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Background

- Current interfaces for PAH risk assessment are **simplistic** and **lack interactive designs** to comprehensively understand patients' prognosis
- Interactive clinical decision-support tools have leveraged **what-if explanations** to provide previously unaccessible insights about machine learning algorithms, such as PHORA¹
- It is unclear how what-if explanations would be **used** by clinicians and how they should be **designed**

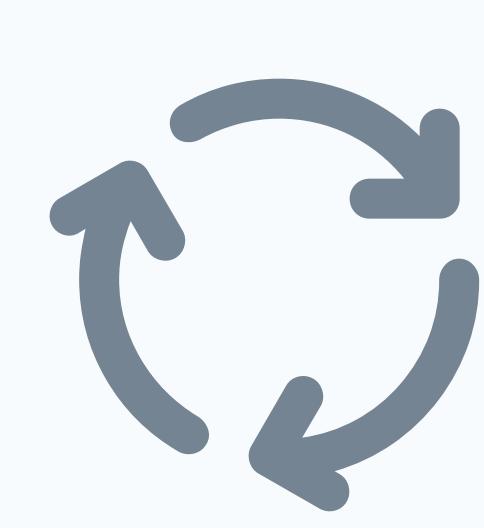
Goals

- Identify how clinicians would like to **use** what-if explanations **in practice**
- Establish **design guidelines** based on how clinicians would like to utilize these explanations
- Design a novel, **interactive what-if explanation visualization** to help guide clinicians through machine learning-based PAH risk stratification

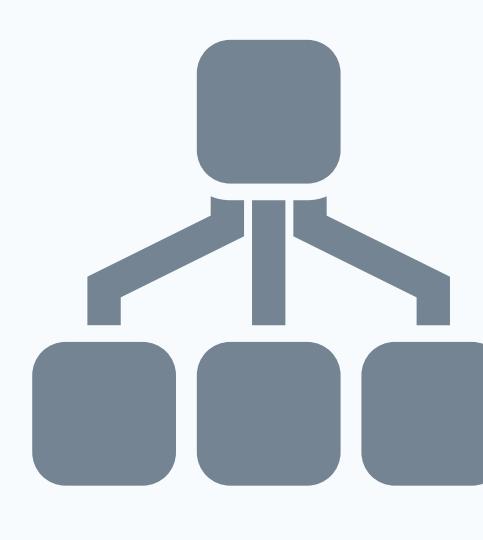
Methods



28 PAH
Clinicians



Iterative
Prototyping



Thematic
Analysis

- Conducted semi-structured need-finding interviews and user studies with **28 PAH clinicians**
- Iteratively prototyped, progressing from static low-fidelity to interactive high-fidelity prototypes to a **deployed, web-based interactive dashboard**
- Thematic analysis of interview transcripts to inform dashboard design and clinician preferences

Results

- Identified the **primary ways clinicians intended to use the what-if explanation:**
 - Educate patients, caregivers, and less experienced clinicians about PAH
 - Motivate patients to improve their conditions
 - Identify appropriate treatment plans
 - Understand the machine learning model
- Developed a **novel, interactive what-if explanation visualization** based on clinician needs and preferences identified from interviews

