RxReduce

A solution to the problem is reducing the problem

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Meet the Team

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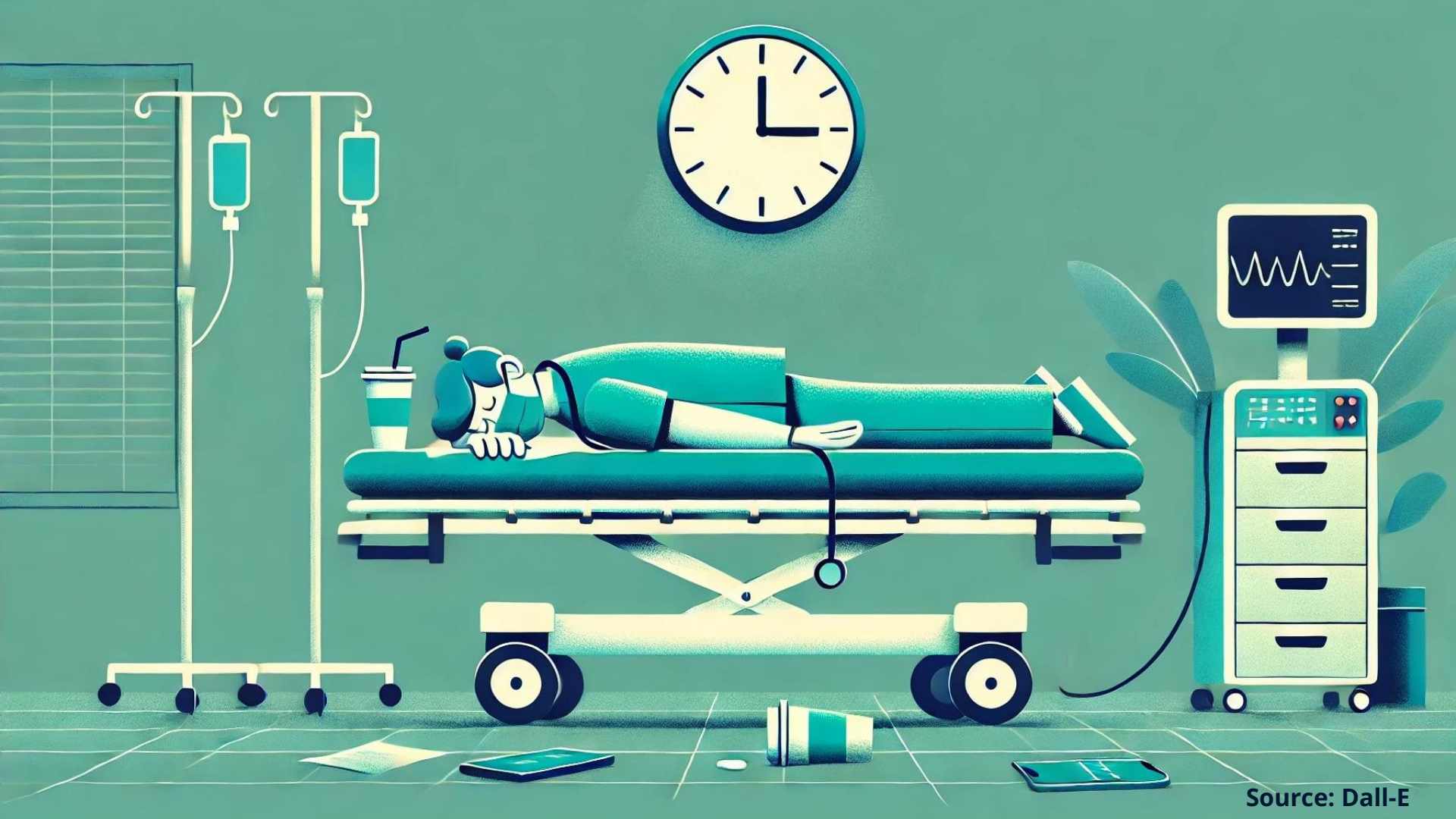
Discharge Medication Reconciliation

