

# THE IMPACT OF AN ANTICIPATED DISCHARGE DATE COMMUNICATED BY A PHYSICIAN ASSISTANT ON LENGTH OF HOSPITAL STAY AFTER MAJOR HEAD AND NECK SURGERY

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**Abstract:** Patients undergoing major head and neck (H&N) surgery require complex multidisciplinary care. Surgical ward rooms contain whiteboards primarily used by nurses. The display of an “anticipated discharge date” (ADD) may be a simple yet effective discharge tool.

Adults following H&N resection with reconstruction were block randomized into two groups: without an ADD (control) or with an ADD (intervention). For the intervention group, the physician assistant (PA) provided an ADD 48-hours prior to and documented it on the whiteboard. The PA also provided additional discharge education. On the day of discharge, all patients completed a survey examining readiness for discharge. Nurses and allied health also completed a survey examining protocol effectiveness. The primary outcome was the length of hospital stay (LOS).

Thirty-two patients were examined. There were no statistical differences in demographics, postoperative complications, and days to tracheostomy decannulation. Median LOS was 0.5 days shorter for the intervention group (11.50 vs. 12.00,  $p=0.84$ ). No patients were readmitted within 30-days and there were no mortalities. There were trends for the intervention group to better understand their hospital course and believe their discharge date was adequately communicated ( $p=0.18$  and  $p=0.16$ ). Sixty-seven percent of staff believed the ADD assisted their practice, while 83% believed the PA improved efficiency of the discharge process.

Surprisingly, providing patients an ADD did not significantly reduce LOS. Despite most patients having advanced cancer and considerable comorbidities, the 30-day readmission rate was zero. The PA improved patient education, while 66% of staff agreed on an ADD positively impacts patient care.

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## Introduction

Patients undergoing major head and neck (H&N) surgery require multidisciplinary care before and following surgery. Typically patients require frequent perioperative assessments from surgeons, consulting physician services, respiratory therapists, nurses, speech-language pathologists, dietitians, physiotherapists and occupational therapists. For safe discharged from the hospital, all providers should be satisfied with patient progress.

Although most hospital discharges may be considered 'simple,' up to 20% of hospital discharges are delayed for non-medical reasons<sup>1</sup> such as delayed transport and poor recognition of patients' social circumstances<sup>2</sup>. Team communication is critical for timely discharges. Communication breakdowns occasionally result in delayed discharges or prolonged hospital stays. Poor or inadequate discharge planning (D/C) may lead to clinically adverse events during the transition to home<sup>3</sup>. D/C planning is critical for both patient and health-systems outcomes. Less time in the hospital means fewer hospital-acquired infections, greater bed availability and improved patient experience<sup>4</sup>.

Within otolaryngology-head and neck surgery (OHNS), some strategies to reduce hospital length of stay have included earlier drain removal<sup>5</sup>, selective rather than automatic ICU admission<sup>6</sup>, postoperative dexamethasone<sup>7</sup>, modified postoperative ventilator and sedation protocols in ICU<sup>8</sup>, and transoral robotic versus open surgery<sup>9</sup>. One non-surgical strategy was the use of a physician "inpatient coordinator" to facilitate D/C planning<sup>10</sup>.

On the OHNS ward, all patient rooms contain whiteboards that are primarily used by nurses and families for communication and patient orientation. Presently these boards are not used for D/C planning. Display of a patient's "anticipated discharge date" (ADD) may be a simple yet effective D/C communication tool at minimal additional cost. Following total hip arthroplasty, an ADD decreased hospital length of stay by 1.2 days and significantly increased the number of discharges before noon and over the weekends<sup>11</sup>.

Recently the otolaryngology-head and neck surgery ward employed a physician assistant (PA) to assist in perioperative ward management. The role definition for the PA is evolving with skill acquisition and more time in the position. As an extension and representative of the surgical resident team, the PA assists in communicating the ADD and providing patient education at discharge. We hypothesized that an ADD would reduce the length of hospital stay and improve patients' perceived readiness to leave the hospital.

