listed have a potential 10% impact on the metrics that track performance and success of an ambulatory system. To further demonstrate this impact a performance improvement table, an action plan that would merit steps to ensure success in performing the task. The columns listed in the table are *Metrics*, which provide a trackable activity that aids in showing success; *Goal*, which sets the minimum success threshold for the metrics once the steps listed in the action plan are complete; *Results*, which define the perceived

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outcome of implementation; *Action Plan*, which highlights activities that will aid in the achievement of the respective goal; and *Financial Impact*, which defines the potential ramifications of successful implementation and completion of the listed action plan. A listed metric in the table for example is Block Time Utilization, an important metric within an Ambulatory Surgery Center. The goal is 10% increase in utilization and results are increased operating room utilization. The Action Plan details steps to reduced non-operating time in the operating room to increase cases being performed and producing revenue from case completion. The financial impact of improved block utilization is increased cases being performed at the ASC, which directly impact the revenue of the surgery center.

Value Stream Map: Current State

Ambulatory Surgery Center Procedure – Rt Hand Node Removal

Patient is referred to Surgeon

Ortho Appointment → Anesthesia Assessment → COVID-19 Test → Pre Operative Assessment → Ortho Surgery → Post Operative Appointment → 6-Week Follow Up
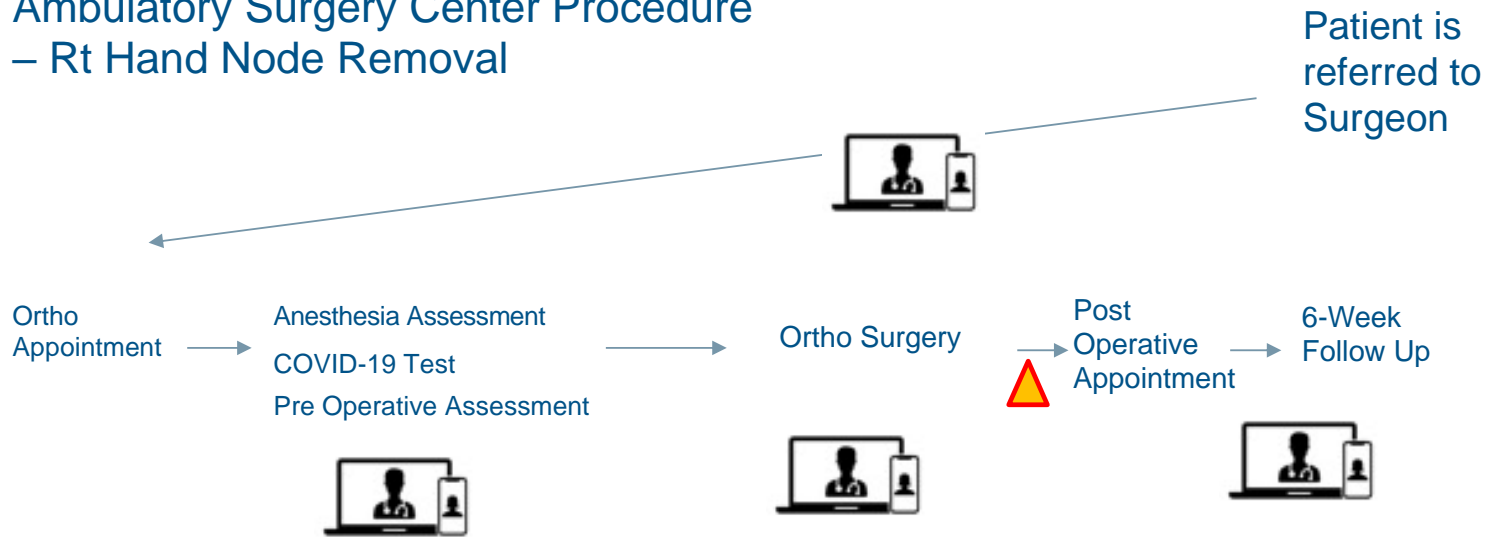
Viewed from what the customer experiences and usage of VSM indicates waste.

△ = Delay

Figure 2: Future State with Telehealth Integration

Value Stream Map: Future State

Ambulatory Surgery Center Procedure – Rt Hand Node Removal

Patient is referred to Surgeon

Ortho Appointment

Anesthesia Assessment
COVID-19 Test
Pre Operative Assessment

Ortho Surgery

Post Operative Appointment

6-Week Follow Up

Viewed from what the customer experiences and usage of VSM indicates waste.

