What Are the Chances?  
Risk in the Real World

Suzanne M. Mahon, RN, DNSc, AOCN®, APNG

Increased survival from cancer has been a result of improved treatment and the earlier detection of cancer. This column will provide a focus on wellness for patients with cancer, their caretakers, and health professionals. This inaugural column provides a review of a basic epidemiologic principle—risk assessment, which is central to wellness.

Life is risky business. Although the world is filled with various risks, never before has more been known about how to manage them. People take risks every day, at times worrying more about certain risks than about others. Sometimes worry is appropriate; other times, it is not. Often, little or no thought is given to the dangers associated with activities. People choose to take certain risks. Every morning, millions of workers make decisions about how to get to work. Should they take a car, bus, or train; walk; or bike? Dangers are associated with each, but statistically, a bus is safest (Pringle, 1989).

Risk is an elusive concept for professionals and the public. As oncology professionals identify their personal risks for cancer as well as provide risk assessments to patients and their loved ones, they must consider the science of risk assessment.

The Psychology of Risk

A key factor involved in risk taking is whether a hazard is voluntary. People are much more willing to take or accept risks when they believe they have some control. People may smoke, drink, drive recklessly, fail to use a seatbelt, or go hang gliding because they feel they are in control. Involuntary hazards such as pollutants from industries, additives in food, and riding on commercial airlines frequently scare people more because they tend to feel powerless and more vulnerable to hazards.

Even when people believe they have control over situations, the amount of control may not be near what is perceived. Automobile drivers may feel in control of their destinies, but even the best defensive driving techniques cannot prevent some accidents. Often, people simply are overconfident or overvalue their judgment.

People often attach great significance to unlikely events if they seem important to them. For example, the meltdown of a nuclear plant is a highly unlikely event, but some people may be extremely worried about it. Winning a huge prize in a lottery also is associated with a very remote chance, but people often wager significant sums of money, no matter how slight their chances, in hopes of becoming instant millionaires.

The dread factor greatly influences perception (Pringle, 1989). Some events, such as nuclear weapon attacks, natural disasters, and terrorism, score higher on the dread factor continuum. Cancer is particularly feared and, for many, still is erroneously associated with protracted suffering and certain death.

Conceptualization of Risk

Experts in risk usually are more concerned about the quantity of risk, whereas the public often is more concerned about the quality of risk. If only a few lives per hundred thousand are at risk from a particular exposure, concern about the risk may be minimal for public health officials. For those exposed, however, the risk and its associated fears may be very real. Thus, interpretation about various risks is very personal. Almost everyone who has been diagnosed with cancer will affirm that, in retrospect, it did not matter what their personal risk for developing the malignancy was, once diagnosed. The only important aspects after diagnosis are whether the disease was detected when still amenable to effective, tolerable treatment. If knowledge of risk resulted in improved screening and earlier diagnosis, accurate perception and assessment of risk were clinically valuable.

The conceptualization of risk is rooted in psychology, science, and statistics. Helping people to understand complex scientific and statistical information in clear, simple form is the biggest challenge in risk assessment.  

Suzanne M. Mahon, RN, DNSc, AOCN®, APNG, is a clinical professor in the Division of Hematology/Oncology in the Department of Internal Medicine at Saint Louis University in Missouri.  

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assessment. In addition to the complex psychological perception of risk, the influence of media cannot be underestimated. Some risks are ignored, whereas others are exaggerated. Numbers and statistics often are manipulated in interesting ways. Television tends to focus on the unknown and dreaded factors, resulting in increased and elevated fear or inaccurate perceptions of risks.

Cancer Risk Assessment: The First Step in Managing Risk

A risk factor for cancer is a trait or characteristic that is associated with a statistically significant and increased likelihood of developing the disease. Having a risk factor, however, does not mean a person will develop a malignancy; nor does the absence of a risk factor make a person immune to developing a malignancy. Some risk factors can be modified or controlled; others cannot.

Basic elements of cancer risk assessment include a review of medical history, a history of exposures to carcinogens in daily living, and a detailed family history. Once all information is gathered, it must be interpreted and explained to patients in understandable terms. Often, this is accomplished by using various risk calculations such as absolute risk, relative risk, attributable risk, or specific risk models for various cancers.