Donny

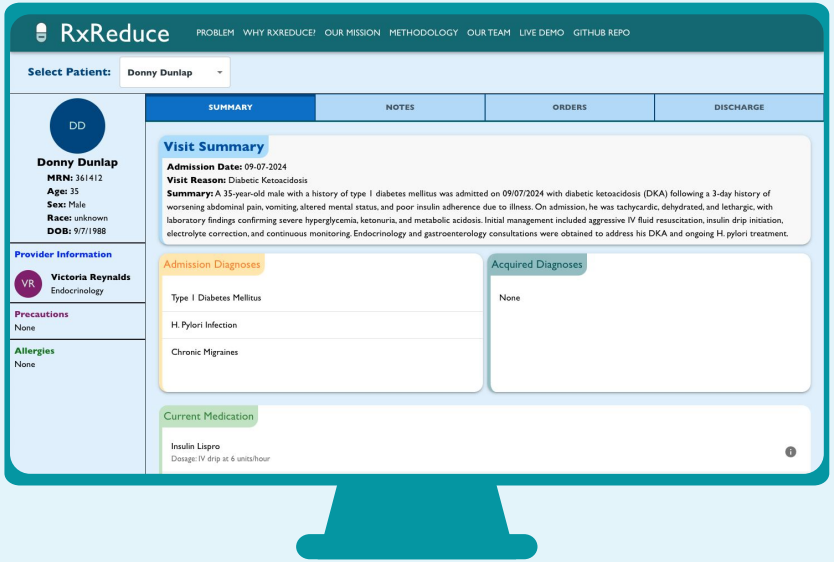
- 35 year old male
- Type 1 diabetes
- Completing a 6d inpatient stay for Diabetic Ketoacidosis (DKA)
- Was admitted on day 10/14 of treatment for H Pylori



Source: Dall-E

02

Demo


RxReduce
PROBLEM
WHY RXREDUCE?
OUR MISSION
METHODOLOGY
OUR TEAM
LIVE DEMO
GITHUB REPO
Select Patient:
Donny Dunlap
DD
Donny Dunlap
MRN: 361412
Age: 35
Sex: Male
Race: unknown
DOB: 9/7/1988
Provider Information
VR
Victoria Reynalds
Endocrinology
Precautions
None
Allergies
None
SUMMARY
NOTES
ORDERS
DISCHARGE
Visit Summary
Admission Date: 09-07-2024
Visit Reason: Diabetic Ketoacidosis
Summary: A 35-year-old male with a history of type 1 diabetes mellitus was admitted on 09/07/2024 with diabetic ketoacidosis (DKA) following a 3-day history of worsening abdominal pain, vomiting, altered mental status, and poor insulin adherence due to illness. On admission, he was tachycardic, dehydrated, and lethargic, with laboratory findings confirming severe hyperglycemia, ketonuria, and metabolic acidosis. Initial management included aggressive IV fluid resuscitation, insulin drip initiation, electrolyte correction, and continuous monitoring. Endocrinology and gastroenterology consultations were obtained to address his DKA and ongoing H. pylori treatment.
Admission Diagnoses
Type 1 Diabetes Mellitus
H. Pylori Infection
Chronic Migraines
Acquired Diagnoses
None
Current Medication
Insulin Lispro
Dosage: IV drip at 6 units/hour

"Though seemingly simple, the clinical process of reconciling patient medication lists is **incredibly time-consuming** ..."
-Matthew Growdon, MD, MPH

"Continuing **inappropriate medications**, especially at **discharge**, can be detrimental to patient health and outcomes..." **-Brian L Michaels, PharmD, BCPS**

As an urgent care pediatrician....The more tools we have to **simplify this process** so that medication lists are up to date and are the current best treatment for the patient, the better care our patients will receive. **-Jessica Pourain, MD, FAAP**

As a hospitalist...reviewing a patient's medication profile is a **complex and time-consuming process**...Too often, **I don't have time to go through this exercise**....frequently requiring the review of **hundreds of pages of clinical notes**.... **-Cynthia Fenton, MD**

