Using Data and Science to Improve Healthcare and Reduce Emergency Department Costs

Overview

RIPL has built a predictive model that **could save government millions in total Medicaid Emergency Department (ED) costs per year by predicting divertible ED costs before they occur**. The model can **predict with up to 78% accuracy** which Medicaid enrollees who currently have no divertible ED costs will emerge with divertible costs in the coming year. This data-driven approach can proactively connect patients to appropriate care while saving government tens of millions of dollars.

Predicting High-Cost ED Users

Medicaid ED visits are an expensive form of care, and for certain types of visits could be diverted to more appropriate treatment in primary care.[1] Current methods used to coordinate care for high-cost, non-emergency (or "divertible") users wait to see which patients visit the ED multiple times *before* assisting them. This approach is expensive, because a large fraction of costs accrue before policymakers know which individuals require additional intervention and coordinated care. It is often the case that a patient's first year of divertible ED use tends to be the most expensive before decreasing towards baseline ED use in subsequent years. This first and most expensive year is thus the most important to target.

We partnered with Rhode Island to find a low-cost way to identify divertible, high-cost ED users *before* they incur any divertible ED costs. Using government data and machine learning, we built a predictive model that:

1) **Predicts which current Medicaid enrollees will emerge as divertible high-cost users in the coming year with up to 78% accuracy.**

2) **Highlights key predictive factors that predict divertible ED costs**. For example, prior research has investigated if high divertible cost users are disconnected from primary care providers and routine care. Instead, our model shows that they consistently use *more* primary care and specialist visits than the overall Medicaid population, which indicates multiple missed opportunities to intervene with targeted support services.

3) **Identifies cost savings over wait-and-see approaches**. We can simulate cost savings of using our identification approach to connect targeted social support to individuals in need. **Using the RIPL model, outreach to the top 1% of predicted high-cost users could save 5% of divertible ED costs, while accruing no identification costs common to wait-and-see models.**

Figure 1. Outreach to the top 0.5%, 1% and 5% of potentially high-cost ED users yields significant cost savings
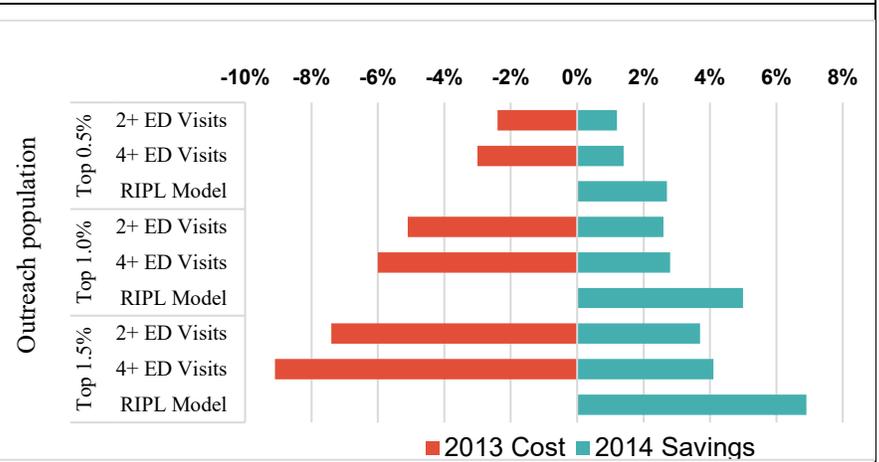
Notes: Data from the RI 360 data lake show the fraction of divertible Medicaid Emergency Department costs in 2014 that might have been saved through outreach to the top predicted high-cost users. Approaches that use previous ED visits to identify high-cost users accrue substantial identification costs in 2013.

Policymakers don't need to wait for millions of dollars in non-emergency ED visits to accrue. Using a data-driven approach, we can rapidly identify what works and why, and proactively connect patients to better care, improving lives and saving money at the same time. **Better yet, this low-cost, high-impact model runs on data that state and state and county governments already have.**