

Better way to interpret blood tests to diagnose pulmonary embolism

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Dr. Clive Kearon (right) and Dr. Kerstin de Wit of McMaster University and Hamilton Health Sciences. Credit: Hamilton Health Sciences

A study led by Hamilton researchers has found a new way to interpret blood test results in patients who are investigated for blood clots in their lungs, a condition known as pulmonary embolism.

This new approach applies to D-dimer blood tests, which are used by physicians to rule out the presence of a blood clot. Researchers found that a higher than usual D-dimer level can be considered a negative result if the physician has assessed the patient as having a low probability of having a pulmonary embolism.

The study team notes the findings are important as they mean a lot fewer patients need a computerized tomography (CT) scan, which results in patients avoiding radiation exposure and spending less time in the [emergency department](#). The [health system](#) also benefits, they say, as it frees up CT scans for other patients and it improves ability to move patients more quickly through the emergency department.

The study results were published today in the *New England Journal of Medicine*.

"The primary goal of diagnostic testing for pulmonary embolism is to identify which patients should be treated with anticoagulant agents and which should not," said first author Clive Kearon, professor of medicine at McMaster University and a thrombosis specialist with Hamilton Health Sciences.

"When a physician is concerned that pulmonary embolism may be present, chest imaging with CT pulmonary angiography is usually done in half of these patients. We wanted to find a way to reduce the number of CT scans that need to be done."

A total of 2,017 patients aged 18 and older were enrolled and evaluated in the study, of which seven per cent had pulmonary embolism on initial diagnostic testing. The average age of the patients was 52 years, and 66 per cent were female.

Of the patients in the study, 73 per cent, or 1,474, were enrolled at Hamilton Health Sciences or St. Joseph's Healthcare Hamilton.

These patients, and those at other university-based clinical centres in Canada, were tested from December 2015 through May 2018 and assessed 90 days later.

Of the 1,325 patients identified by an emergency department physician as having a low (1,285 of the patients) or a moderate (40 patients) probability of having a pulmonary [embolism](#) and who had negative D-dimer results (that is, less than 1,000 or 500 nanograms per millilitre (ng/mL) respectively), none had venous thromboembolism during follow-up.

"Our analyses show that [pulmonary embolism](#) is ruled out by a D-dimer level of less than 1,000 ng/mL in patients with a low probability, and by a D-

dimer level of less than 500 ng/mL in patients with a moderate probability. This way of using D-dimer testing and clinical assessment reduced the need for CT scanning by one-third," said Kearon.

"This was a collaborative study among thrombosis and emergency medicine physicians and researchers. Dr. Kerstin de Wit, who is an emergency medicine and thrombosis specialist, was key to this research and to the study's translation."

Provided by McMaster University

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