A posted ADD in addition to D/C education may improve patients' confidence, knowledge of self-medical care and knowledge of surgical follow up<sup>12</sup>. The team anticipated that a visible ADD provides the patient, family, and healthcare providers a target date for D/C planning and promotes early problem identification and resolution.

## Methods

The study included Adult patients admitted following Head and Neck resection with free flap reconstruction. Excluded patients included those undergoing emergent or urgent surgery (e.g. tracheostomy for airway compromise, drainage of deep neck space infection), and elective

cases with an anticipated hospital stay of only 1-2 days (thyroidectomy, parotidectomy, parathyroidectomy or neck dissection).

Upon the tracheostomy tube decannulation or change to laryngectomy tube, patients were block randomized into two groups of those without an ADD (control) or those with an ADD (intervention).

The PA became aware of all patients' medical/surgical and social barriers to D/C while in daily rounds with the resident team and weekly multidisciplinary rounds. The PA liaised with the surgical team, nursing and allied health providers in their role. The chief resident provided the PA with a targeted ADD for the intervention group.

Forty-eight hours before the anticipated discharge date, the PA documented the date on the whiteboard, communicating the plan to the patient. Updates to the posted ADD occurred as patient issues arose or clinical status changed.

Patients randomized into the ADD group received a discharge education session (DES) with the PA. The DES outlined home care needs, prescriptions, disposition after hospital D/C, and the follow-up plan. The DES was standardized to provide equal education to the patients but individualized to meet each patients' needs. The PA deferred patient questions involving cancer staging and prognosis. On the day of D/C, all patients received a short survey examining knowledge of their postoperative clinical course, the follow-up plan, as well as readiness for D/C.

On study completion, allied health staff and nurses on the ward were invited to complete a survey examining the effectiveness of the ADD and DES. Because the PA does not work during weekends, the junior resident physician rounding on the weekends took responsibility for posting the ADD for patients with anticipated discharges on Mondays or Tuesdays with the DES still performed by the PA.

The primary measured outcome of the study was length of hospital stay (LOS). Secondary outcomes included the 30-day readmission rate, patient readiness for D/C, and staff satisfaction with the protocol.

A Shapiro-Wilk test for normality was performed for each variable. A *t*-test or Mann-Whitney-U test was performed depending on normality compare continuous variables. This study applied a Fischer's exact test for categorical variables.

## Results

### *Patient demographics*

Thirty-two post-operative patients were recruited between January and June 2018, and divided into the control ( $n=16$ ) and intervention ( $n=16$ ) groups. The most common surgeries performed were oral cavity and/or oropharyngeal resections ( $n=28$ ) with radial forearm free flap (RFFF;  $n=20$ ) or fibular free flap (FFF;  $n=7$ ) reconstruction (double free flap reconstruction  $n=1$ ). Four patients underwent total laryngectomy +/- pharyngectomy with RFFF reconstruction. Table 1. provides further patient demographics.

There were no significant differences in any descriptive variable between groups, including tumour site, pathologic cancer staging, and Charleston Comorbidity Index scores. Six patients underwent resection for benign pathology, e.g. osteoradionecrosis or benign neoplasm (control  $n=3$  vs. ADD  $n=3$ ).

<b>Table 1. Demographics and baseline parameters</b>	<b>Control group (n=16)</b>	<b>ADD group (n=16)</b>	<b>p-value</b>
<b>Gender</b>			
Male	13	14	1.00
Female	3	2	
<b>Age (years)</b>			
	61.4 (48-89)	55.7 (36-76)	0.21
<b>Education level</b>			
Completed elementary or high school	11	7	0.26
Completed post-secondary	4	7	
Missing data	1	2	
<b>Living arrangement</b>			
Independent	15	15	1.00
Assisted living	1	1	
<b>Marital status</b>			
Single / divorced / widowed	9	7	0.71
Married	6	8	
Missing data	1	1	
<b>Tumour site</b>			
Oral cavity/oropharynx	10	12	0.70
Other	6	4	
<b>Cancer staging</b>			
Early (Stage I-II)	6	5	0.68
Late (Stage III-IV)	7	8	
Pathology not applicable	3	3	
<b>Charleston Comorbidity Index score</b>			
<3	3	5	0.23
≥3	13	11	

