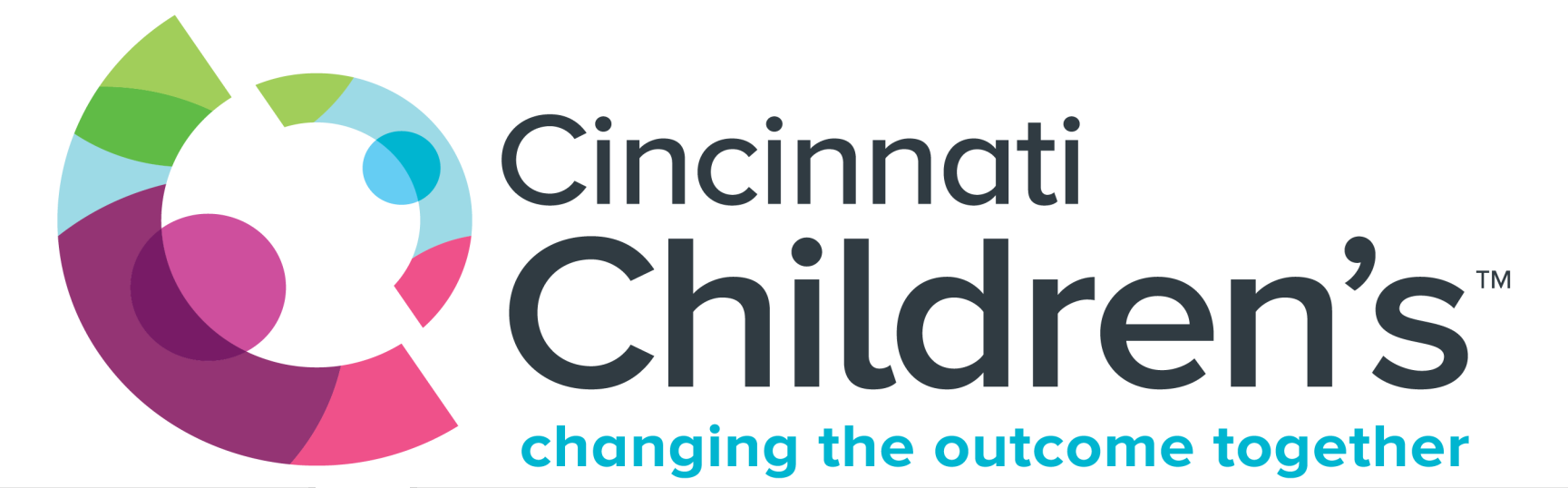


Are Electronic Alerts Helping Some Patients and Harming Others?

