

# Ensuring Head and Neck Oncology Patients Receive Recommended Pretreatment Dental Evaluations

AQ: A

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## Abstract

**Purpose:** Head and neck (H&N) cancer therapy can have a detrimental effect on oral health by increasing the risk of dry mouth, dental caries, dental infection, and osteonecrosis of the jaw. Pretreatment dental evaluations are recommended for patients with H&N cancer before radiation therapy to minimize the risk of acute and long-term adverse effects. In an earlier effort to educate patients and community dentists about the importance of pretreatment dental evaluations, we created a dental instructional guide (DIG) that outlines the necessary components of the preradiation dental evaluation. Yet our program did not have a system for documenting which patients received the DIG. The aim of this project was to create a reliable system to ensure that patients are given the DIG before radiation therapy and that such patients are readily identifiable, allowing us to confirm that their dental evaluations are complete before starting treatment.

**Methods:** We implemented a tracking template within the H&N oncology program at the Dana-Farber Cancer Institute that documents the date, patient, and clinician who gave the DIG. We used the Model for Improvement methodology and performed plan-do-study-act (PDSA) cycles to test and monitor the results of the template implementation.

**Results:** We showed a significant improvement in the rate of DIG documentation from a baseline of 0% (range, 0% to 0%) to a mean of 53% (range, 0% to 100%) over 3 months ( $P < .01$ ).

**Conclusion:** This intervention was the first step in creating a sustainable system for ensuring timely preradiation dental evaluation, thereby decreasing the risk of dental complications from H&N cancer therapy.

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## Introduction

Cancers of the head and neck (H&N) are treated with surgery, chemotherapy, radiation therapy (RT), or a multimodality combination of these approaches. Each of these therapies can have detrimental short- and long-term adverse effects on the oral cavity and dentition.<sup>1-4</sup> Therefore, patients who expect to receive RT to the H&N should undergo a thorough dental evaluation before treatment. Because many patients prefer to have an evaluation by their community-based dentist, we developed a dental instructional guide (DIG) outlining the necessary components of the preradiation dental evaluation, including a comprehensive oral examination with full-mouth and panoramic radiographs. This information is then returned by the community dentist to the Brigham and Women's Hospital Division of Oral Medicine and Dentistry, where the treatment plan is reviewed and additional recommendations may be provided by the oral medicine specialists.

The problem we addressed was that there was no structured, well-defined process in place to document that the DIG was given to appropriate patients before RT. Even though most patients did receive a preradiation dental exam, there was no system to document that the DIG was given or any record that it was returned to our institution. We hypothesized that improving the rate of DIG documentation would allow us to

identify which patients were being evaluated and treated by community dentists and to follow up to ensure that the evaluations occurred expeditiously so as not to delay initiation of RT. We used process improvement methodologies including the Model for Improvement, DMAIC (Six Sigma) and PDSA cycles.<sup>5</sup>

## Methods

The H&N oncology program at the Dana-Farber Cancer Institute is a multidisciplinary clinic where patients are evaluated by radiation oncologists, medical oncologists, and H&N surgeons. There are multiple potential treatment pathways for each patient as a result of the diversity of histology, disease sites, and stages. Patients may first be treated with surgery, radiation, or chemotherapy. A multidisciplinary team of front-line clinicians and administrative staff was assembled representing radiation oncology, dentistry, medical oncology, and H&N surgery. The team began by studying the current state process to better understand the problem, creating a process map from the initial patient consultation to documentation that the patient received the DIG before starting radiation.

Charts were reviewed to quantify how often DIG provision was documented at baseline. Clinical staff were surveyed to identify barriers to DIG provision and documentation. The

results were summarized in a Pareto chart. A cause-effect diagram identified additional root causes. With a focus on the most commonly identified reasons for lack of DIG documentation, the team brainstormed potential interventions and used a priority/payoff matrix to prioritize and select which interventions to test. Several PDSA cycles were performed to test the chosen process changes.

There were two key interventions implemented: definition of roles/responsibilities for DIG documentation, and implementation of an electronic medical record (EMR) template documenting DIG provision. Weekly data collection was performed using a process measure of the proportion of eligible patients with documented DIG provision as shown on the EMR template. The numerator excluded patients who received a dental evaluation at our institution rather than with their community-based dentist. The denominator consisted of all patients with H&N cancer with an anticipated need for RT. Patients were excluded if they had cutaneous or other malignancies with minimal anticipated radiation dose to the oral cavity or salivary glands.

