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RESEARCH PAPER

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Head and neck cancer readmission reduction (HANCARRE) project: Reducing 30-day readmissions

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Abstract

Objective: Unplanned 30-day readmissions result in increased costs and decreased patient satisfaction. The objective of this study was to compare readmission rates before and after a multidisciplinary quality improvement initiative that focused on patient and staff education, use of targeted skilled nursing facilities, and appropriate use of patient observation status.

Methods: This was a quality improvement study of all unplanned admissions to the Head and Neck Oncology service at a tertiary care facility during a 3-year period between October 2015 and September 2018. In October 2016, the Head and Neck Oncology service revised its discharge practices for patients undergoing extirpative and/or reconstructive surgery. These changes included enhancing patient education, increasing the use of a skilled nursing facility with directed staff education and patient handoffs by advanced practice nurses, and appropriate utilization of 23-h observation status for returning patients. The readmission rate from the pre-intervention era (October 2015 through September 2016) was compared to the readmission rate from the post-intervention era (October 2016 through September 2018). Secondary outcomes were the rates of 23-h observation within 30 days of the discharge as well as emergency room visits within 30 days of discharge.

Results: In this sample of 449 patients, 161 (35.9%) were observed before the change-in-practice (before October 2016), and 288 (64.1%) were observed following the change-in-practice (after September 2016). On univariable analysis, the risk of readmission declined by approximately 41.4% from the pre-intervention era, though this conclusion was not statistically significant ($P = 0.06$). On multivariable analysis, patients at moderate or high risk of death were 2.31 times more likely than those at minor risk of death to readmit within 30 days ($P = 0.03$). Similarly, those with recurrent or persistent cancer were 3.33 times more likely than those undergoing initial curative surgical management of cancer to readmit within 30 days ($P = 0.001$). No patient characteristics were associated with a 23-h observation following discharge (all $P > 0.05$). Conclusions were similar for emergency room visits following discharge.

This study was previously published as an oral presentation at AHNS 2018 Annual Meeting in Austin, Texas on May 2, 2019.

Conclusions: A three-part quality improvement strategy resulted in a clinically important decrease in 30-day readmissions, though the decline was not statistically significant. There were no significant changes in 23-h observation within 30 days of discharge or emergency room visits within 30 days of discharge.

KEYWORDS
30-day readmissions, head and neck oncology, healthcare utilization

Highlights

Readmission rates were decreased by targeting three areas of improvement:

- Improved patient education regarding management of unique postoperative needs in our patient population such as tracheostomy care, gastrostomy care, and wound care.
- Utilization of nurse practitioners or other healthcare professionals on the team to assist with the transition of care from the hospital admission to discharge location.
- Application of 23-h observation for select and appropriate patients that require a quick evaluation and management that does not require prolonged hospital readmission.

INTRODUCTION

The American healthcare system is an expensive one with costs rising annually. Healthcare expenditures are projected to rise on average 5.4% each year from 2019 to 2028, reaching a peak spending amount of $6.19 trillion dollars in 2028.[1] One of the biggest spenders in the healthcare industry is the government through Medicare and Medicaid, accounting for approximately 40% of all healthcare spending.[2] Reducing overall healthcare costs in the United States has been an area of focus in recent decades with the challenge that quality of healthcare delivered is not compromised.

For better or worse, hospital readmissions within 30 days of discharge have increasingly become a surrogate measure of the quality of patient care. The idea is that premature discharge or substandard care during the index hospitalization may increase the risk of readmission. There is also a financial incentive to decrease readmissions. Research has found that if 20% of Medicare beneficiaries are readmitted within 30 days of a hospital discharge, the cost to the Medicare system is an extra 26 billion dollars a year.[3] When the Affordable Care Act was signed into law in March 2010, Section 3025 stated the newly created Hospital Readmissions Reduction Program would hold hospitals financially accountable for all 30-day readmissions.[4] The Centers for Medicare and Medicaid (CMS) required that hospitals track and report hospital readmission rates for five diagnoses: acute myocardial infarction, congestive heart failure (CHF), pneumonia, chronic obstructive pulmonary disease, and elective total knee and total hip replacements.[2] Hospital reimbursements would be calculated based on an adjustment factor determined by the institution's expected versus observed 30-day readmission rate for these five diagnoses. Institutions with higher-than-expected readmission rates would incur monetary penalties.

