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Digital Preoperative Education for Patients Undergoing Head and Neck Surgery and Effect on Outcomes

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Digital Preoperative Education for Patients Undergoing Head and Neck Surgery and Effect on Outcomes

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Abstract

The purpose of this quality improvement project was to see if there were improved outcomes for patients undergoing head and neck surgery requiring free flap reconstruction and a tracheotomy who completed digital preoperative education versus those that did not complete the education. The design was a retrospective, cohort study and was conducted in Philadelphia, Pennsylvania at a large academic institution with a total sample was 122 patients. All patients in the Department of Otorhinolaryngology scheduled for surgery requiring free flap reconstruction and a tracheotomy were offered the digital preoperative education with participation being voluntary. Data was collected from the electronic medical record on all patients who had the specific surgery. Outcomes studied included length of hospital stay, 30-day readmissions, 30-day emergency room visits, and discharge destination. The outcomes of the two study groups were then compared. There were no statistically significant results. Patients that completed the preoperative education had an average length of stay of 7.6 days compared to the control group of 7.8 days. Patients that completed the preoperative education had less 30-day readmissions (19.7%) compared with the control group (21.6%). Patients that completed the preoperative education went home more than the patients in the control group (74.6% compared to 74.5%). The emergency room visit rate for patients that completed the preoperative education was 22.5% compared to the control group rate of 19.6%. The results had a positive trend and were clinically significant and support that digital preoperative education improves outcomes.

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Chapter 1: Introduction and Background

Promoting patient engagement in navigating their healthcare journey and patient experience has several advantages. It can help patients feel in control, increase quality and patient safety, and increase patient satisfaction (Ellen et al., 2018). This can be achieved through preoperative education. Evidence shows that preoperative patient education has numerous benefits, including improving patient outcomes, increasing patient satisfaction, and decreasing patient anxiety. In addition, preoperative educational interventions are becoming important components in Enhanced Recovery After Surgery (ERAS) protocols. These protocols are evidence-based perioperative guidelines with the aim of reducing post-operative complications, improving the efficiency of care, and improving resource use and cost of care (Dort et al., 2017).

Significance

In the United States, cancer is the second leading cause of death. It is estimated that there were 66, 470 new cases of head and neck cancer in 2022 and 15, 050 deaths. The primary cancer sites included in this estimation were the oral cavity, pharynx, and larynx (Siegal et al., 2022). Treatment for head and neck cancer is often multi-modal, including a combination of surgery, radiation therapy, and chemotherapy. A type of surgery performed as part of reconstruction for large defects is microvascular surgery (free flap surgery). UCSF Health (2022) provides this description of free flap surgery:

> Microvascular head and neck reconstruction is a technique for rebuilding the face and neck using blood vessels, bone and tissue, including muscle and skin from other parts of the body. The technique is one of the most advanced surgical options available for

> rehabilitating surgical defects that are caused by the removal of head and neck tumors. (para. 1)

This type of surgery is very involved and requires a hospital stay of five to seven days (UCSF Health, 2022). Given the complexity of free flap surgeries, patients need thorough preoperative education to understand what the surgical and post-operative periods entail. In the healthcare institution, the current standard of care for preoperative education for free flap surgeries is verbal education which varies between surgeons. In addition, there is usually not enough time before surgery to schedule more than one office visit to ensure adequate understanding of the surgical and perioperative periods. The timing of diagnosis of head and neck cancers has a profound effect on prognosis and quality of life. Graboyes et al. (2019) systematic review found that most of the studies examined had an association between delayed diagnosis to treatment initiation with decreased survival. Data suggests that more than two-thirds of patients present with locally advanced disease (Graboyes et al., 2019). Therefore, when Quil Health partnered with the Department of Otorhinolaryngology to implement digital preoperative education, the head and neck division prioritized the patients undergoing free flap surgery as those who would benefit first and foremost from digital preoperative education.

Clinical Question

The clinical question for this project is: In adult head and neck cancer patients undergoing surgery (patient population), how does participating in digital education preoperatively (intervention) compare to not participating in digital education (comparison) affect their outcomes related to surgery (outcome)?

Change Model

The conceptual model used for this project is Kurt Lewin's Force Field Model of Change. This change model is simplistic and only has three stages. The first stage is "unfreezing" which involves disrupting equilibrium to get rid of old behaviors. The second stage is "movement." This is where the plan for the proposed change is developed, and a timeline is put in place. There may be resistance at various levels during this stage which needs to be addressed. The change is implemented in the third and final stage called "refreezing" (Schriner et al., 2010).

For this project, the unfreezing phase includes the setting, population, and resources/personnel/technology. The movement phase is where institutional review board (IRB) approvals are obtained. The change is implemented in the second phase where the head and neck cancer patients are offered preoperative digital education followed by data collection. In the final stage of refreezing, data is analyzed to determine if there is any improvement in patient outcomes for those patients who did engage in preoperative digital education.

Goals of Project

The overarching goal of this project is that participating in digital preoperative education improves outcomes in patients undergoing free flap surgery. The specific goals are:

1. There will be a decrease in 30-day readmission rates in the cohort of patients that completed the digital preoperative education.
2. There will be a decrease in 30-day emergency room visits in the cohort of patients that completed the digital preoperative education.

3. There will be a decrease in the length of stay after surgery in the cohort of patients that completed the digital preoperative education.
4. There will be an increase in the number of patients discharged home compared to a skilled nursing facility (SNF), inpatient rehabilitation center, or a long-term acute care hospital (LTACH) in the cohort of patients that completed the digital preoperative education.

Lastly, there is a dynamic between discharge from the hospital after surgery and complications. A secondary goal is to see if the discharge destination impacts this dynamic.

Summary of Chapter

Preoperative education is an integral part of perioperative care for surgical patients and is now included in many ERAS protocols. Given the variability of preoperative education for free flap surgery patients and the complexity of these surgeries, a digital preoperative intervention was developed at the healthcare institution in conjunction with Quil Health. Kurt Lewin's Force Field Model of Change was used to guide the project with the primary goal of improving patient outcomes after surgery.

Chapter 2: Literature Review

Patients with head and neck cancer suffer from increased depression, anxiety, and fatigue, as well as a decreased quality of life compared to the general population (Hammermuller et al., 2021). One of the mainstays of treatment for head and neck cancer is surgery. Patients undergoing any type of surgery often have some level of anxiety, affecting as many as 77% of patients (Wilson et al., 2016). Therefore, head and neck cancer patients undergoing surgery are at an increased risk for preoperative anxiety. Data supports that educational interventions can reduce preoperative anxiety (Wilson et al., 2016). Data also supports that preoperative educational interventions can improve patient outcomes for various types of surgery. It is important to determine what type of preoperative education is best for the head and neck cancer population and to see if preoperative education can improve patient outcomes.