The outcome measure for this phase of the project, with its emphasis on using the EMR documentation as the central mode of tracking patients, was the proportion of patients with documented DIG provision who had completed DIG evaluation and supporting radiographs returned to the Oral Medicine Clinic (OMC). On receipt of these materials, the OMC placed an EMR template documenting DIG receipt within 1 to 2 business days. Administrative staff reviewed the information at least weekly, contacting eligible patients who did not have documentation of DIG provision or DIG receipt by the OMC. The balance measure was not specifically quantified but considered to be any additional phone calls or e-mails related to the DIG involving additional work hours. The change data were analyzed using a P-chart with a 3-sigma level of significance ( $P = .01$ ).

## Results

The process map (Figure 1) identified considerable variation in the process, with several points of contact where the patient could be given the DIG, but little consistency around documenting when or if it was given. The process map also highlighted the importance of giving the DIG early in the patient's course so that dental evaluations could be completed expeditiously to avoid last-minute dental extractions that may delay RT initiation, or occur after surgery, when dental examinations or procedures can be more difficult or uncomfortable for the patient.

Additional diagnostic data from the clinician survey and cause-and-effect diagram showed that among the most common reasons for failing to document DIG provision were that the clinician forgot or was not aware of the packet, and confusion around responsibility and timing of DIG distribution (Appendix Figures A1 and A2, online only). To address those issues, we held a discussion with the H&N oncology team, which resulted in a consensus that radiation oncologists would provide the DIG to patients before radiation, surgical nurse practitioners would incorporate the DIG documentation into presurgical planning, and medical oncology program nurses

would give and document the DIG for the sequential chemotherapy care plan.

Most clinicians suggested developing an EMR template to place in the patient's EMR outlining the purpose of the DIG and the date it was given to the patient. The template would be readily accessible to all clinicians with access to EMR, including administrative personnel, who could then easily contact patients to ensure they scheduled a dental evaluation in a timely manner.

The run chart (Figure 2) summarizes the baseline and change data, showing a significant improvement in the frequency of DIG documentation from a baseline of 0% (range, 0% to 0%) to a mean of 53% (range, 0% to 100%) over 3 months ( $P < .01$ ). During the time period shown, there were two interventions tested and refined. For the first test of change, we trial tested both interventions, defining the clinicians responsible for DIG provision and documentation, and using the newly created EMR template. We pilot tested the intervention among the smaller study-team and studied the weekly change data via prospective chart review, presenting this in our weekly radiation oncology meeting. The process was then implemented within the entire H&N oncology program. The 3 weeks with a 0% documentation rate were weeks with a particularly low volume of 0 to zero to one eligible patients (mean, four eligible patients/week, range, one to 11). Although the balance measure was not quantified, the feedback from front-line clinicians and administrative staff was that the intervention enhanced the efficiency of the preradiation work process.