37%

Adults have polypharmacy

13% to 39%

Rates in 65+ y/o have tripled

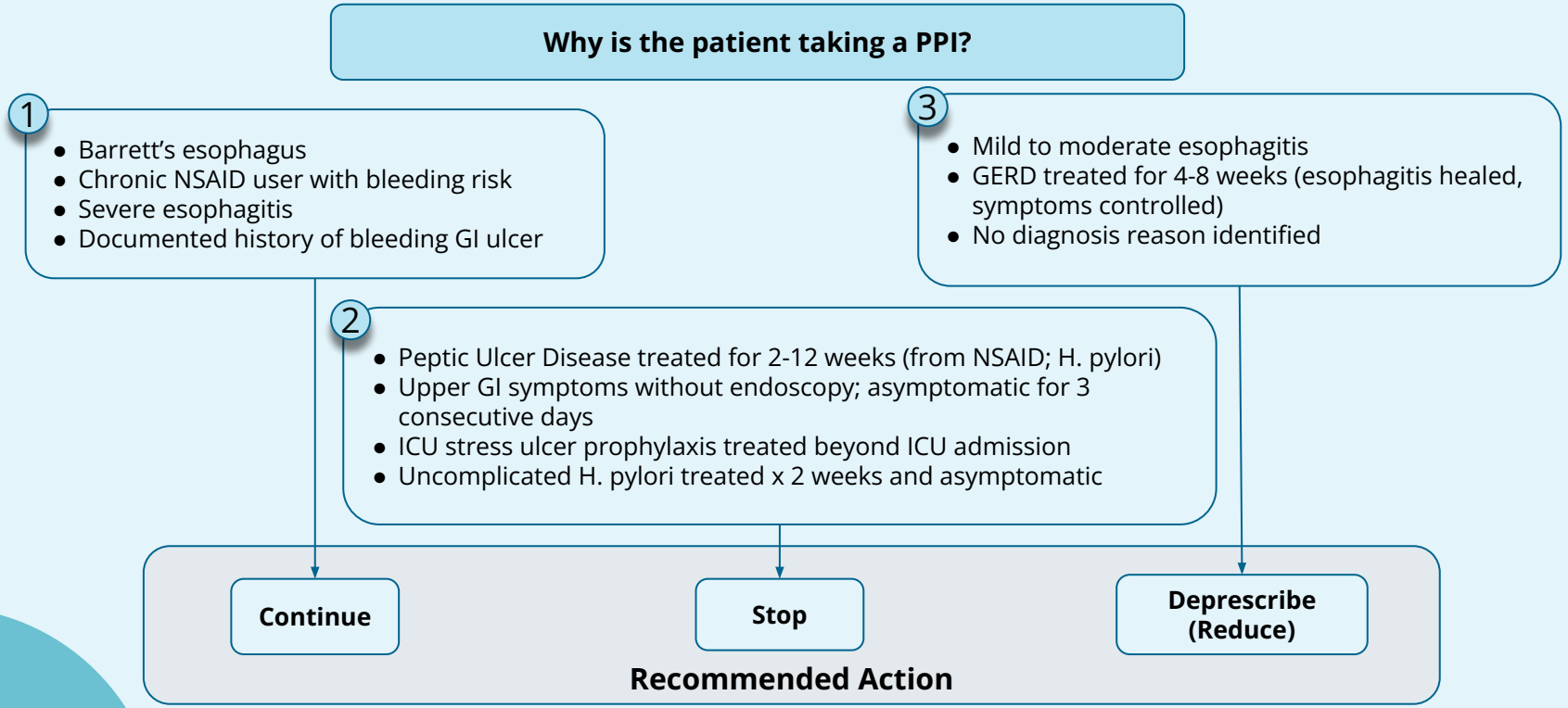
5% to 28%

Of acute geriatric medical admissions are attributed to adverse drug events (ADEs)