Although otolaryngology-specific procedures are not included in the current CMS readmission policy, section 3025 included a clause that left the door open to expand the policy to additional conditions in future years.[4] Additionally, decreasing readmissions for any patient group results in lower costs and improved patient satisfaction. In an effort to reduce the incidence of unplanned 30-day readmissions in our institution's Head and Neck Oncology service, we performed a quality improvement (QI) project aimed at identifying factors contributing to readmissions, implemented changes, and measured the effect of these efforts up to 2 years after implementation.

METHODS

Study design

This was an unplanned (non-powered) QI study of 30-day readmissions to the Head and Neck Oncology service at our tertiary care academic medical center during a 3-year period. After obtaining approval from the Loyola University Medical Center (LUMC) Institutional Review Board, all Head and Neck Oncology admissions were identified using MS-DRG 146, 147, 148 or an ICD-9 or 10 code assigned to a Head and Neck Oncology diagnosis.

Intervention

All charts for head and neck oncology readmissions during a 1-year period (July 2015–June 2016) were reviewed. A multidisciplinary group comprised of physicians, nursing staff, social workers, and the service line executive director reviewed the cases and identified modifiable factors that may affect 30-day readmissions. The top three factors identified were: improved and consistent teaching materials; partnering with skilled nursing facilities (SNF) identified as willing and able to care for complex head and neck patients through improved teaching and communication with these facilities, and increasing the appropriate use of 23-h patient observation status. This change-in-practice was first administered in October 2016 using improved teaching materials; education of staff at a targeted SNF by our advanced practice nurses (APNs), use of a warm handoff at the time of discharge to the SNF, education of the patient and families regarding the benefits of using a targeted SNF as the preferred SNF choice; and education of Otolaryngology and Emergency Medicine house staff and attendings of precise language at the time of entry into the hospital (i.e., 23-h observation vs. true admission status).

Measures

The outcomes were unplanned 30-day readmission, unplanned 23-h observation within 30 days of discharge, and an ED visit within 30 days of discharge. The primary explanatory variable for these three outcomes was the era of the index admission (i.e., before October 2016 vs. after September 2016), and additional covariates included patients' age at the index admission, sex, race, insurance status, free-flap status, type of pathology, cancer site, cancer staging as measured by the National Comprehensive Cancer Network guidelines, the severity of illness and risk of mortality as measured by Vizient[5] and discharge disposition.

Statistical methods

Patient characteristics are provided as valid counts and proportions stratified by the year of their index admission. Univariable and multivariable logistic regression models were used to estimate the odds of readmission within 30 days of the discharge as a function of patient characteristic including the era of their admission, sex, race, age, insurance status, free-flap status, pathological diagnosis, the severity of illness, risk of mortality, discharge location, cancer stage, and cancer site. For the multivariable model, the explanatory variable of interest was the era of the patients' admission and covariates were included in the model if they improved model fit as measured by Akaike's information criterion (AIC statistic). Due to the sparse number of patients experiencing an unplanned 23-h observation within 30 days of discharge or an emergency visit within 30 days of discharge, comparisons for these outcomes were made using Fisher exact tests; exact logistic regression models were used to estimate the association between age and 23-h observation within 30 days of discharge as well as age and an emergency visit within 30 days of discharge. All analyses were completed using SAS version 9.4.

RESULTS

In this sample of 449 patients, 161 (35.9%) patients were observed before the change-in-practice (before October 2016) and 288 (64.1%) patients were observed following the change-in-practice (after September 2016). Most patients were male (71.3%, 320/449), White (85.3%, 383/449), and enrolled in a public insurance program (59.2%, 264/446), which included Medicare (84.5%, 223/264) or Medicaid (15.5%, 41/264). Further, most patients had squamous cell carcinoma pathology (83.4%, 373/447) while few had thyroid cancer (7.4%, 33/447) or some other pathology (9.2%, 41/447). As defined by Vizient,[5] most patients had a minor (13.4%, 60/449) or moderate (55.0%, 247/449) illness; 135 (30%) patients had a major illness and only seven patients (1.6%) were extremely ill. Nearly all patients had a minor (43.4%, 195/449) or moderate (47.7%, 214/449) risk of mortality; few (8.7%, 39/449) were at major risk of death and only one patient (0.2%) was at severe risk of mortality. By far, the majority of patients were discharged home (80.4%, 361/449) while few were discharged to a skilled nursing facility (16.3%, 73/449) or other location (3.3%, 15/449) (see Table 1).