( ) = range in years

#### *Hospital Clinical Course*

There were no differences between groups in rates of postoperative complications that contributed to an extended hospital stay (control  $n=8$  vs. ADD  $n=6$ ). The most common complication experienced was neck incision dehiscence ( $n=4$ ). Five patients returned to the OR to manage wounds surgically (control  $n=2$  vs. ADD  $n=3$ ,  $p>0.05$ ). None of the free flaps failed

or required redo vessel anastomosis. Of the 28 patients who underwent tracheostomy at the time of resection (control  $n=14$ , ADD  $n=14$ ), it took 1.3 days longer to decannulate patients in the control group, but this difference was not statistically significant (control 8.00 d vs. ADD 6.71 d;  $p=0.23$ ). Three patients did not have their tracheostomy stoma site sutured given potential need of reinserting a tracheostomy tube or recurrent air collection in the neck (control  $n=2$  vs. ADD  $n=1$ ). No patients required a tracheostomy at D/C. Similarly, there were no differences between groups in need for gastrostomy tubes at D/C (control  $n=3$  vs. ADD  $n=2$ ,  $p>0.05$ ). Figure 1. depicts the frequency of the categorical variables throughout the hospital course.

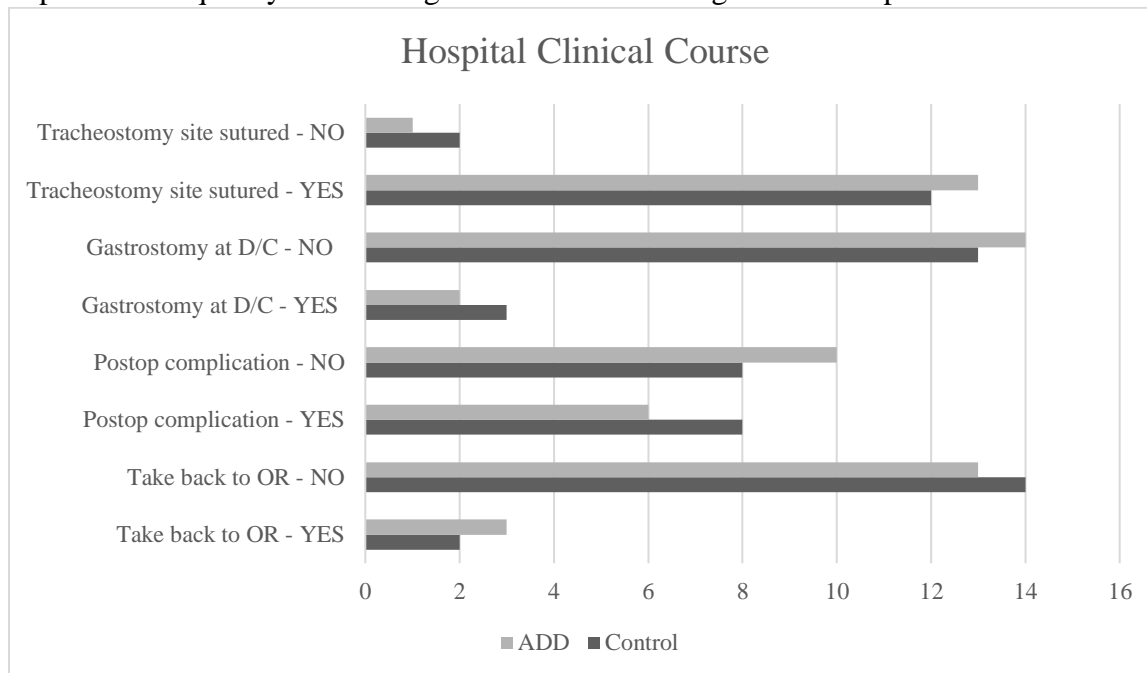


Figure 1. Frequencies of Categorical Variables, differences between groups using Fischer exact tests; Hospital Clinical Course. Tracheostomy site sutured after decannulation, gastrostomy required at hospital discharge due to dysphagia, the occurrence of postoperative complication, early return to the operating room required.

