

# Multi-state Modeling of Tricuspid Regurgitation Disease Progression Rate using an EHR-integrated Natural Language Processing Platform

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# Background

- ▶ Tricuspid Regurgitation is a morbid disease with negative outcomes
- ▶ Disease progression is poorly characterized
- ▶ Understanding disease progression is crucial for optimizing patient outcomes and determining timing of intervention

# Methods

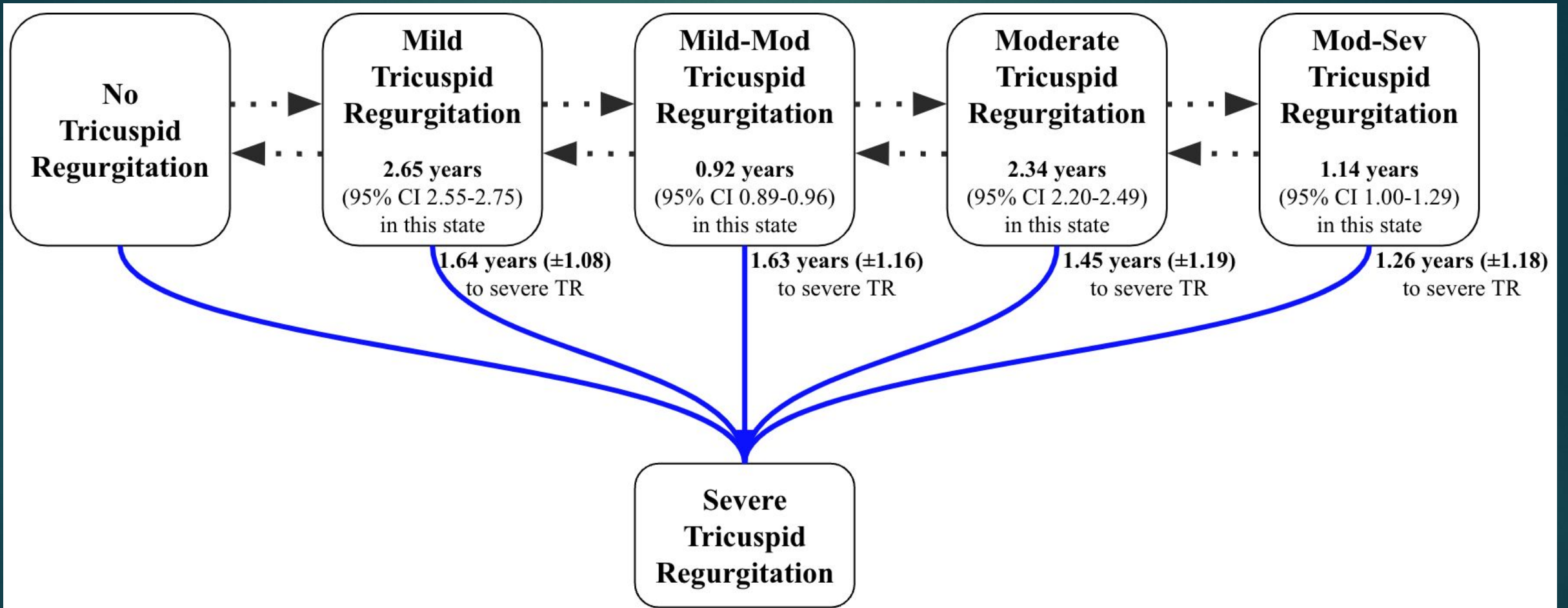
- ▶ Tempus Next (Tempus Labs Inc, Chicago, IL) studied patients with TR at baseline between August 2018 to December 2021 with a follow up echo until May 2023
- ▶ Demographic and Echo indices were parsed from the Echo report using natural language processing
- ▶ The endpoint was progression to severe TR (“progression”), characterized using a multi-state Markov model
- ▶ Patients with a Tricuspid Valve (TV) intervention after the index echo but before the follow up echo were excluded

# Results

- ▶ 52,090 patients (93,335 echoes) were retrospectively analyzed and screened for TR, (8,041 mild; 1,005 mild-moderate; 1,230 moderate; 280 moderate-severe), with an average observation window of 557 days (range: 31-1723 days)
- ▶ 27% of patients that were moderate-severe at the time of their index echo experienced progression, and this was significantly higher ( $p < 0.001$ ) than the progression rates for moderate (10%), mild-moderate (4%) and mild TR (1%).



# Results



# Results

- ▶ Patients indexed at moderate-severe TR had 10%, 16% and 24% probability of progression within 6 months, 1 year, and 2 years, respectively.
- ▶ However, the time to progression was not significantly different when comparing patients indexed at mild, mild-moderate, moderate, or moderate-severe TR ( $p=0.178$ ).
- ▶ For example, the time to progress to severe TR from mild TR ( $n=72$ ) was 1.64 years, while the time to progression from moderate-severe was 1.26 years.
- ▶ The average time patients stayed in mild TR was 2.65 years (95% CI 2.55-2.75), 2.3 years in moderate TR (95% CI 2.20-2.49), and 1.2 years in moderate-severe (95% CI 1.00-1.29).

# Conclusions

- ▶ The study findings provide insights on the progression of TR which can be incorporated into future efforts to assess frequency of follow up imaging
- ▶ These findings highlight the importance of vigilant monitoring which can help guide future tricuspid intervention trials.
- ▶ Further research is needed to elucidate the underlying mechanisms influencing TR progression