Expression of Risk

To manage risk, people must accurately identify and measure it. Risk is determined by the probability of an event occurring and the severity of the event. The risk of death in an automobile accident in the United States is about 1 in 4,000. The probability is 1 in 4,000, and the severity is death. Data on automobile accidents are relatively straightforward. Other hazards are less easy to quantify. Expressing risk so it is understandable to lay people is important. For example, the chance of dying during any one automobile trip is about 1 in 4 million. If an average person makes about 50,000 automobile trips, in a lifetime of driving, about 1 of every 140 people dies in an accident; in a lifetime, 1 of 3 drivers is injured seriously enough to be disabled for at least one day (Pringle, 1989). Despite the relative dangers associated with automobile rides, people regularly get in automobiles for long and short trips and, in many cases, give little thought to the associated inherent risk.

Absolute risk is a measurement of the occurrence of disease, either incidence (new cases) or mortality (deaths), in the general population. Absolute risk can be expressed as the number of cases for a specified denominator (e.g., 43 cases per 10,000 people annually) or as a cumulative risk until a specified age (e.g., 1 in 8 women will develop breast cancer if they live until age 85). Another way to express absolute risk is to discuss the average risk of developing breast cancer at a certain age. For example, a woman’s risk of developing breast cancer may be 2% at age 50 but 11% at age 85.

Certain assumptions are made to determine absolute risk. For example, the 1-in-8 figure describes the “average” risk of breast cancer in Caucasian American women and is calculated to take into consideration other causes of death over the life span. The figure overestimates breast cancer risk for some women with no risk factors and significantly underestimates the risk for women with several risk factors, especially those with genetic mutations. What the statistic actually means is that the average woman’s breast cancer risk is just 2% to age 50, 6% from 50–70; and 3% from 70–85 (Kelly, 2000).

The 11% or 1-in-8 risk is obtained by adding the risk in each age category (2% + 6% + 3% = 11%). When a woman who has an average risk reaches age 50 without a diagnosis of breast cancer, she has passed through 2% of her risk, so her risk to age 80 is 11% minus 2%, which equals 9%. When she reaches age 70 without a diagnosis of breast cancer, her risk to age 80 is 11% – 2% – 6% = 3% (Kelly). Time must be considered for a risk figure to be meaningful. Absolute risk is helpful when patients need to understand what the chances are for all people in a population of developing a particular disease.

Relative risk refers to a comparison of the incidence or deaths between those with a particular risk factor and those without the risk factor. By using relative risk factors, people can determine personal risk factors and better understand the personal chances of developing a specific cancer. If the risk for people with no known risk factors is 1.0, the risk of those with risk factors can be evaluated in relation to that figure. For example, a relative risk of 1.0 means that aspirin has no effect on the risk of developing colorectal cancer. A relative risk of 2.0 indicates that an individual taking aspirin therapy has twice the risk of developing colorectal cancer as an individual who is not taking aspirin; a relative risk of less than 1.0 means that aspirin has a protective effect against colorectal cancer. For instance, a relative risk of 0.80 means that a individual’s risk of developing colorectal cancer while taking aspirin therapy is reduced by as much as 20%. A relative risk statistic is helpful only if the baseline risk with which the statistic is being compared is clear; otherwise, the number is not useful and can be misleading. Relative risk can be very helpful when selecting screening recommendations. If a person’s relative risk is significantly higher than most in the general population, healthcare professionals should modify the screening recommendation usually given in the general population.

Attributable risk is the amount of a disease in the population that could be prevented by alteration of a risk factor. Some risk factors convey very large relative risk but are restricted to a few individuals; so changing them benefits only small groups. Conversely, some risk factors that can be altered (such as cigarette smoking) can decrease the morbidity and mortality associated with malignancy in large numbers of people. The number of cases of endometrial cancer that might develop after taking a particular hormonal agent also could be expressed as attributable risk. A package insert might report a relative risk of 2.35 in women younger than age 55 whose first exposure to the drug was in the previous four years. If the
annual incidence rate (absolute risk) for women aged 50–54 is 26.7 per 100,000, a relative risk of 2.35 increases the possible risk from 26.7 to 62.75 cases per 100,000 women. The attributable risk of endometrial cancer is calculated to be 3.38 per 10,000 additional women per year. The slight increase in the number of cases may be associated with use of the hormone.