From October 2015 to September 2016 (i.e., before the change-in-practice), the 30-day readmission rate was 13.0% (21/161). From October 2016 to September 2018 (i.e., following the change-in-practice), the readmission rate declined to 7.6% (22/288)—a reduction in the risk of readmission of approximately 41.4% (relative risk ratio = 0.59, 95% confidence interval [CI]: 0.33–1.03; $P = 0.06$). However, after adjusting for patients' insurance status, risk of mortality, discharge location, and cancer stage, there was no significant decline in the odds of 30-day readmission from the pre-intervention era (odds ratio [OR] = 0.67, 95% CI: 0.34–1.30; $P = 0.23$). Conversely, controlling for all other variables in the model, patients at moderate or high risk of death were 2.31 (95% CI: 1.10–4.86) times more likely than those at minor risk of death to readmit within 30 days ($P = 0.03$). Similarly, those treated for a recurrent or persistent cancer were 3.33 (95% CI: 1.70–6.55) times more likely than those undergoing their initial surgical cancer treatment to readmit within 30 days ($P = 0.001$) (see Table 2).

Within the 30 days after discharge, the rate of 23-h observation was 2.5% (4/161) before the change-in-practice. This was comparable to the 23-h observation rate of 2.1% (6/288) following the change-in-practice ($P = 0.75$). In fact, there were no associations between patient characteristics and the rate of 23-h observation within 30 days of discharge (all $P > 0.05$). Conclusions were similar for emergency room visits. Thirty days after discharge, the rate of an emergency visit was 1.9% (3/161) before the change-in-practice. Although the rate of emergency room visits increased to 5.9% (17/288) following the change-in-practice, this increase was not significant ($P = 0.06$) (see Tables 3 and 4).

TABLE 1 Patient characteristics [*n* (%)]

Characteristic	Admission era (intervention)		Total (*n* = 449)
	Pre (*n* = 161)	Post (*n* = 288)	
30-day readmission			
No	140 (87.0)	266 (92.4)	406 (90.4)
Yes	21 (13.0)	22 (7.6)	43 (9.6)
Sex			
Male	120 (74.5)	200 (69.4)	320 (71.3)
Female	41 (25.5)	88 (30.6)	129 (28.7)
Race			
White	137 (85.1)	246 (85.4)	383 (85.3)
Non-White	24 (14.9)	42 (14.6)	66 (14.7)
Insurance (*n* = 446)			
Private	58 (36.3)	124 (43.4)	182 (40.8)
Public	102 (63.7)	162 (56.6)	264 (59.2)
Free flap status (*n* = 447)			
No	89 (55.3)	169 (59.1)	258 (57.7)
Yes	72 (44.7)	117 (40.9)	189 (42.3)
Pathology (*n* = 447)			
Squamous cell carcinoma (SCCa)	143 (88.8)	230 (80.4)	373 (83.4)
Other	18 (11.2)	56 (19.6)	74 (16.6)
Illness severity			
Minor	26 (16.1)	34 (11.8)	60 (13.4)
Moderate of high	135 (83.9)	254 (88.2)	389 (86.6)
Risk of mortality			
Minor	75 (46.6)	120 (41.7)	195 (43.4)
Moderate or high	86 (53.4)	168 (58.3)	254 (56.6)
Discharge location			
Home	128 (79.5)	233 (80.9)	361 (80.4)
Other	33 (20.5)	55 (19.1)	88 (19.6)
Cancer stage (*n* = 447)			
Recurrent	50 (31.1)	61 (21.3)	111 (24.8)
Other	111 (68.9)	225 (78.7)	336 (75.2)
Cancer site			
Oral, oropharynx, larynx, or hypopharynx	125 (77.6)	208 (72.2)	333 (74.2)
Other	36 (22.4)	80 (27.8)	116 (25.8)

Note: Unless otherwise noted, the valid *n* = 449.

