Cancer symptom detection is often overlooked in population-level strategies to improve cancer outcomes in the US. Yet, early detection and diagnosis help reduce cancer deaths; in general, the earlier the stage at diagnosis, the better the prognosis and more effective the treatment.

The myriad and often nonspecific manifestations of early cancer and complexity of the diagnostic process create more than 1 pathway to detection, which often results in undesirable variability. Missed, incorrect, and delayed cancer diagnoses are common and result in patient harm and preventable death; these diagnostic issues are among the leading causes of medical malpractice lawsuits in the US. Screening (detection of preclinical cancer or precancerous lesions in asymptomatic populations) is the main strategy in the approach for early cancer detection in the US. However, more cancers could be detected earlier if the notion of early detection were expanded to include detecting possible cancer among those presenting with symptoms.

Cancer screening is not expected to detect every cancer. Most cancers do not have screening tests, existing tests are imperfect in design and in practical use, and uptake is incomplete. Only 4 types of cancer have screening tests with A or B recommendations from the US Preventive Services Task Force (USPSTF): colon/rectum, lung, breast, and cervix.1 Cancers diagnosed in other organ sites cannot be found through routine screening. Cancer screening tests are known to be imperfect tools; all include risks of both overdiagnosis and underdiagnosis, leading to iatrogenic and economic harms. In addition, despite decades of research, gaps remain in uptake of screening tests; completion of screening processes, such as follow-up of an abnormal test result, and equitable reach to populations experiencing health disparities. For example, lung cancer screening uptake has remained low, with an estimated 17.7% of eligible adults having received USPSTF-recommended screening in 2018.2 Under current USPSTF recommendations, one estimate suggests one-third of diagnosed cancers are potentially detected after screening, two-thirds of cancers are detected through other pathways.3

Many Cancers Are Symptom-Detected
In addition to diagnosing cancer after asymptomatic, routine screening, cancers may be detected following incidental, serendipitous findings discovered during unrelated investigations and symptomatic presentation, when people report signs or symptoms that are subsequently found to be due to cancer. Symptomatic presentation is likely to account for most cancers not detected through screening.

Data from other high-income countries support this conjecture. The UK, which has universal health care coverage and a primary care gatekeeping system, provides comprehensive, no-cost access to bowel, breast, and cervical cancer screening. Data from a 2014 English National Cancer Diagnosis Audit, which identified referral pathways to cancer diagnosis, showed that among all cancer diagnoses (17 042 cases), only 7% occurred after screening, whereas 64% occurred after patients presented with symptoms in primary care.4 The proportion of cancers diagnosed through different referral pathways varied between cancer types, although most diagnoses across cancer types followed symptomatic presentation in primary care. For example, among 2714 breast cancer cases, 34% were detected via screening, while 59% were diagnosed following presentation in primary care.4

Evidence suggests that efforts to expedite diagnosis of some symptomatic cancers can improve stage of diagnosis, cancer survival, and quality of life.5,6 Once cancer-related symptoms occur, the disease process may have progressed to a stage that is less amenable to treatment, but, for many cancers, decreasing the time from symptom detection to diagnosis can improve outcomes.5 Cancers with specific presenting symptoms, such as melanoma and breast cancer, are generally more amenable to this approach than cancers with broad, nonspecific presenting symptoms, such as pancreatic cancer.7 Focusing on symptomatic presentation may also improve care quality through reducing diagnostic errors and reducing costs by allowing use of less expensive, earlier-stage treatments.3 To the extent that cancer disparities are driven by late-stage detection, focusing on symptom detection in low-resource populations could be a path to reducing disparities.

Challenges to Achieving Diagnostic Excellence
Similar to asymptomatic screening, the goal of diagnosing symptomatic cancer is to identify, diagnose, and treat cancers at the earliest possible stage. For this approach to work, symptoms must appear at a disease stage that allows timely diagnosis and treatment. Furthermore, diagnosing cancer is complex; it is a process that occurs over time, is not linear, and can be iterative and cyclical.8 The diagnostic pathway for cancer includes key events with intervals between events. Specific to symptomatic cancers, the patient interval begins when a person first notices signs or symptoms, which they may appraise or self-manage, and decides to seek medical care. The diagnostic interval begins with first presentation to health care (eg, primary, specialty, emergency), which may involve referral to specialist care, and ends with diagnosis. The treatment interval (time between formal diagnosis and treatment initiation)
indicates the period in which, in many cases, treatment may improve cancer outcomes, regardless of early detection strategy.