Chapter Two reviews the literature on the effects of preoperative education on the outcomes of patients undergoing surgery for head and neck cancer. This review is divided into the following sections: a) Anxiety Related to Surgery, b) Psychological Distress Measurement Tools, c) Preoperative Patient Education, d) Digital Education, e) Quil, f) Preoperative Patient Education and Anxiety, g) Preoperative Patient Education and Post-operative Outcomes, h) Length of Stay, and i) Preoperative Patient Education and Patient Satisfaction.

Terms, Concepts, & Definitions

For this study, preoperative education is any type of educational intervention that a patient receives before surgery. Digital education refers to any educational platform that uses technology or requires the patient to use technology in some way. Preoperative anxiety is

any type of anxiety or emotional distress directly related to surgery in the perioperative period. Post-operative outcomes are any measurable outcomes after surgery, such as readmission rates, length of stay, or issues with wound healing. Head and neck cancer is defined as "cancers that start in several places in the head and throat, not including brain cancers or cancers of the eye" (Centers for Disease Control and Prevention [CDC], 2020, section one). These cancers can start in the sinuses, inside and behind the nose, in the mouth, in the back part of the mouth and throat called the pharynx, in the voice box called the larynx, or in the glands that make saliva for the mouth (CDC, 2020).

Search Strategy

The initial literature search for this DNP project took place in February 2022. The databases searched were CINAHL Complete, MEDLINE Complete, and PubMed for studies addressing patients undergoing surgery for the treatment of head and neck cancer, as well as their psychological distress related to surgery, and any preoperative educational interventions. Studies were included that were published between 2015 and 2022. The following search terms were used: head and neck cancer patients, surgery, head and neck cancer, preoperative education, education, anxiety reduction, anxiety, fear of surgery, preoperative anxiety, and adverse outcomes. A total of 705 studies were found. Inclusion criteria included: studies published or accessible in the English language and studies addressing psychological distress. Once inclusion criteria were applied, 19 studies remained. The bibliographies of the remaining studies were reviewed, and four additional articles were selected. Studies were excluded if children were the sample population or if they addressed non-surgical treatment, such as radiation therapy. A total of 15 studies were included in the review; 1 was a systematic review, 4 were randomized controlled trials, 1 was a controlled

trial without randomization, 8 were case-control or cohort studies, and 1 was a systematic review of a qualitative study. Not all studies had sample populations of head and neck cancer patients as there are a limited number of articles on this in the literature. Information was also collected from the Quil website, as this digital platform will be used in this DNP project. To date, there are no articles or studies published on Quil.

A second literature review search for this DNP project took place from July through September 2022. CINAHL Complete was searched for studies addressing preoperative education and patient outcomes. Studies were included that were published between 2017 and 2022. The following search terms were used: preoperative education, outcomes, benefits, effects, and patient outcomes. A total of 422 studies were found. Inclusion criteria included: studies published or accessible in the English language and studies addressing outcomes related to preoperative education. Once inclusion criteria were applied, nine studies remained. Studies were excluded if children were the sample population. Eight studies remained after exclusion criteria were applied. A total of 8 studies were included in the review; 2 were systematic reviews and meta-analyses, 5 were case-control or cohort studies, and 1 was a qualitative or descriptive study. Only one study was specifically regarding patients with cancer. The other studies included were not limited to a specific type of surgery or patient population.

Literature Review

Anxiety Related to Surgery

In the studies reviewed, 16.7% to 77% of patients were found to have preoperative anxiety (Majumdar et al., 2019; Wilson et al., 2016). In the Guo (2015) study, 29.8% had moderate anxiety or depression before surgery, which was associated with complications

after surgery, specifically surgical wound-related readmissions, longer hospital stays, urinary complications, and bleeding complications after surgery. Similarly, Majumdar et al. (2019) found that preoperative anxiety was significantly associated with complications. Mulugeta et al. (2018) found that the most common reason patients had preoperative anxiety was fear of complications. Other reasons were concern about family and fear of postoperative pain. Characteristics of patients who may be more at risk of experiencing preoperative anxiety are female patients and younger patients (Mulugeta et al., 2018; Wang et al., 2019).

Psychological Distress Measurement Tools

The studies reviewed used various measurement tools to assess anxiety and psychological distress. Some even used a combination of tools and surveys. Four studies used Spielberger's State Trait Anxiety Inventory (STAI) (Kesanen et al., 2017; Lin et al., 2016; Tulgar et al., 2017; Wilson et al., 2016). Of note, there are two versions of the STAI. One version is the state scale (STAI-S) which evaluates the current anxiety level of the patient, and the other is a trait scale (STAI-T) which evaluates the general mindset of the patient regarding anxiety (Lin et al., 2016). Two studies used the Amsterdam Preoperative Anxiety Information Scale (APAIS) (Kaur et al., 2016; Tulgar et al., 2017). Majumdar et al. (2019) identified preoperative anxiety by examining the electronic medical record of patients to see if they had an anxiety care plan initiated before their surgeries. Read et al. (2019) used the Beck Anxiety Inventory (BAI), while Wang et al. (2019) used the Hospital Anxiety and Depression Scale (HADS). Helms et al. (2020) used a simple visual analog scale (VAS-A) where 0 represented no preoperative anxiety, and a score of 10 represented extreme preoperative anxiety. An adapted version of the Kessler Psychological Distress

Scale (K10-A) was used by Jabbour et al. (2017). Kesanen et al. (2017) measured health-related quality of life (HRQoL) with the Rand 36-Item Health Survey 1.0 (RAND-36). Britteon et al. (2017) used data collected via questionnaires by the national Patient Reported Outcome Measures (PROMs) program in England. In Guo (2015) systemic review, three studies used HADS, one used STAI, and one used BAI to measure anxiety. Bozec et al. (2016) used the European Organization for Research and Treatment of Cancer (EORTC) information module questionnaire (QLQ-INFO25) and the EORTC Core Quality of Life Questionnaire (QLQ-C30). Lastly, the Generalized Anxiety Disorder Questionnaire GAD-2 was used to assess anxiety in head and neck cancer patients in Hammermuller et al. (2021) study.

Preoperative Patient Education

Preoperative patient education can improve patient outcomes, as well as patient satisfaction. There are a variety of educational methods. Written educational material is still likely the most common form of preoperative education (Wilson et al., 2016). Jabbour et al. (2017) found that 74% of the head and neck cancer patients in their study preferred to have as many details as possible related to their cancer and treatment expectations. Forty-five percent of the patients in the same study reported preferring the ability to access multiple modalities of information and education regarding their cancer treatment.

