

A New Blood Test for Early Detection of Multiple Types of Cancer

Summary of “Clinical Validation of a Targeted Methylation-Based Multi-Cancer Early Detection Test Using an Independent Validation Set”

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Cancer is often diagnosed in people after they start to show symptoms, such as lumps, pain, unexpected weight loss, and unusual bleeding. Symptoms often mean a person’s cancer has become more serious. Detecting cancer *before* a person has symptoms can lead to better outcomes, including fewer deaths.¹⁻³ That is why we have screening tests for certain types of cancer. The goal of screening is to detect cancer at an earlier stage. Treating early-stage cancer is likely to require less intervention and be more successful. In the US, screening tests for 5 cancers are recommended: breast, cervical, colorectal, prostate (on a case-by-case basis), and lung (with a history of heavy smoking).⁴ While these tests save lives, they only look for one of 5 types of cancer at a time. There are many more types of cancer that do not have screening tests. In fact, nearly three-fourths of cancer deaths are caused by cancers that do not have recommended screening tests.⁵

For this reason, GRAIL has developed a multi-cancer early detection (MCED) test. This new test, named Galleri™,⁶ can detect multiple types of cancer with a single blood draw. It is meant to be used in addition to recommended screening tests to help detect more cancers earlier. The MCED test analyzes human blood to tell us two things: (1) whether a cancer signal is detected in the blood, and (2) if a cancer signal *is* detected, the test can point to where that signal is coming from in the body.

So how was this MCED test created? Most of the development of this test happened in the Circulating Cell-free Genome Atlas (CCGA) study.^{7,8} This study included thousands of people 20 years of age or older either with or without cancer. CCGA tested whether multiple types of

cancer signals could be detected with a single blood test. To do this, the study was divided into three parts. The first part of the study evaluated three ways of finding cancer signals to determine the best one. In the second part of the study, the test method was refined and underwent initial evaluation of how well it worked.⁷ The third part of the study was designed to confirm how well the test works (published in June 2021).⁸ To do this, the third part of the study looked at how well the test worked in 4077 people with and without cancer. Specifically, it evaluated whether the MCED test would *detect* a cancer signal in the 2823 people with cancer, and *not detect* a cancer signal in the 1254 people without cancer.

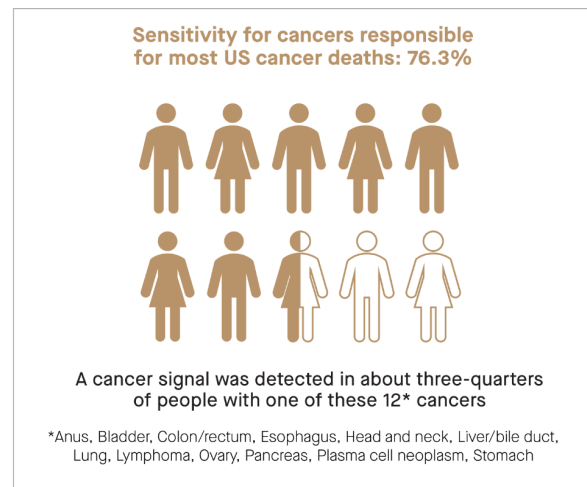
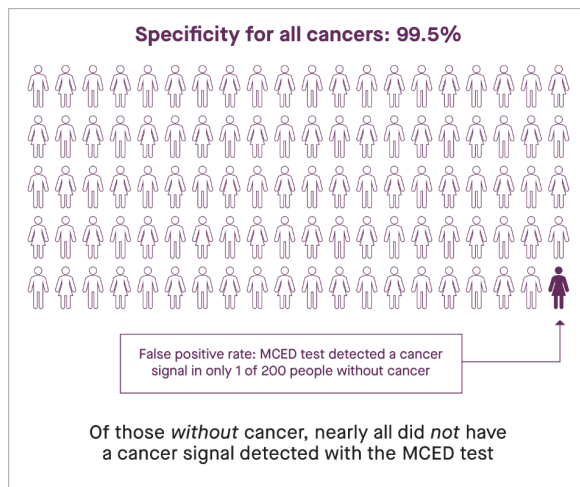
Of those people in the study *with* cancer, 51.5% had a cancer signal detected with the MCED test. This value is referred to as the “sensitivity” of the test. When looking more closely at 12 cancers that are responsible for about two-thirds of US cancer deaths each year, test sensitivity rose to 76.3%. These sensitivity results mean that the MCED test detected a cancer signal in about 3 out of 4 people with one of these cancers. Many of these cancers do not currently have screening tests available, such as pancreatic and ovarian cancer.

Of those in the study *without* cancer, 99.5% did not have a cancer signal detected with the MCED test. This value is referred to as the “specificity” of the test. What this means is that there were *only* 0.5% false positives—in other words, the MCED test only *detected* a cancer signal in 1 in 200 people *without* cancer. It is important for cancer screening tests to have low false positive rates. This helps reduce anxiety and unnecessary follow-up tests/procedures in people who do not have cancer.

In the study, the MCED test was able to detect cancer signals, including from early stages of cancer and before the cancer had spread. It also correctly predicted where in the body the cancer signal was coming from 88.7% of the time. This high accuracy of predicting the cancer signal origin is important because it can help doctors pinpoint where in the body the cancer might be to guide necessary follow-up tests and procedures. Only 20 participants in the study reported a side effect related to the blood draw such as dizziness or bruising.

This MCED test is intended for use in adults with an elevated risk of cancer, such as those 50 years of age or older. Along with this MCED test, people should still receive the individual cancer screenings recommended by their healthcare provider. This MCED test will not be a replacement for those screenings but will be an important additional tool for healthcare providers.

In summary, this study showed that the MCED test detects cancer signals from many cancers. It also provides information with high accuracy about where the cancer signal may be coming from in the body. Based on this study and others, the MCED test is currently available, by prescription only, in the US.



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