



The Opioid-Abuse Predictor

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Introduction

The opioid epidemic has had severe consequences on public health, leading to hundreds of American deaths daily and burdening the health care system. Identifying those at risk of opioid aberrant drug-related behavior (ADRB) is crucial. However, traditional tools like the Opioid Risk Tool (ORT) are limited by self-reported measures. Alternatively, machine-learning algorithms, particularly recurrent neural networks (RNNs), offer a new approach to analyzing this data. RNNs can effectively consider temporal variations in medications, conditions, and other factors. Implementing an RNN-based machine learning model would significantly improve the identification of individuals at risk of opioid abuse.

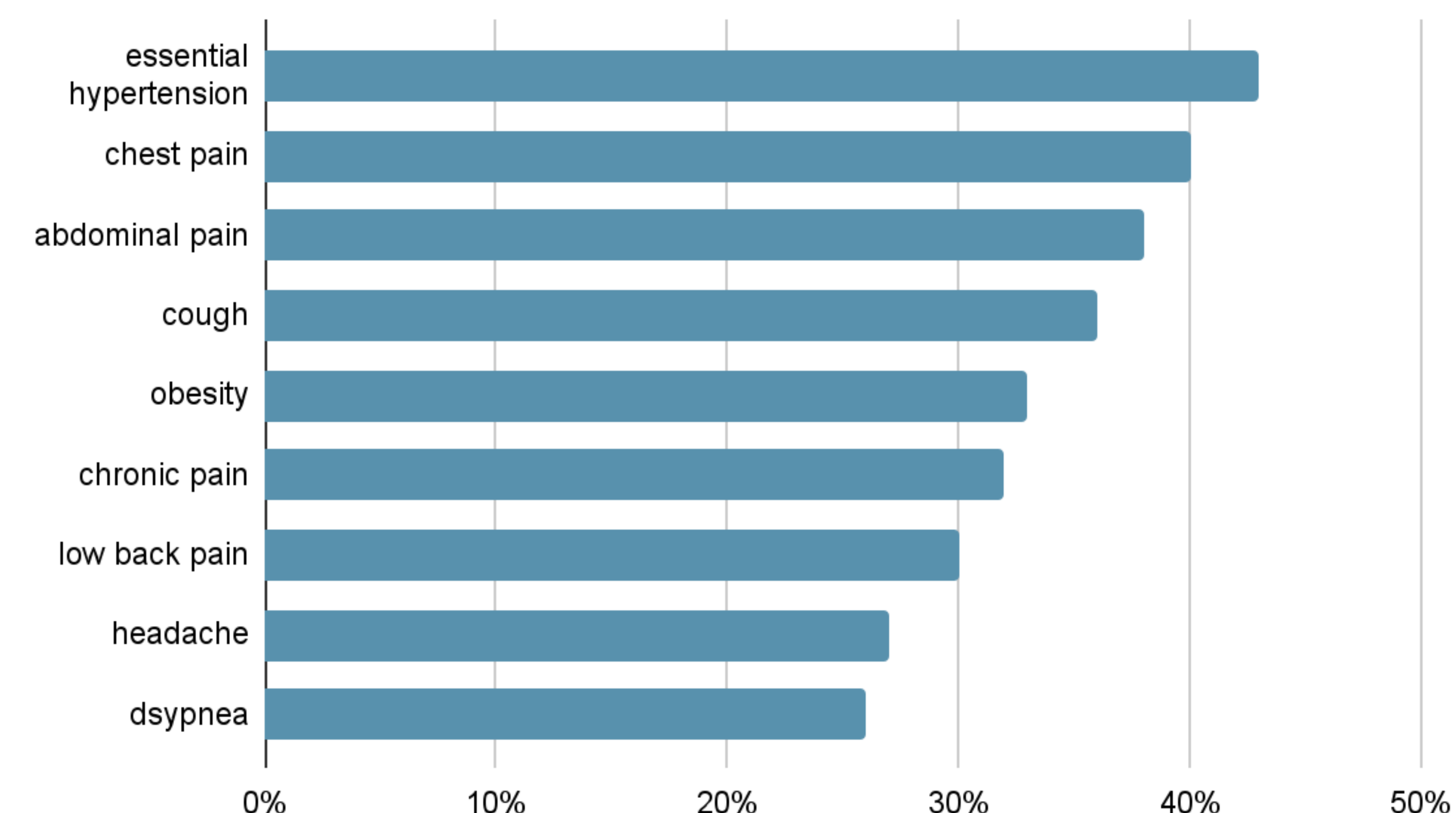
Methods

Through SQL queries, we obtained patient time-series data on conditions and medications from Research All of Us. Selecting specific conceptual features from Deaver et al. and other reputable sources, we constructed a feature matrix of patient-visit information. Subsequently, we trained an LSTM RNN model using our chosen features.