Digital Education

Of the nine studies that examined preoperative or pretreatment education, eight included some sort of digital education (Bozec et al., 2016; Guo, 2015; Helms, 2020; Jabbour et al., 2017; Kaur et al., 2016; Lin et al., 2016; Read et al., 2019; Tulgar et al., 2017). In Jabbour et al. (2017) study, the preferred method of education was a one-on-one

meeting with a health professional (30%), followed by internet-based written information (15%), while 72% preferred multiple modes of information delivery. State anxiety scores related to surgical anxiety were lower in the patients that sought information from the internet regarding surgery compared to other sources in Tulgar et al. (2017) study. Similarly, Wilson et al. (2016) found that audio-visual education effectively reduces anxiety in both the preoperative and postoperative time periods.

Quil. Quil is a digital health platform that offers personalized and interactive health journeys (Quil, 2022). Health systems and providers can build individualized educational journeys for patients/caregivers and integrate these journeys into electronic medical records. Quil can be integrated with Epic, MyChart, Cerner, Allscripts, and MEDITECH. The healthcare institution started using Quil in numerous departments. Initial data showed that there was a 14% decrease in length of stay, a 22% increase in discharge to home, a 26% decrease in readmission rates, and 100% of patients felt better prepared and less anxious (Quil, 2022).

Preoperative Patient Education and Anxiety

The results from many of the studies showed that preoperative patient education decreased patient anxiety. Read et al. (2019) found that the anxiety level related to surgery decreased in the intervention group who received preoperative education related to surgery and anesthesia, while the control group received no preoperative education and had no change in their anxiety levels. Similarly, ninety percent of the patients who received preoperative education reported a reduction in anxiety related to surgery in Pelkowski et al. (2021) study. Lin et al. (2016) showed that anxiety was significantly lower in the intervention group who watched a preoperative educational video on anesthesia compared to

the control group who had received the standard verbal education. Results from a few studies demonstrated that anxiety decreased in both the intervention and control groups. In the Helms (2020) study, the intervention group watched a video and had standard preoperative education versus the control group, who had just received the standard preoperative education. Both groups showed a decrease in preoperative anxiety after they received their education. However, the intervention group had a reduction in self-perceived anxiety on the visual analog scale in more items compared to the control group. This may be because the addition of digital education helped reduce anxiety. Similarly, Kaur et al. (2016) had similar results. The intervention group watched a video and had standard preoperative education, while the control group just had standard preoperative education. Both groups had a decrease in preoperative anxiety after receiving the preoperative education. In Tulgar et al. (2017) study, patients had a decrease in preoperative anxiety when they sought additional information besides what was given to them routinely by their surgeon and anesthesiologist, and Mulugeta et al. (2018) found that patients had lower state anxiety scores when they had information related to the surgical procedure and anesthesia. In Kesanen et al. (2017), anxiety levels decreased in the intervention group who received an educational telephone discourse before surgery. The control group received a standard preoperative telephone call, and the anxiety levels in this group did not decrease until after surgery. Guo's (2015) systematic review has contradictory findings compared to the previous studies discussed in this section. In two trials, anxiety decreased after preoperative education interventions while three trials did not demonstrate a difference in anxiety scores between the intervention and control groups.

Preoperative Patient Education and Post-operative Outcomes

Majumdar et al. (2019) found that preoperative anxiety is associated with increased intraoperative and postoperative complications for patients undergoing outpatient cancer surgery. Similarly, Britteon et al.'s (2017) study supports that patients with anxiety and depression are more likely to experience a wound problem post-operatively. However, patients undergoing colorectal surgeries with the creation of a stoma had statistically significantly fewer stomal and peristomal complications if they attended a preoperative stoma education class compared to those who did not attend the class. These complications included less frequent leakage from the ostomy pouching system and peristomal skin irritation (Stokes et al., 2017).

Patients undergoing cancer-related surgery who received some type of preoperative educational intervention had a significant reduction in pain levels after surgery in Kim et al. (2021) systemic and meta-analysis study. However, a different study was unable to prove that preoperative patient education has any significant impact on postoperative health-related quality of life, disability, or pain (Kesanen et al., 2017). Next, it was found that information gain was higher in the intervention group in a study who received standard preoperative education with the addition of a video compared to the control group in the same study who received standard preoperative education (Kaur et al., 2016). Subsequently, for patients who underwent a total hip or knee arthroplasty and attended an optional preoperative educational class in Jones et al. (2022) study, the ambulation distance postoperatively was statistically significant with preoperative class participants having greater ambulation distances than patients who did not attend the class. In the same study, the patients who underwent knee surgery and did not attend the preoperative educational

class were more likely to be discharged to a skilled nursing facility (SNF) versus home than those patients who did attend the class; these results were also statistically significant (Jones et al., 2022). Meanwhile, a study found that there was a reduction in post-operative phone calls from patients that attended a preoperative education class for partial or total primary or revision knee or hip arthroplasty compared to the patients that did not attend the class (Pelkowski et al., 2021). Lastly, Fredericks et al. (2017) systemic review and meta-analysis compared the effectiveness of individualized patient educational interventions versus standardized patient education for patients undergoing cardiovascular surgery. They found that individualized patient education did reduce hospital readmission rates, reduced anxiety and depression, and enhanced performance of self-care behaviors and cognitive mental functioning (Fredericks et al., 2017).

Length of Stay

Patients undergoing total hip or knee replacement surgeries had a decreased length of hospital stay when they attended a preoperative education class compared to patients that did not attend the class (Sisak et al., 2019; Jones et al., 2022). This decreased length of stay equates to cost savings for the institution. Similarly, patients who attended a nurse navigator-led preoperative education course before posterolateral lumbar fusion surgery had a significantly shorter length of stay and decreased average hospital cost (Turcotte et al., 2021. However, after age, comorbidities, and the number of lumbar levels fused were controlled for, there was no statistically significant reduction in length of stay. There still was a statistically significant reduction in hospital costs (Turcotte et al., 2021).

Preoperative Patient Education and Patient Satisfaction

In Guo's (2015) systematic review, two trials looked at patient satisfaction, and both showed increased satisfaction levels when patients had some form of preoperative education. Likewise, in another systemic and meta-analysis study, patients undergoing cancer-related surgery who received some type of preoperative educational intervention had a statistically significant increase in patient satisfaction (Kim et al., 2021). Similarly, patient satisfaction was higher in the intervention groups that received a preoperative educational video compared to the control groups that just received standard education (Lin et al., 2016; Kaur et al., 2016).

