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**ReachMD**
www.reachmd.com
info@reachmd.com
(866) 423-7849

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# 2022 ESC/ERS Guidelines for the Diagnosis and Treatment of Pulmonary Hypertension

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**Dr. McLaughlin:**
Hello, I'm Dr. Vallerie McLaughlin, Director of the Pulmonary Hypertension Program at the University of Michigan, and I would like to welcome you to this presentation on the 2022 ESC/ERS Guidelines for Diagnosis and Treatment of Pulmonary Hypertension. This is a really exciting document, and I'm sure we're going to do a number of programs on this over the coming months, but I just wanted to give you an overview of some of the topics that I thought are the most exciting and the biggest changes.

So, on this next slide, you'll see some of the changes that have occurred, and I'll focus on the new definition, the update in the classification, and some issues regarding risk stratification and the revised risk table.

And we'll talk about the new hemodynamic definition of pulmonary hypertension that was proposed in this document. As you might recall, in 2018 at the last WORLD Symposium, the mean pulmonary artery pressure was lowered from 25 to 20 for the definition of pulmonary hypertension. And that stands through in this document, but the other change is that the definition for pulmonary vascular resistance has been lowered from 3 to 2. So now precapillary pulmonary hypertension is a mean pulmonary artery pressure of greater than 20, a wedge pressure less than 15, and a pulmonary vascular resistance of greater than 2 wood units. To be considered isolated postcapillary pulmonary hypertension, the mean pulmonary artery pressure is greater than 20, the wedge pressure is greater than 15 and the calculated pulmonary vascular resistance is less than 2 wood units. Whereas combined pre and postcapillary pulmonary hypertension has a mean pulmonary pressure greater than 20, a wedge pressure greater than 15, and a calculated pulmonary vascular resistance greater than 2 wood units. And exercise pulmonary hypertension has been reintroduced into the definition, and it's been defined, not as an absolute number, but as a slope, as the ratio of the mean pulmonary pressure to cardiac output. If that slope is greater than 3 millimeters of mercury per liter per minute between rest and exercise, then that meets the definition of exercise pulmonary hypertension. But just a word of caution, even though this hemodynamic definition has changed, it's important to remember, in terms of the treatment algorithm, that that really applies to patients with a resting pulmonary vascular resistance of greater than 3 wood units.

The next slide highlights some of the changes in the clinical classification. So, one change for Group 1 pulmonary arterial hypertension has been a little bit of tweaking of the verbiage regarding the vasoreactivity testing. So, 1.1.1 is non-responders at vasoreactivity testing, that's where most patients fall. And then 1.1.2 is patients who have an acute response at vasoreactivity testing, so that's an important distinction there. Patients with pulmonary venous or capillary changes, PVOD and PCH, are categorized as 1.5. For Groups 2 through 4, they've changed the "due to" to associated with, which I think is a good change. They also changed the verbiage a little bit in Group 2 pulmonary hypertension associated with left heart disease, the heart failure verbiage to be consistent with other guidelines, so pulmonary hypertension due to heart failure with preserved ejection fraction or with reduced or mildly reduced ejection fraction, some minor changes to the lung disease hypoventilation syndrome rather than just obstructive sleep apnea, and some minor tweaks to Group 5, those with unclear or multifactorial mechanisms as well.

And on the next slide you'll see the central illustration, which kind of, I think, nicely reviews the classification, the different types of pulmonary hypertension. It puts the prevalence into perspective. In fact, Group 1 PAH is very rare, whereas Group 2 is very common, and Group 3 is also common. Then it outlines some of the therapeutic strategies as well.

Again, the diagnostic algorithm has been tweaked, and as some beautiful figures you see on the common symptoms of pulmonary hypertension, and then the following signs, some of the physical exam signs that we see.

And you see the diagnostic algorithm for patients with unexplained dyspnea or suspected pulmonary hypertension. And as was shown in the central illustration, pulmonary hypertension is common, but Group 1 pulmonary arterial hypertension and Group 4 CTEPH are relatively rare. And on the far right of this illustration, you'll see the option to fast-track to a PH center when you have a high suspicion for Group 1 or Group 4 pulmonary hypertension. And in the center, you see the more common lung and heart disease workup that most of the patients will get.

On the next slide, you see a lot of the echo parameters that we assess pulmonary hypertension with. I think this is a beautiful illustration, and it really highlights that there's so much more to the echo than just the estimated pulmonary artery pressure, and we need to be aware of all of these echo findings.

The next slide really puts this in perspective. It gives you an echocardiographic probability of pulmonary hypertension. It starts with a TR velocity, but it really highlights those other echo findings that can change the probability of pulmonary hypertension, so really important point there.

The next slide goes over the risk assessment table, and there have been some changes to this regarding echo, adding the TAPSE over systolic pulmonary artery pressure ratio into that risk assessment, adding some parameters from cardiac magnetic resonance imaging, and then adding stroke volume index to the hemodynamics. I think all very nice additions.

And then the next slide really highlights the four-strata method. As you may know, there are a couple really important papers published on risk stratification and using four rather than three strata, which I think is critically important. That intermediate risk group is just too big with the three-strata method. And so, using this four-strata method and changing that intermediate category to intermediate low and intermediate high with noninvasive objective data, I think, really adds to our treatment decisions. I'm using this every day now in clinical practice.

So, to summarize, we all know that the complexity of managing PH patients requires really a broad multidisciplinary approach. And streamlining the care of these patients is challenging but really required to effectively manage pulmonary hypertension. We've made so much progress in the year since the last guidelines, and so I think this document is a very welcome addition to the literature, and it really brings a heightened awareness to many aspects, including earlier detection, assessing risk, and, really, a nice flow of the treatment algorithm. The incorporation of some of the newer imaging and diagnostic modalities bring a very fresh, useful look at the ways we assess pulmonary hypertension. The change in the hemodynamic definition, I'm sure we'll get a lot of discussion over the coming months. And this is the first program in a short series that we will use to look at some of the changes in the guidelines. In further episodes we'll focus on the diagnostics, on the new treatment algorithm, and beyond Group 1 pulmonary hypertension. So, thank you for your attention.

**Announcer:**
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