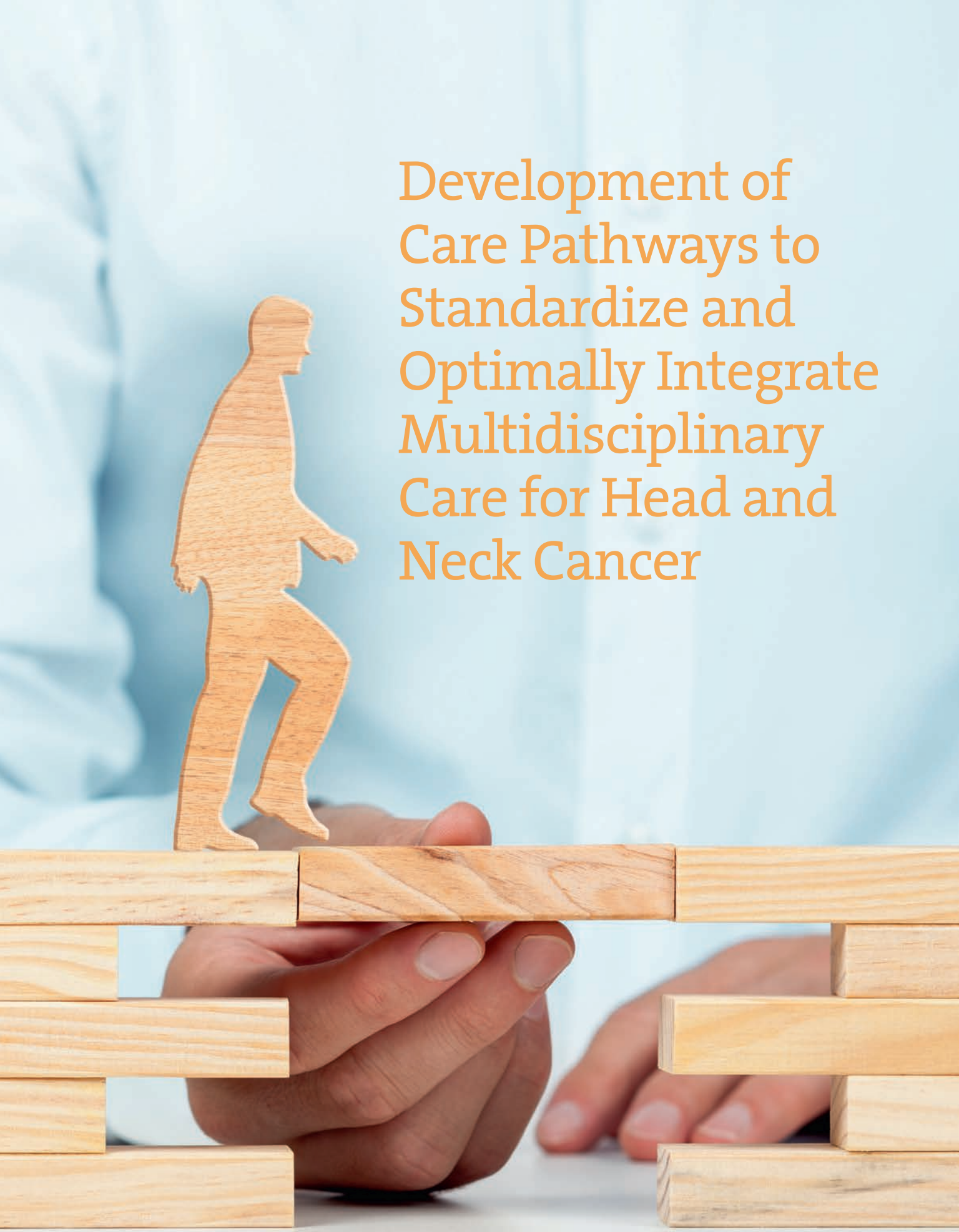
Development of Care Pathways to Standardize and Optimally Integrate Multidisciplinary Care for Head and Neck Cancer



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Head and neck cancer is the sixth most common cancer worldwide, with an estimated 600,000 new cases and 300,000 patient deaths reported annually.[1-3] In recent years, curative interventions have dramatically improved the five-year overall survival rate from 54.7 percent in 1992-1996 to 65.9 percent in 2002-2006.[4] This improvement is due in part to the increasing incidence of head and neck cancer caused by human papillomavirus (HPV).[5] In contrast to HPV-negative head and neck cancer, which is typically associated with tobacco and alcohol use, HPV-associated head and neck cancer is a distinct biological and clinical entity with improved treatment response and survival rates.[6-11] Because the majority of head and neck cancer patients present with locally advanced disease, curative treatment is often multimodal, including surgery, radiation, and/or chemotherapy.[12] The combined toxicity of these various interventions results in devastating disruption of quality of life (QOL), increased healthcare utilization, and poorer health outcomes.[13] Side effects carrying the greatest burden include dysphagia, dysarthria (difficulty swallowing), xerostomia (dry mouth), dental caries (tooth decay), pain, feeding tube dependence, lymphedema, and altered cosmesis (disfigurement).[14-17]

