Evidence-Based Oncology Oral Care
Clinical Practice Guidelines:
Development, Implementation, and Evaluation

Carrie Tompkins Stricker, MSN, CRNP, AOCN®, and Jacqueline Sullivan, PhD, RN, CCRN

Introduction

As the evidence for oncology nursing practice expands exponentially, nurse clinicians, including oncology nurses, are faced with a growing demand to integrate evolving contemporary evidence into practice. Models such as the Evidence-Based Practice (EBP) Framework (University of Pennsylvania Health System [UPHS] Nursing Research Committee, 1999) (see Figure 1), as well as the Oncology Nursing Society’s (ONS’s) EBP Online Resource Center, can provide critical guidance for clinicians pursuing EBP initiatives. At UPHS, a comprehensive, evidence-based, oncology oral care clinical practice guideline (CPG) was developed and revised by a multidisciplinary work group and is being implemented and evaluated for its impact on nursing and patient care outcomes at the Hospital of the University of Pennsylvania under the leadership of the primary author. The formulation of this practice guideline represents a significant research-based innovation in nursing and multidisciplinary clinical practice at UPHS and provides an excellent example of how practicing oncology nurses can use an EBP framework to effect change in an institution.

Step I: Identifying a Clinical Problem and Determining Its Priority for Practice Change

The UPHS EBP framework’s first step involves identifying a clinical problem and determining its level of priority for practice change. At UPHS, the product committee’s reexamination of oral care products prompted the review of nurses’ oral care practices. Consultation with the practice committee revealed that no institutional guidelines existed, with the exception of basic standards for oral care in head and neck surgery and prophylactic antibacterial and dental care standards in allogeneic bone marrow transplantation; however, documentation of supporting evidence was not available. A subsequent survey of inpatient oncology nursing staff found that tradition, patient preference, and physician orders predominantly guided nurses’ oral care practices. Therefore, the creation of a health-system-wide oral care CPG was identified as a priority. Oncology-specific recommendations were prioritized because of the high incidence of oral alterations and product usage in the hematology and oncology and radiation oncology divisions.

Step II: Gathering and Evaluating Evidence

The next phase in the EBP framework involves gathering and evaluating evidence. The development of new evidence-based CPGs can be costly in terms of time and resources. Searching for available clinical guidelines, which may preclude the need to perform this extensive work, is advisable. Using the UPHS model’s suggested resources (see Figure 2), existing guidelines related to oncology oral care were compiled and evaluated for methodologic rigor and clinical relevance using model criteria (see Figure 3). A 1989 National Institutes of Health (NIH) consensus statement, “Oral Complications of Cancer Therapies” (NIH, 1989), provided a core of general recommendations but was too broad to be the foundation for the CPG and required updating with literature that was published after 1989. Next, a search was performed for published oral care standards using the terms “dental care/standards” and “oral hygiene/standards.” An article highlighting an oral care standard implemented at Emory University Hospital for the care of patients with leukemia and bone marrow transplant recipients was identified, and it contributed to the basic structure and some content items of the UPHS oncology oral care CPG (Yeager, Webster, Crain, Kaskow, & McGuire, 2000). However, significant limitations were present related to the strength of patient outcome data collected, and the evidence base for the standard was not fully delineated.

Therefore, a comprehensive search of biomedical databases was performed in MEDLINE®, CINAHL®, and the Cochrane Database of Systematic Reviews. The search terms “oral hygiene,” “stomatitis,” and “mucositis” were combined with “oncology,” “neoplasms,” “radiation,” “surgery,” and “chemotherapy.” Fifty-four articles were selected for full review and divided into topics of (a) assessment, (b) prevention, and (c) treatment of oral complications in patients undergoing chemotherapy.

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Key Words: stomatitis, analgesics

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FIGURE 1. EVIDENCE-BASED PRACTICE FRAMEWORK

*Note.* Courtesy of the University of Pennsylvania Health System Nursing Research Committee. Used with permission.
stem cell and bone marrow transplant, and radiotherapy. Articles addressing pharmacologic interventions such as prophylactic oral antibiotics were excluded because the CPG was to be directed at general oral care.