03

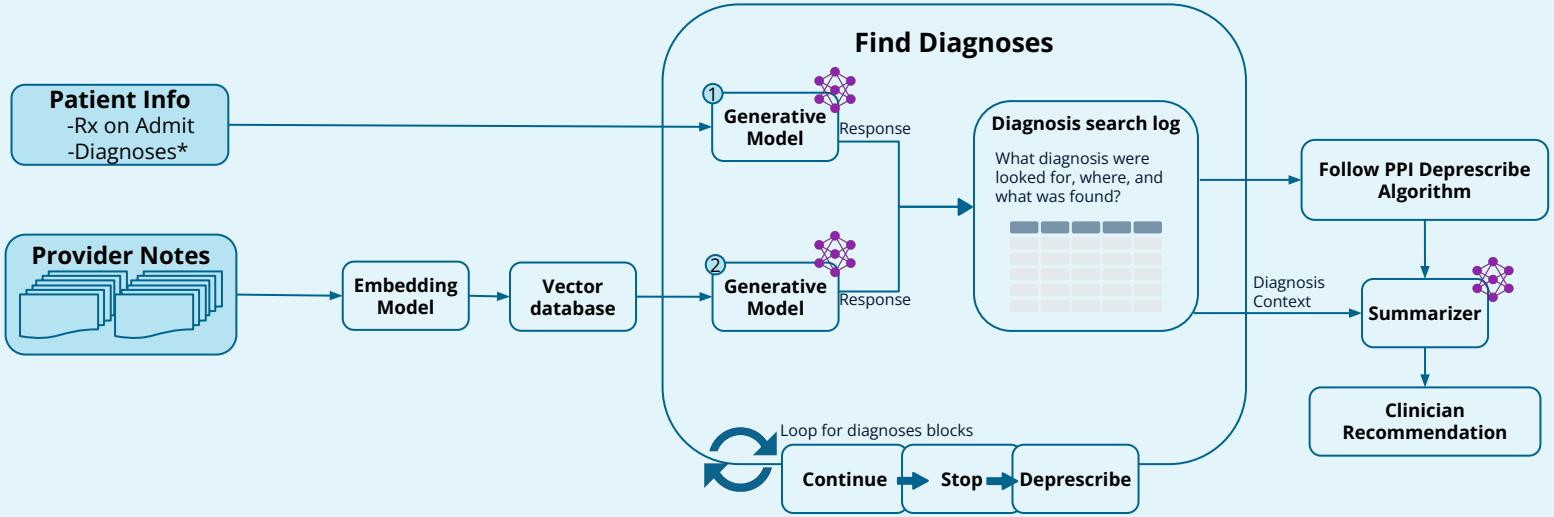
Technical Approach

PPI Deprescribing Algorithm



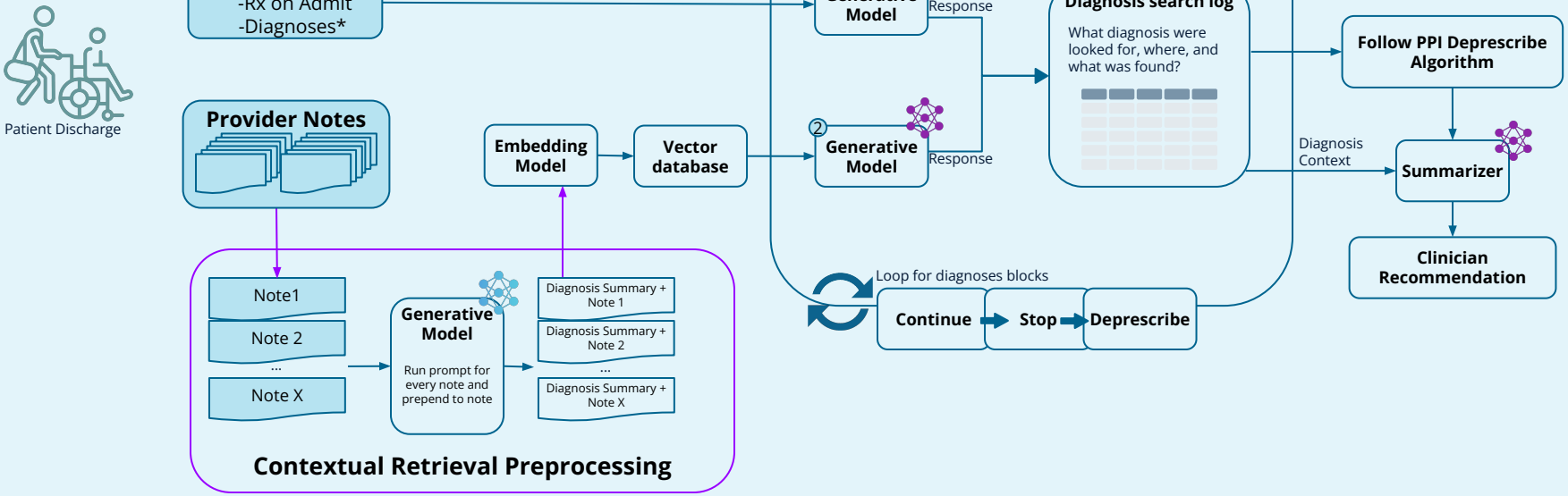
Source: deprescribing.org

Initial Baseline MVP: RAG Approach



*Patient diagnosis data is often incomplete

Final MVP:
RAG Approach with Context Preprocessing



*Patient diagnoses data is often incomplete