The high symptom burden across multiple functional domains has driven the need to incorporate supportive services during curative head and neck cancer treatment. The multidisciplinary team approach harnesses the combined contributions of physicians and ancillary providers to drive greater patient-centered care, addressing factors that heavily influence morbidity, mortality, and QOL. Numerous studies have investigated clinical and functional outcomes in institutions that offer multidisciplinary care.[18] David et al. reviewed 46,567 patients treated for squamous cell carcinoma of the oropharynx, larynx, and hypopharynx from the National Cancer Database, comparing survival rates between high- and low-volume facilities.[19] Patients treated in high-volume facilities with presumptive access to experienced multidisciplinary teams had improved survival compared to institutions with lower volumes and likely less multidisciplinary access.[19] Retrospective review of a single institution's adherence to treatment planning before and after implementation of multidisciplinary care practices revealed that implementation of this type of care led to:[20]

- Improved adherence to clinical quality indicators
- Higher rates of dental and nutritional assessments

The high symptom burden across multiple functional domains has driven the need to incorporate supportive services during curative head and neck cancer treatment. The multidisciplinary team approach harnesses the combined contributions of physicians and ancillary providers to drive greater patient-centered care, addressing factors that heavily influence morbidity, mortality, and QOL.

- Completed positron emission tomography (PET) scans
- Referrals to radiation and medical oncology
- Shorter length of inpatient stays postoperatively
- Reduced time from surgery to onset of adjuvant treatment.

The compelling body of evidence highlighting the benefits of multidisciplinary care prompted the National Comprehensive Cancer Network (NCCN) guidelines to include the following statement: "The management of patients with head and neck cancers is complex. All patients need access to the full range of support services and specialists with expertise in the management of patients with head and neck cancer for optimal treatment and follow-up. Outcomes are improved when patients with head and neck cancers are treated in high-volume centers."[21]

Care pathways have been proposed as a way to translate evidence-based practice and published national guidelines into an organization's care delivery model. Care pathways also carry the opportunity to hard-wire consistency and efficacious methodology in the provision of head and neck cancer care.

Though integration of multidisciplinary care may seem germane to the provision of curative head and neck cancer care, numerous implementation barriers such as insufficient facilities, lack of standardization, time constraints, and poorly developed interprofessional relationships have raised questions about its efficacy and value.[22] To overcome these barriers, Vanhaecht et al. defined *care pathway* as "a complex intervention for the mutual decision-making and organization of care processes for a well-defined group of patients during a well-defined period."[23] Care pathways have been clinically integrated for numerous healthcare conditions within the United States and abroad. Published benefits of care pathways include reduced lengths of hospital stay, reduced hospital costs, and improved patient outcomes with reduced complications.[24,25] This integrated model eliminates fragmentation, providing a structured, reproducible method for administering multidisciplinary care to individuals with a specific medical condition. Care pathways have been proposed as a way to translate evidence-based practice and published national guidelines into an organization's care delivery model. Care pathways also carry the opportunity to hard-wire consistency and efficacious methodology in the provision of head and neck cancer care. Growth in the multidisciplinary head and neck cancer team at our Head and Neck Center of Excellence provided an opportune time to develop and implement care pathway methodology.

Our Materials and Methods

Representatives across multiple disciplines participated in our care pathway development, including:

- Physicians (medical, radiation, and surgical oncology)
- Nursing
- Speech-language pathology
- Nutrition
- Physical and occupational therapy
- Social work
- Program administrator.

We conducted multiple small-group breakout sessions to create the care pathways, with decisions surrounding timing and frequency of visits based on specialty clinical expertise, recommendations from peer-reviewed literature and NCCN guidelines, and program feasibility. Our goal was to create treatment modality-specific rather than disease site-specific care pathways. All small groups included at least one representative from each discipline to ensure that physician-based and supportive services were appropriately represented.