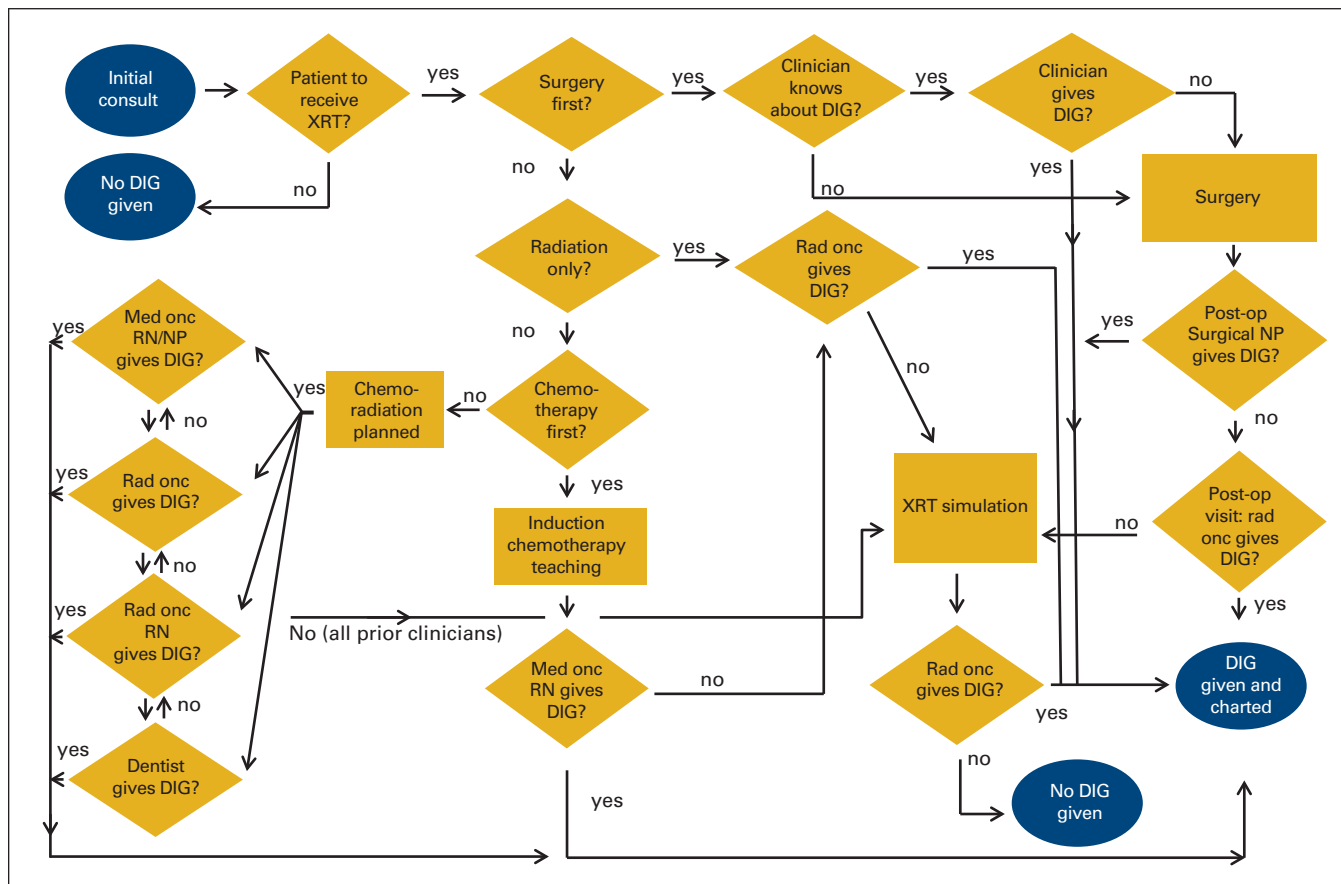
A sustainability plan was created to maintain and monitor the gains from our tests-of-change. The process and outcome measures were reviewed during weekly radiation oncology patient rounds, in which multidisciplinary clinicians and administrative staff review all patients seen in consultation, patients receiving treatment, and patients anticipated to start RT. This information was studied to raise awareness among providers, identify new barriers to pretreatment dental screenings, and identify patients needing follow-up to ensure that their community-based dental evaluation/treatments were complete.

After review of the last 3 months of data, it was noted that 89% of patients with documentation of DIG provision had subsequent DIG receipt by our OMC at a median of 11 days before RT start, with seven patients having the DIG returned only after the start of RT. For 15 patients, the DIG was received by the OMC yet without documentation of initial DIG provision.

## Discussion

Through a multidisciplinary approach, we implemented an intervention to identify patients undergoing community-based dental evaluation before RT for H&N cancer. We demonstrated a significant change in the existing process for DIG documentation and created a plan for sustainability by incorporating weekly assessment of the intervention into patient rounds.

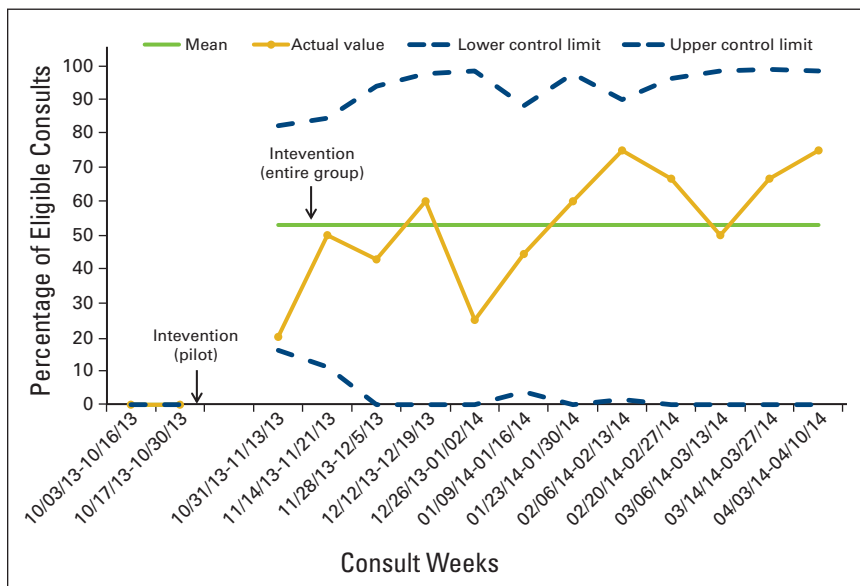
We noted several potential barriers that require continued monitoring. First, because of the multidisciplinary nature of the H&N oncology program, the successful implementation of the DIG documentation process requires sustained coordination of efforts across multiple disciplines. Second, despite recommenda-



