Highlighting new innovations in early cancer detection

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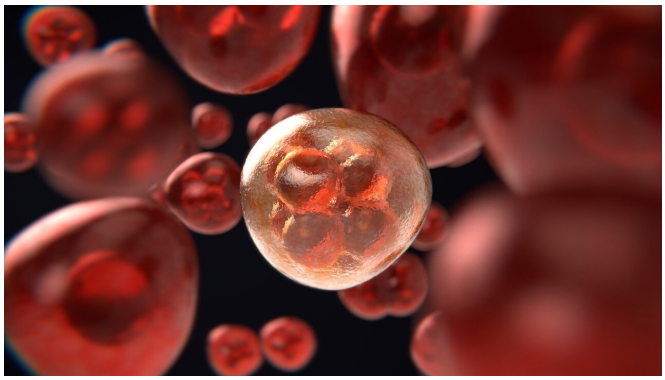

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The latest special issue of *PLOS Medicine* features five studies outlining novel strategies for detecting cancer and for identifying minimal residual disease—when a small amount of tumor cells survive treatment, potentially leading to recurrence of cancer. The studies were selected by *PLOS Medicine*'s editorial team and guest editors Chris Abbosh, Sarah-Jane Dawson, and Charles Swanton.

Last year, more than 19 million people around the world were newly diagnosed with cancer, and more than 10 million died from the disease. The ability to detect cancer early and to identify minimal residual disease could help improve timely treatment and lower these numbers.

Two of the featured studies discuss innovations in early detection. One, led by Jeffrey Szymanski of Washington University School of Medicine, United States demonstrates the potential for an approach called plasma cell-free DNA ultra-low-pass whole genome sequencing to distinguish between benign and malignant tumors caused by the condition neurofibromatosis type 1—and to help monitor the effectiveness of treatment. The other, led by Brian Nicholson of the University of Oxford, UK outlines how routine clinical tests could be widely used to estimate the risk of cancer for people with unexpected weight loss.

The other three studies address minimal residual disease. Yaqi Wang of Fudan University Shanghai Cancer Center, China and colleagues showed that combining magnetic resonance imaging with measurements of circulating tumor DNA (ctDNA)—tumor DNA found in the bloodstream—can help predict treatment effectiveness and risk of recurrence for people with locally advanced rectal cancer. Meanwhile, Jeanne Tie of the Walter and Eliza Hall Institute of Medical Research, Australia and colleagues demonstrated that post-treatment ctDNA measurements can help predict risk of relapse for people with colorectal cancer that has spread to the liver.

Lastly, Pradeep Chauhan of Washington University School of Medicine, United States and colleagues showed how next-generation sequencing of tumor DNA found in urine could aid in detecting minimal residual disease and guide personalized treatment for people with bladder cancer that has invaded the bladder wall.

The methods outlined in all five studies have the potential to be widely applied and could help inform the future of cancer care and research.

More information: Brian D. Nicholson et al, Combining simple blood tests to identify primary care patients with unexpected weight loss for cancer investigation: Clinical risk score development, internal validation, and net benefit analysis, *PLOS Medicine* (2021). DOI: 10.1371/journal.pmed.1003728

Pradeep S. Chauhan et al, Urine tumor DNA detection of minimal residual disease in muscle-invasive bladder cancer treated with curative-intent radical cystectomy: A cohort study, *PLOS Medicine*

(2021). DOI: 10.1371/journal.pmed.1003732

Yaqi Wang et al, Utility of ctDNA in predicting response to neoadjuvant chemoradiotherapy and prognosis assessment in locally advanced rectal cancer: A prospective cohort study, *PLOS Medicine* (2021). DOI: 10.1371/journal.pmed.1003741