DISCUSSION

Readmission rates

Prior studies have reported 30-day readmission rates for Head and Neck patients utilizing either single institution or nationwide databases. Readmission rates described in Head and Neck literature are reported to be 16.1% for general head and neck cases.[6] 8.8%–26% for microvascular and free flap reconstruction for head and neck defects and 11.9%–26.5% for total laryngectomies.[7–14] Thirty-day readmissions to our Head and Neck Oncology service combined across the 3-year time frame was 9.6% (43/449). Our data includes a larger patient population than what has been previously reported in the literature by other single institution studies such as Offodile (*n* = 249) or Graboyes (*n* = 155).[11,14] Osborn et al.[10] retrospectively reviewed a total of 682 patients for their single-institution review. However, our data capture all surgeries for Head and Neck Oncology patients while Osborn et al excluded patients that did not undergo free flap or pedicled flap reconstruction.

Although there was no statistically significant difference in the readmission rates before and after our QI project [adjusted OR: 0.67 (0.34–1.30) post-QI project vs. pre-QI project], the clinical implications of the decrease in readmissions to our institution in terms of bed availability and to our patients in terms of satisfaction are important and notable.

We note important risk factors for unplanned readmissions including patients being treated for recurrent disease and patients who were a high mortality risk on their index hospitalization based on Vizient[5] criteria. Although not statistically significant, there was also a trend toward more readmissions in patients with public insurance options and those discharged to non-home locations were more likely to be re-admitted within 30 days. We plan to examine more closely the readmissions in these latter groups to continually modify our interventions and focus our efforts on decreasing readmissions. Areas of improvement may include interventions such as more targeted preoperative and postoperative teaching along with more frequent follow-up phone calls and visits.

QI

The goal of our study was also to evaluate whether we could reduce readmission rates in subsequent years through a targeted approach created by a multidisciplinary team. A systematic review of 43 studies by Hansen et al.[15] revealed 12 different interventions to reduce hospital readmissions categorized as pre-discharge, post-discharge and transitional interventions. These interventions mirrored those our study implemented: improved patient education, facilitating the transition of care to preferred SNFs, and appropriate utilization of 23-h observation status.

TABLE 2 Odds of 30-day readmission

Characteristics	Valid *n*	Unadjusted		Adjusted	
		OR (95% CI)	*P* value	OR (95% CI)	*P* value
Era: post vs. pre	449	0.55 (0.29–1.04)	0.06	0.67 (0.34–1.30)	0.23
Sex: male vs. female	449	0.92 (0.47–1.83)	0.82	-	-
Race: Non-White vs. White	449	1.14 (0.49–2.69)	0.76	-	-
Age (per 5-year increase)	449	1.02 (0.90–1.16)	0.73	-	-
Insurance: public vs. private	446	2.37 (1.14–4.96)	0.02	2.06 (0.94–4.48)	0.07
Free flap: yes vs. no	447	1.57 (0.83–2.96)	0.17	-	-
Pathology: SCCa vs. other	447	4.45 (1.05–18.80)	0.04	-	-
Illness severity: high vs. low	449	1.19 (0.45–3.16)	0.73	-	-
Mortality risk: high vs. low	449	2.41 (1.18–4.92)	0.02	2.31 (1.10–4.86)	0.03
Discharge location: other vs. home	449	2.17 (1.09–4.30)	0.03	1.79 (0.85–3.78)	0.13
Stage: recurrent vs. other	447	2.99 (1.57–5.69)	-	3.33 (1.70–6.55)	-
Site: oral-larynx[a] vs. other	449	1.17 (0.56–2.45)	0.68	-	-

Note: The sample size for the adjusted estimates = 444 (with 42 or 9.5% readmission events).

Abbreviations: CI, confidence interval; OR, odds ratio; Valid *n*, the sample size used for the unadjusted estimates.

[a]The category "Oral-Larynx" comprises the following cancer sites: Oral cavity, oropharynx, larynx, and hypopharynx.

Patient-centered education

We identified patient-directed education as an area of improvement with the understanding that health literacy may be limited. Additionally, Head and Neck Oncology patients frequently face complex post-operative care due to altered anatomy from the initial cancer ablation and/or free flap reconstruction with several sites of wound care. Many patients must also master tracheostomy and/or gastrostomy care. Literature has shown that those with limited reading ability are at an increased risk of hospitalization and mortality.[16] Therefore, patient education has been recognized in multiple studies as a critical intervention to reduce hospital readmissions. Fonarow et al.[17] found a significant 85% reduction in hospital admissions for CHF patients following comprehensive education and discharge planning. Nursing staff educated patients and family members on management of their CHF condition and reinforced this information with brochures.