Gaps in Literature

Numerous factors need to be studied further regarding preoperative education and its effects on patient outcomes, including psychological distress. A person's level of education can play a role in the severity of preoperative anxiety. Bozec et al. (2016) found that patients with a high education level had greater information demands and were less satisfied with the information they received compared to Tulgar et al. (2017) and Mulugeta et al. (2018) who found that anxiety levels decreased as the level of education increased. Mahoney et al. (2018) found that bariatric surgery patients with a high school education or less were significantly more likely to have a hospital visit than patients with a higher education level. Next, the timing of preoperative education should be examined. The studies in this review had a range of different time points when education was given to patients. Hammermuller et al. (2021) found that the closer patients were to their head and neck cancer diagnosis, the worse their scores were when surveyed about depression, anxiety, fatigue, and quality of life. This leads to the consideration that the level of preoperative

anxiety may be correlated to a patient's diagnosis. Patients with a cancer diagnosis may have a baseline higher anxiety level related to their prognosis than patients undergoing elective surgery, where anxiety is purely related to the actual surgical procedure. Lastly, a limited number of studies in the literature examined head and neck cancer patients undergoing surgery, preoperative anxiety levels, preoperative educational interventions, and patient outcomes. Further research is clearly needed to address these topics. Since there is such little evidence on outcomes related to preoperative digital education in head and neck cancer patients undergoing surgery, that will be the focus of this study leading to future studies on the education level of patients and timing of preoperative education.

Summary of Chapter

Head and neck cancer patients are at risk for psychological distress, especially preoperative anxiety. The literature shows that preoperative education reduces preoperative anxiety and improves patient satisfaction in various populations. Preoperative education can also improve post-operative patient outcomes, including a decreased length of stay and readmission rates. It is unclear what type of preoperative education is best, but there is some evidence to support digital education being superior to other methods. Therefore, the purpose of this project was to study how participating in preoperative digital education affects the outcomes of adult head and neck cancer patients undergoing surgery that requires free flap reconstruction and a tracheotomy.

Study Questions

1. Does digital preoperative education decrease 30-day readmission rates in the adult head and neck cancer population?

2. Does digital preoperative education decrease 30-day emergency room visits in the adult head and neck cancer population?
3. Does digital preoperative education decrease the length of stay after surgery in the adult head and neck cancer population?
4. Does digital preoperative education increase the number of patients discharged home compared to a skilled nursing facility (SNF), inpatient rehabilitation center, or a long-term acute care hospital (LTACH) in the adult head and neck cancer population?

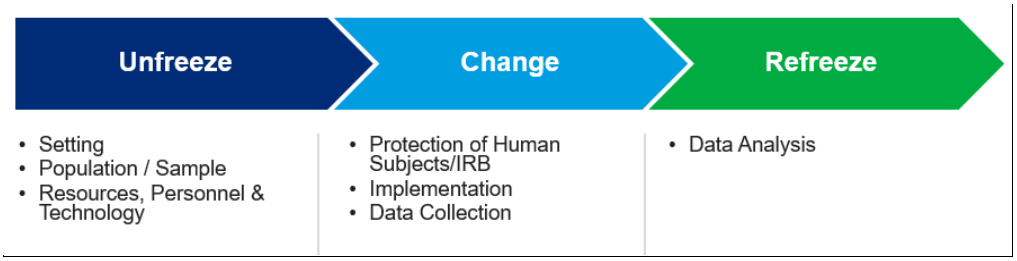
Chapter 3: Methods

Digital preoperative education was developed by head and neck surgeons and nurse practitioners in the Department of Otorhinolaryngology in partnership with Quil Health for patients undergoing particular surgeries. All patients scheduled for the specific surgery were electronically invited to engage in the digital education prior to surgery. Participation was optional. This quality improvement project was a retrospective cohort design and compared the outcomes of the patients that did engage in the preoperative education versus the patients that did not engage in the preoperative education.

Kurt Lewin's three-step change theory is simplistic but has very distinct stages that can be followed to elicit change successfully in healthcare settings. The first step is "unfreezing" where the current practice is stopped. The second step is "moving" where the new practice or change needs to be accepted. The third and final step is "refreezing" where the change is implemented and becomes the new norm. There are usually two different forces which include those promoting the change and those resisting the change (Hee et al., 2019). See Table 1 for how this project incorporated Lewin's change theory.

Table 1

Incorporation of Lewin's Model of Change into Project



Note: The first stage is "unfreeze" followed by "change" then "refreeze."

Unfreeze Phase

Setting

This study was conducted in Philadelphia, Pennsylvania at a large academic institution with an annual operating revenue of 9.9 billion dollars (Penn Medicine, 2022). It was conducted within the Department of Otorhinolaryngology where there are eight head and neck surgeons who perform surgeries that require free flap reconstruction and a tracheotomy. Surgeries were performed at one of two hospitals that are part of the health system. At these two hospitals, there were a total of 53,617 admissions and 107,393 ER visits in 2021 (Penn Medicine, 2022). On average, 220-260 free flap surgeries are performed at this institution annually.

Population/Sample

This study included all patients that had head and neck surgery requiring a free flap and a tracheotomy between April 2021 through September 2022. Most of the patients had head and neck cancer. Convenience sampling was used. Patients were excluded that expired during their hospital stay. There was no recruitment. It was estimated that 150 patients would be included in the study based on the average amount of surgeries performed each month by the eight head and neck surgeons.

In terms of statistical power, regarding the continuous dependent variables, the G*power software indicated that within a multiple linear regression model with 4 explanatory variables, a medium effect size (Cohen's f=.15) between the explanatory and dependent variable, with power set at .80 and alpha set at .05, would require a sample size of 85 study participants. Thus, the projected sample of 150 study participants would provide sufficient statistical power for the analysis.

In terms of statistical power regarding the dichotomous dependent variables, the Power and Precision software program indicated that a medium effect size effect (OR=3.34) would be detected between a dichotomous independent and dependent variable (with a projected event rate of .26 and .54 among the 2 groups) using a binary logistic regression model with power set at .80 and alpha set at .05, using a sample size of 100 study participants. Thus, the projected sample of 150 study participants would provide approximately sufficient statistical power for the analysis.

Resources, Personnel & Technology

This study was conducted within the Department of Otorhinolaryngology in the subdivision of head and neck surgery. In the subdivision of head and neck surgery, there are eight surgeons, four nurse practitioners, nurses, medical assistants, four surgery schedulers, three speech pathologists, and one nurse navigator. The educational journey was developed and implemented in conjunction with Quil Health who already had a partnership with the healthcare institution prior to the initiation of the project. Therefore, there was no budget, and no costs were incurred. The head and neck nurse practitioner who is this DNP student coordinated the study, collected the data, and performed the data analysis.

Movement (Change) Phase

Protection of Human Subjects/IRB

This study was approved by the Institutional Review Board (IRB) at both the healthcare institution (see Appendix A) and West Chester University (see Appendix B) as an exempt research study. No subjects were enrolled, and no vulnerable populations were included. All data was stored in a password protected database which only the principal investigator (PI) had access.