We created each care pathway in a Microsoft Excel worksheet with the understanding that pathways were fluid documents subject to future modification. Each document followed a standardized format whereby the left-hand column listed each medical service as a separate row and each subsequent column was a specific time point across the care continuum that was marked when provision of a medical service was indicated. Following dissemination and approval of the care pathways from our multidisciplinary team at large, the second stage involved troubleshooting methods to optimize implementation. A workgroup (composed of our physicians, head and neck program directors, information technology support team, health system business office, and Moores Cancer Center healthcare administration) completed the following:

- Leveraged our shared electronic health record (EHR) to create order sets for referral generation
- Interfaced with our business office to implement a preauthorization process for certain ancillary services
- Implemented newly developed programs (patient navigation, head and neck cancer survivorship clinic)
- Expanded our resources and services for patient education.

Our Results

We created and implemented four care pathways, including two pathways each for single- and multimodality therapy rendered with curative intent. These care pathways are for:

1. Concurrent radiation with chemotherapy (Table 1, page 32)
2. Surgery followed by postoperative radiation (Table 2, page 34)
3. Surgery alone (Table 3, page 36)
4. Radiation alone (Table 4, page 38).

Below we detail our prescription of the various supportive services and the solutions we devised to contend with implementation barriers.

Speech-Language Pathology

The speech-language pathologist plays a critical role within the multidisciplinary head and neck cancer team. These professionals are directly responsible for administering diagnostic and therapeutic services addressing speech, voice, and swallowing functions. Curative head and neck cancer treatment generates acute and chronic deficits in these areas, causing a deleterious impact on QOL. The severity of QOL effects is directly related to tumor characteristics and prescribed cancer therapies, including site, modality, anatomic extent of treatment, and treatment dose(s). Published literature recommends a pre-treatment speech-language pathologist evaluation incorporating clinical, behavioral, and instrumental methods for all patients.[26] Results drive subsequent interventions and recommendations that optimize patient safety, education, and functional capacity.[26,27] NCCN guidelines recommend a formal baseline evaluation for patients with speech and/or swallowing dysfunction or whose treatment is likely to impair speech and/or swallowing.[21] NCCN also recommends routine evaluations until the patient has achieved a stable baseline post-treatment or indefinitely in certain cases.[21] Our care pathway workgroup integrated speech-language pathologist services in a calibrated fashion across the care continuum. Specific time points are driven by each treatment modality-specific care pathway (see Tables 1-4, pages 32–39). Though structured time points are delineated, services may be escalated based on severity of symptoms.

Nutrition

Poor nutritional status across the head and neck cancer care continuum is highly prevalent, underscoring the pivotal role that nutrition therapy plays for patients undergoing curative treatment. Altered nutrition and weight loss at baseline are typically driven by the underlying disease. Nutrition and weight loss are further exacerbated during and after treatment by therapeutic intervention and associated toxicity. Nutrition rates in head and neck cancer patients are as high as 52 percent at time of diagnosis and present in 44 to 88 percent of patients receiving radiation with or without chemotherapy.[28-30] The clinical significance of malnutrition is its association with increased rates of morbidity, mortality, and QOL disruption.[31] Weight loss before and during radiation is an independent prognostic indicator of five-year disease-specific survival.[29] These findings cement the role of the registered dietitian as a key member of the head and neck cancer multidisciplinary team.

Historically, prescription of feeding tube placement has been prophylactic or reactive, based primarily on provider recommendation and preference. NCCN guidelines now advise against prophylactic placement in patients with good performance status who do not have significant airway obstruction, significant weight loss, or severe dysphagia at baseline.[21] For patients who require enteral feeding, it is paramount for the registered dietitian to regularly communicate with the speech-language pathologist regarding status of swallowing function; this collaboration enables continued encouragement of oral intake during treatment (if safe to do so) and facilitates expeditious enteral wean. Our care pathway workgroup integrated dietitian services at baseline, a minimum of every two weeks during treatment, and specified time points post-treatment to provide patient-specific strategies to optimize nutrition and minimize unintentional weight loss.

Care pathways include both services to address any changes in neck or shoulder range of motion post-treatment. Occupational therapy instructs on upper extremity exercises post-operatively and educates patients on ways to maximize independence with ADLs.

