The 2011 volume of Epidemiologic Reviews on screening has now been published. Twelve articles reflect the intellectual advances and the real-world challenges of developing an evidence base for screening policies. In this editorial, I introduce readers to this remarkable volume in hopes that they will read much more in the volume itself.

Six articles address when screening is justified. Harris et al. (1) suggest a new approach to evaluating proposed screening programs, an alternative to the usual checklists. They propose that screening recommendations be based on the balance of benefits and harms related to health outcomes (not intermediate outcomes or diseases) and, if there are net benefits, whether they are worth the resources required to implement them. The authors propose that screening be for “predictors of poor health,” a new term that subsumes disease, predisposition, and risk factors, because preventing poor health should be the purpose of screening programs.

The shortcomings of screening to prevent diseases, not health outcomes, are illustrated in a review by Echouffo-Tcheugui et al. (2) of screening for type 2 diabetes and dysglycemia. Expert groups recommend early detection because of a large and growing burden of suffering from diabetes and its complications, the existence of accurate screening tests, and strong evidence that interventions can prevent development of diabetes. However, the evidence is much less convincing that early detection and treatment lead to fewer cardiovascular complications of diabetes than treatment after clinical diagnosis.

Screening often detects patients who neither have the disease being sought nor are disease free—a condition commonly called “predisease.” This condition is a consequence of diseases developing by degrees—for example, from small colonic adenomas to metastatic colorectal cancer. Viera (3) proposes criteria for when to intervene in predisease. The author’s reasoning takes into account the argument, put forth by Rose (4) in an article entitled, “Sick Individuals and Sick Populations,” that identifying and treating “high-risk” individuals (the screening strategy) does little to prevent the burden of illness in the population because most people who develop disease had been at intermediate or lower risk beforehand.

Screening recommendations often rely on cost-effectiveness analyses. In a review of 32 models of colorectal cancer screening, Lansdorp-Vogelaar et al. (5) note a game-changing development in the case for screening: because of large increases in the cost of treatment, colorectal cancer screening is becoming not just cost-effective but also cost saving! An article by Burke et al. (6) describes how the screening agenda has been greatly expanded by the development of new genetic tests. Identification of disease-associated genes in the laboratory has opened up a very large task—to build an evidence base for the responsible use of these new tests in the care of patients.

Chou (7) examines reasons that screening recommendations from respected organizations differ, even though they are based on the same research evidence. The author reminds us that guideline development involves not only evidence but also subjective judgments—for example, about whether the strength of the evidence is compelling and whether benefits outweigh harms. Another reason that guidelines differ is that cost-effectiveness models, part of the evidence base for screening recommendations, may come to substantially different conclusions because of different assumptions (5).

Five papers discuss elements of successful screening programs. Levin et al. (8) point out that organized screening programs are more likely to be successful than opportunistic screening and describes several examples. Von Wagner et al. (9) remind us that cancer screening rates—and indeed most health indices—are inversely related to socioeconomic status across the whole spectrum of social advantage, even in countries where care is provided at no cost to individuals. The authors describe correlates of socioeconomic status—stresors, resources, educational opportunities, and illness experience—and propose a framework for linking these to known, downstream determinates of screening uptake such as belief in the value of early detection, fatalism, and self-efficacy.

Screening involves detection of “high-risk” people in the population. Buijsse et al. (10) found that a variety of tools to detect the risk of developing diabetes have been shown to discriminate well in a source population and somewhat less well in different populations. However, much less is known about how well these tools predict the development of diabetes in individuals. This limitation is important because the interventions to prevent diabetes—mainly behavior change and drugs—are recommended by clinicians for individuals. The argument for why tests that discriminate well in populations...
might not be well enough calibrated to distinguish among individuals who will and will not develop a condition has been shown at the conceptual (4) and quantitative (11) levels but has not yet been accepted in the screening community.

How should the results of screening programs be interpreted? Hanley (12) points out that summary measures of screening effectiveness can underestimate the true effects of a long-standing screening program. Effectiveness changes over time—from the years just after screening is begun, when effects are absent or small, to a later period when effects are strongest, to an even later period (if screening is discontinued) when effects of screening decline. De Gelder et al. (13) also examine how screening effects change over time. Overdiagnosis rates—detection of cancers that would not have become symptomatic during a lifetime if screening had not taken place—vary greatly in published reports. Using a model based on experience with the mammography program in the Netherlands, the authors found that overdiagnosis rates were high at the beginning of screening but later fell to substantially lower levels.

Fletcher (14) describes lessons learned in breast cancer screening over the past 35 years. Some major issues now—increasing difficulty conducting randomized trials, over-diagnosis, and false-positive tests—were not foreseen years ago. More sensitive tests, often at the expense of specificity, and stronger research evidence for harms have resulted in a greater need for shared decision making. The author notes that recent improvements in treatment may decrease the added value of screening for breast cancer. In the overview accompanying the issue, Harris cautions that while screening has become a main prevention strategy, evidence suggests, "with few exceptions, its contribution to improving the health of the public is small" (15, p. 1).

Taken together, these papers are a wonderful update on some important developments in screening. They remind us that a vigorous research community still has lots of challenges to grapple with if screening is to be as effective and efficient as it could and should be.

ACKNOWLEDGMENTS
Conflict of interest: none declared.

REFERENCES

Robert H. Fletcher (e-mail: Robert_fletcher@hms.harvard.edu) Department of Population Medicine, Harvard Medical School, Boston, MA 02215

DOI: 10.1093/aje/kwr080; Advance Access publication June 21, 2011