Objectives

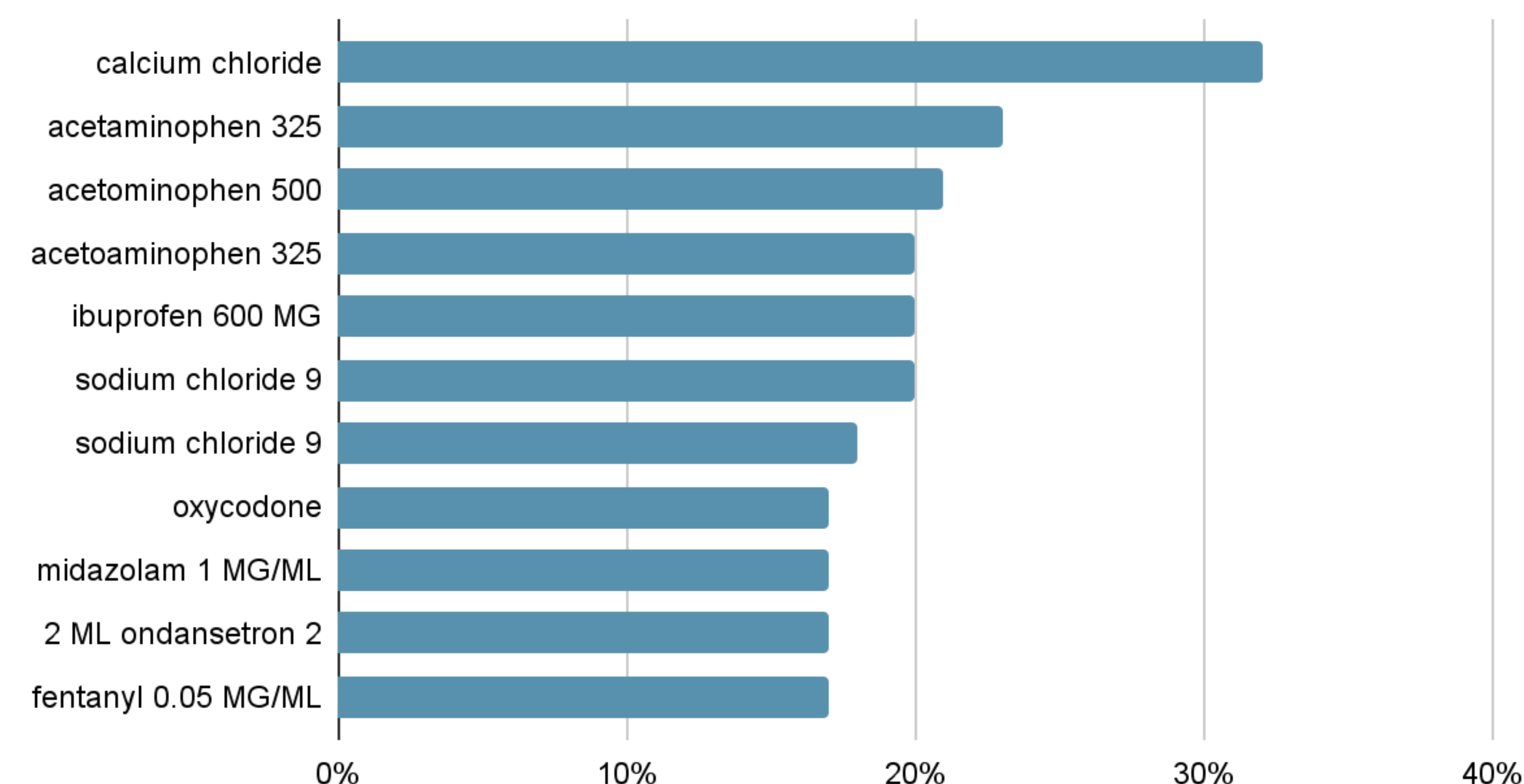
The Opioid-Abuse Predictor aims to enhance clinical decision-making by identifying individuals at risk of opioid abuse, improving patient safety during opioid prescriptions. The Opioid-Abuse Predictor mobilizes Research All of Us EHR data and employs advanced technologies such as LSTM RNNs and factor analysis to explore temporal dependencies among medication, procedures, lab results, and diagnosis histories. The predictor serves as a modern, user-friendly foundation for future research endeavors, aiming to provide more precise predictions of opioid abuse.

Top 10 Conditions Features



These figures detail the most common conditions and medications for patients with at least 1 opioid prescription in their medical history.

Top 10 Medication Features



Expected Results

Despite encountering setbacks, we remain optimistic about the predictor's ability yield favorable results. Our confidence stems from the strong support provided by previous literature, which reinforces the belief that the selected features, are indeed suitable predictors for opioid abuse.

References

Deaver et al. "Using Machine Learning Methods and Electronic Health Records to Classify Patients as At-Risk for Opioid Abuse and Dependence." *University of Virginia*, 2023.

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