Physical and Occupational Therapy

The tradeoff of curative head and neck cancer treatment is often residual physical disability, such as general deconditioning, trismus (reduced opening of the jaw), lymphedema, altered shoulder/neck range of motion, and reduced physical independence. Though physical therapy and occupational therapy interventions could potentially mitigate impairment and enable restoration of function in many instances, integration of these services for head and neck cancer is not well defined. NCCN guidelines broadly highlight the importance of physical medicine and rehabilitation and provide general principles and guidelines for physical and/or aerobic activity.[21,32] The absence of appropriate physiotherapy intervention would be especially detrimental to long-term function and QOL. Therefore, it was essential that we included physical therapy and occupational therapy in our care pathways to improve QOL and basic function through activities of daily living (ADLs), strengthening, and endurance exercise. Care pathways include both services to address any changes in neck or shoulder range of motion post-treatment. Occupational therapy instructs on upper extremity exercises post-operatively and educates patients on ways to maximize independence with ADLs. It also addresses head and neck lymphedema by providing education, evaluation, and complex decongestive therapy, which has been shown to improve symptomatology.[33] Physical therapy addresses mobility issues involving trismus (reduced opening of the jaw) and stiffness of the head, neck, and shoulders. Physical therapy also plays an important role in addressing strength and cardiorespiratory fitness both before and after treatment.[34,35]

Survivorship

The concept of cancer survivorship stems from a seminal publication in 2005, which highlighted the numerous unmet needs of a rapidly growing number of cancer survivors.[36] Though cancer

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Table 1. Concurrent Chemotherapy and Radiation Care Pathway

Service Line	Initial Visit	Treatment Phase					
		Week 1	Week 2	Week 3	Week 4	Week 5	
Head and neck surgery	x[1]						
Head and neck surgery admin	Outside slides and images requested						
Head and neck surgery nursing	Add to tumor boards, generate after-visit summary to include pathway timeline; needs assessment[2]						
Medical oncology (MD or NP)	x			3 weeks (with more frequent visits as needed)			
Radiation oncology	x	x	x	x	x	x	
Survivorship clinic	x						
Speech-language pathology	Baseline fluoroscopy/ endoscopy clinic visit		Visit, week 2 or 3			x	
Dietary	x			x		x	
Occupational therapy							
Physical therapy					x		
Navigator	x[3]						
Patient education	x						
Dental	x						
Audiology	x (as needed)	x (as needed, if on platinum with hearing change)					
Imaging	x						

[1]Initiate pathway-based referrals at initial visit. [2]Alert MD for patients needing social work, pastoral services, palliative care, integrative health. [3]Navigator at initial visit and at care transitions. [4]Transition to survivorship per guidelines.[5]Post-treatment PET/computed tomography will be ordered by radiation oncology.
MD = medical doctor.

			Post-Treatment					
	Week 6	Week 7	Month 1				Month 2	Month 4
			Week 8	Week 9	Week 10	Week 11		
	x (optional)							x[4]
	x			x				x[4]
	x	x				4-6 weeks after treatment, sooner if symptomatic	x	x[4]
								x[4]
		x		Scope and visit, week 9 or 10			Fluoroscopy as needed week 13	Scope/clinic swallow[4]
		x					As needed	
						x	As needed	
						x	As needed	
			x					
			x (as needed, if had platinum with hearing change)					
								x[5]

Table 2. Surgery Followed by Postoperative Radiation Care Pathway

Service Line	Initial Visit	Preop	Tumor Board	
Head and neck surgery	Establish staging, pathway,[1] surgical plan		x	
Head and neck surgery admin	Outside slides and images requested	Surgery date selected, postop appointment scheduled	x	
Head and neck surgery nursing	Add to tumor board; generate after-visit summary to include pathway timeline; needs assessment[2]		x	
Microvascular surgery		As needed		
Medical oncology (MD or NP)			x	
Radiation oncology		See patient preop, establish preauthorization for radiation therapy; place dental referral	x	
Survivorship clinic	x			
SLP (for noncomplex surgery, SLP may not be required)		Baseline visit for complex/ mucosal surgery: endoscopy, FEES, ±MBSS	x	
Dietary		Assessment and education session	x	
Occupational therapy		Lymphedema baseline		
Physical therapy				
Navigator	x[4]			
Education		x		
Dental	x			
Imaging	x			

[1]Initiate pathway-based referrals at initial visit. [2]Alert MD for patients needing social work, pastoral services, palliative care, integrative health. [3]Discharge order set to specify SLP for endoscopic swallow. [4]Navigator at initial visit and at care transitions. [5]Transition to survivorship per guidelines. ADLs = activities of daily living; FEES = fiberoptic endoscopic evaluation of swallow; MBSS = modified barium swallow study; MD = medical doctor; POD = post-operative day; SLP = speech-language pathology; UE ROM = upper extremity range of motion.