Challenges arise throughout this pathway. In the patient interval, misappraisal of symptoms and untoward anxiety, as well as health care access barriers (eg, cost, appointment availability), could delay care seeking and subsequent diagnosis. In the diagnostic interval, clinicians are likely to encounter the dilemma that many cancer symptoms are common, but most patients with those symptoms do not have cancer. Clinicians need guidance to strike a balance between referring patients with concerning symptoms and not overwhelming specialists. As with screening, over-testing and overdiagnosis are concerns. Furthermore, lack of diagnostic evaluation tools, too few appropriate specialists, and lack of effective communication and coordination among collaborating clinicians and between clinicians and patients can contribute to delays in cancer diagnosis.

Using Symptoms for Early Detection: The UK Example
Evidence from the UK suggests that these challenges can be overcome. The UK National Health Service emphasizes both symptom detection and screening in its national early cancer detection strategy. Given that most potential symptoms that could be related to cancer are not due to cancer, a focus of research over the past decade has been identifying clinical features associated with specific cancers. These features, in turn, are helping to create clinical guidance and cancer risk prediction tools for use in primary care. For instance, using national data linkages, particularly the National Institute for Health and Care Research’s Clinical Practice Research Datalink, researchers have generated symptom lists and corresponding positive predictive values to aid in identifying patients with cancer. These findings informed the 2015 UK clinical guidance for recognition of and referral for suspected cancers and were used to develop interactive calculators for use in primary care to predict an individual’s risk of cancer prior to diagnosis based on presenting symptoms. More recently, multidisciplinary diagnostic centers, aiming to improve rapid access to diagnostic testing for nonspecific symptoms, appear to have potential for identifying cancers in patients presenting with nonspecific symptoms.

Diagnostic Excellence Includes Symptom Detection
Despite the heterogeneous nature of health care and cancer diagnosis in the US, lessons from other countries suggest feasible and significant next steps. To begin incorporating symptom assessment into national priorities for early cancer detection, the US can improve data infrastructure to build symptom epidemiology and describe care pathways. For example, cancer registries could include mode of detection and a description of the diagnostic trajectory, such as symptoms, referral pathways, and time to diagnosis. These data are essential both to create evidence around what combinations of signs, symptoms, and test results are useful for identifying cancer early and to identify potential points of intervention in the diagnostic pathway. For example, if symptom misappraisal is causing delays, public awareness campaigns may form part of the solution. If lack of access to diagnostic testing is an issue, then multidisciplinary diagnostic centers that create a single pathway for diagnostic testing may reduce delays.

Achieving the goal of diagnostic excellence for cancer requires an expansion of early detection to include both screening and symptom detection (Box). This expansion should be reflected in data collection, research priorities, research funding, quality improvement efforts, and using every tool available to improve the diagnosis of cancer. With many cancers detected after symptomatic presentation, early diagnosis of symptomatic cancers complements, but does not replace, screening as an early detection strategy. Together, the US health care system could identify more cancers through screening, encourage earlier care-seeking for symptoms, establish earlier referral for and equitable access to diagnostic tests, and improve care coordination to ensure timely follow-up. A more comprehensive early detection approach could lead to better-quality cancer diagnosis and reduce cancer deaths.

Box. Key Points for Diagnostic Excellence for Cancer
1. Screening leads to the diagnosis of a small fraction of all cancers.
2. Many cancers are detected after people present with signs and symptoms of their cancer.
3. Earlier diagnosis of symptomatic cancers could improve outcomes, minimize costs, and reduce disparities in cancer outcomes.
4. Although challenges exist along the diagnostic pathway for cancer, the UK provides an example of how challenges for diagnosing symptomatic cancers can be overcome.
5. The US could adopt a national strategy that combines screening and early diagnosis of symptomatic cancers to improve diagnostic excellence and reduce cancer deaths.

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