04

Evaluation

Model Evaluation Metrics

Classification Metrics

Precision | Recall | **F1 Score (Focus Metric)**

Response Quality

RAGAS Faithfulness & Relevancy | BERTScore | BLEU | ROUGE | METEOR

Retrieval Quality

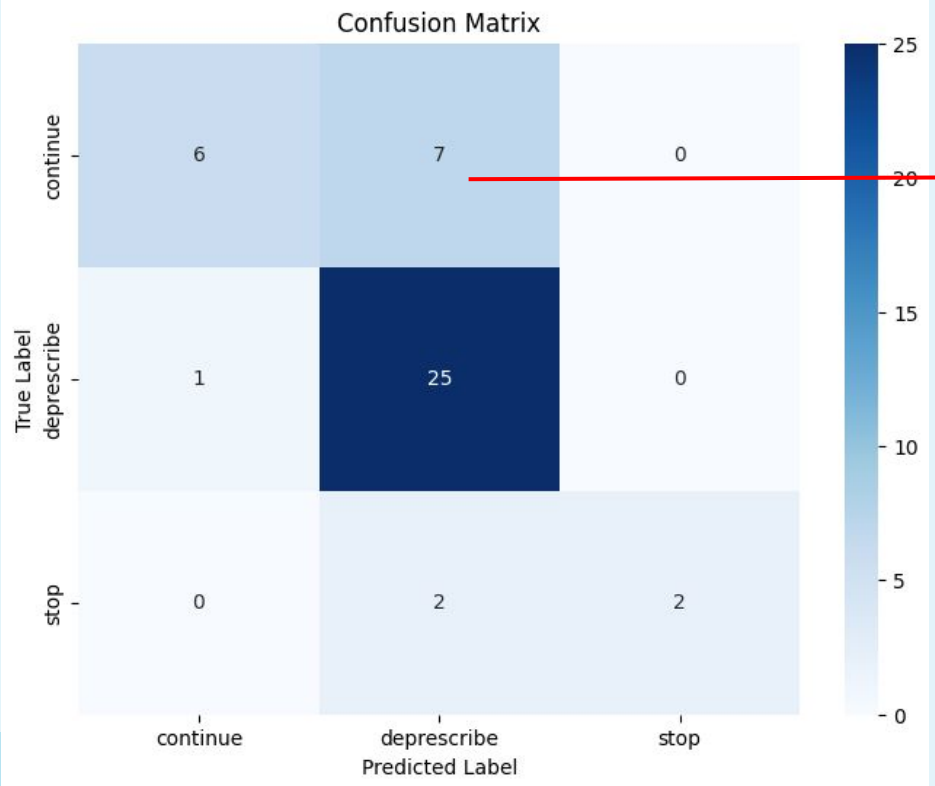
RAGAS Context Precision & Recall | User Feedback