△ = Delay

= Telehealth

Table 4: Ambulatory Surgery Center Services Compared to Telehealth Substitution based on Unit of Service

Activity	Performed by:	Hourly Cost	Telehealth Available (Yes/No)	Units of Service:	Time per Unit	Total Units per FTE (8 hours):	Total Units per FTE+	Hourly Cost	Telehealth Additions Improve UOS by 50%	Time per UOS	Total per FTE	Total Units per FTE @ 260 days	Difference (+/-)
Referral to Surgeon	Receptionist	$15	Yes	0.90	54 mins	9	2,340.	$31,200	0.45	27 mins	18	4,680.	200%
Consultation with Provider	Provider	$192	Yes	0.50	30 mins	16	4,160.	$399,360	0.50	30 mins	16	4,160.	100%
Scheduling ASC Appointment	Receptionist	$15	Yes	0.90	54 mins	9	2,340.	$31,200	0.45	27 mins	18	4,680.	200%
Booking of Surgical Space at ASC	Surgical Scheduler	$24	Yes	0.80	48 mins	10	2,600.	$49,920	0.40	24 mins	20	5,200.	200%
Conducting Pre-Screen Questionnaire	Surgical Scheduler	$24	Yes	0.75	45 mins	11	2,860.	$49,920	0.38	22.5 mins	21	5,460.	191%
Review Insurance Information	Billing Agent	$15	Yes	0.50	30 mins	16	4,160.	$31,200	0.25	15 mins	32	8,320.	200%
Contacting Insurance Agency	Billing Agent	$15	Yes	0.90	54 mins	9	2,340.	$31,200	0.45	27 mins	18	4,680.	200%
Reminder Call to Patient of Appointment	Surgical Scheduler	$24	Yes	0.50	30 mins	16	4,160.	$49,920	0.25	15 mins	32	8,320.	200%
Review of Pre/Post-Operative Care	Surgical Scheduler	$24	Yes	0.75	45 mins	11	2,860.	$49,920	0.38	22.5 mins	21	5,460.	191%
Scheduling of Follow-Up Appointment	Surgical Scheduler	$24	Yes	0.50	30 mins	16	4,160.	$49,920	0.25	15 mins	32	8,320.	200%
Follow Up Appointment	Provider	$192	Yes	0.50	30 mins	16	4,160.	$399,360	0.50	30 mins	16	4,160.	100%
Totals:							36,140	$1,173,120				63,440	176%

*Provider reductions are not yet feasible with current work flow expectations.

+(annual/2080 hours)*260 days

CHAPTER V DISCUSSION

5.1 Discussion of Results

In conducting research on utilization of telehealth resources in Ambulatory Surgery Centers, the findings are generally in its infancy as leverage due to pandemic pressures and increase patient demand favor increased utilization, the response of ASC's to adopt resources that reduce strain and improve efficiencies is still open for mass adoptions. A few main areas of surgical care that are being used as a valuable tool is customer and employee satisfaction, this information is limited in research and is normally a driver for quick conversion or mass adoption by a health system. The individuals actually performing the work are the drivers of organizational success. The success goals of an Ambulatory Surgical Center are that of decreased readmission, accomplishment of surgical request and optimized surgical space; to include appropriate usage of instruments and labor hours of personnel. As volume grows and an increased demand for quality outcomes are levied against surgeons and medical systems, early adoption of enhanced medical devices are a necessity. We have entered into a decade of technological advancements but in most cases require enough evidence to make a nonsense conversion to a device that removes human error. Are investment into technology is only limited by the financial implications and the laws that provide relief to thereof. Research suggest that personnel and patients are supporters of new age practices as long as there is physician buy-in which is often limited but what is supported in the larger medical communities. Physician support is levied by what is reimbursable, not what is billable; a common fallacy in adaption of medical discovery and usage. The drivers for medical procedure have always been a number, not

a nuisance game and the more informed professionals are on the benefits of devices and technology will benefit the patient.

5.2   Limitations

There are several limitations to the research. Due to COVID-19, access was denied observing patient workflows and processes in an ASC and we were unable to access current patient data. Therefore, the study relies on review of the literature and feedback from experts. However, as this is an emerging field, these methods are appropriate to understand the processes where technology can be introduced to improve care in ASC settings.

5.3   Future Research

As telehealth progresses, the infusion of ICD codes and exploratory reimbursement procedures is necessary. As technology advances beyond the speed that our government can vote on sufficient protocols we are limited by the nuisances of discovery and ideal situations when prompted provided ideal points of usage that support new devices and practices.

As an organization reviews opportunity for substitution of resources for telehealth resources, a provision into availability and tech support is necessary for a worthy succession of resources. The products often require time for adaptation and troubleshooting to perceive corrections of conversions.

To understand the benefit of telehealth as a cost saving method for Ambulatory Surgery Centers, Table A has been inserted to display the necessary review needed for a leadership team to understand the financial implications of substituting services with telehealth. In the table a typical visit that produces a surgery at an Ambulatory Surgery Center was listed in order from initial referral to post-operative follow up; the complete visit to a surgery center is prompted by a referral and discharged once post-operative appointments have been scheduled. A corresponding

title pay and units of service assist in illustrating the financial implications that arise from manual processes related to patient care.

5.4 Conclusions

Telehealth is a natural course of our medical practices, it has shown to provide integration components which favor ease of access, instant communication and simple process navigation. The abilities of telehealth integration mimic those of dated telephone connections, in that we no longer are dependent of an operator to relay a message to a physician or wait in a queue to check our next appointment. Technology has solved a plethora of telehealth and health care concerns with its integration. As health care leaders, we have a duty to provide the best treatment for the right procedures at the right pace for the best outcome; telehealth provides such relief.

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