

# Implementation of an Evidence-Based Order Set to Impact Initial Antibiotic Time Intervals in Adult Febrile Neutropenia

Janie T. Best, DNP, RN, CNL, ACNS-BC, Karen Frith, PhD, RN, NEA-BC, Faye Anderson, DNS, RN, NEA-BC, Carla Gene Rapp, PhD, RN, CCRN, Lisa Rioux, BSN, RN, OCN®, and Christina Ciccarello, PharmD

**N**eutropenia, one of the most common side effects of chemotherapy, places patients with cancer at increased risk for systemic infection (sepsis) and infection-related death. Chemotherapy depletes infection-fighting resources, specifically neutrophils, and infection may be masked by the absence of the normal febrile response (National Comprehensive Cancer Network [NCCN], 2011). Fever related to neutropenia (febrile neutropenia) is a major reason for hospitalization of chemotherapy recipients. In addition to increased healthcare costs, delays in chemotherapy decrease overall quality of life and may prevent optimal treatment outcomes (Coughlan & Healy, 2008; Donohue, 2006; Kuderer, Dale, Crawford, Cosler, & Lyman, 2006; Nirenberg et al., 2006a). Patients who develop febrile neutropenia following chemotherapy require hospitalization to receive antibiotic therapy. Delays in initiation of antibiotics can occur at any point in the admission process, increasing the patient's risk for sepsis and death (Baltic, Schlosser, & Bedell, 2002). The purpose of this project was to evaluate the effects of the implementation of a standardized order set on the time interval in initiation of antibiotic therapy for adult patients with cancer and febrile neutropenia who were admitted to the oncology unit of an urban hospital.

## Febrile Neutropenia

NCCN guidelines (2011) define a fever as a single temperature of 38.3°C or higher orally or 38°C or higher over one hour. Infection may be subtle in patients with a low absolute neutrophil count because of a compromised immune response, with fever often being the only sign of a serious infection (Camp-Sorrell, 2005; Coughlan & Healy, 2008; Kannangara, 2006). Febrile neutropenia is defined by the presence of fever in a patient who has an inadequate amount of circulating neutrophils to fight infection (Book,

**Purpose/Objectives:** To evaluate the impact of the implementation of a standardized order set on the time interval in initiation of antibiotic therapy for adult patients with cancer and febrile neutropenia.

**Design:** Practice change.

**Setting:** The oncology unit of an urban hospital in the southeastern United States.

**Sample:** Adult patients with cancer and febrile neutropenia admitted six months prior to ( $n = 30$ ) or during the three months following ( $n = 23$ ) implementation of the order set.

**Methods:** Literature regarding febrile neutropenia, use of order sets, and change process was reviewed. In addition, a retrospective and concurrent chart review was conducted for adult patients admitted with febrile neutropenia. Time intervals were analyzed using SPSS® software, version 18.

**Main Research Variables:** Initial antibiotic times, order-set use, and length of stay.

**Findings:** An overall reduction in time intervals for initiation of antibiotic therapy was observed for presentation ( $t = 2.25$ ; degrees of freedom [df] = 37;  $p = 0.031$ ) and order ( $t = 2.67$ ;  $df = 40.17$ ;  $p = 0.012$ ) to antibiotic administration, with an order-set usage of 31% in the inpatient unit and 71% in the emergency department.

**Conclusions:** Findings in the presence of low order-set usage suggest that staff education and placement of the order-set antibiotics in unit-based medication dispensing machines helped reduce time intervals for initial antibiotic therapy.

**Implications for Nursing:** The use of an evidence-based approach to nursing care is essential to achieving the best outcomes for patients with febrile neutropenia. Incorporation of current evidence into an order set to guide clinical practice and comprehensive nurse, pharmacy, and physician education are needed for the successful implementation of evidence-based practice changes.

2008) or an absolute neutrophil count lower than 500/mcl (NCCN, 2011). Although 6% of febrile neutropenic events occur during the first cycle of chemotherapy treatment, about 11% of patients are at risk for experiencing a febrile