Model Recommendation Performance

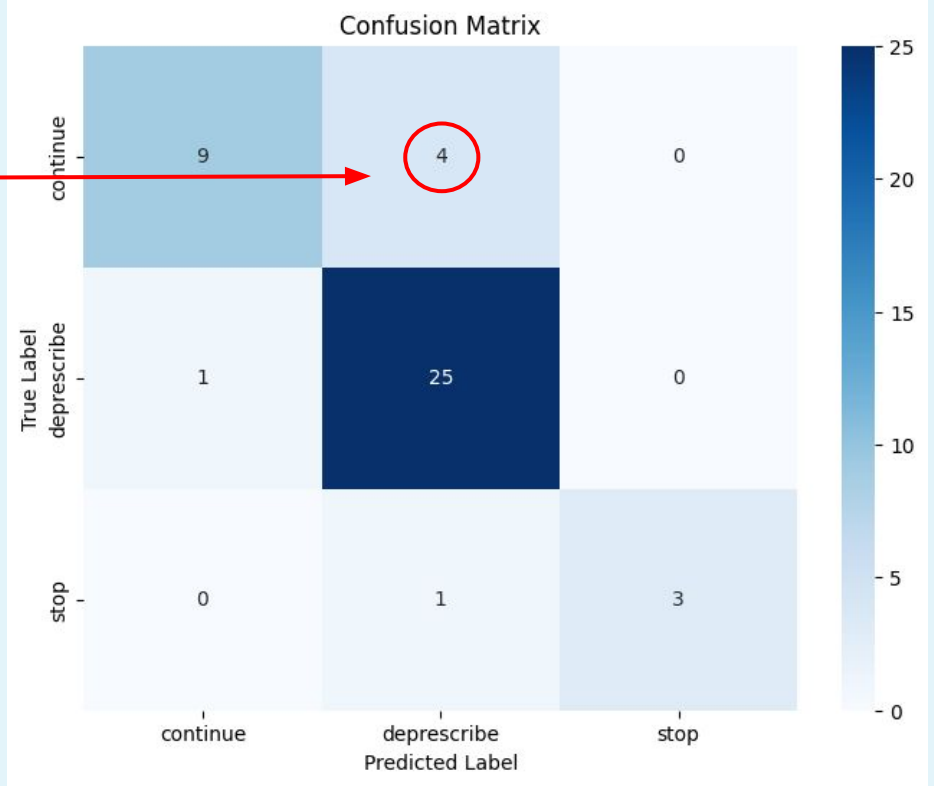
Model	Notes Retrieval	Precision	Recall	F1
Baseline MVP	Raw	.86	.64	.70
Mini MVP	PreProcessed Summary Only	.68	.67	.66
Final MVP	PreProcessed Summary + Raw	.91	.80	**.84**

Confusion Matrix

Baseline MVP



Final MVP



Manual Error Analysis

Synthetic Patient 1
Labeled Recommendation: Stop

Medication Recommendation Summary

Based on the patient's health information, the recommended action for the patient's current medication is to **stop**. This recommendation is primarily due to the completion of the treatment course for Helicobacter Pylori (H. Pylori) infection, as indicated in the patient's notes history (source: notes). The patient has completed the 14-day treatment course with combination therapy and is scheduled for a follow-up H. pylori test in 4 weeks (clinician notes from 09/13/2024 and 09/07/2024).

Synthetic Patient 5
Labeled Recommendation: Continue

Medication Recommendation Summary

Based on the patient's health information, the recommended action for the patient's current medication is to **deprescribe**. This recommendation is supported by the presence of associated diagnoses in the patient's medical notes history, specifically the patient's past medical history of Gastroesophageal Reflux Disease (GERD) and ongoing management of GERD symptoms (Source: Patient notes history).

Integrations

Fast Healthcare Interoperability Resource (FHIR)

Query patient test data from the Epic sandbox environment

RxReduce-API

API connected to RxReduce code base with fastAPI package

Electronic Medical Record (EMR)

API output formatted for connectivity with EMR

Source: Dall-E

Resources and Acknowledgements

Webpages:

- Git
- Webpage
- Deprescribing Algorithm

Acknowledgements:

- Korin Reid
- Ramesh Sarukkai
- Mark Butler
- Jessica Pourain
- Brian Michaels
- Matthew Growdon
- Cynthia Fenton
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- Krystyna Perez

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