D/C = discharge; OR= operating room. All  $p$ -values  $> 0.05$ .

*Discharge Data*

Median LOS after surgery was not significantly different between groups (control = 12.00 d [9-40 d] vs. ADD 11.50 d [8-71 d];  $p=0.33$ ). Three patients in the ADD group required modification of their ADD for unforeseen clinical issues, including insufficient oral intake and wound care. An ADD did not allow for an earlier D/C time on the day of hospital D/C (control  $n=7$  vs. ADD  $n=5$ ;  $p=0.71$ ). There were also no differences between groups in the disposition after hospital D/C. Four patients transferred to another hospital for further recovery and rehabilitation (control  $n=2$  vs. ADD  $n=2$ ;  $p=1.00$ ) and the remaining 28 patients discharged home. Figure 2 depicts the LOS and hospital D/C time date.

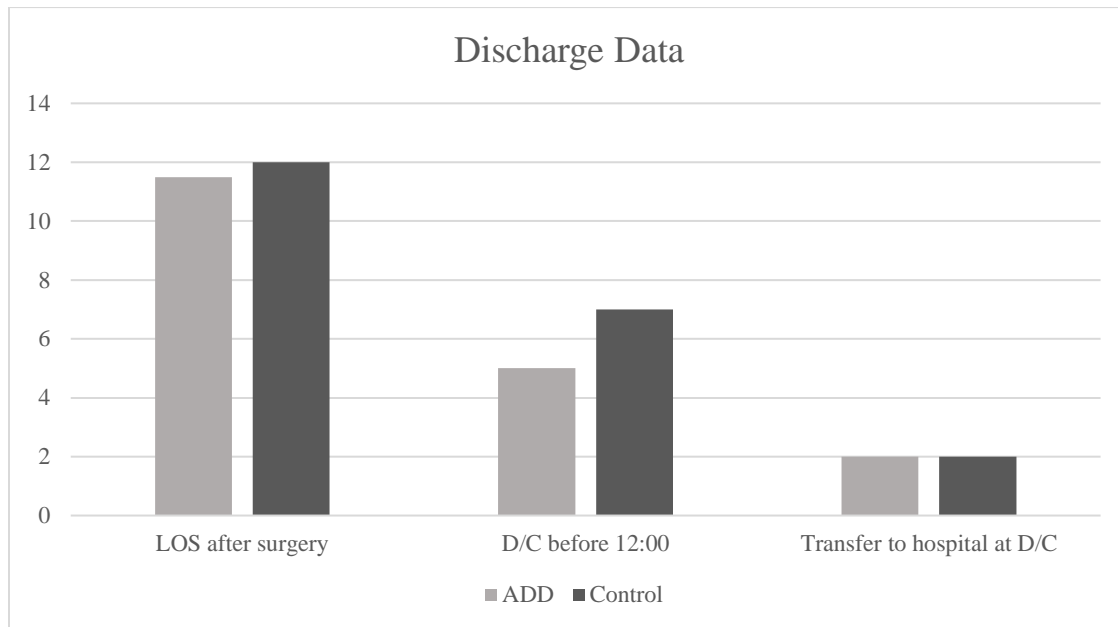


Figure 2. Discharge Data, differences between groups using Mann Whitney or Fischer exact tests. Hospital length of stay after surgery, the number of patients discharged before noon time, and a number of patients transferred to another hospital at discharge. LOS = length of stay. D/C = discharge. All  $p$ -values > 0.05.

#### Readmissions and Mortality

During the study, there were no readmissions within 30-days of hospital D/C. There were no patient mortalities.

#### Survey Results

The response rate to the patient survey was 87.5% ( $n=28$ ). There were missing survey data from 2 patients in each group. Although not statistically significant, there was a trend for more patients in the ADD group to Strongly Agree with two statements on the survey: A) “I understand the medical and surgical events that occurred during my hospital stay,” and B) “My discharge date was adequately communicated to me” ( $p=0.18$ ,  $p=0.16$  respectively). Figures 3 and 4 depict four responses from the patient survey.