**Figure 1.** Process map from the initial patient consultation to documentation of the dental instructional guide (DIG) showing the process before project initiation. DIG, dental instructional guide; Med onc, medical oncologist; RN, registered nurse; Rad onc, radiation oncologist; RN, registered nurse; XRT, radiation therapy.

tion for preradiation evaluation, some patients are reluctant to have dental evaluations. Prior research shows that lack of dental insurance may affect receipt of dental care among cancer survivors<sup>4,6</sup> but it is less studied in the pretreatment setting.<sup>6</sup> Third, the DIG allows

patients to be evaluated by their community dentists but requires a separate process to ensure that the evaluation and any necessary dental work are complete to allow timely initiation of cancer-directed therapy. We described a coordinated effort with the OMC



**Figure 2.** Percentage of eligible new consults with documented provision of the dental instructional guide. P-chart, 3-sigma.

to document receipt of the community-based dental evaluation and a process for patient tracking and follow-up.

The extremely limited time window between consultation and RT start, often only 2 weeks, requires a highly efficient process. Our data showed that although most patients had timely dental evaluations completed before RT start, some patients only had the DIG returned to our institution after RT initiation. Future work will involve increasing direct communication with community dentists to facilitate timely coordination of preradiation dental evaluation in combination with use of EMR templates.

#### AQ: F **Authors' Disclosures of Potential Conflicts of Interest**

Disclosures provided by the authors are available with this article at [jop.ascopubs.org](http://jop.ascopubs.org).

#### AQ: G **Author Contributions**

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## References

1. Jensen SB, Pedersen AM, Vissink A, et al: A systematic review of salivary gland hypofunction and xerostomia induced by cancer therapies: Prevalence, severity and impact on quality of life. *Support Care Cancer* 18:1039-1060, 2010
2. Hong CH, Napeñas JJ, Hodgson BD, et al: A systematic review of dental disease in patients undergoing cancer therapy. *Support Care Cancer* 18:1007-21, 2010
3. Chaveli-López B: Oral toxicity produced by chemotherapy: A systematic review. *J Clin Exp Dent* 6:e81-e90, 2014

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**AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST****Ensuring Head and Neck Oncology Patients Receive Recommended Pretreatment Dental Evaluations**

