Risk Modeling: Applying Evidence-Based Risk Assessment in Oncology Nursing Practice

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Purpose/Objectives: To introduce nurses to the concept of evidence-based risk models and their use in practice.

Data Sources: Poster presentations at meetings and published articles and books.

Data Synthesis: Evidence-based risk models can be used in many clinical situations to identify patients at higher risk for a particular disease or clinical outcome, such as adverse events. These models may be based on molecular, epidemiologic, clinical, or family information obtained from patients. Risk models also may provide information about the cost-effectiveness of prevention, treatment, or support strategies for specific patients.

Conclusions: Determining the risks of disease- or therapy-related adverse events can help healthcare providers and patients. Risk assessment to identify patients who are most likely to benefit from supportive care can lead to the cost-effective use of these supportive care measures and improved clinical outcomes.

Implications for Nursing: Through awareness of relevant evidence-based risk models, nurses can become more effective in actively managing their patients' care. Because of their close and ongoing contact with patients with cancer, oncology nurses are in an ideal position to assess risk factors for adverse events and to use appropriate supportive care for those patients who are at greatest risk.

The concept of risk plays a key role in most decision making. In everyday life, the term "risk" is used in many different contexts to describe probability. Risk generally is perceived to be associated with the negative aspects of a situation and inversely related to benefit (Sokolowska & Pohorille, 2000). In the context of clinical practice, risk commonly is associated with the occurrence of undesirable outcomes, such as a disease- or treatment-related adverse event. An example of a typical disease risk model is the Gail model, developed to predict the five-year risk of invasive breast cancer in women. The model is based on factors such as a family history of breast cancer, personal history of breast biopsies, age at first live birth, current age, age at menarche, and age at menopause (Claus, 2000; Gail et al., 1999).

Assessing risk always has been part of the process through which healthcare providers make decisions about patient care. For many health-related outcomes, key factors have been identified that can help healthcare providers determine patients' levels of risk. Statistical models based on information about these factors can be useful tools in clinical practice. By using models to predict risk, providers can more effectively target patients who are most likely to benefit from risk-reducing strategies. This approach can improve how resources are allocated, which is particularly important with costly procedures or therapies.

Key Points . . .

- ➤ Risk models can be used to predict a patient's likelihood of developing therapy-related adverse events.
- ➤ Nurses who are familiar with evidence-based risk models may be better able to prevent or more effectively ameliorate serious adverse events associated with prevention, treatments, conditions, and diseases.
- ➤ Risk assessment to identify patients who are most likely to benefit from supportive care options can lead to cost-effective use and improved clinical outcomes.

Definitions of Risk in Clinical Practice

Risk generally is categorized as either relative or absolute. A glossary of basic statistical terms is provided in Figure 1. Relative risk (RR) compares the occurrence or likelihood of an outcome among people exposed to a given risk factor (i.e., a characteristic, behavior, or exposure related to the outcome) with the occurrence or likelihood of the outcome among people who lack exposure to the risk factor. The odds ratio (OR) is another measure for comparing risk and, for rare events, is similar to RR. An OR is calculated in logistic regression equations and is a typical measure of risk in meta-analyses. Although RR has value for describing risk at the population level (Claus, 2000), the goal of risk prediction in most clinical situations is to assess the absolute risk (AR) for a patient. This sometimes can be called incidence; it is the predicted probability that a person will experience an outcome in a specified time. Estimates of AR can help healthcare workers make key decisions about the use and effectiveness of interventions (Claus).

Various statistical methods (e.g., multivariate logistic regression, Cox proportional hazards modeling) have been developed to estimate risk. Based on information about the

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