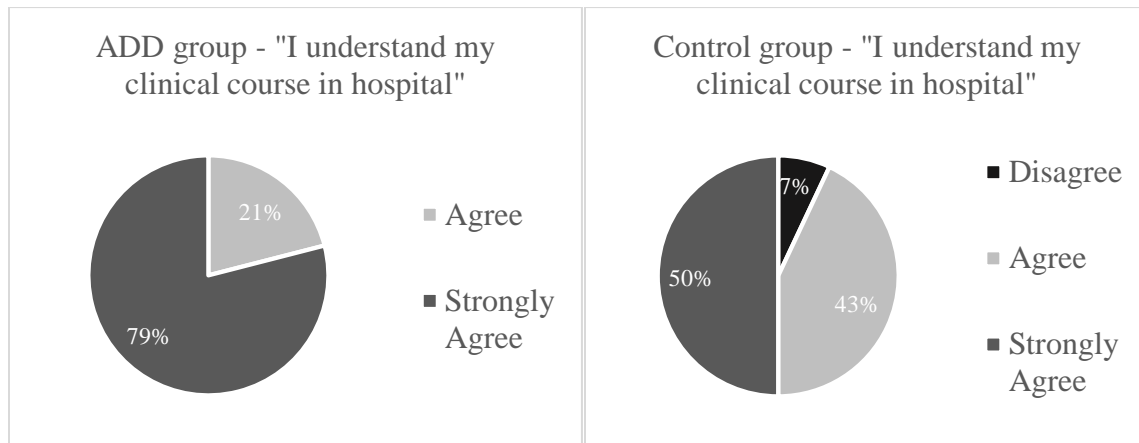


Figure 3. Percentage of patients comparing levels of (dis)agreement to subjective surveys at the time of hospital discharge using Fischer Exact tests. The trend for significance,  $p=0.18$ . ADD group  $n=14$ , control group  $n=14$ . Colour corresponds to the subjective level of agreement to the question, "I understand the medical and surgical events that occurred during my hospital stay."

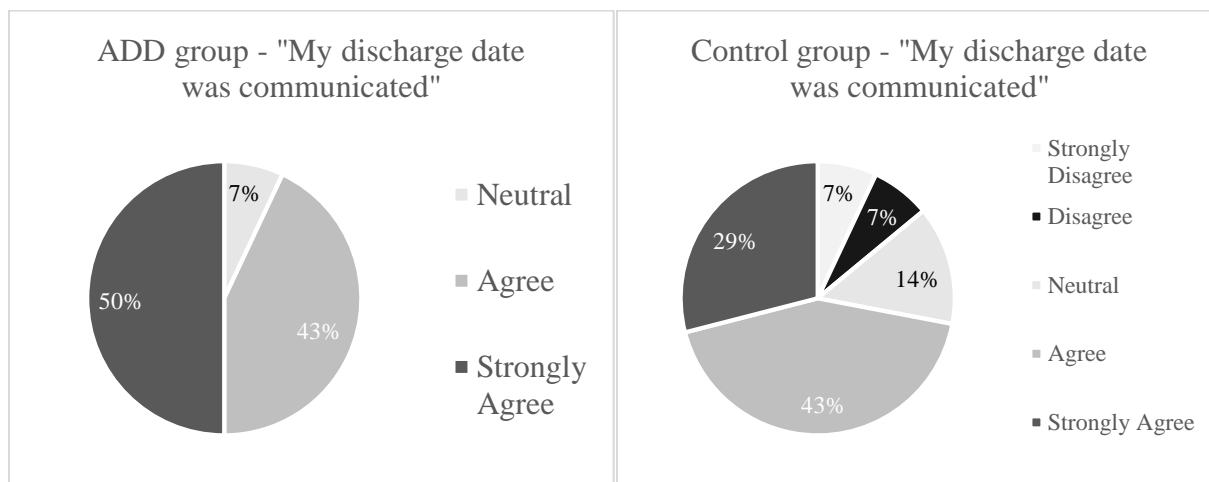


Figure 4. Percentage of patients comparing levels of (dis)agreement to the subjective surveys at the time of hospital discharge using Fischer Exact tests. The trend for significance,  $p=0.16$ . ADD group  $n=14$ , control group  $n=14$ . Colour corresponds to an individual level of agreement to the question, "My discharge date was adequately communicated to me."