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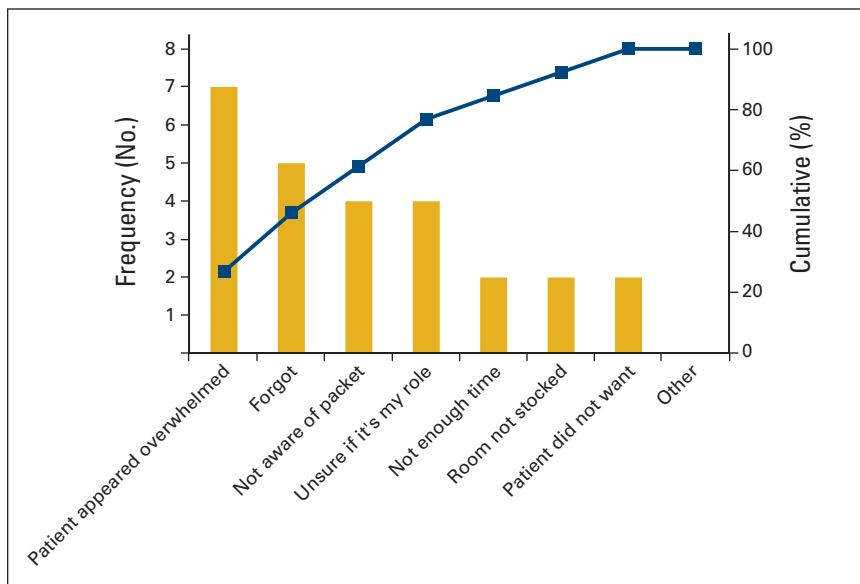
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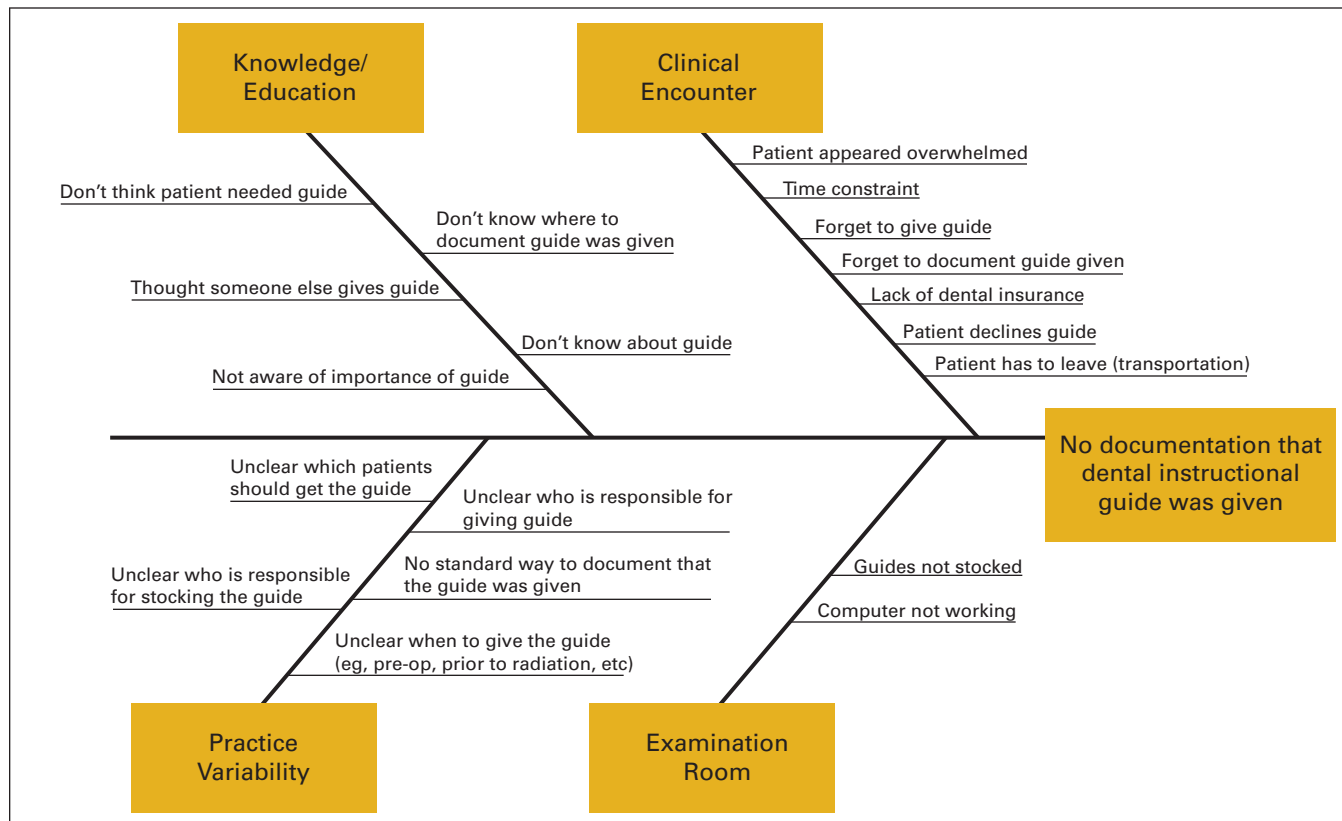
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Appendix

FA1-FA2



**Figure A1.** Pareto chart summarizing survey results of 18 clinicians from the head and neck (H&N) oncology program. Clinicians reported the top reasons for failing to provide the dental information guide. Respondents included a dentist (n = 1), radiation oncologists (n = 4), H&N surgeons (n = 4), medical oncologists (n = 4), a speech pathologist (n = 1), surgical nurse practitioners (n = 2), and program nurses (n = 2). More than one reason was allowed per respondent.



**Figure A2.** A cause and effect diagram showing all reported reasons for failing to document provision of the dental instructional guide. Reasons were elicited from the clinician survey and from formal brainstorming sessions of the front-line clinicians and administrative staff that comprised the study/implementation team.

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