



### 3. Definition and Description of the Problem

Mucositis is an inflammatory and potentially ulcerative process that affects the mucous membranes of the oral cavity and gastrointestinal tract of individuals receiving chemotherapy and radiation therapy as treatments for cancer (i.e. mucotoxic chemotherapy, hyperfractionated radiotherapy to a field including the oral cavity, and concurrent chemotherapy and radiation therapy) (Avritscher et al., 2004; Brown & Wingard, 2004).

#### ICD-9 Criteria for Mucositis (Puckett, 2004, p. 738)

528.0 Stomatitis—inflammation of the oral mucous membrane

Stomatitis:

Not otherwise specified

Ulcerative—a form marked by the appearance of small ulcers

Vesicular stomatitis—a form marked by vesicular eruption on the mucous membrane

Historically, literature used the terms mucositis and stomatitis in combination (i.e., mucositis/stomatitis) or almost interchangeably. For reference searches, stomatitis and mouth mucosa are the required Medical Subject Headings (MeSH) terms. Use of the term mucositis will produce less comprehensive findings. In contrast, experts in oral cavity changes associated with mucositis recommend a change in nomenclature to use the term *stomatitis* to refer to inflammatory diseases of the mouth including mucosa, dentition/periapices and periodontium and the term *mucositis* to refer to inflammation of the mucous membranes which typically manifests as erythema or ulcerations (National Cancer Institute & National Institutes of Health, 2004; Rubenstein et al., 2004). A request is pending with the National Library of Medicine to have mucositis made into a MeSH heading.

Mucositis can encompass all of the mucous membranes. One other example of a change in terminology related to this clarification in the use of the terms mucositis and stomatitis is use of the term mucotoxic rather than stomatotoxic to refer to treatments that have the potential to damage the mucous membranes.

This document will focus on mucositis involving the oral and oropharyngeal cavity. Gastrointestinal mucositis, although of significance in the well-being of patients, is less readily visible and thus more challenging for nurses to assess, diagnose, and treat.

Mucositis is a multifaceted problem that can lead to a number of clinical complications (Eilers, 2004; Eilers & Epstein, 2004), including pain, hemorrhage, and taste changes, that can decrease quality of life. Xerostomia, or lack of saliva, may or may not accompany mucositis. Individuals with mucositis use the terms pain, bleeding, taste changes, and dry mouth to report the symptoms that they



experience and have reported mucositis to be the most distressing symptom of high-dose therapy (Bellm et al., 2002; Borbasi et al., 2002).

Mucositis remains a major dose-limiting side effect of cancer therapy. This dose-limiting effect is related to the risk of life-threatening infections secondary to breakdown in the mucosal lining that normally provides the first line of defense against microbial invasion by the organisms in the oral cavity. Use of antimicrobial agents in individuals receiving cancer treatments also alters the make-up of the normal flora in the oral cavity, thus contributing to the risk of problems because of the disruption of the normal balance of organisms.

### **Factors That Influence Mucositis**

<b>Risk Factor</b>		<b>Increased Risk</b>
Patient related		
	Age	Young children and elderly <sup>a, d</sup>
	Gender	Women are at greater risk for severe mucositis. <sup>a</sup> No difference <sup>b</sup>
	Oral health and oral hygiene	Poor oral health and poor oral hygiene <sub>a, b</sub>
	Salivary function	Reduced production <sup>a</sup>
	Genetics	High expression of cytokines <sup>a</sup>
	Body mass index	Poor nutritional status <sup>a</sup> Role of nutritional status controversial <sub>b</sub>
	Renal function and possibly hepatic function	Altered drug metabolism <sup>a, d, e</sup>
	Smoking	History of tobacco use may increase risk. <sup>a, c</sup>
	Alcohol use	History of heavy use may increase risk. <sup>c</sup>
Therapy related	Chemotherapy or biotherapy agent	Agents that affect DNA synthesis <sup>g</sup> Interleukin-2, lymphokine-activated killers, tumor necrosis factor, and interferons <sup>f</sup>
		Higher doses and longer-term infusions <sup>a</sup>
		Combined with radiation therapy <sup>a</sup>
	Type of blood and marrow stem cell transplant	Allogeneic <sup>a</sup>