Twelve members from the daytime allied health and nursing staff completed the staff surveys. Table 2 depicts their responses.

<b>Table 2. Staff survey results</b>	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
ADD helped me in my practice	3	5	4	0	0
PA served as a critical member of the team in communicating the ADD	5	5	1	0	1

PA served as a critical member of the team in the discharge process	4	6	1	0	0
PA improved the quality and efficiency of the discharge process	3	5	4	0	0

**Discussion**

This study was conducted to examine the impact of an ADD on hospital length of stay following primary Head and Neck surgical resection.

*Demographics*

The study participants were primarily middle-aged males with advanced oral cavity or oropharyngeal cancers, which is consistent with other H&N epidemiologic studies<sup>13,14</sup>. Unsurprisingly, in this group, oral cavity or oropharyngeal cancers were the most common cancer subsites with laryngeal primaries accounting for only 12.5% of cancers. The incidence of oropharyngeal cancer is sharply increasing due to the increasing incidence of human papilloma virus-related cancer; further, oral cavity cancer is four-fold that of laryngeal cancer in Canada<sup>15</sup>. The study agrees with data in the literature on tumour stage at presentation with 55% of participants presenting with locoregionally advanced cancer - stage III and IV disease - on pathologic staging<sup>16</sup>.

*Morbidity*

There were no differences between the groups in rates of postoperative complications. The overall complication rate was 44% (n=14/32). Five patients required takeback to the operating room for wound dehiscence closure or orocutaneous fistulae. The remaining wound complications were managed conservatively (n=6). Other major and minor complications were cardiac, (n=2; myocardial infarction, rapid atrial fibrillation), respiratory (n=1; bilateral pneumothoraces) and neurologic (n=1, iatrogenic facial nerve palsy). Following H&N resection, Chauker et al. reported major and minor wound complications in 7% and 22% of patients respectively, though only 43% of those patients underwent free flap reconstruction<sup>17</sup>. Following neck dissection alone, Pellini et al. revised nearly 6% of patients in the operating room to manage significant wound dehiscence > 2cm<sup>2</sup>. Their overall postoperative wound complication rate was 20%, with 35% of participants in that series undergoing preoperative chemoradiation<sup>18</sup>. Consistent with many H&N cancer patients, this population was at high risk for wound complications given preoperative rates of malnourishment, smoking, alcoholism, and previous external beam radiation.

There were no mortalities during this study's period. Over a 3-year study period, Penel et al. demonstrated overall mortality was approaching 4% in 261 patients 30-days following major H&N resection. Penel identified female gender, age > 70 years, active alcoholism and laryngeal tumours as four independent risk factors for postoperative death<sup>19</sup>. The contrasting differences in Penel's and our OHNS study were the duration and patient demographics. Our study was only six months long, and participants were primarily younger men with oral cavity or oropharyngeal tumours.



In this study, the mean number of days until tracheostomy tube decannulation was 1-day longer in the control group, although this was not statistically significant. At our institution, patients are decannulated once they tolerate plugging of the tracheostomy tube for a minimum of 24 consecutive hours. Theoretically, a delay in tracheostomy tube removal could translate to a longer LOS as the initiation of oral intake depends on surgical airway status. Interestingly, this was not the case. No patients required a tracheostomy tube at hospital discharge. However, five (15%) patients did require a gastrostomy tube due to dysphagia and inadequate oral caloric intake. In a study by Al-Khudari et al., 40% of patients with advanced oropharyngeal cancers required a gastrostomy tube following transoral robotic surgery<sup>20</sup>. Similarly, in the current study, three of the five patients requiring gastrostomy tubes had oropharyngeal primaries.

