

# Using a Computer-Based Risk Assessment Tool to Identify Risk for Chemotherapy-Induced Febrile Neutropenia

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This article evaluates the feasibility of developing and implementing a computer-based risk assessment tool (CBRAT) for febrile neutropenia and determines whether it could improve documentation of risk assessment in patients starting myelosuppressive chemotherapy regimens. The CBRAT was designed using a template creator in a commercial electronic medical records system. The effectiveness of the CBRAT was evaluated by comparing medical records data of patients with one or more risk factor for febrile neutropenia who were given prophylactic granulocyte–colony-stimulating factor before and after implementation. CBRAT usage significantly increased the likelihood of documented febrile neutropenia risk assessment from 13% before implementation to 100% after implementation ( $p < 0.001$ ). No significant changes occurred in febrile neutropenia incidence rates, dose reductions, or dose delays. In addition, healthcare providers quickly learned how to operate the CBRAT and used it routinely, significantly improving the number of patients with documented febrile neutropenia risk assessment. Implementation of a computer-based tool can help nurses follow evidence-based guidelines that recommend routine febrile neutropenia risk assessment for patients initiating myelosuppressive chemotherapy.

**F**ebrile neutropenia is recognized as a serious adverse event of myelosuppressive chemotherapy. Defined as the occurrence of fever (higher than  $38.2^{\circ}\text{C}$  for longer than an hour) associated with an absolute neutrophil count lower than  $500/\text{mm}^3$  (Freyer, Ligneau, & Trillet-Lenoir, 1998), febrile neutropenia typically requires hospitalization, blood cultures, and broad-spectrum antibiotics (National Comprehensive Cancer Network [NCCN], 2008b). Even with treatment, febrile neutropenia can be associated with substantial mortality. Research on febrile neutropenia-related hospitalizations in the United States has determined that the risk for inpatient mortality is 6.8%–9.5% overall (Caggiano, Weiss, Rickert, & Linde-Zwirble, 2005; Kuderer, Dale, Crawford, Cosler, & Lyman, 2006) and 21% in patients with more than one major comorbidity (Kuderer et al., 2006).

Complications of febrile neutropenia often result in chemotherapy dose reductions and delays (Crawford et al., 2008; Lyman, Dale, & Crawford, 2003; Lyman, Dale, Friedberg, Crawford, & Fisher, 2004), which can compromise treatment outcomes. Clinical trials have documented that dose reductions are associated with poorer overall survival in the curative setting in chemosensitive cancers, such as non-Hodgkin lymphoma (Bosly et al., 2007; Pettengell, Schwenkglenks, & Bosly, 2008) and early-stage breast cancer (Bonadonna et al., 2005; Early Breast Cancer Trialists' Collaborative Group, 2005). Dose reductions and delays also have been shown to

## At a Glance

- ◆ Chemotherapy-induced febrile neutropenia is associated with significant morbidity and mortality and may require dose modifications that compromise survival in some patients.
- ◆ International evidence-based guidelines recommend routine assessment for febrile neutropenia risk before patients start myelosuppressive chemotherapy.
- ◆ Use of a standardized computer-based template can help oncology nurses target the use of granulocyte–colony-stimulating factor to patients who are most likely to receive benefit.

preclude optimal outcomes in the noncurative setting in patients with metastatic breast cancer (Hryniuk, Frei, & Wright, 1998), metastatic colorectal cancer (Scheithauer et al., 2003), and small cell lung cancer (Ardizzoni et al., 2005).

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