Ten Best Readings in Cancer Screening

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This article summarizes the eight major randomized, controlled clinical trials of breast cancer screening with mammography, provides an objective critical review of the evidence for screening, and assesses the current state of knowledge about breast cancer screening. This report concludes that, for women between 50 and 69 years of age, screening significantly reduces mortality from breast cancer by approximately 30%. For women under 50 and over 69 years of age, trial data do not provide adequate information to judge effectiveness. (See also “Deficiencies in the analysis of breast cancer screening data,” a dissent from the main conclusions, in the same issue.)


This metaanalysis combines the results of 13 controlled studies, both randomized and casecontrol varieties, and concludes that screening mammography significantly reduces the mortality from breast cancer in women between 50 and 74 years of age. Screening may be effective in women between 40 and 49 years of age after 10 to 12 years, but the same benefit might be achieved by beginning screening at age 50.


The breast cancer screening debate continues about when to start (age 40 or 50 years), when to stop (age 69, 74, or older), and how often to screen (annually or biennially). This article compares the costeffectiveness of several different screening strategies and concludes that the most costeffective strategy is biennial mammography for women aged 50 to 79 years, but a strategy of annual mammography for women aged 40 to 49 years and biennial screening for those aged 50 to 79 years is more costeffective than annual mammography for those aged 50 to 79 only.


Screening costs and lack of access to medical care usually are considered barriers that restrict women from receiving cancer screening services. This article compares the breast and cervical cancer screening behaviors of women in the United States and Ontario, Canada. Canada offers universal insurance coverage through its “singlepayer” national health care system, while a significant proportion of Americans are uninsured. The results show that rates for Papanicolaou testing and clinical breast examination were similar in both countries, but screening mammography rates were two to three times higher in the United States across all age groups. In both countries, women with less education and lower income were less likely to receive screenings. This article concludes that universal coverage alone is not sufficient to overcome the other economic, social, cultural, and informational barriers related to cancer screening.


Recent data have suggested that screening for colon cancer with fecal occult blood tests and/or sigmoidoscopy may reduce the mortality from the disease. However, this has not yet been confirmed with randomized, controlled clinical trials. This review summarizes the current evidence for screening and addresses clinical issues such as (1) the diagnostic approach to a positive screening test, (2) the approach to further surveillance in people with adenomas, (3) the options for screening strategies (eg, when to start and stop screening and how often to screen), and (4) the future potential to identify highrisk patients by using genetic or biologic markers.


While screening for prostate cancer with serum prostate specific antigen (PSA) is a promising screening tool, its efficacy in reducing the mortality rate from prostate cancer has yet to be shown in randomized, controlled trials. In the evolution and development of this screening test, different indexes have been proposed that may enhance the early detection capability of PSA. This article reviews a recent national demonstration project in which the relative values of several indexes were compared in 2011 men without prostate cancer and in 171 men with prostate cancer. In this series, none of the indexes showed an advantage compared with the standard serum PSA value, defined as 4.0 ng/mL.


This article describes the current National Cancer Institute “PLCO” trial, an ongoing randomized, controlled trial evaluating effectiveness of screening for prostate, lung, colorectal, and ovarian cancer. Background data, rationale, design, and endpoints for the prostate cancer screening arm of the trial are outlined.


The worldwide incidence of melanoma has been increasing rapidly for several years. The neoplasm is theoretically ideal for screening, since the lesion is external and visible, its risk factors and epidemiology are known, and early lesions, ie, thin tumors, are associated with high survival rates. However, the efficacy of melanoma screening has not yet been tested with randomized, controlled trials. This article summarizes the preliminary data available from melanoma screening and early detection efforts conducted in the last decade, presents the intermediate measures of efficacy, acknowledging that mortality reduction data do not yet exist, and offers recommendations for future studies in melanoma prevention, education, and screening.


Four randomized, controlled trials of lung cancer screening in male adult smokers have been conducted, and none has shown reduced mortality with screening. Currently, no organization recommends screening for lung cancer. This article reassesses the data from the trials and concludes that in two studies (the Memorial SloanKettering Lung Project and Johns Hopkins Lung Project), annual chest radiography improved survival rates in both experimental and control groups compared with predicted survival rates from National Cancer Institute Surveillance, Epidemiology, and End Results data or American Cancer Society annual cancer statistics. In two other studies (the Mayo Lung Project and the Czechoslovak Study), the groups screened with chest radiography had improvements in stage distribution, resectability, and survival compared with unscreened groups. However, in these two latter studies, the screened groups had higher cancer incidence than control groups, negating mortality reductions. This article argues that biases overdiagnosis, lead time, and length do not adequately account for the data. This article argues cogently for another trial to assess effectiveness of lung cancer screening; such a trial is ongoing through the NCI “PLCO” screening study.


In previous trials of lung cancer screening, sputum cytology studies did not favorably influence outcome. However, sputum samples in the Johns Hopkins trial were archived. This study used two immunostaining techniques with monoclonal antibodies and showed correlation between positive staining and the development of lung cancer in the
sampled population. New tests awaiting prospective trials and the clinical issues of at-risk populations, cost, and patient compliance are also discussed.