#### *Discharge data*

The median hospital LOS after surgery was 0.5 days shorter in the ADD group, although this was not significantly less than the controls. The median LOS was utilized instead of the mean to accommodate outliers; 20% ( $n=8$ ) of patients in this series had a LOS > 20 days. LOS in this study (12.5 d [ADD group], 13.0 d [control group]) was similar to American national data that reported a mean LOS of 13.5 days following H&N resection with free flap reconstruction<sup>21</sup>. The use of an ADD did not shorten the LOS as anticipated.

It appears that patients in the control group tolerated hospital discharge without much-advanced notice despite needing lengthy travel times from the broad catchment area. Three patients in the ADD group advanced so quickly after the estimated ADD was provided, they inherently received only 24-hours' notice of discharge. Conversely, three patients required modification of the ADD provided to a later date in order to further monitor wounds or improve caloric intake.

Following total hip arthroplasty, Webber-Maybank et al. provided a "ticket home" card to patients on the day of hospital admission. The card contained education about recovery and the predicted discharge date. The "ticket home" reduced LOS by 19%, and over 85% of patients achieved discharge on the predicted date. The authors believed that in elective surgical patients, a predicted discharge date motivates patients towards an earlier discharge and provides a greater sense of achievement<sup>11</sup>. In our study, it is possible that LOS would have significantly improved if the ADD was provided earlier in recovery rather than 48-hours before anticipated discharge. This estimated date is challenging to predict given the complexity of recovery following Head and Neck surgical reconstruction.

The H&N surgical ward historical data demonstrated that the median hospital LOS is 14.1 days<sup>22</sup>, with 57% of patients having met this target between July 2017 and June 2018. The surgical division had targeted the LOS for major H&N surgery as 14 days. The study's LOS reduced to 12.5 or 13 days (ADD vs. control group). Factors for this difference were not thoroughly analyzed. However, concurrent quality improvement projects or the presence of a full-time PA on the surgical ward may be factors. There were no readmissions to the hospital within 30-days of discharge. If patients presented to their local emergency department or family physician, it was not identified.

### *Survey data*

The survey response rate from patients reached 88%. The surveys revealed a non-significant trend that patients in the intervention group understood the surgical and medical events during their hospital stay and knew their anticipated discharge date. This survey did not directly ask if patients were satisfied with their overall hospital experience. There were no significant differences between groups regarding their physical preparedness for discharge, nor their sense of a well-organized discharge. It is speculated that patients are more relieved than nervous to leave hospital earlier than expected.

From the staff survey, 83% agreed or strongly agreed that the PA improves the quality and efficiency of the D/C process. A third (33%) of staff said an ADD did not have an impact on their practice. This response leads to questions of what other intervention(s) would help nursing and allied health staff better prepare their patients for D/C. Only 58% of staff thought the ADD was adequately communicated. It is possible that writing the ADD on the patient's whiteboard was not the best means of communication, especially if staff are not routinely referring to it. One written comment from the staff survey described that "whiteboards often get erased." Multidisciplinary rounds were identified as best for discussing the ADD. Unfortunately, not all nurses and allied health staff attend these multidisciplinary rounds. Further, it is difficult to communicate an ADD to all staff members given the nature of shift work, multiple different health care providers, and the necessity for thorough and reliable patient handover.

A limitation of this study is basing the 30-day readmission rate on a return or presentation to the hospital of surgery. If the patients presented themselves to their family physician or local emergency department for complications or concerns, it was not known. The second limitation is the heterogeneous free flap population, including the combination of non-cancer and cancer cases. Lastly, calculations of the precise response rate of the staff survey did not occur as the staff totals was unknown.

### **Conclusion**

This quality improvement project is a preliminary study examining the impact of an ADD on hospital LOS following major H&N surgery with reconstruction. The data suggests an ADD given 48-hours in advance to anticipated discharge does not translate to significantly less time in hospital. However, patients have a greater awareness of their in-hospital course with an education session and naturally, are more aware of their day of discharge with an ADD. In academic surgical settings, physician extenders such as PAs can assist in providing patient education and planning for patient discharge.

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