	Inpatient	Post-Surgery	During Adjuvant Radiation Therapy	Post-Radiation
	Inpatient and discharge order sets to reflect pathway	2-3 weeks (earlier as needed drains, bolsters, etc.)		4-6 weeks (earlier as needed), then transition to NCCN guidelines[5]
		(per plastic reconstructive surgeon)		
		As needed, pending path; if adjuvant chemo required, follow chemoradiation pathway		
		2-3 weeks	Weekly	4-6 weeks (earlier as needed), then transition to NCCN guidelines[5]
				4 months[5]
	Every patient, POD 0 or 1	Discharge order set[3] to reflect pathway, 1-2 weeks, FEES ± MBSS	Every 2 weeks (increased frequency as needed)	Clinic + FEES 2-3 weeks, as needed MBSS 4-6 weeks; then transition to NCCN guidelines[5]
	As needed (tube feeds, malnourished or high risk, MD or speech-language pathologist recommended)	1-2 weeks	Every 2 weeks (increased frequency as needed)	1-3 weeks, then transition to NCCN guidelines[5]
	All neck dissections—for UE ROM and ADLs	As needed (per inpatient recs)		4 weeks
	As needed, if nursing identifies need for assistance with out of bed mobility (neck dissection; microvascular)	As needed (per inpatient recs)		As needed
		x		
		x (for patients who do not expect radiation)		
				x

Table 3. Surgery Alone Care Pathway

Service Line	Initial Visit	Preop	Tumor Board	Inpatient	Post-Surgery
Head and neck surgery	Establish staging, care pathway,[1] surgical plan		x	Inpatient and discharge order sets to reflect pathway	2-3 weeks (earlier as needed drains, bolsters, etc.)
Head and neck surgery admin	Outside slides and images requested	Surgery date selected, postop appointment scheduled	x		
Head and neck surgery nursing	Add to tumor board; generate after-visit summary to include pathway timeline; needs assessment[2]		x		
Microvascular surgery		As needed		Microvascular surgeon to dictate rehab needs	x[5]
Survivorship clinic	x				
Speech-language pathologist (for complex surgery)		Baseline visit: endoscopy, FEES, ±MBSS	x	Every patient, POD 0 or 1	Discharge order set[3] to reflect pathway; 1-2 weeks, FEES ± MBSS
Dietary		Assessment and education session	x	As needed (tube feeds, malnourished or high risk, MD or speech-language pathologist recommendations)	1-2 weeks
Occupational therapy				All neck dissection-for UE ROM and OOB ADLs	As needed (per inpatient recommendations)
Physical therapy				As needed (neck dissection) if nursing identifies need for assistance with OOB mobility	As needed (per inpatient recommendations)
Navigator	x[4]				x[5]
Patient education		x			
Imaging	x				As needed

[1]Initiate pathway-based referrals at initial visit. [2]Alert MD for patients needing social work, pastoral services, palliative care, integrative health. [3]Discharge order set to specify SLP for endoscopic swallow. [4]Navigator at initial visit and at care transitions. [5]Transition to survivorship per guidelines. ADLs = activities of daily living; FEES = fiberoptic endoscopic evaluation of swallow; MBSS = modified barium swallow study; MD = medical doctor; OOB = out of bed; POD = post-operative day; SLP = speech-language pathology; UE ROM = upper extremity range of motion.

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survivorship research has primarily focused on the most common cancers, the rapidly changing landscape and toxicities associated with head and neck cancer mark a watershed of opportunity in this population. The goals of our newly formed survivorship clinic include:

- Prevention
- Detection and surveillance for cancer recurrence or development of second primaries
- Interventions for physical and psychosocial late effects from head and neck cancer and its therapies
- Improved care coordination with specialists and primary care providers.

These goals were in line with the consensus-based management strategies published by the American Cancer Society for head and neck cancer survivorship.[37] NCCN guidelines state that "an individual is considered a cancer survivor from the time of diagnosis, through the balance of his or her life."[32] NCCN recommends integration of survivorship care and care plan within one year.[21] Based on these recommendations, our nurse practitioner-run survivorship clinic was integrated into all four care pathways at baseline, 4 and 12 months post-treatment, and then annually (refer to Tables 1-4 and Figure 1, page 40, and Figure 2, page 41). In addition to the aforementioned goals, the nurse practitioner provides patients with a document detailing the summary of treatment received, information for surveillance recommendations and post-treatment needs, and healthy behavior recommendations per NCCN.[32]

Patient Navigation

The role of care navigation in head and neck cancer is designed to provide patients with clear, proactive guidance in traversing the complex structure of multidisciplinary cancer care. The National Cancer Institute describes patient navigation as the support and guidance provided to persons with abnormal screenings or new cancer diagnoses, including overcoming challenges and barriers to accessing the healthcare system in a culturally competent manner.[38] Integrating navigation within a care coordination model has reduced redundancies and delays in treatment, promoted greater participation in clinical trials, improved patient education and satisfaction, and reduced costs.[39,40] Though published literature typically describes nursing models for patient navigators, the American Cancer Society launched a patient navigator program in 2005, which includes a broad representation of individuals; some, but not all, have a healthcare background.[41] Our program implemented a philanthropy-funded, facilitated care navigation model led by a public health provider. Timed interventions for care navigation were designed to reduce vulnerable periods, including at initial diagnosis through treatment planning and across care transitions (Tables 1-4).

