

Breast and Prostate Cancer Screening: How Much is Too Much?

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SJ Lowry

Screening practices for breast cancer and prostate cancer have been hugely controversial in recent years, with high-profile changes in screening recommendations. Population health care policies, as well as individual-level decisions about care, rely on accurate data to balance screening benefit and harm. Recent studies have highlighted the problem of overdiagnosis as a potential harm of cancer screening. “Overdiagnosed” cancer cases are actual cancer cases which never would have been detected in a patient’s lifetime without screening. “Overdiagnosis has always been a concern in prostate cancer screening because we have known for a long time that there are many silent cases, particularly in older men,” notes Dr Etzioni. “however, concerns about overdiagnosis in breast cancer are more recent. Unfortunately, recent high-profile studies have overestimated the frequency of overdiagnosis and inflated concerns.” A review of the literature reveals that available estimates of overdiagnosis frequency are widely varying. For example, estimates of overdiagnosis in prostate cancer range from 23% to more than 60% of screen-detected cases; for breast cancer, the estimates range from 10% to more than 40% of screen-detected cases.

Dr. Ruth Etzioni, along with colleagues from Public Health Sciences and from Georgetown University School of Medicine, sought to determine why estimates of overdiagnosis are so variable, and identified important differences across published studies which explain some of the variability in overdiagnosis estimates. In their report, recently published in the *Annals of Internal Medicine*, they also provide recommendations for interpreting existing studies, and for conducting and reporting on future studies of overdiagnosis in cancer screening. Dr. Etzioni and colleagues identified three areas which may explain differences across studies, providing examples from published research to demonstrate how this can occur.

First, studies may define and measure overdiagnosis differently. For example, some define overdiagnosis as a screen-detected cancer which never would have become clinically evident if the patient had not received screening. This includes *both* non-progressing cancers, as well as progressive cancers in patients near the end of their lifetime. Other studies define overdiagnosis only as the former (non-progressing cases). These differences can result in very disparate estimates of overdiagnosis rates. Overdiagnosis can also be measured differently; recent studies have used at least eight different measures of overdiagnosis, which can also lead to inconsistent estimates.

Second, study design and the context of the study may influence overdiagnosis estimates. For example, estimates from population studies are based on screening practices in a given population, whereas clinical trials generally require regular, frequent screening. In addition, the study population can be widely variable in terms of underlying rates and prevalence of cancer, and the intensity of diagnosis in the absence of screening. These factors will influence rates of overdiagnosis. Finally, the way in which screening is implemented in the population can directly affect overdiagnosis estimates; for example, a lower threshold for referral to biopsy may generate a higher frequency of overdiagnosis.

Third, there are different statistical approaches used to estimate overdiagnosis and their influence on estimates is not well understood. A “lead-time” approach uses cancer incidence in a screened population to make inferences about the lead time, which is the amount of time by which screening advances disease diagnosis. Overdiagnosis can then be calculated from the lead time. An “excess incidence” approach, on the other hand, simply uses the empirical difference in cancer incidence between screened and unscreened groups to approximate overdiagnosis. Dr. Etzioni *et al.* explain how differences in estimation approaches can affect estimates of overdiagnosis rates, and demonstrate why the excess incidence approach used in several recent high-profile studies of breast cancer screening often leads to an overly high assessment of the magnitude of the overdiagnosis.

This paper by Etzioni *et al.* is a valuable resource for anyone interested in understanding or publishing research related to overdiagnosis rates. It provides a framework with which to interpret and understand widely disparate existing findings, and to inform the design of, and reporting on, future research. Policy recommendations for cancer screening are applicable to the entire adult population at certain ages, yet such policies may be based on misunderstood overdiagnosis data. “Our goal in writing this article was to alert users of overdiagnosis results to the complexities of estimating overdiagnosis so that they can identify those studies that are most likely to be valid and representative of the population of interest,” says Dr Etzioni. “In particular, we would like policy makers to be informed consumers in the interest of developing sound screening policies.” Dr Etzioni and team’s efforts to address the confusion are an important contribution to the broader conversation about how best to use screening as a tool for cancer control.

[Etzioni R, Gulati R, Mallinger L, Mandelblatt J.](#) 2013. Influence of study features and methods on overdiagnosis estimates in breast and prostate cancer screening. *Annals of Internal Medicine* 158(11):831-838. doi: 10.7326/0003-4819-158-11-201306040-00008.

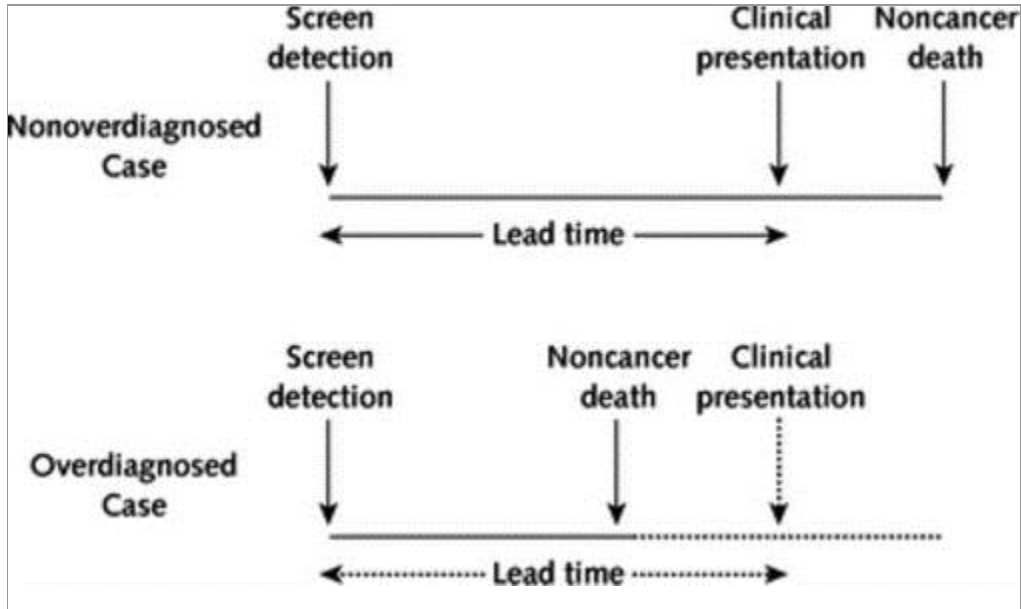


Image from article (Etzioni et al)

"A nonoverdiagnosed case (top) is a screening-detected case that would have presented clinically before dying of causes not related to cancer. An overdiagnosed case (bottom) is a screening-detected case that would have died of causes not related to cancer before presenting clinically (i.e., a screening-detected case that would not have been diagnosed without screening). The lead time is the time from screening detection to clinical diagnosis. The longer the lead time, the greater the chance of overdiagnosis. Similarly, the higher the risk for death from another cause, the greater the chance of overdiagnosis."