Findings from 29 research studies (including 14 randomized trials), 17 review articles, and 8 clinical articles and abstracts were compiled by the primary author using the UPHS EBP framework’s tables of evidence and guidelines for article review. Similar data tables also are available on ONS Online (see Figure 4) to guide the critical analysis of research articles and assist with organization of findings. These results were combined with the NIH consensus statement and the published Emory oral care standard (Yeager et al., 2000). The synthesized CPG addressed the following oral care practices in the general oncology and bone marrow and stem cell transplant populations: (a) oral assessment—

daily nursing assessment using Eilers, Berger, and Petersen’s (1988) Oral Assessment Guide, (b) daily oral hygiene regimen, (c) use of antibacterial mouthwashes, including chlorhexidine, (d) management of xerostomia, (e) topical analgesics for oral pain, and (f) patient education (see Figure 5 for a sample subsection of UPHS Oncology Oral Care CPG). To incorporate “expert opinion” as a form of evidence into the guidelines and facilitate the successful implementation and evaluation of the CPG, a multidisciplinary work group was convened. This work group is composed of clinical and administrative nurses and nurse practitioners from the divisions of hematology and oncology, radiation oncology, and bone marrow transplant, as well as the UPHS clinical director for nursing practice and research, two medical oncologists, a nationally recognized oral medicine specialist, and a doctorally prepared nurse with internationally recognized expertise in mucositis and oral complications related to cancer therapy. Minimal revisions were made to the content of the CPG during the group’s initial

<table>
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<tr>
<th>Guideline Criteria</th>
<th>Findings</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Publication date</td>
<td>Guidelines have been published within the past five years.</td>
<td>Yes</td>
</tr>
<tr>
<td>Literature search procedure</td>
<td>Literature search process is clear.</td>
<td>Yes</td>
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<tr>
<td>Key terms</td>
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<td>No</td>
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<tr>
<td>Databases</td>
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<td>No</td>
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<td>Years searched</td>
<td>Yes</td>
<td>No</td>
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<td>Inclusion criteria for review of a study</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Exclusion criteria for reviewing a study</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Membership panel</td>
<td>Evidence of the membership and credentials of the panel</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient population</td>
<td>Population is identified.</td>
<td>Yes</td>
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Note. Based on information from the University of Pennsylvania Health System Nursing Research Committee, 1999.

Figure 2. Online Resources for Gathering Evidence

Note. Based on information from the University of Pennsylvania Health System Nursing Research Committee.
work, and efforts were redirected toward the implementation and evaluation of the CPG across the health system. In future EBP projects, such a work group should be formed earlier, for this would have markedly improved the comprehensiveness of the initial draft of the CPG as well as the timeliness of its development.

**Step III: Making Change**

Principles of the change theory are addressed on ONS’s EBP Online Resource Center, and these guided the efforts prior to implementation of the oncology oral care CPG. Preliminary and planning phases are critical in preparing the practice environment to accept change (ONS EBP Online Resource Center, n.d.). During the preliminary phase, the necessary tasks are to (a) identify expected outcomes of the change and their relevance to the organization, (b) collect baseline data on current practices within the organization, (c) identify and assess stakeholders, and (d) determine the costs and resources necessary for implementation and maintenance. Stakeholders were identified as inpatient nurse practitioners who wrote orders on the oncology units, nurse managers on the oncology and bone marrow transplant units and outpatient radiation oncology center, and specific dental and medical oncologists. These stakeholders agreed to become members of the UPHS oncology oral care work group. This work group indicated that incorporation of interventions into the inpatient computerized order entry and documentation system would be a critical structural component of successful adoption of the CPG. Additionally, the group deliberated carefully in choosing baseline data to collect and outcomes to measure preceding and following CPG implementation.

During the planning phase, critical activities included (a) identifying the setting for implementation of practice change, (b) identifying structure or process components that need to be revised, (c) determining the appropriate approval process, (d) identifying barriers and bridges to implementation, such as staff nursing time burden, and (e) developing a time frame for educating all involved staff (ONS EBP Online Resource Center, n.d.). The implementation and evaluation of the oncology oral care CPG currently is under way on the oncology and bone marrow transplant inpatient units and the outpatient radiation oncology department at the Hospital of the University of Pennsylvania. A detailed plan was developed for communication about the new CPG and education of nursing, medical, and dental staff. Computerized oral care order sets were written. Didactic content and schedules were developed for nursing staff CPG services, which included viewing a video explaining the Oral Assessment Guide (Emory University Hospital, 1994). In addition, students from the School of Dental Medicine at the University of Pennsylvania were recruited and educated to conduct hands-on clinical training sessions with staff nurses to practice the use of didactic content. Patient education handouts on prevention and treatment of oral care complications and instructional posters for patient rooms were revised by the oral care work group.

**Step IV: Evaluating Practice Methods**

A quasiexperimental, pretest–post-test design was devised to measure statistically and clinically significant patient- and nursing-specific outcomes. To increase the effect size, the evaluation plan is being conducted in two populations at high risk for oral complications: patients with acute leukemia receiving inpatient chemotherapy and outpatients undergoing head and neck radiotherapy. The sample is 40 patients (20 pretest and 20 post-test) matched on key demographic and disease or treatment variables using a baseline questionnaire designed by the work group. Sixty oncology nurses practicing in these settings comprised the sample to be evaluated on pre- and post-test measures of nursing outcomes related to the implementation of the oral care CPG.