Communication of Risk

No perfect model exists that completely and accurately explains an individual’s risk for developing a particular cancer or cancers (Leventhal, Kelly, & Leventhal, 1999). For most cancers, a portion of the cases diagnosed cannot be explained by recognized risk factors. For example, only 41% of breast cancer cases can be attributed to later age at first birth, nulliparity, or family history of breast cancer (Leventhal et al.). Ideally, knowledge of risk factors should guide primary prevention efforts. However, in the case of breast cancer, the inability to readily alter the risk factors has limited their relevance for primary prevention. In some cancers, such as breast cancer, the central role of risk-factor identification is to identify women at higher risk, particularly those with potential genetic susceptibility, and to screen them more aggressively.

The transmission of information about risk often is influenced by professional judgment (Fischhoff, 1999). Many professionals have standards of practice or position statements that influence how they communicate risks to patients. Such biases probably are communicated no matter how nonjudgmental professionals try to be during risk-communication sessions. Communication of cancer risk also is challenging because it usually includes a qualitative and quantitative component. The quantitative component usually is more straightforward. It typically involves risk figures such as absolute or relative risk. Numerical data should be presented with the understanding that some individuals have a greater capacity than others to comprehend the meaning of such data. Qualitative information should follow the presentation of quantitative data. Presentation should include discussion of what the quantitative data specifically mean for a patient. Many experts in risk communication believe that all discussions of risk should include a qualitative and quantitative component (Rothman & Kiviniemi, 1999).

People often have inaccurate assessments of their personal risks for developing cancer (Kreuter, 1999). Patients may inaccurately perceive their risks to be lower or higher than they actually are. Such biases may occur because people have inaccurate information; are unable to comprehend complex, technical information; or use a psychologically protective coping mechanism.

Awareness of people’s anxiety also is important because anxiety can limit their ability to understand their risks for developing cancer. The thought of cancer can be so anxiety provoking in some individuals that they fail to understand their actual risks for cancer. Risk information should be communicated according to how much patients or families wish to know (Hopwood, 1997). Timing also may be important. Messages suggesting increased susceptibility to breast cancer may be less effective if delivered too soon after the breast cancer diagnosis of a close relative, but they might be appropriate several months after such diagnosis (Rimer, Schildkraut, Lerman, Lin, & Audrain, 1996).

The manner in which the information is communicated (sometimes referred to as framing) also is important (Salovey, Schneider, & Apanovitch, 1999). If material is presented in a negative fashion, patients may assume that the risk is more than it actually is. If discussion is too positive, the magnitude of risk may be underestimated or minimized. Framing also occurs with statistics. If an individual is told that he has a chance of a particular occurrence of 1.4 in 10,000 compared to the general population’s chance of 1 in 10,000, that is not particularly impressive. If the same risk is communicated using the format that the individual has a 40% greater risk than the general population, the situation is likely to be seen as riskier, even though the two situations are equivalent (Bottorff, Ratner, Johnson, Lovato, & Joab, 1998). Clearly, this is the most challenging aspect of cancer risk-assessment communication. The goal is not to frighten patients unnecessarily; however, if risk is minimized too much, patients may not see the value in recommended cancer prevention and screening activities (Meyerowitz & Chaiken, 1987). Thus, the importance of communicating risk individually should not be underestimated. A meta-analysis found that individualized risk communication generally leads to increased use of screening modalities because it makes risk more realistic and personal to individuals (Edwards, Unigwe, Elwyn, & Hood, 2003).

Implications for Nurses

Assessing risk and giving patients information about risk factors do not affect the risk of developing cancer. However, such information about risk may influence patients’ choices regarding screening and may change the way some people think about their lives. Risk assessment can improve patients’ health care and ultimately their quality of life if it results in regular screenings and possibly the early detection of malignancy. Conversely, if people are distressed or upset by the information conveyed during risk assessment, recommendations for screening may be ignored or patients may experience psychological harm and possibly increased morbidity if malignancy is not detected early.

Understanding that life is filled with many risks, some of which are modifiable, some of which are not, is the cornerstone of risk assessment. Empowering patients with enough information in understandable terms so that they can make informed choices about cancer screening is the ultimate goal of cancer risk counseling.

Author Contact: Suzanne M. Mahon, RN, DNSc, AOCN®, APNG, can be reached at mahonsm@slu.edu, with copy to editor at CJOEditor@ons.org.

References


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