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## Risk Assessment Tools In Pulmonary Arterial Hypertension (PAH): A Survey of Real-World Practices and Barriers To Use

Wilson M<sup>1</sup>; Keeley J<sup>2</sup>, Kingman M<sup>3</sup>, Rogers F<sup>4</sup>

<sup>1</sup>*Advent Health Orlando, Orlando, FL*

<sup>2</sup>*Cardiovascular Institute, Allegheny Health Network, Pittsburgh, PA*

<sup>3</sup>*University of Texas Southwestern Medical Center, Dallas, TX*

<sup>4</sup>*Temple University Hospital, Philadelphia, PA*

**Background:** Guidelines suggest that treatment decisions in PAH should be informed by regular assessment of patients' clinical risk. Tools such as REVEAL (Registry to Evaluate Early and Long-term PAH Disease Management) and COMPERA (Comparative, Prospective Registry of Newly Initiated Therapies for Pulmonary Hypertension) provide objective estimates of patients' 1-year mortality risk, based on multiple factors including functional class, hemodynamics, biomarkers, comorbidities, and exercise testing. These tools predict mortality risk across multiple patient cohorts more effectively than functional status alone.

**Methods:** In February 2019, members of the PHA providers' networks were invited, via email, to complete an online survey regarding their use of risk assessment tools in PAH.

**Results:** A total of 168 providers responded, of whom 138 identified themselves as treatment decision makers (77 physicians; 61 nurse practitioners and other nurse providers). Of these, 80 (58%) reported using formal tools to assess risk. Those who don't use tools rely primarily on gestalt to estimate risk. Use of formal risk tools was marginally lower for non-physicians (49%, vs 65% for physicians), providers at smaller PAH centers (45% for centers with 1-100 patients, vs 64% centers with >100 patients), and providers with less experience treating PAH (50% for providers with 1-5 years, vs 62% providers with >5 years). Among all treatment decision makers, the most frequent occasions for assessing risk were time of diagnosis (cited by 51%), worsening symptoms (41%), medication changes (34%), right heart catheterization (33%), and echocardiogram (25%). Among all treatment decision makers, 11% assess risk at every visit, 16% at least once every 3 months, and 19% at least once every 6 months. Among non tool- using respondents, problems related to lack of information were frequently cited as barriers to tool use: complexity of tools and scoring systems (cited by 20% non-users, vs 11% users), lack of clarity on best tool to use (31% non-users, vs 21% users), and lack of education/awareness (24% non-users, vs 5% users). When respondents were asked to suggest how the use of risk tools could be increased, the most common suggestions were technological interventions to improve convenience and efficiency such as electronic medical record integration, pop-up reminders, automated calculation, and online/phone app risk calculators (72% non-users, vs 56% tool users).

**Conclusions:** These results suggest that despite the importance of risk assessment, real-world use of formal risk tools remains low, especially for smaller clinics and less experienced providers. Uptake of tools may be improved through targeted education, and through technological interventions to streamline their use.



Figure 1. Barriers to the use of risk assessment tools in PAH, cited by Users vs Non-Users of risk tools (percentage of respondents citing each barrier).

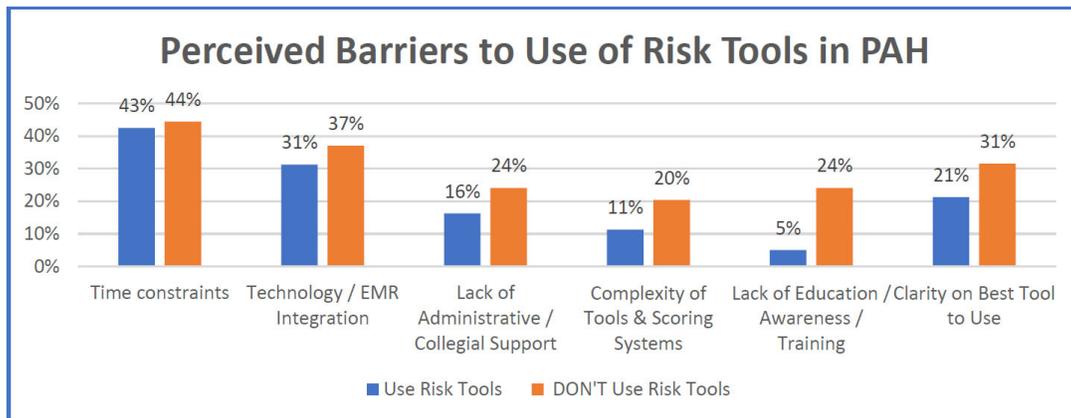


Figure 2. Suggestions for facilitating the use of risk assessment tools in PAH, offered by Users vs Non-Users of risk tools (percentage of respondents who offered suggestions).

