Prioritization of Risk Factors for the Prevention and Treatment of Pediatric Obesity

Ming Dong[1] (PI), Elizabeth Towner[2] (Co-PI), Dongxiao Zhu[1] (Co-PI)
1: Department of Computer Science, Wayne State University, Detroit, MI 48202
2: Department of family medicine and public health sciences, Wayne State University, Detroit, MI 48202

OVERVIEW

Urban communities are facing many challenges, the persistence of obesity disparities in early childhood is one example. Some risk-factors for obesity are highly specific to the community in which a particular child lives.

Successful efforts to prevent and treat pediatric obesity depend upon integration of data from multiple community sources and systems. Expert committee guidelines suggest a staged approach to prevention and treatment of pediatric obesity that begins in the primary care setting with a thorough assessment of medical and behavioral risk factors.

However, completion is a daunting task given the short duration allotted for well-child visits, which also does not include assessment of community-level risk factors.

An additional concern is that guidelines suggest providers to use clinical judgment to guide risk assessment because a qualitative formula to integrate information gathered is not available.

AIMS

- Design innovative multi-level mixed effects machine learning methods and scalable algorithms that will integrate multiple datasets to precisely prioritize a preschooler's personalized risk.

- Develop a data- and tool-rich online Web portal dedicated to pediatric obesity by leveraging quantitative, community-aware information visualization techniques.