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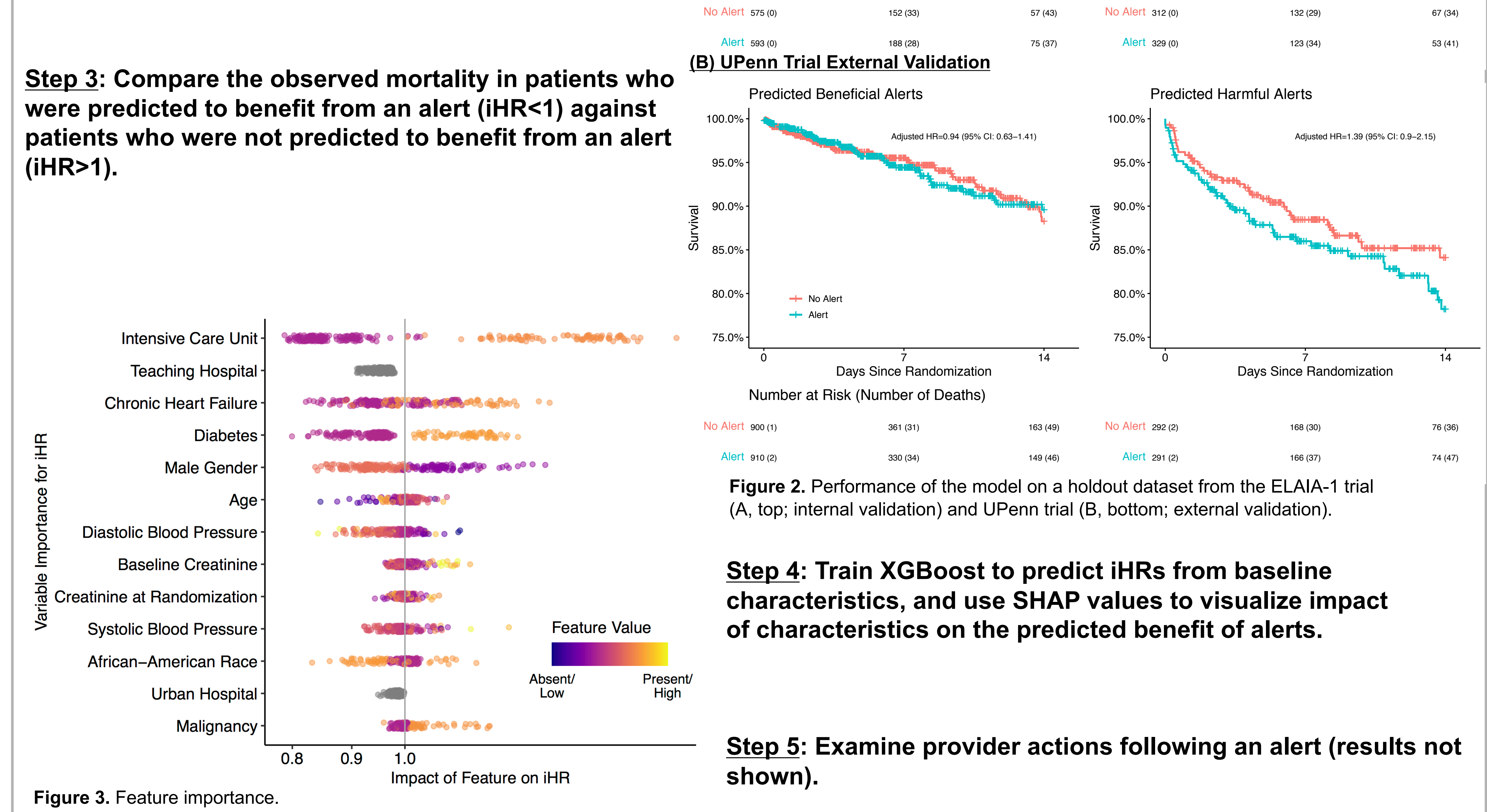
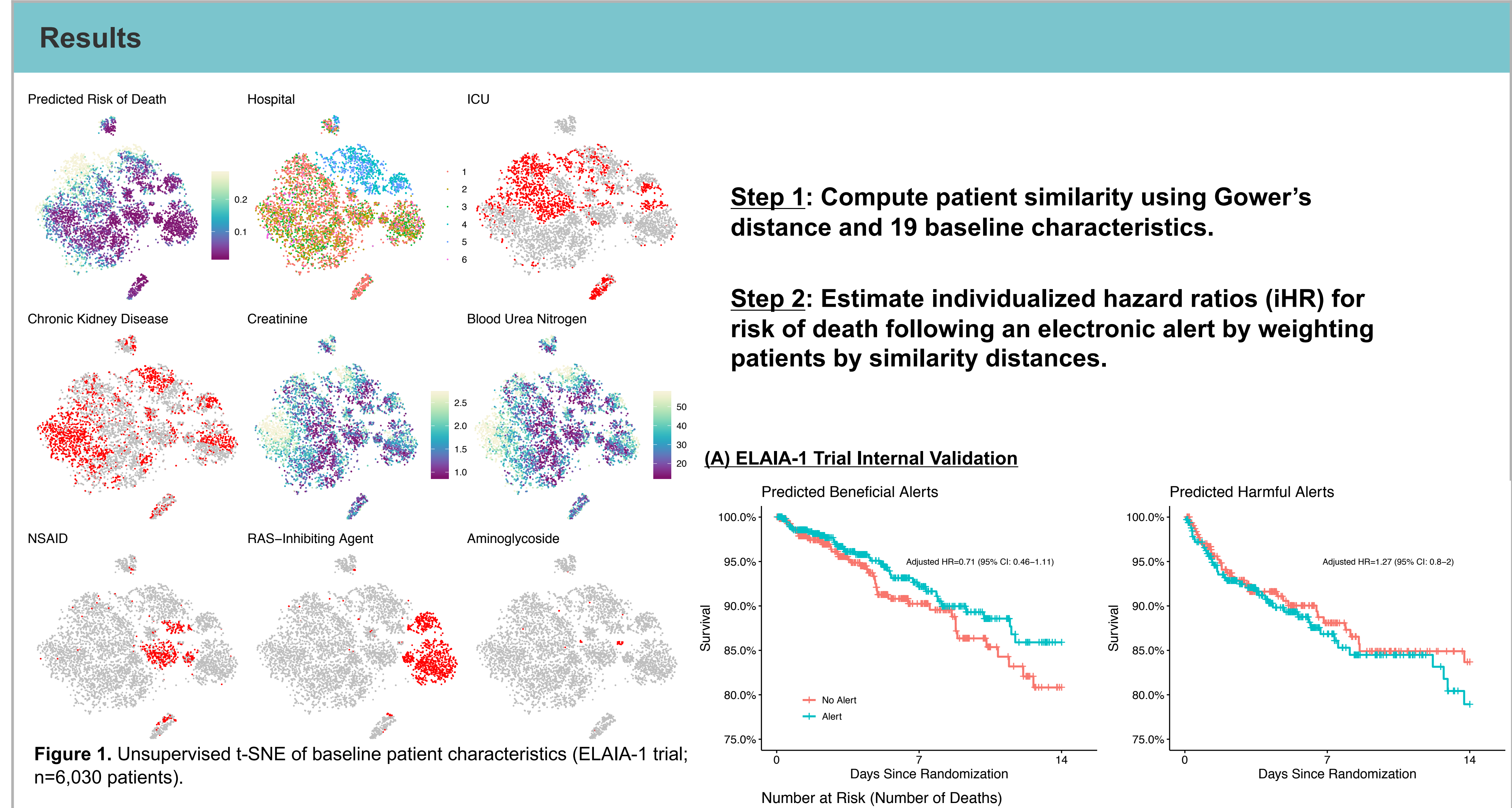