Quil de-identified data regarding the patients that were sent the preoperative education. The study data was stored and secured in the Quil Health instance of Snowflake Enterprise Cloud database. Quil and the healthcare institution signed a business relationship in September 2019 under a HIPAA Business Associates Agreement. In October 2020, Quil and the healthcare institution expanded their business relationship by signing an Enterprise Strategic Alliance Agreement in which Quil is responsible for regular risk assessments to ensure the security and privacy of the healthcare institution's patients. The latest security assessment in March 2022 found Quil to have no issues or non-conformities to the healthcare institution policies.

Outcome data was collected from the electronic medical record (EMR) of patients. The only way to access this data was by using medical record numbers (MRNs) which are considered protected health information. A waiver of the HIPAA authorization requirement was granted as part of IRB approval at the healthcare institution. Once the outcome data was obtained, patients were de-identified. Data was destroyed in accordance with the healthcare institution's policies.

Implementation

The implementation process and timeline for this project are listed below in the order that they occurred.

1. The healthcare institution partnered with Quil Health. The Department of Otorhinolaryngology developed two task forces which included one for rhinology patients and one for head and neck patients.
2. This project focused on the head and neck group. The task force was led by a head and neck attending surgeon and a head and neck nurse practitioner. Other providers

and staff in the division of head and neck surgery contributed to the development of the educational journey at times, including the nurse navigator.

3. For the development of the head and neck surgery patient preoperative education, a specific surgery was chosen to start with. There are many head and neck surgeries that are offered at the healthcare institution, so it was decided to choose a surgery that is comprehensive and requires a lot of education. The surgery chosen was one requiring some type of free flap reconstruction and a tracheotomy.
4. Starting in December 2020, frequent virtual meetings were held with the healthcare institution taskforce and the Quil taskforce to develop the preoperative educational journey. The education was a combination of written material, videos, surveys, and learning checkpoints. The content of the educational journey included information about the care team, components of the surgery, the hospital stay, discharge process, recovery, adjuvant treatment, lifestyle changes, and survivorship. See Appendix C for an example of the written educational content in the educational journey (Understanding a Tracheostomy).
5. The educational journey went live in May 2021. Once a patient was scheduled for surgery by the surgery scheduler, the educational journey was sent via email to the patient. For a patient to be selected for Quil, they had to have one flap code, one tracheotomy code, and be scheduled for surgery with one of the head and neck surgeons. The codes used to trigger the journey invitation were CPT procedural codes in the EMR (see Appendix D).
6. Data was collected on the patients that did and did not engage in the educational journey from May 2021 through September 2022. In the first week of October 2022,

Quil sent a password protected excel chart with all the patients that were invited to engage in the educational journey.

7. Data collection for outcome data was done in early November 2022 from the EMR to ensure that readmissions and emergency room (ER) visits were captured for any patients that engaged in the journey in September 2022.
8. The outcome data was cross-referenced with the list of all patients who were invited to engage in the preoperative educational journey. This data was then analyzed to see if there were any trends for patients that did versus did not engage in the preoperative educational journey in relation to outcomes.

Data Collection

Outcome data was collected from the EMR which interfaced with Quil. The specific outcome data that was collected included: 30-day readmissions, emergency room visits within 30 days of discharge, length of stay, and discharge destination. Expected mortality risk was also collected from the EMR to normalize the groups. The demographic data collected included: gender, age, race, ethnicity, state, and zip code. In addition, the data collected related to Quil utilization were registration status (yes or no) and date of surgery.

Refreeze Phase

Data Analysis

Data analysis was performed using the latest version of SPSS (SPSS 27.0). The data analysis was conducted in three phases. First, all study variables were presented using descriptive statistics, such as means, standard deviation, and minimum/maximum values for continuous variables (Interval/Ratio level) and frequencies and percentages for categorical variables (Nominal/Ratio level).

Second, a series of bivariate tests was used to produce inferential findings regarding which explanatory variables, including the independent variable *Study Group (*Participated in preoperative education - Yes/No*)*, and the covariate variables (e.g., age, gender, ethnicity, race, etc.) are related to each dependent variable at a statistically significant level ($p<.05$). For example, when the relationship between two categorical variables was examined, a chi-square analysis was used. Pearson's r zero-correlation was used to examine if continuous explanatory variables were significantly related to the continuous dependent variable. An independent-samples *t*-test was used to examine if dichotomous explanatory variables were significantly related to the continuous dependent variable. Finally, a One-Way ANOVA was used to examine if categorical explanatory variables, with three or more categories, were significantly related to the continuous dependent variable. All explanatory variables related to each dependent variable at a statistically significant level were included in the third phase of analysis, multivariate analysis for that respective dependent variable.

The third phase of data analysis was multivariate analysis. Here, a multiple linear regression model was used to model the continuous dependent variable (number of emergency room visits 30 days from discharge, length of stay as the number of days in hospital) as a function of the independent variable *Study Group* while controlling for the covariate variables significantly related to that dependent variable in bivariate analysis. Analysis was focused on the overall model statistical significance and R-squared value, as well as the beta values and significance of the individual explanatory variables within the model.

A binary logistic regression model was used to model each dichotomous dependent variable (30-day readmission - Yes/No, Discharge Destination – Home/Treatment Facility)

as a function of the independent variable *Study Group*, while controlling for the covariate variables significantly related to that dependent variable in bivariate analysis. The model was assessed in terms of overall statistical significance, chi-square value, the percentage of cases categorized correctly, the significance of individual predictors, and the odds ratio effect size values along with the 95% confidence interval for each odds ratio value.

Within the final inferential analysis presented, the parametric test assumptions of normality, linearity, homoskedasticity, multicollinearity, and no undue influence of outlier scores were examined. If missing data values were present, a plan was applied based on the amount of data missing as well as any potential patterns (MCAR, MAR, NMAR) within the missing data.

Summary of Chapter

The Department of Otorhinolaryngology at the healthcare institution in Philadelphia, PA developed and implemented digital preoperative education in conjunction with Quil Health for head and neck patients undergoing surgery that included free flap reconstruction and a tracheotomy. After IRB approval was obtained from both the healthcare institution and West Chester University, a retrospective cohort study was conducted to compare the outcomes of patients that engaged in the preoperative educational journey versus patients that did not engage. Outcome data was collected from the EMR. Lastly, data analysis was performed to see if there were any statistically significant trends between the two cohorts of patients.

Chapter 4: Results

This chapter covers the results of the data analysis. Included are updates to the original data analysis plan, descriptive analysis of the study variables, and an analysis of the dependent variables. There are numerous tables to present the results.