Audiology

Patients with head and neck cancers are at risk for progressive sensorineural hearing loss after receipt of chemotherapy with platinum derivatives such as cisplatin.[42] Therefore, proactive audiologic evaluations should be implemented at baseline, during, and after platinum-based treatment to prevent further deterioration of hearing and to counsel on compensatory communication strategies or incorporate assistive listening devices when indicated.[37,43,44] Published literature regarding ototoxicity management recommends complete audiologic examinations, including case history, otoscopy, tympanometry, pure tone audiometry, distortion product otoacoustic emissions, and patient counseling. These assessments should occur at baseline (prior to or within 24 hours after platinum administration), routinely during treatment, and post-treatment (months 1, 3, 6, 9, and 12 and then annually as indicated).[44-47] NCCN guidelines recognize audiology professionals as an important component of the multidisciplinary team for head and neck cancer, with evaluations being recommended "as clinically indicated."[21]

Our program implemented a philanthropy-funded, facilitated care navigation model led by a public health provider. Timed interventions for care navigation were designed to reduce vulnerable periods, including at initial diagnosis through treatment planning and across care transitions.

Incorporating published recommendations as well as feasibility based on hospital resources, we recommended audiology evaluations for patients receiving platinum-based chemotherapy at baseline, during, and after treatment as clinically indicated (Table 1).

Nuts and Bolts of Implementation

Successful implementation of the care pathways was contingent on addressing systematic barriers and maintaining a patient-centric focus. For example, entering orders for multiple individual referrals into the EHR is time-consuming and prone to unintentional omission. Therefore, we created pre-populated order sets in the EHR for each care pathway, which enables ordering providers to more efficiently and consistently place all relevant referrals amidst a busy clinic. Insurance authorization for each individual service is also triggered earlier, increasing the probability that services are rendered in parallel rather than sequentially. This latter point is especially critical because time to treatment initiation represents an independent risk factor for head and neck cancer survival outcome.[48] For ancillary services such as speech-language pathology, we worked with our business office to obtain preauthorization for all relevant services (consultation, diagnostic

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Table 4. Radiation Alone Care Pathway

Service Line	Initial Visit	Treatment Phase					
		Week 1	Week 2	Week 3	Week 4	Week 5	
Head and neck surgery	x[1]						
Head and neck surgery admin	Outside slides and images requested						
Head and neck surgery nursing	Add to tumor board; generate after-visit summary to include pathway timeline; needs assessment[2]						
Radiation oncology	x	x	x	x	x	x	
Survivorship clinic	x						
Speech-language pathologist	Baseline fluoroscopy/endoscopy/ clinic visit				x	As needed	
Dietary	x				x	As needed	
Occupational therapy							
Physical therapy					x		
Navigator	x[3]						
Patient education	x						
Dental	x						
Imaging	x						

[1]Initiate pathway-based referrals at initial visit. [2]Alert MD for patients needing social work, pastoral services, palliative care, integrative health. [3]Navigator at initial visit and at care transitions. [4]Transition to survivorship per guidelines. [5]Post-treatment PET/computed tomography will be ordered by radiation oncology. MD = medical doctor.

			Post-Treatment					
	Week 6	Week 7	Month 1				Month 2	Month 4
			Week 8	Week 9	Week 10	Week 11		
	x (optional)							x[4]
	x	x				4-6 weeks after treatment, sooner if symptomatic[5]		x[4]
								x[4]
			x	Scope and visit, week 9 or 10		Fluoroscopy, week 13	Scope/clinic swallow[4]	x[4]
			x			x	As needed	
						x	As needed	
						As needed	As needed	
			x					
								x[5]

Figure 1. Surveillance Plan Patient Handout

UC San Diego Head and Neck Cancer Center

Name _____

Blue blocks are NCCN-recommended follow-up. You may be seen more often, as indicated.

