

Cancer data provide insights into occurrence, overdiagnosis, and treatment advances

2 October 2019

Critical questions about progress in the fight against cancer cannot be answered simply by looking at rates of cancer incidence, a special report published in the *New England Journal of Medicine* finds. H. Gilbert Welch, MD, MPH, a senior investigator in the Center for Surgery and Public Health at Brigham and Women's Hospital, and colleagues analyzed 40 years of cancer burden data and examined patterns of incidence and mortality for various cancers, finding examples for which incidence and mortality moved in concert—such as lung cancer—and examples where discordance in incidence and mortality indicate that overdiagnosis may be at play.

"Cancer incidence is not a reliable measurement of cancer burden," said Welch. "Rising incidence may not reflect rising true cancer occurrence but instead reflect overdiagnosis; that is, the detection of small cancers not destined to cause symptoms or death. Overdiagnosis can either be the result of purposely looking harder for the disease—that is, cancer screening—or from stumbling onto small cancers while testing patients for something else. It's an issue that's been around for years but this paper highlights that we can't rely on cancer incidence alone."

Welch and colleagues examined mortality and incidence patterns from 1975 through 2015 for selected cancers in the United States. The investigators used mortality data from the National Vital Statistics System, maintained by the National Center for Health Statistics, and incidence data from the Surveillance, Epidemiology, and End Results (SEER) Program.

The team illustrated mortality and incidence trends for each cancer and characterized the resulting "signatures." In some cases, they found a desirable signature: for Hodgkin's lymphoma and

chronic myeloid leukemia (CML), [mortality rates](#) have declined, reflecting either gradual treatment improvements (for Hodgkin's lymphoma) or rapid treatment improvements (CML). Another important example of a desirable signature is lung cancer, where both incidence and mortality have risen and fallen together—the rise and fall of cigarette smoking is followed, three decades later, by the rise and fall of lung cancer occurrence and [lung cancer](#) death.

The team also finds good news in rates of stomach, cervical and colorectal cancer, all three of which are simply less common than they were in 1975. The authors point out some likely explanations of these favorable trends, including the decline of a powerful risk factor for stomach cancer (the bacterium *Helicobacter pylori*) and better screening and treatment of precancerous lesions for [cervical cancer](#).

The authors also provide examples of undesirable signatures, likely reflecting the problem of overdiagnosis. For thyroid cancer, kidney cancer, and melanoma, rates of [cancer incidence](#) appear to be rising steeply, but rates of cancer [mortality](#) are largely unchanged.

While Welch and colleagues laud the efforts of the federal government to track data and make them publicly accessible, they call for including a critical piece of information in cancer databases in the future: mode of cancer detection. Did the patient present with symptoms? Was the patient screened for cancer? Was their [cancer](#) detected by chance?

"Many people have assumed that additional screening is the best thing for population health, but in fact it may not be. You don't test a population to health," said Welch.

More information: *New England Journal of*

Medicine (2019). DOI: [10.1056/NEJMSr1905447](https://doi.org/10.1056/NEJMSr1905447)

Provided by Brigham and Women's Hospital

APA citation: Cancer data provide insights into occurrence, overdiagnosis, and treatment advances (2019, October 2) retrieved 26 April 2021 from <https://medicalxpress.com/news/2019-10-cancer-insights-occurrence-overdiagnosis-treatment.html>

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