DATA & METHODS

Figure 1: Datasets collected in the Detroit and Metro Detroit community for pediatric obesity.
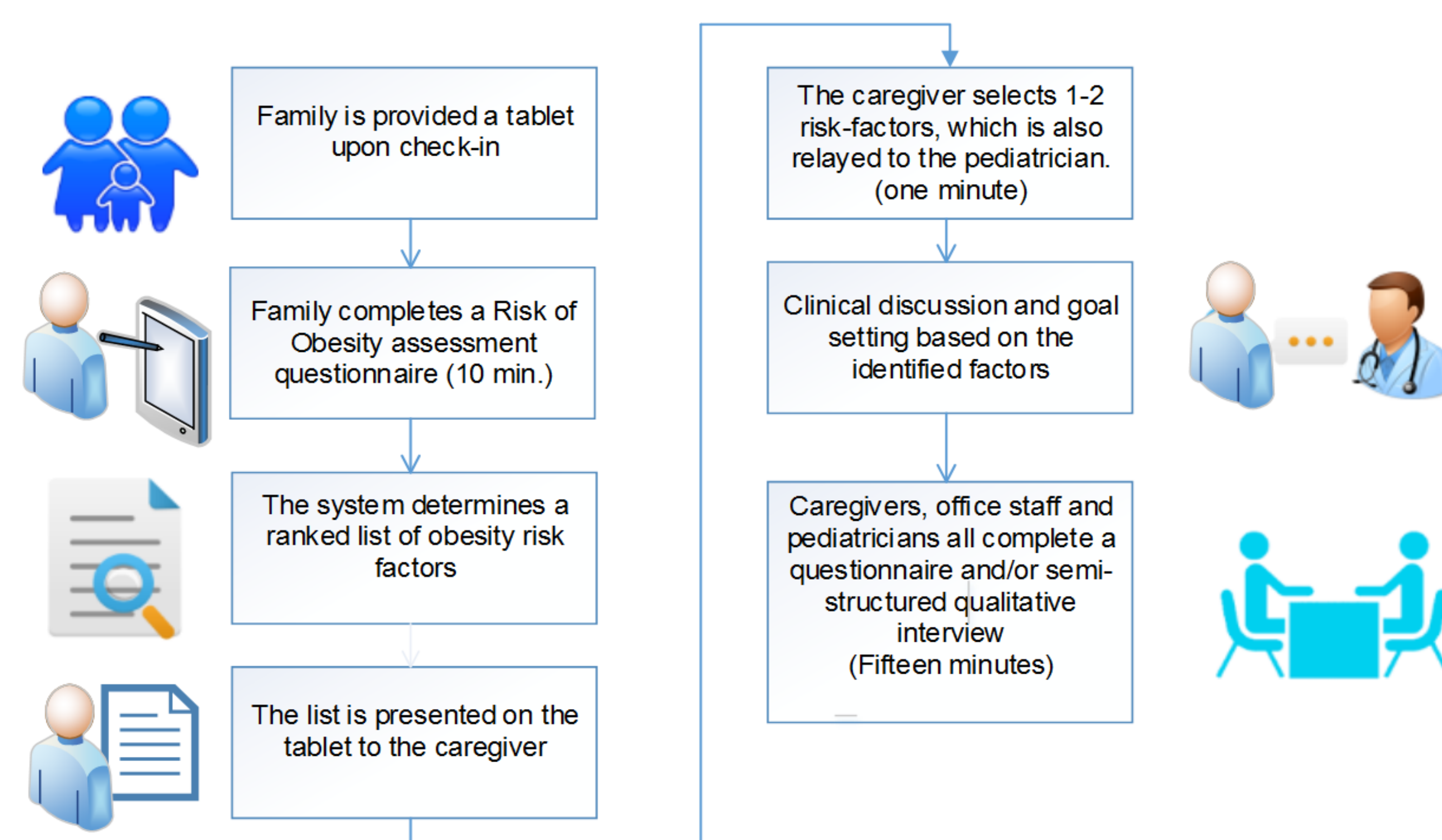
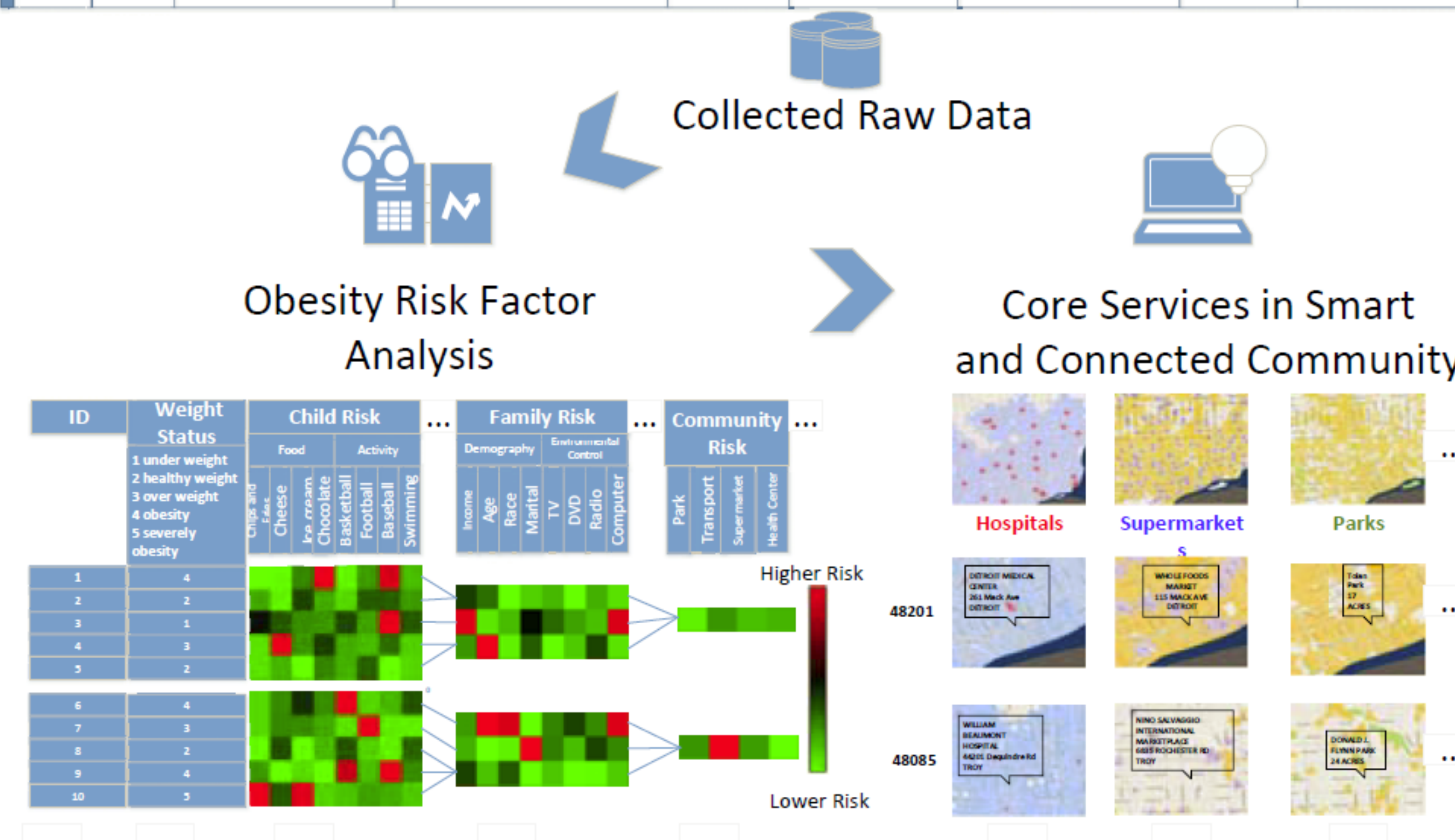Figure 2: Operation flow of our system.