Background

- Automated, electronic alerts for acute kidney injury affect physician behavior (e.g., increase orders for intravenous fluids, urinalyses, and creatinine measurements).
- The effect of alerts on patient mortality in previous studies has varied; they may increase patients' mortality risk in some settings and decrease it in others.

Methods

- Objective:** To understand the heterogeneous treatment effects of electronic alerts for acute kidney injury (AKI).
- Design:** Secondary analysis of individual patient data from two randomized controlled trials. Data from the first trial (ELAIA-1) were used to predict the individualized effect of alerts on mortality based on patients' phenotype. Results were internally validated on a holdout dataset and externally validated using data from the second trial (UPenn). In addition, provider actions following alerts were examined as a possible explanation of how alerts impacted patient mortality.
- Setting:** Seven hospitals in the Northeast region of the United States.
- Participants:** 8,423 hospitalized patients with AKI.
- Intervention:** Electronic alerts for AKI.
- Main Outcome Measure:** Mortality within 14 days of randomization.



Discussion

- This secondary analysis of data from two randomized controlled trials (n=8,423 patients) found that the effect of automated alerts on mortality depends on the patient's phenotype.
- Alerts were associated with increased risk of mortality in patients with low blood pressure and decreased the risk of mortality in patients with chronic heart failure.
- In one hospital, over a seven-month period, we estimated that 14 patient deaths may have been prevented by alerting patients who were predicted to benefit, and withholding alerts in patients who were not.**
- This effect was likely mediated by providers actions in response to the alerts.

Conclusions

- Alerts might influence providers to take actions that are harmful to the patient.
- Alerting systems should be rigorously evaluated to ensure safety and efficacy and potentially tailored to individual patients.

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