Statistical Analysis

All data analysis was performed using the latest version of SPSS (SPSS 28.0). The data analysis was planned to be conducted in three phases. First, all study variables were presented using descriptive statistics, such as, means, standard deviation, and minimum/maximum values for continuous variables (Interval/Ratio level) and frequencies and percentages for categorical variables (Nominal/Ratio level). Second, bivariate analysis was used to examine if the dependent variables, 1) Emergency room visit 30 days from discharge – Yes/No, 2) length of stay as the number of days in hospital, 3) 30-day readmission - Yes/No, and 4) Discharge Destination – Home/Treatment, varied at a statistically significant level ($p<.05$) by the independent variable *Study Group*. The original data analysis plan also incorporated examining if the covariate variables (e.g., age, gender, ethnicity, race, etc.) were significantly related to each dependent variable.

The original data analysis plan additionally proposed examining the dependent variables number of emergency room visits 30 days from discharge and length of stay as the number of days in the hospital as continuous variables. However, the variable number of emergency room visits 30 days from discharge fell into only two categories (Yes/No) and was examined as a categorical variable. Additionally, the variable length of stay as the number of days in the hospital evidenced a non-normal distribution that was more appropriately examined as a categorical variable. Thus, all four dependent variables were

examined as categorical variables. Subsequently, a series of chi-square analyses were used to examine the relationships between the *Study Group* and the dependent variables at the bivariate level. The mean and median of the length of stay were also calculated.

The original data analysis plan stated that the third phase of data analysis would incorporate multivariate analysis, where multivariate linear regression would model each dependent variable as a function of the independent variable *Study Group* while controlling for the covariate variables significantly related to that dependent variable in bivariate analysis. However, bivariate analysis revealed that each dependent variable was not significantly related to the independent variable *Study Group* at the bivariate level. Subsequently, multivariate analysis was not necessary.

In terms of statistical power, the Power and Precision software program indicated that a medium effect size effect (OR=3.34) would be detected between a dichotomous independent variable and categorical dependent variable (with a projected event rate of .26 and .54 among the 2 groups) with power set at .80 and alpha set at .05 using a sample size of 100 study participants. Thus, the current sample of 122 study participants provides approximately sufficient statistical power for the current analysis.

Results

Descriptive Analysis

Table 2 presents a descriptive analysis of the study variables. Data indicated the average study participant was 60.98 (*SD*=13.00, MIN/MAX=18.00-89.00) years old, male (*n*=80, 65.6%), of a White racial identity (*n*=103, 89.6%), a non-Hispanic ethnicity (*n*=114, 95.8%), and from the state of Pennsylvania (*n*=79, 64.8%). About half of the sample evidenced a Mortality Expected 2022 Risk Model AMC score of 0.00 (*n*=62, 50.8%). The

most frequent length of stay in the hospital was 5-6 days (*n*=35, 28.7%). Less than one-quarter of the sample evidenced a 30-day Readmission (*n*=25, 20.5%), as well as an emergency room visit 30 days from discharge (*n*=26, 21.3). About three-quarters of the sample had a discharge destination of home (*n*=91, 74.6%). The experimental group incorporated a little over half of the sample (*n*=71, 58.2%).

Table 2

Descriptive Analysis of Study Variables (*n*=122)		
Variable	**N**	**%**
Age	*M*=60.98, *SD*=13.00, *MIN/MAX*=18.00-89.00	
Gender		
Female	42	34.4
Male	80	65.6
Race		
White	103	89.6
African-American/Black	4	3.5
Hispanic Latino/White	1	0.9
Asian	7	6.1
Missing	*7*	
Ethnicity		
Hispanic Origin	5	4.2
Non Hispanic	114	95.8
Missing	*3*	
State		
Delaware	7	5.7
Indiana	1	0.8
North Carolina	1	0.8
New Jersey	30	24.6
New York	3	2.5
Pennsylvania	79	64.8
Virginia	1	0.8
Mortality Expected 2022 Risk Model AMC		
0.00	62	50.8
0.01	52	42.6
0.02	5	4.1
0.04	1	0.8
0.05	2	1.6
Length of Stay as the Number of Days in the Hospital		
5-6 days	35	28.7
7 days	31	25.4
8-9 days	33	27.0
10 days or more	23	18.9

30-day Readmission		
Yes	25	20.5
No	97	79.5
Emergency Room Visit 30 days from Discharge		
No	96	78.7
Yes	26	21.3
Discharge Destination		
Home	91	74.6
Treatment Facility	31	25.4
Study Group		
Experimental (Completed education)	71	58.2
Control	51	41.8

Length of Stay

Table 3 presents a chi-square analysis examining the dependent variable: *Length of Stay as the Number of Days in the Hospital* by Study Group. Data indicated that the *Length of Stay as the Number of Days in the Hospital* did not vary at a statistically significant level by study group, $X^2(3)=3.41$, $p=.33$. The average length of stay for the experimental group was 8.8 days and 8.7 days for the control group. When only looking at a length of stay of less than 15 days, the average length of stay for the experimental group was 7.6 days and 7.8 days for the control group.

Table 3

Chi-Square Analysis Examining the Dependent variable: Length of Stay as the Number of Days in the Hospital by Study Group (*n*=122)

	Length of Stay as the Number of Days in the Hospital					
	5-6 (*n*=35)	**7 (*n*=31)**	**8-9 (*n*=33)**	**≥10 (*n*=23)**		
Variable	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**X^2(df)**	**p**
Study Group					**3.41 (3)**	**.33**
Experimental	21 (29.60)	16 (22.50)	23 (32.4)	11 (15.50)		
Control	14 (27.50)	15 (29.4)	10 (19.6)	12 (23.50)		

Emergency Room Visits

Table 4 presents a chi-square analysis examining the dependent variable: *Emergency Room Visit 30 days from Discharge (Yes/No)* by Study Group. Data indicated that *Emergency*

Room Visit 30 days from Discharge (Yes/No) did not vary at a statistically significant level by study group, $X^2(1)=.15$, $p=.70$, where 22.50% ($n=16$) of the experimental group had an emergency room visits 30 days from discharge relative to 19.60% ($n=10$) of the control group.

Table 4

Chi-Square Analysis Examining the Dependent variable: Emergency Room Visit 30 days from Discharge (Yes/No) by Study Group (*n*=122)

	Emergency Room Visit 30 days from Discharge			
	Yes (*n*=26)	No (*n*=96)		
Variable	**n (%)**	**n (%)**	**X^2(df)**	**p**
Study Group			**.15 (1)**	**.70**
Experimental	16 (22.50)	55 (77.50)		
Control	10 (19.60)	41 (80.40)		

Readmissions

Table 5 presents a chi-square analysis examining the dependent variable: *30-day Readmission (Yes/No)* by Study Group. Data indicated that the *30-day Readmission (Yes/No)* did not vary at a statistically significant level by study group, $X^2(1)=.06$, $p=.80$, where 19.70% ($n=14$) of the experimental group had a 30-day readmission relative to 21.60% ($n=11$) of the control group.

