Screening for Prostate Cancer*

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INTRODUCTION

Prostate cancer screening is a fait accompli in the United States at this time. Regardless of whether it is justifiable from a scientific standpoint, it is occurring. The evidence for this statement can be found in the incidence rates of prostate cancer before and after the advent of prostate-specific antigen (PSA) screening. Figure 1 graphically demonstrates this phenomenon. PSA became widely available in 1987–1988, and screening for prostate cancer increased dramatically shortly thereafter.

Concurrent with this medical phenomenon has been an increased focus on the merits of prostate cancer screening. The vigorous debate that has ensued has resulted in widely disparate recommendations of various organizations with regard to the merits of prostate cancer screening. A brief summary of these recommendations includes:

The American Cancer Society recommends that “both prostate specific antigen (PSA) and digital rectal examination (DRE) should be offered annually, beginning at age 50 years, to men who have at least a 10-year life expectancy, and to younger men who are at high risk. Information should be provided to patients regarding potential risks and benefits of intervention” (1).

The American Urological Association endorses the recommendations of the American Cancer Society.

The US Preventive Services Task Force does not recommend either DRE or PSA-based prostate cancer screening.

The American Academy of Family Physicians provides information on prostate cancer and prostate cancer screening. It recommends talking “to your family doctor to find out if this information applies to you and to get more information on this subject” (2).

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Fig. 1. Incidence rates of prostate cancer before and after the advent of PSA screening.

The wide variation in recommendations of these organizations, when one realizes that each of the expert panels involved had access to identical factual information can leave the student of screening perplexed. This chapter will provide two views of this contentious issue. This issue is probably best understood when the two arguments are contrasted.

GENERAL PRINCIPLES OF SCREENING

The Sensitivity and Specificity of Screening Tests Must Be High

This concept is exceedingly important, as well as its corollary—that the prevalence of significant adverse outcomes must also be high. The reason for this requirement is best framed by a discussion of the performance characteristics of screening tests. A fundamental truth is that there are no clinical tests that always detect disease and never suggest disease when it is not present. As a result, any screening test has four potential outcomes:

- True positive (TP): The test is positive. Disease is present.
- True negative (TN): The test is negative. Disease is not present.
- False positive (FP): The test is positive, but disease is not present.
- False negative (FN): The test is negative, but disease is present.

The two terms that are most frequently employed, using these outcome variables of a screening test, to describe how the test functions are sensitivity and specificity. They are defined as follows:

Sensitivity = TP/(TP + FN) (This can also be defined as the percent of time that the test is positive when it is applied to men who actually have the disease.)
Specificity = TN/(TN + FP) (As above, one can also think about this term as referring to the percent of time that the test is negative when it is applied to men without disease.)

Obviously, it is in the clinician’s best interest to maximize both sensitivity and specificity. With regard to sensitivity, we certainly desire to know that the test will be positive