Our intervention included an explanatory letter given to patients and their caregivers preoperatively that specifically outlined the expected postoperative time course, as well as time and duty expectations for the caregivers. Patients and their caregivers are often overwhelmed during the preoperative period, so this pre-operative letter gives them the practical information needed to arrange their schedules. We have also found that providing this information about the postoperative time commitment aids in the identification of those patients who will likely need discharge to an SNF, allowing our care manager to start SNF planning as soon as possible in the postoperative period. We also revised and standardized the postoperative teaching materials for tracheostomy care, gastrostomy tube care, and donor site and recipient site wound care. These materials were developed by our nursing staff and APNs and vetted by our head and neck surgical attendings, nursing education, and our Patient and Family Advisory Council (PFAC).

Transition of care

The transition of care between different settings is another area of vulnerability with potential compromises in the quality of care delivered and patient safety. Walraven et al.[18,19] has suggested the importance of continuity of care upon discharge with a team familiar with the patient's hospital course along with the availability of discharge summaries to the next responsible provider. We addressed continuity of care with the utilization of APNs who were heavily involved in both patient care during the hospital admission and acted as transitional care providers. As part of our QI implementation, relationships were created with local SNFs through meetings with leadership partners from our institution and the SNF. Our Head and Neck APNs assist with the postoperative education to patients and their caregivers. Additionally, part of our QI project involved our APNs providing education to select SNF caretakers on managing the complex needs of our head and neck oncology patients. The Head and Neck APNs supply patient-specific discharge summaries to SNF providers in the form of "warm hand-offs" through direct communication before discharge. Patients were also closely monitored upon discharge with early clinic visits to address any concerns and to offer early interventions to avoid hospital readmissions. Coleman et al.[20] has quantitatively shown that similar interventions utilizing APNs as a "transition coach" leads to fewer hospital readmissions within 30 days ($P = 0.048$). Although Coleman's patient population included those only admitted for medically related diagnoses, surgical patients also face a risk of readmission during the transition of care.

TABLE 3 Associations with 23-h observation within 30 days of discharge [*n* (%)]

Characteristic	23-h observation			*P* value
	No (*n* = 439)	Yes (*n* = 10)	Total (*n* = 449)	
Admission era				0.75
Pre	157 (35.8)	4 (40.0)	161 (35.9)	
Post	282 (64.2)	6 (60.0)	288 (64.1)	
Sex				0.99
Male	313 (71.3)	7 (70.0)	320 (71.3)	
Female	126 (28.7)	3 (30.0)	129 (28.7)	
Race				0.99
White	374 (85.2)	9 (90.0)	383 (85.3)	
Non-White	65 (14.8)	1 (10.0)	66 (14.7)	
Insurance type (*n* = 446)				0.54
Private	179 (41.1)	3 (30.0)	182 (40.8)	
Public	257 (58.9)	7 (70.0)	264 (59.2)	
Free flap status (*n* = 447)				0.20
No	250 (57.2)	8 (80.0)	258 (57.7)	
Yes	187 (42.8)	2 (20.0)	189 (42.3)	
Pathology (*n* = 447)				0.38
SCCa	363 (83.1)	10 (100.0)	373 (83.4)	
Other	74 (16.9)	0	74 (16.6)	
Severity of Illness				0.37
Minor	60 (13.7)	0	60 (13.4)	
Moderate of high	379 (86.3)	10 (100.0)	389 (86.6)	
Risk of mortality				0.99
Minor	191 (43.5)	4 (40.0)	195 (43.4)	
Moderate or high	248 (56.5)	6 (60.0)	254 (56.6)	
Discharge location				0.99
Home	353 (80.4)	8 (80.0)	361 (80.4)	
Other	86 (19.6)	2 (20.0)	88 (19.6)	
Cancer stage (*n* = 447)				0.27
Recurrent	107 (24.5)	4 (40.0)	111 (24.8)	
Other	330 (75.5)	6 (60.0)	336 (75.2)	
Cancer site				0.46
Oral, oropharynx, larynx, hypopharynx	324 (73.8)	9 (90.0)	333 (74.2)	
Other	115 (26.2)	1 (10.0)	116 (25.8)	

Note: Unless otherwise noted, the valid *n* = 449.