Table 5

Chi-Square Analysis Examining the Dependent variable: 30-day Readmission (Yes/No) by Study Group (*n*=122)

	30-day Readmission			
	Yes (*n*=25)	No (*n*=97)		
Variable	**n (%)**	**n (%)**	**X^2(df)**	**p**
Study Group			**.06 (1)**	**.80**
Experimental	14 (19.70)	57 (80.30)		
Control	11 (21.60)	40 (78.40)		

Discharge Destination

Table 6 presents a chi-square analysis examining the dependent variable: *Discharge Destination (Home/Treatment Facility)* by Study Group. Data indicated that the *Discharge Destination (Home/Treatment Facility)* did not vary at a statistically significant level by study group, $X^2(1)=.00$, $p=.99$, where 74.60% ($n=53$) of the experimental group had a destination of home relative to 74.50% ($n=38$) of the control group.

Table 6

Chi-Square Analysis Examining the Dependent variable: Discharge Destination (Home/Treatment Facility) by Study Group (*n*=122)

	Discharge Destination			
	Home (*n*=91)	Treatment Facility (*n*=31)		
Variable	**n (%)**	**n (%)**	**X²(df)**	**p**
Study Group			**.00 (1)**	**.99**
Experimental	53 (74.60)	18 (25.40)		
Control	38 (74.50)	13 (25.50)		

Conclusion

Descriptive analysis of the study variables revealed that the average study participant was 60.98 years old, male, of a White racial identity, of a non-Hispanic ethnicity, and from the state of Pennsylvania. The most frequent length of stay in the hospital was 5-6 days, less than one-quarter of the sample evidenced a 30-day Readmission, as well as an emergency room visit 30 days from discharge. About three-quarters of the sample had a discharge destination of home. The experimental group incorporated a little over half of the sample. The four dependent variables were examined as categorical variables and were not significantly related to the independent variable *Study Group* when examined by bivariate analysis.

Chapter 5: Discussion

The purpose of this quality improvement project was to see if digital preoperative education improved patient outcomes for patients who had head and neck surgery that required free flap reconstruction and a tracheotomy. Promoting patient engagement through preoperative education can help patients feel in control, increase quality and patient safety, and increase patient satisfaction (Ellen et al., 2018). Digital preoperative education was developed by surgeons and nurse practitioners in the Department of Otorhinolaryngology in partnership with Quil Health for patients undergoing particular surgeries. This project focused on the patients that had surgeries requiring free flap reconstruction and a tracheotomy. The key findings from the results show that the patients that engaged in the preoperative education had fewer 30-day readmissions, were discharged home versus a treatment facility, and had a shorter length of stay in the hospital compared to the control group. These results support the literature that preoperative education can improve patient outcomes.

The study sample included a total of 122 participants with 71(58.2%) in the experimental group and 51(41.8%) in the control group. The study was comprised of 34.4% females and 65.6% men with an average age of 60.98. Most of the sample had a White racial identity (89.6%) and were of non-Hispanic ethnicity (95.8%). The Mortality Expected 2022 Risk Model AMC was used to normalize the two groups.

Patients that completed digital preoperative education had fewer 30-day readmissions (19.7%) compared to the patients that did not complete the education (21.6%). Next, patients that completed digital preoperative education were discharged home rather than a treatment facility (53 patients, 74.6%) more than patients that did not complete the education (38

patients, 74.5%). Lastly, the dependent variable length of stay had a non-normal distribution due to a few outliers. These outliers were likely due to very prolonged admissions that are not the norm. Therefore, when looking at the average length of stay for both study groups less than 15 days, the patients that completed the digital preoperative education had an average length of stay of 7.6 days while the patients that did not complete the digital preoperative education was 7.8 days. This is also a positive trend. These positive trends were not statistically significant; however, if there was a larger sample size they like would have been. Smaller effect sizes require larger study samples to show statistical significance.

The results did not show that digital preoperative education reduced ER visits. The ER visit rate for patients that completed digital preoperative education was 22.5%. The ER visit rate for patients that did not complete the education was 19.6%.

Limitations of the Project

There were a few limitations of this project. First, patients were included in the experimental group if they registered to receive the digital preoperative education. However, it was not taken into consideration how much of the educational journey they completed. Therefore, patients that had poor outcomes in the experimental group may not have completed the education. Future studies should take this into account and only include patients in the experimental group if they completed a certain percentage of the education.

Another limitation is how the ER visit data was captured. The reason for the visit was not included, so there may be some ER visits that had nothing to do with postoperative recovery. This likely skewed data as visits that were unrelated to surgery were mixed in the data. Future studies should sort through the data and only include ER visits that are directly related to surgery. Additionally, not all readmissions or ER visits may have been captured.

The EMR only interfaces with certain healthcare institutions. Therefore, if a patient visited an ER or was readmitted at a healthcare institution that does not interface with the EMR of the study institution, that data was not included in the study which may have altered results.

The patients in the study population usually have an advanced cancer or serious disease if they require a free flap for reconstruction and a tracheotomy. Therefore, negative outcomes may have occurred for reasons that are not related to how prepared or unprepared a patient was from preoperative education.

Lastly, Quil Health stopped partnering with the study institution in the Fall of 2022 for digital education journeys. Therefore, patients were not able to receive the digital education after September 2022. If this had not occurred, additional data would have been collected through January 2023 leading to a larger study sample and possibly statistically significant results. Prior to ending their partnership with the study institution, Quil provided the educational journeys in a PDF format which is currently being used in the department for preoperative education.

Implications for Nursing Practice, Education and Research

As evidenced by the literature and now this project, preoperative education does improve patient outcomes. These results are clinically significant as patients had clear benefits when they completed the education with fewer 30-day readmissions, shorter hospital length of stays, and being discharged home. Efforts should be made to ensure it is a standard of care that all patients have adequate preoperative education across all healthcare settings, and preoperative education should be included in ERAS protocols.

Future research should focus on additional surgeries other than ones that require free flap reconstruction and a tracheotomy. There may be an increased gain seen for surgeries that

generally have healthier populations than this current project study sample. Next, ways to assess how much education patients completed should be examined. Digital platforms may be able to capture this information. Lastly, it may be valuable to examine clinical significance by measuring patient satisfaction and psychological distress related to surgery to see how preoperative education affects these variables. The literature suggests preoperative education reduces psychological distress related to surgery and improves patient satisfaction; these can be measured by adding in associated validated surveys.