	Survivorship Clinic	Head and Neck Surgeon	Radiation Oncologist	Medical Oncologist	Speech Pathologist, Nurse, Social Worker, Dietitian	Dentist
Pretreatment	**All patients**	Chemoradiation Radiation Surgery	Chemoradiation Radiation	Chemoradiation	Chemoradiation Radiation Session with team	Chemoradiation Radiation
Post-treatment						
1 month				Chemoradiation	Chemoradiation Radiation Session with team	Chemoradiation Radiation
2 months			Chemoradiation Radiation			
4 months	**All patients**	Chemoradiation Radiation Surgery		Chemoradiation	Chemoradiation Radiation	Chemoradiation Radiation
6 months		Surgery	Chemoradiation Radiation	Chemoradiation	Chemoradiation Radiation	Chemoradiation Radiation
9 months		Chemoradiation Radiation Surgery				
12 months/ 1 year	**All patients**	Surgery	Chemoradiation Radiation	Chemoradiation	Chemoradiation Radiation	Chemoradiation Radiation
18 months		Chemoradiation Radiation Surgery				Chemoradiation Radiation
24 months/ 2 years	**All patients**	Surgery	Chemoradiation Radiation	Chemoradiation	Chemoradiation Radiation	Chemoradiation Radiation
32 months	**All patients**	Chemoradiation Radiation Surgery				Chemoradiation Radiation
40 months	**All patients**	*	*			Chemoradiation Radiation
48 months	**All patients**	*		*		Chemoradiation Radiation
56 months	**All patients**	*	*			Chemoradiation Radiation
Annually at 5 years	**All patients**	*		*		Chemoradiation Radiation

For help with pain, nausea, and constipation: Chemotherapy patients: Contact your medical oncology nurse: [Name].
Radiation-only and radiation-after-surgery patients: Contact your radiation nurse: [Name].
Surgery-only patients: Contact your surgical team: [Number].

Post-treatment imaging: (Chemotherapy patients: medical oncology; radiation-only and radiation-after-surgery patients: radiation oncology; surgery-only patients: surgical team):
1) Single baseline imaging 12-16 weeks after therapy, option for additional.
2) Patients 50 years or older and 20 pack-years smoking should have an annual low-dose chest computed tomography for at least two years.
3) Carotid ultrasound five years after neck radiation and repeat every 5 years if negative, otherwise refer to primary care physician.

Thyroid monitoring: every 6-12 months for patients with radiation therapy.
* For some patients, extended follow-up may be advised.

Figure 2. Electronic Order Set for Concurrent Chemotherapy and Radiation Care Pathway

REFERRALS

Referrals to Physician Providers

- ☐ Consult/Referral to Head and Neck/Surgical Oncology
  STAT, Internal referral
- ☐ Consult/Referral to Radiation Oncology
  STAT, Internal referral
- ☐ Consult/Referral to Head and Neck/Medical Oncology
  STAT, Internal referral
- ☐ Consult/Referral to Encinitas/Vista Medical Oncology
  STAT, Internal referral

Referrals for Supportive Services

- ☐ Referral Oncology Survivorship Clinic Head and Neck
- ☐ Referral to Patient Navigator—Head and Neck
  STAT, Internal referral
- ☐ Consult/Referral to Speech Pathology/Therapy Within Head and Neck Surgery
  STAT, Internal referral, NOTE: Dysphagia, dysarthria, or dysphonia are the only billable diagnoses for speech-language pathology services
- ☐ Video Swallow (Aspiration Evaluation)
  STAT, Normal
- ☐ Consult/Referral to Nutrition/Oncology (Moores Use Only)
  STAT, Internal referral
- ☐ Consult/Refer to UCSD Physical Therapy
  STAT, Internal referral, NOTE: Physical therapy referral is appropriate for the following patients: Patients with trismus; patients with temporomandibular joint (TMJ) symptoms; patients with neck range of motion issues
- ☐ Consult to UC Occupational Therapy
  STAT, Internal referral, NOTE: Occupational therapy referral is appropriate for the following patients: Patients with lymphedema; patients with symptoms related to scar tissue; patients with shoulder range of motion issues; patients with radiation fibrosis
- ☐ Consult/Referral to Audiology Clinic
  STAT, Internal referral
- ☐ Central Venous Catheter Service Request
  STAT, Normal
- ☐ Consult to Angio Interventional Rad
  STAT, Internal referral, Consult to Angio Interventional Rad for G-Tube Placement
- ☐ Consult Psychiatry Moores
  STAT, Internal referral
- ☐ Referral Psychology Moores
  STAT, Internal referral

Referrals for Imaging

- ☐ CT Soft Tissue Neck with Contrast
  STAT, Normal
- ☐ CT Chest with Contrast
  STAT, Normal
- ☐ PET/CT (Non-diag CT for AC) Skull to Mid-thigh
  STAT, Normal

(Note: Each care pathway [not shown herein] has its own prepopulated order set in the EHR.)

