

**Article:**

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From Pooled Cohorts to PREVENT: A Perspective for Clinical Laboratorians.
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Guest: Dr. Jeff Meeusen is a clinical chemist at Mayo Clinic in Rochester, Minnesota, specializing in lipid and lipoprotein testing.

Bob Barrett:

This is a podcast from *Clinical Chemistry*, a production of the Association for Diagnostics & Laboratory Medicine. I'm Bob Barrett.

Heart disease is the leading cause of death in the United States, claiming the lives of 160 individuals per 100,000 each year. Fortunately, years of research have identified modifiable risk factors that can reduce one's chances of suffering a cardiovascular event if addressed early enough. To predict 10-year risk, the Framingham Risk Score was introduced in 1998 and its successor, the Pooled Cohort Equations, or PCE, were introduced in 2013. These equations showed some ability to predict risk, but their performance in contemporary patient populations was poor, with the PCE overestimating actual cardiovascular event rates in several different studies.

To address this limitation, the latest iteration of predictive formulas, Predicting Risk of Cardiovascular Disease EVENTS, or PREVENT, was released in 2023 and was formally adopted by the 2026 joint professional society guideline on the management of dyslipidemia.

A News and Views article in the July 2026 issue of *Clinical Chemistry* describes the development of PREVENT, summarizes its advantages over previous risk estimating equations, and highlights the central importance of clinical laboratory test harmonization in these large-scale data science initiatives.

Today we welcome the article's lead author. Dr. Jeff Meeusen is a clinical chemist at Mayo Clinic in Rochester, Minnesota, specializing in lipid and lipoprotein testing. He leads efforts to integrate advanced laboratory metrics into cardiovascular risk prediction and clinical decision making.

So, Dr. Meeusen, what motivated the transition from Pooled Cohort Equations, or PCE, to the PREVENT equations?

Jeff Meeusen:

Yeah, there has been a lot of change in how people are being treated for cardiac cardiovascular disease. It's more and more common for people to be on extremely high dose of statins, which are lipid lowering drugs. So, it was time to

update who would benefit and the identification of those that would benefit from getting statins.

Bob Barrett: What limitations in the PCE were the most important to address with this new model?

Jeff Meeusen: So, the Pooled Cohort Equation was designed using very thoroughly planned studies where they would enroll patients and then monitor them over decades to see who it is that would end up developing cardiovascular disease or ASCVD [atherosclerotic cardiovascular disease]. But the trick is, in order to monitor patients over decades, you have to enroll them decades ago. And so, it was starting to become questionable whether or not those patients were still representative of the current populations that we were seeing and treating for cardiovascular risk.

Bob Barrett: So how did the authors address these limitations for PREVENT compared to prior risk calculators?

Jeff Meeusen: It's really interesting. They were able to leverage the continually increasing amounts of big data. And big data just keeps getting bigger and bigger.

So now what they actually did for the PREVENT risk calculator, which is new and possibly unique in my understanding, is they went into lots of insurance and electronic health record data. And so they were able to leverage millions of samples from actual medical results rather than people that were enrolled in a specific study. It's using the aggregated data of all of us as we're going to our healthcare providers.

Bob Barrett: How does the inclusion of kidney and metabolic markers like eGFR, albuminuria, and hemoglobin A_{1c} reshape cardiovascular risk prediction?

Jeff Meeusen: Yeah, so we've done a lot over the decades to learn that cardiovascular risk is based on a variety of different inputs. Our age, it's a long-term disease. So the older we get, the more likely we are to have developed some cardiovascular disease. It definitely is a lipid disease. So the more lipids we have, LDL-cholesterol specifically, in our arteries, the more risk we are at of having some blockages start to form.

But it also turns out, and this was something that we were able to identify when we started accessing millions and millions of records using the contemporary electronic health record and insurance company data, we saw that there was a major input to cardiovascular disease was kidney impairment.

So patients with high creatinine or low eGFR, suggesting they had impaired renal function, actually are at increased risk.

So, it really starts to bring together two of these concepts that we're monitoring anyway, and now it helps to put them into a single calculator to show that if you're starting to have increased lipids or hypertension and decreased kidney function, that together this is now an increased, aggregated risk for ASCVD.

Bob Barrett: Dr. Meeusen, what are the clinical implications of lower estimated ASCVD risk in PREVENT relative to PCE?

Jeff Meeusen: Yeah, one of the big concerns for the Pooled Cohort Equation, the PCE, was that it started to overestimate risk. Now, there was an ongoing controversy on whether or not that risk is overestimated or we simply needed to increase the number of people being treated. But in either case, they eventually, when they came to the PREVENT score, they found that it did suggest that there would be a lower treatment threshold.

So whereas the Pooled Cohort Equation had a lower treatment threshold of 7.5% risk of a cardiovascular event over the next 10 years. And that led to a significant number of the U.S. population being eligible for statin or lipid lowering treatment.

In order to adjust the fact that our new risk calculator in the PREVENT score has slightly different outputs, they've actually adjusted where they call the percent that ought to trigger a conversation about lipid intervention and had to assign new thresholds. So now starting even as low as 3.5% risk over the next 10 years, they want you to start discussing with your provider on whether or not you should consider starting lipid lowering therapy.

Bob Barrett: Okay, so how might this affect treatment decisions, particularly statin eligibility and preventive therapy?

Jeff Meeusen: Yeah, it'll definitely make it so more people are eligible should they choose to follow it. And that's a good thing because all the data have shown since statins came on the market back in the 80s that no matter what your risk level for ASCVD is, when you start taking these medicines, it always goes down.

So if you're at moderate risk, you'll go to low risk. If you're at low risk, you go to almost nonexistent risk. So it'll certainly make it easier for patients to be eligible for these medicines and it'll prompt physicians to have these conversations with their patients earlier.

Bob Barrett: Well, finally, Dr. Meeusen, from a clinical laboratorian perspective, what are the key opportunities and challenges associated with implementing PREVENT in practice?

- Jeff Meeusen: Yeah, this is a fun risk calculator. It has lots of different inputs. Compared to our previous calculators, this one includes some kidney function, as we mentioned before. And I think that this provides more opportunity for the laboratory to try and stay standardized and harmonized so that wherever you get your labs performed, it'll plug into the PREVENT calculator and give similar outputs.
- Bob Barrett: And that is the first time I ever heard the term "fun risk calculator." So cool.
- Jeff Meeusen: There you go.
- Bob Barrett: That was Dr. Jeff Meeusen from Mayo Clinic in Rochester, Minnesota. He wrote a News and Views article in the July 2026 issue of *Clinical Chemistry* summarizing the impact of the PREVENT equations. And he's been our guest in this podcast on that topic. I'm Bob Barrett. Thanks for listening.