Observation status

There has been concern that hospitals may falsely achieve reductions in readmissions by inappropriately placing patients in observation status rather than a formal admit. A review of readmission and observation service use within 30 days of a hospital discharge in Medicare beneficiaries found no evidence that changes in observation-unit stays were responsible for the decrease in overall hospital readmissions.[21] During the baseline evaluation phase of our QI project, 38% of readmissions were determined to be more appropriate for observation status. This led to a conscious effort to appropriately utilize the 23-h observation status when clinically indicated through proper education of

TABLE 4 Associations with an emergency room visit within 30-days of discharge [*n* (%)]

Characteristic	Emergency visit			*P* value
	No (*n* = 429)	Yes (*n* = 20)	Total (*n* = 449)	
Admission era				0.06
Pre	158 (36.8)	3 (15.0)	161 (35.9)	
Post	271 (63.2)	17 (85.0)	288 (64.1)	
Sex				0.13
Male	309 (72.0)	11 (55.0)	320 (71.3)	
Female	120 (28.0)	9 (45.0)	129 (28.7)	
Race				0.99
White	366 (85.3)	17 (85.0)	383 (85.3)	
Non-White	63 (14.7)	3 (15.0)	66 (14.7)	
Insurance type (*n* = 446)				0.65
Private	175 (41.1)	7 (35.0)	182 (40.8)	
Public	251 (58.9)	13 (65.0)	264 (59.2)	
Free-flap status (*n* = 447)				0.50
No	248 (58.1)	10 (50.0)	258 (57.7)	
Yes	179 (41.9)	10 (50.0)	189 (42.3)	
Pathology (*n* = 447)				0.55
SCCa	355 (83.1)	18 (90.0)	373 (83.4)	
Other	72 (16.9)	2 (10.0)	74 (16.6)	
Severity of illness				0.32
Minor	56 (13.1)	4 (20.0)	60 (13.4)	
Moderate or high	373 (86.9)	16 (80.0)	389 (86.6)	
Risk of mortality				0.65
Minor	185 (43.1)	10 (50.0)	195 (43.4)	
Moderate or high	244 (56.9)	10 (50.0)	254 (56.6)	
Discharge location				0.78
Home	344 (80.2)	17 (85.0)	361 (80.4)	
Other	85 (19.8)	3 (15.0)	88 (19.6)	
Cancer stage (*n* = 447)				0.43
Recurrent	108 (25.3)	3 (15.0)	111 (24.8)	
Other	319 (74.7)	17 (85.0)	336 (75.2)	
Cancer site				0.03
Oral, oropharynx, larynx, or hypopharynx	314 (73.2)	19 (95.0)	333 (74.2)	
Other	115 (26.8)	1 (5.0)	116 (25.8)	

Note: Unless otherwise noted, the valid *n* = 449.

both Otolaryngology staff and Emergency Medicine physicians. There was no statistically significant difference in 23-h observation occurrence or ED visits within 30 days of discharge between our pre-QI implementation and post-QI implementation, suggesting that the finding of decreased readmissions after our QI implementation was not a result of a shift from full admissions to 23-h observation status.

Limitations

There are several limitations to our study. Our project only captures data from a single tertiary care institution and is limited to cases that occurred during a 3-year time frame. Additionally, our readmissions may not have all been captured as no attempt was made to identify

patients who were readmitted to another facility. We think this bias is low, however, as outside facilities frequently contact our service when a fresh postoperative patient appears for evaluation.

CONCLUSIONS

Head and Neck Oncology patients comprise a population that is at risk for readmissions due to many factors including recurrent disease, high mortality risk, insurance status, and need for complex postoperative care. We conclude that our institution's targeted head and neck cancer readmission reduction QI project involving a multidisciplinary team in its conception, creation, and implementation has successfully resulted in a clinically important decrease in overall readmissions. Future efforts will be directed at continuing to assess our readmissions to identify common causes of readmission. We will continue to modify our readmission reduction plan so that we are able to provide ever-improving head and neck cancer care.

AUTHOR CONTRIBUTIONS

Design, data collection, analysis, writing of the manuscript, editing: Sara Yang. *Analysis and writing of the manuscript*: William Adams. *Design, analysis, writing of the manuscript, and editing*: Carol Bier-Laning.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

This was previously published as an oral presentation at AHNS 2018 Annual Meeting in Austin, Texas on May 2, 2019.

ETHICS STATEMENT

Permission for retrospective chart review was obtained through the Loyola Institutional Review Board.

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