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studies, and treatment). Physical and occupational therapy services already engaged in a similar practice.

It was important to be mindful of the number and frequency of medical visits that our patients would encounter, particularly in light of symptom burden and psychosocial and economic restraints. The addition of the patient navigator to assist with care transitions reduced the number of missed consultations. Schedulers were also required to communicate with each other for improved visit coordination. Speech-language pathology and dietitian appointments are now scheduled on the same date, in this order, so that the dietitian has information related to swallow safety prior to providing dietary recommendations. Additionally, schedulers were instructed to arrange all medical visits in close proximity to avoid a prolonged wait or requirement of multiple trips. We also give patients EHR-generated, comprehensive calendars to improve visit adherence across the care continuum.

The genesis and evolution of our care pathways have provided a wealth of insights, highlighting both the strengths and weaknesses of our performance improvement initiative. The team was composed of representatives from numerous service areas—both outpatient and inpatient settings—which ensured a collective, cohesive multidisciplinary voice in all decision making and allowed for better management across vulnerable care transitions.

We developed an education course for new head and neck cancer patients to facilitate early introduction of multidisciplinary care practices. During this monthly meeting, the patient meets several allied health professionals and receives an overview of all supportive services. We also created a comprehensive booklet for patient education. Additionally, we created survivorship surveillance plans (based on NCCN guidelines) that are provided to patients as handouts.

Finally, we arranged for a small group of allied health professionals to meet after our weekly multidisciplinary tumor board to identify individuals with incomplete care pathway referrals or high-risk individuals already on a care pathway who may require more intensive support. This weekly patient care conference is a safety net to ensure maximal care pathway execution.

Closing Thoughts

The complexity of head and neck cancer management and associated morbidity demands accelerated efforts to provide highly integrated care. Because the ideal model for prescribing multidisciplinary care services is not well defined, it provided the ideal impetus for our care pathway performance improvement initiative.

The framework afforded by a well-defined care pathway enables predictability and consistency in both care delivery and cost. This model is becoming increasingly popular among healthcare systems and accountable care organizations seeking gross reductions in costly errors and redundancies that plague the existing status quo. Though cost savings was an important consideration, our primary aim was to define and describe the ideal multidisciplinary model that was feasible for our program and to identify areas requiring improvement. Our team elected to construct treatment-specific rather than disease site-specific pathways largely due to the unique symptoms and toxicities incurred by each treatment modality.

Though care pathway models support hard-wired consistency and reproducibility, we designed the process to be a guide rather than a precise recipe. Commonly, ancillary providers may need to increase the frequency of visits due to acute changes in function. It is therefore critical that the model remain fluid, allowing for modification and customization as needed to maximize patient safety and avoid adverse events and unplanned hospitalizations.

The genesis and evolution of our care pathways have provided a wealth of insights, highlighting both the strengths and weaknesses of our performance improvement initiative. The team was composed of representatives from numerous service areas—both outpatient and inpatient settings—which ensured a collective, cohesive multidisciplinary voice in all decision making and allowed for better management across vulnerable care transitions. Additionally, care navigation and survivorship were integrated to help engage patients and reinforce the clinical benefits of multidisciplinary care. In retrospect, the care pathways should have delineated a clear framework for the delivery of psychosocial, dental, and prosthodontic services, because they are critical to patient outcomes. At the time of article submission, our institution is finalizing recruitment efforts to secure a dedicated dentist/prosthodontist; in the interim, our patient navigator provides new patients with a list of community partners.

Independent of the care pathways, we did institute administration of the Patient Health Questionnaire 9 for new patients with head and neck cancers. The Patient Health Questionnaire 9 is a validated questionnaire to detect and assess depression severity.[49] Inclusion of this instrument was driven by the understanding that depression is highly prevalent in patients with head and neck cancers and may be associated with poorer survival outcomes.[50] Based on the patient's resultant score, an algorithm triggers appropriate referrals to psychiatry or primary care based on acuity and patient preference.

Finally, our team recognizes that mechanisms to measure adherence to care pathway use should have been developed. Such data would have provided an objective appraisal of progress to

date and facilitated practice modification to optimize adherence. Thus, our future directions will include:

- A modified algorithm for earlier identification of high-risk patients requiring feeding tube placement
- Inclusion of psychosocial and dental services
- Incorporation of mechanisms to measure care pathway adherence
- Rigorous evaluation of how our care pathways impact functional, oncologic outcomes, patient experience, and value. OI

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