Figure 3: Quantitative and community-aware visualization of risk-factors for obesity.
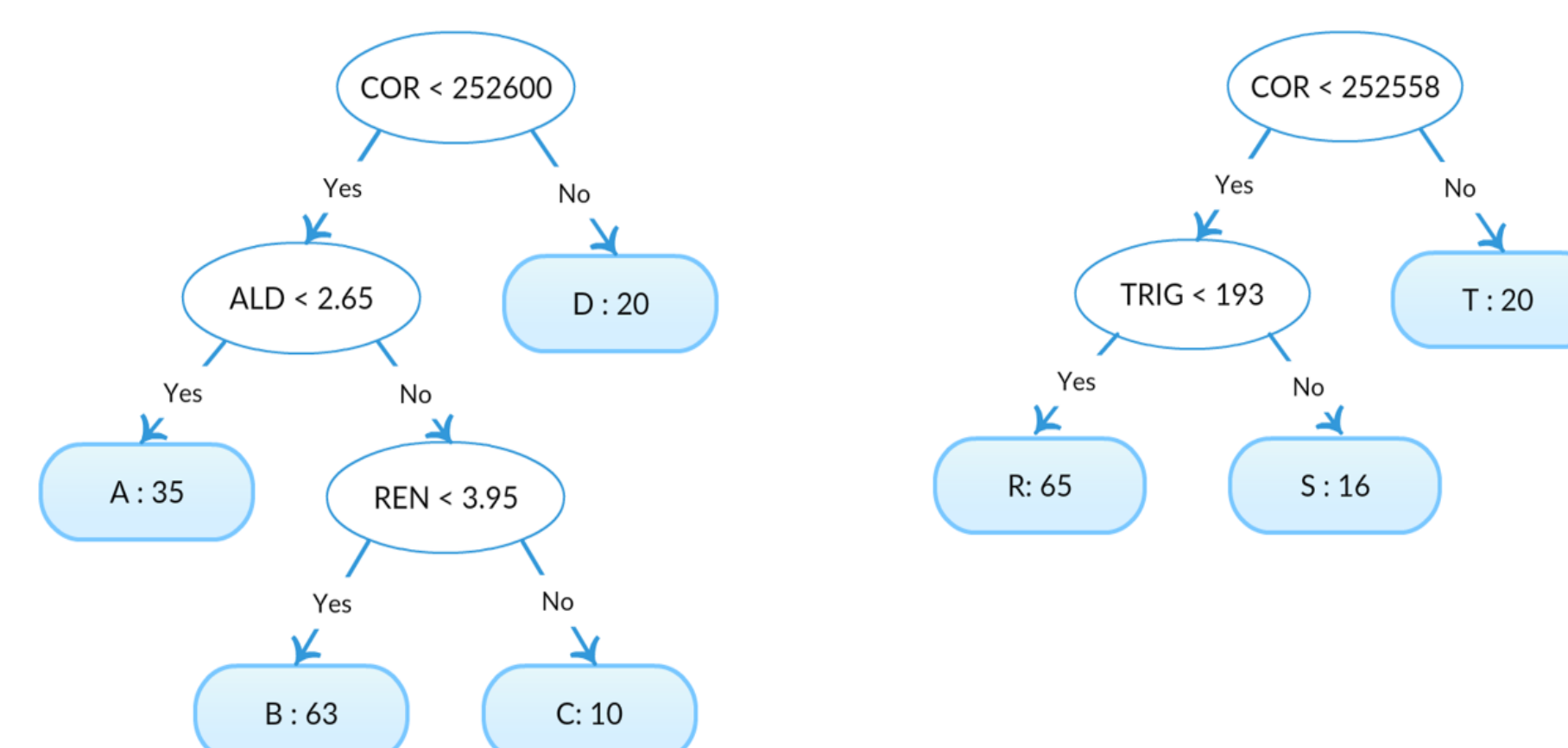