Risk Factor		Increased Risk
	Radiation site and fractionation	Head and neck treatment fields, including total body irradiation (fields including thorax, abdomen and anal-rectal produce gastrointestinal mucositis) <sup>a</sup> Hyperfractionation and acceleration <sup>a</sup>
	Previous cancer treatment	History of mucositis with previous treatment <sup>a</sup>
<sup>a</sup> Avritscher et al., 2004; <sup>b</sup> Barasch & Peterson, 2003; <sup>c</sup> Porock et al., 2004; <sup>d</sup> Berger & Eilers, 1998; <sup>e</sup> Daeffler, 1998; <sup>f</sup> Madeya, 1996; <sup>g</sup> National Cancer Institute & National Institutes of Health, 2004		

### References:

- Avritscher, E.B., Cooksley, C.D., Elting LS. (2004). Scope and epidemiology of cancer therapy-induced oral and gastrointestinal mucositis. *Seminars in Oncology Nursing*, 20, 3–10.
- Barasch, A., & Peterson, D.E. (2003). Risk factors for ulcerative oral mucositis in cancer patients: Unanswered questions. *Oral Oncology*, 39(2), 91–100.
- Bellm, L.A., Epstein, J.B., Rose-Ped A, Martin P, Fuchs HJ. (2000). Patient reports of complications of bone marrow transplantation. *Supportive Care in Cancer*, 8, 33–39.
- Berger A.M., & Eilers, J. (1998). Factors influencing oral cavity status during high-dose antineoplastic therapy: A secondary data analysis. *Oncology Nursing Forum*, 25, 1623–1626.
- Borbasi, S., Cameron, K., Quested B, Olver I, To B, Evans D. (2002). More than a sore mouth: Patients' experience of oral mucositis. *Oncology Nursing Forum*, 29, 1051–1057.
- Brown, C.G., & Wingard, J. (2004). Clinical consequences of oral mucositis. *Seminars in Oncology Nursing*, 20, 16–21.
- Daeffler, R. (1998). Protective mechanisms: Mucous membranes. In B. Johnson & J. Gross (Eds.), *Handbook of oncology nursing* (3rd ed., pp. 440–459). Sudbury, MA: Jones and Bartlett;
- Eilers, J. (2004). Nursing interventions and supportive care for the prevention and treatment of oral mucositis associated with cancer treatment. *Oncology Nursing Forum*, 31(4, Suppl.), 13–23.
- Eilers, J., & Epstein, J.B. (2004). Assessment and measurement of oral mucositis. *Seminars in Oncology Nursing*, 20, 22–29.
- Madeya, M. (1996). Oral complications from cancer therapy: Part 1. Pathophysiology and secondary complications. *Oncology Nursing Forum*, 23, 801–807.
- National Cancer Institute & National Institutes of Health. (2004). Oral



- complications of chemotherapy and head/neck radiation. Retrieved December 30, 2004, from [Oral Complications of Chemotherapy and Head/Neck Radiation](#)
- Peterson, D.E., & Cariello, A. (2004). Mucosal damage: A major risk factor for severe complications after cytotoxic therapy. *Seminars in Oncology*, 31(3, Suppl. 8), 35–44.
- Porock, D., Nikolettic, S., & Cameron, F. (2004). The relationship between factors that impair wound healing and the severity of acute radiation skin and mucosal toxicities in head and Neck cancer, *Cancer Nursing*, 27, 71 – 7.
- Puckett, C.D. (2004). The educational annotation of ICD-9-CM (5th ed.), Reno, NV: Channel Publishing.
- Rubenstein, E.B., Peterson, D.E., Schubert, M., Keefe, D., McGuire, D., Epstein, J., et al. (2004). Clinical practice guidelines for the prevention and treatment of cancer therapy-induced oral and gastrointestinal mucositis. *Cancer*, 100(9, Suppl.), 2026–2046.
- Worthington, H.V., & Clarkson, J.E. (2002). Prevention of oral mucositis and oral candidiasis for patients with cancer treated with chemotherapy: Cochrane Systematic Review. *Journal of Dental Education*, 66, 903–911. [PubMed Abstract](#)
- Worthington, H.V., Clarkson, J.E., & Eden, O.B. (2004). Interventions for treating oral mucositis for patients with cancer receiving Treatment [Cochrane review]. In *The Cochrane Library*, Volume 4, 2004. Oxford, UK: Update Software. [PubMed Abstract](#)