Conclusion

Evidence shows that digital preoperative education improves surgical patient outcomes. The results of this project also show digital preoperative education improves outcomes in patients undergoing head and neck surgery that require free flap reconstruction and a tracheotomy. Although the results were not statistically significant, there is a positive trend toward improved outcomes and clinical significance. If there was a larger study size, the results likely would be statistically significant given the effect size of this project. This quality improvement project supports the need for comprehensive preoperative education to enhance recovery outcomes and should be researched further.

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Appendix A

DATE: 16-Aug-2022
TO: Kelley Culley
CC: Culley, Kelley
Skinner, Ethan
Reger, Christine
Philadelphia, PA 19104
Phone: 215-573-2540
(Federalwide Assurance # 00004028)
RE:
IRB PROTOCOL#: 851864
PROTOCOL TITLE: Digital preoperative education for patients undergoing head and neck surgery and effect on outcomes
SPONSOR: NO SPONSOR NUMBER
REVIEW BOARD: IRB #7
IRB SUBMISSION: NOTICE OF EXEMPTION
Dear Dr. Culley,
The above referenced protocol was reviewed by the Institutional Review Board on 15-Aug-2022. It has been determined that the proposal meets eligibility criteria for IRB review exemption authorized by 45 CFR 46.104, category 4.
As part of the exemption determination, a waiver of the HIPAA authorization requirement was granted as authorized by 45 CFR 164.512 (i). An expedited review procedure was used for the HIPAA authorization waiver because the research involves no more than minimal risk to the privacy of the individuals who are the subject of the protected health information for which use or disclosure is being sought. The review of the research has determined the following:
An adequate plan has been presented to protect the identifiers from improper use and disclosure;
An adequate plan to destroy the identifiers at the earliest opportunity consistent with conduct of the research exists, unless there is a health or research justification for retaining the identifiers, or such retention is otherwise required by law; and,
An adequate written assurance has been provided that the protected health information will not be reused or disclosed to any other person or entity, except as required by law, for authorized oversight of the research project, or for other research for which the use or disclosure of protected

health information would be permitted under the law.
That the research cannot practicably be conducted without the waiver to access and use of the protected health information.
ONGOING REVIEW:
The IRB must be kept apprised of any and all changes in the research that may have an impact on the IRB review mechanism needed for a specific proposal. You are required to submit modifications to the IRB if any changes are proposed in the study that might alter the exemption determination, or any applicable HIPAA waiver determination. New procedures that may have an impact on the exemption determination, or HIPAA waiver determination cannot be initiated until Committee approval has been given.
Consistent with the federal regulations, IRB approval of this protocol will not expire and no continuing reviews will be required for this protocol. The IRB may occasionally contact you to confirm that the trial is still ongoing and that you are adhering the previously stated requirement to submit modifications.
COMMITTEE APPROVALS: You are responsible for assuring and maintaining other relevant committee approvals. This human subjects research protocol should not commence until all relevant committee approvals have been obtained.
If your study is funded by an external agency, please retain this letter as documentation of the IRB's determination regarding your proposal.
If you have any questions about the information in this letter, please contact the IRB administrative staff. A full listing of staff members and contact information can be found on our website: http://www.irb.upenn.edu

Appendix B

Oct 5, 2022

To: Kelley Culley

Department: School of Nursing

Re: Exempt - Initial - IRB-FY2023-60 Digital preoperative education for patients undergoing head and neck surgery and effect on outcomes

Dear Kelley Culley:

Thank you for your submitted application to the WCUPA Institutional Review Board. We have had the opportunity to review your application and have rendered the decision below for Digital preoperative education for patients undergoing head and neck surgery and effect on outcomes.

Decision: Exempt - Limited IRB

Selected Category: Category 8.(i). Secondary research for which broad consent is required: Research involving the use of identifiable private information or identifiable biospecimens for secondary research use, if the following criteria are met:

Broad consent for the storage, maintenance, and secondary research use of the identifiable private information or identifiable biospecimens was obtained in accordance with §46.116(a)(1) through (4), (a)(6), and (d).

If there are any questions, please don't hesitate to reach out to irb@wcupa.edu

Sincerely,

WCUPA Institutional Review Board

IORG#: IORG0004242

IRB#: IRB00005030

FWA#: FWA00014155

Appendix C

Understanding a Tracheostomy

A tracheostomy is a hole made through the front of your neck and into your windpipe (trachea). A tracheostomy tube ("trach tube") is inserted into the hole to keep it open for breathing when the usual route for breathing is blocked or reduced.

Your head and neck surgery requires this to help you breathe during parts of your recovery. For example, if your airway is blocked or narrowed—as it could be because of throat cancer—a tracheostomy will provide an alternative to breathing through your nose and mouth.

You'll leave the hospital with your trach tube, and you'll be instructed on how to care for it and monitor possible complications. You'll also receive instructions about when to call your doctor if problems arise.

The care team will help you adjust to the trach tube while you're in the hospital, and you'll be learning a few new skills to adapt your daily activities. While it is a scary thought that your speaking and eating will be changed—usually temporarily—these new tools will help maintain your quality of life.

You'll learn to:

Clean and care for your trach tube to prevent infection

Speak using devices and techniques (airflow is redirected to help you speak)

Eat using a temporary feeding tube

Cope with dry air that can irritate your throat or airway

Clear secretions from your throat or airway

When a tracheostomy is no longer needed, it will heal shut or is surgically closed. For some People, a tracheostomy is permanent.

Appendix D

Criteria for Patient Selection for Quil

- Patients selected for Quil must have at least 1 Flap Code + 1 Trach Code + have a scheduled surgery with 1 of the head and neck providers
- Flap Codes:

Procedure code	Procedure Name
15756	FREE MUSCLE/MYOCUTANEOUS FLAP W/ MICROVASCULAR ANASTOMOSIS
15757	FREE SKIN FLAP W/ MICROVASCULAR ANASTOMOSIS
15758	FREE FASCIAL FLAP W/ MICROVASCULAR ANASTOMOSIS
15842	GRAFT FACIAL NERVE PARALYSIS FREE MUSCLE FLAP MICROSURG
20955	BONE GRAFT MICROVASCULAR ANASTOMOSIS FIBULA
20962	BONE GRAFT W/ MICROVASCULAR ANASTOMOSIS OTHER THAN ILIAC CREST/METAR
20969	FREE OSTEOCUTANEOUS FLAP W/ MICROVASCULAR ANASTOMOSIS METATARSAL/GREAT TOE
43496	FREE JEJUNUM TRSF W/ MICROVASC ANASTOMOSIS

- Trach Codes

Procedure code	Procedure Name
31600	TRACHEOSTOMY PLANNED
31610	TRACHEOSTOMY FENESTRATION W/ SKIN FLAPS