**Measures**

All measures have been performed at baseline and will be repeated one month following full implementation of the CPG.

**Nursing outcomes:** Nursing knowledge is measured by an investigator-developed and piloted 12-item instrument with multiple-choice questions, and nursing documentation is assessed with a standardized checklist evaluating adherence to daily Oral Assessment Guide use and other CPG parameters.

**Patient-specific outcomes:** All measures are recorded three times weekly for a minimum of weeks per patient by one of five oncology advanced practice nurses (APNs) who...
I. Clinical Practice Guideline (CPG)

A. The following recommendations are intended for the population of inpatient and outpatient oncology patients receiving treatment with systemic chemotherapy or radiotherapy to the head and neck, as well as those patients admitted to the hospital for complications of chemotherapy treatment. This population includes patients with leukemia and patients undergoing bone marrow and stem cell transplant, with additional special requirements for this population incorporated as necessary into the recommendations below.

1. Dental consult encouraged prior to initiation of cancer treatment for the specific subpopulations with allogeneic bone marrow transplantation, leukemia induction/reinduction chemotherapy, or head and neck malignancies.

2. Oral assessment should be performed on a daily basis as a mandatory component of the nursing assessment. The Oral Assessment Guide (OAG) (Eilers et al., 1988) is the daily nursing assessment for the Oral Care CPG. A total score from 8–24 is calculated and is utilized to guide nursing interventions.

3. Oral care regimen should consist of the measures below, and should be performed with the following frequency:
   - Three times daily and at bedtime
   - In addition, the regimen should be performed one additional time (if awake) at night in patients receiving high dose methotrexate, those undergoing bone marrow or stem cell transplants, or patients with a prior history of mucositis.
   - Increase frequency to every two hours in patients with an OAG score of greater than or equal to 14.

   a. Brush teeth with soft toothbrush and fluoride toothpaste for general hospitalized patient population; supersoft toothbrush is suggested for bone marrow transplant and hospitalized leukemia patient populations. Consideration can be given to the use of toothettes or Periogard mouthrinses in situations where toothbrushing may be harmful or contraindicated (for example, in individuals with periodontal disease and low platelets, or gingival hemorrhage). Dental/oral medicine consult should be considered in these situations.

   b. Flossing: Patients with platelets less than 50,000 should not floss.

   c. Mouth rinses: Normal saline is the preferred mouth rinse. Sodium bicarbonate, sterile water, or nonalcoholic mouthrinses, if preferred by patients, are suggested as alternative rinsing agents. Nonalcoholic chlorhexidine mouthwash is not recommended for mucositis prevention, but may be considered for prevention of dental caries in individuals who cannot perform toothbrushing, or in other specified situations as indicated clinically. Dentistry or oral medicine consultation should be considered. Literature review demonstrates a range of positive, negative, and neutral studies comparing this agent to placebo or the other rinses described above. Hydrogen peroxide mouthrinses should not be used.

   d. Topical fluoride (0.1% aqueous stannous fluoride [SF] solution or 0.4% SF gel) for dental hygiene and caries prevention in patients undergoing head and neck or total body irradiation and in patients with significant xerostomia.

   e. Mouth moisturizer (nonpetrolatum) to lips and oral cavity as needed

4. Patient Education
   - Should reinforce the above oral care standard
   - Distribution of Mouth Sores handout upon hospital discharge or at initiation of outpatient therapy
   - Post a standardized Special Care for Your Mouth patient education brochure in patient rooms.

5. Saliva Substitutes
   - Mucin-based saliva substitutes are supported by the literature as being superior to carboxymethylcellulose-based substitutes for both patient preference and reduction of xerostomia.

6. Topical Analgesics
   - Compounded analgesic mouthrinses such as “magic mouthwash,” consisting of various compounded formulations of lidocaine, diphenhydramine, antacids, and/or sodium bicarbonate, are not recommended.
   - Single agent topical analgesics are preferred, such as Ulcerease® [Med-Derm Pharmaceuticals, Johnson City, TN] or straight lidocaine.

II. Evidence Reviewed

A. Guidelines


   - A national awareness campaign sponsored by the National Institute of Dental and Craniofacial Research (of the National Institutes of Health) and the National Oral Health Information Clearinghouse.

B. Expert Opinion

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C. Abbreviated Bibliography


(Continued on next page)


Findings and Implications

All pretest outcome data have been collected. Both nursing-specific outcome tools have been incorporated into an annual oncology nursing core competency to ensure continued monitoring of CPG-related outcomes. Overall, the primary author, an oncology nurse practitioner with extensive clinical responsibilities, has coordinated this implementation and evaluation model feasibly without imposing unrealistic time demands. If evaluation of the CPG demonstrates positive impact on nursing and patient-care outcomes at the Hospital of the University of Pennsylvania, the CPG will undergo health system-wide application in the future.

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References