Figure 4. Cast study: patient subgroup detection and risk factor prioritization. Left panel: Our Subgroup Detection Tree (SDT). Right panel: CART(benchmark method).
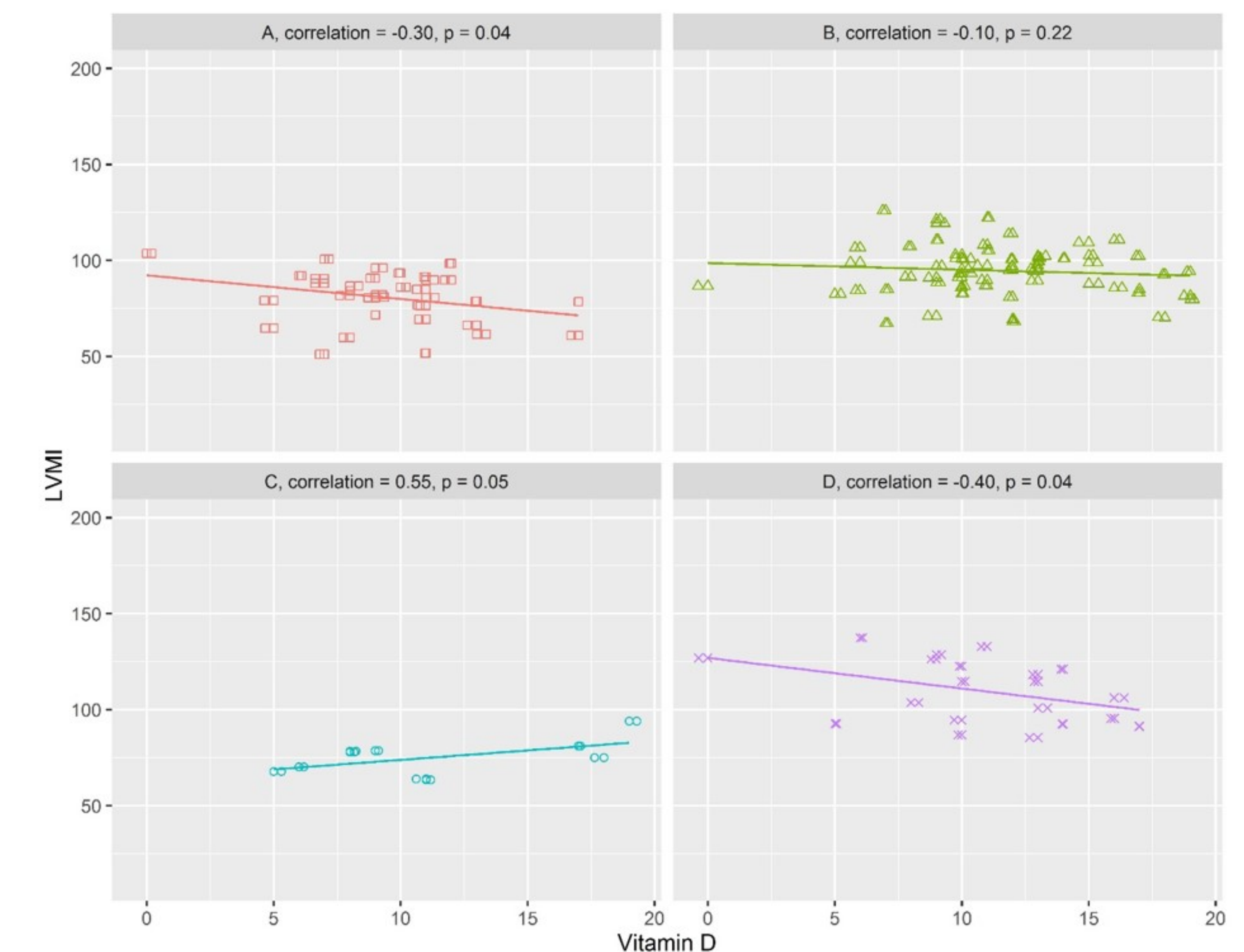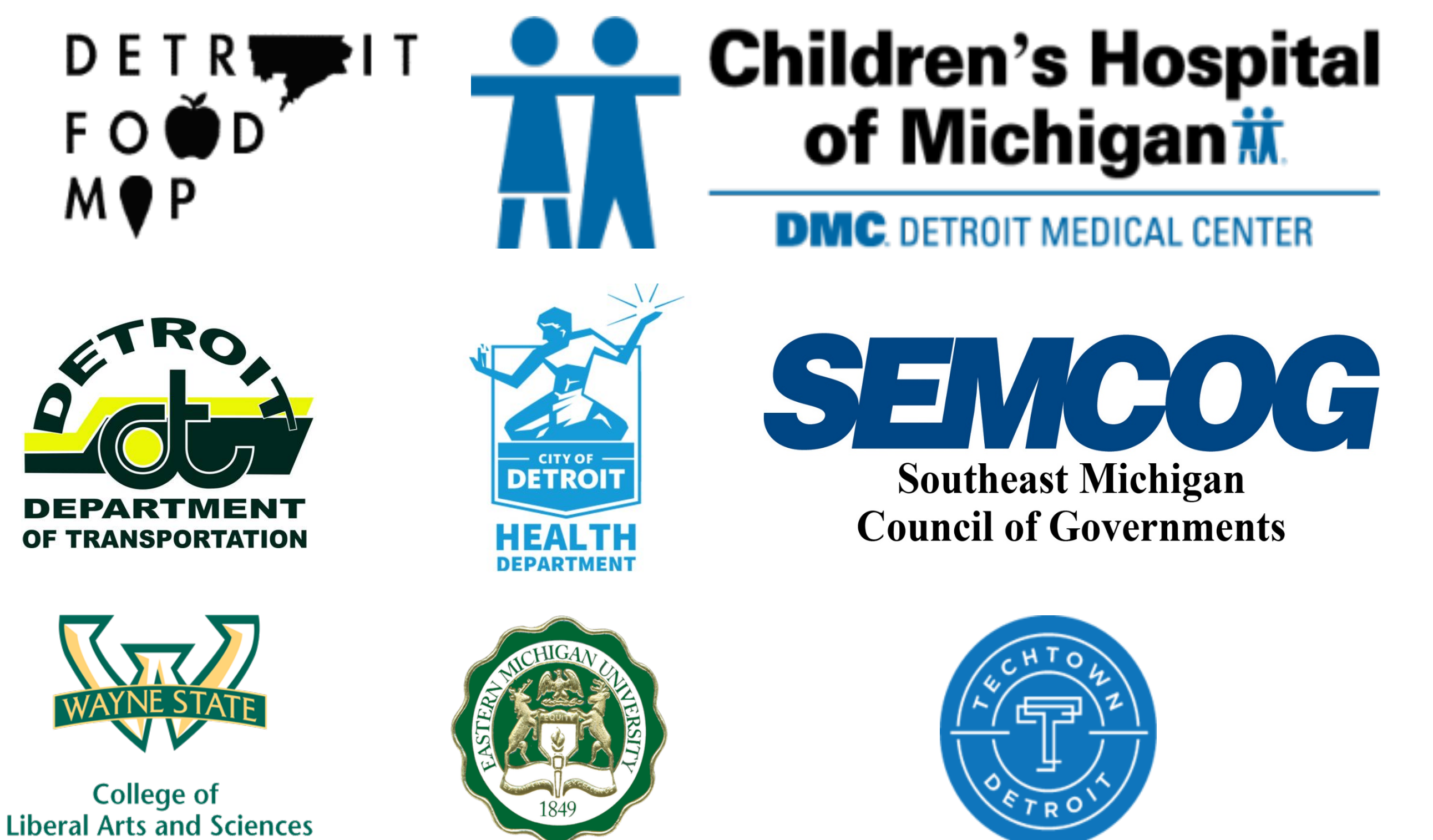
RESULTS

Figure 5: Cast study: patient subgroup detection and risk factor prioritization. Scatter plot for each subgroup of SDT.

ACKNOWLEDGEMENTS

CONTACT

Ming Dong, Ph.D.
Associate Professor
313.577.0725
mdong@cs.wayne.edu