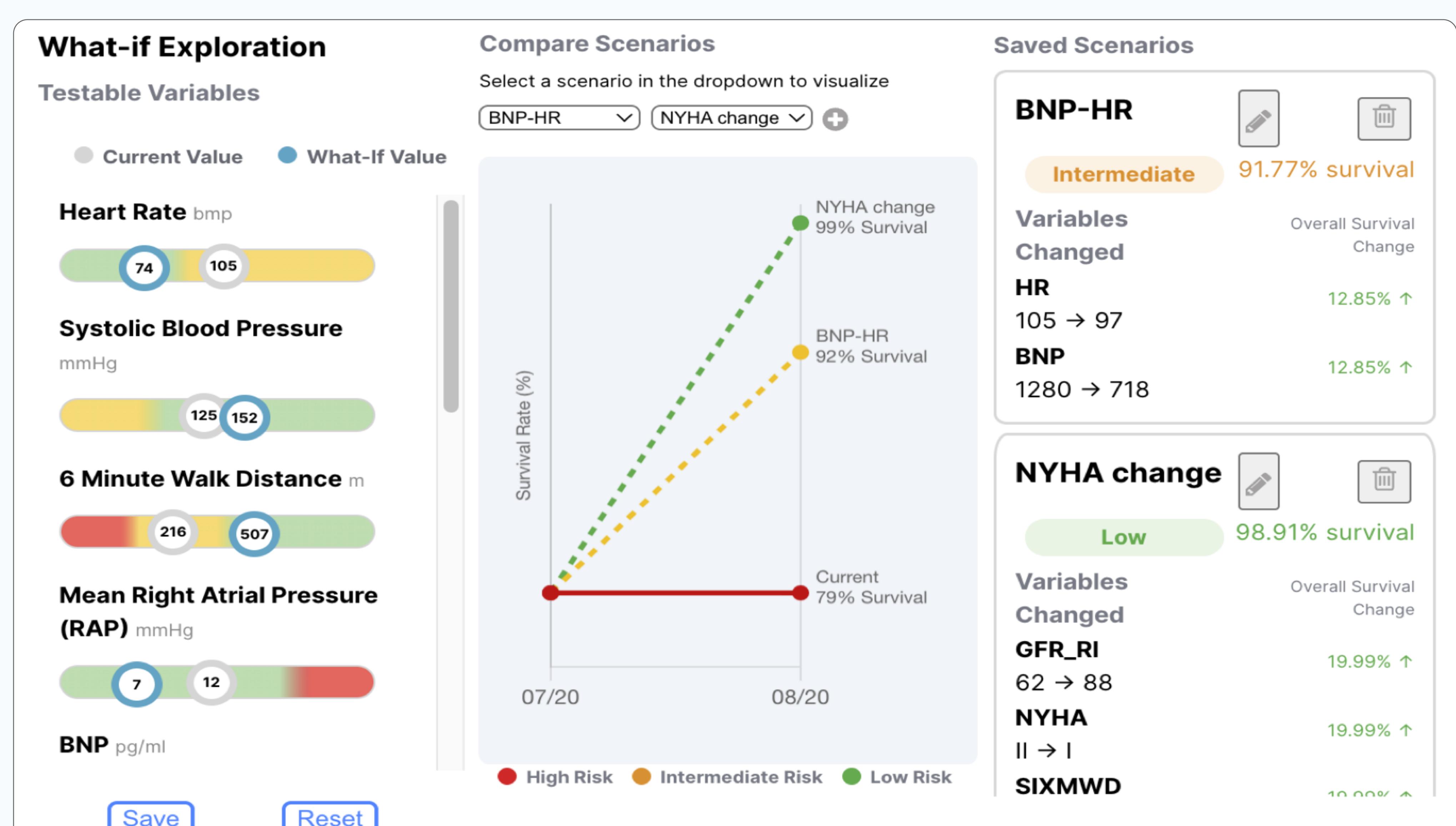


Figure 1: Designed interactive what-if explanation feature to support clinicians' primary intended uses.

Conclusion & Implications

Diverse uses of machine learning models in clinical decision-making, such as augmenting patient communication and treatment planning, underscore the need for safely designed dashboards.

The dashboard we designed aims to **support clinicians' essential needs** when collaborating with predictive models through user-friendly interactions and visualizations.

References & Acknowledgements

- [1] Kanwar, M. K., Gomberg-Maitland, M., Hoeper, M., Pausch, C., Pittrow, D., Strange, G., ... & Benza, R. L. (2020). Risk stratification in pulmonary arterial hypertension using Bayesian analysis. European Respiratory Journal, 56(2).