

MICHIGAN STATE
UNIVERSITY

Project Plan Presentation

An AI Tool to Learn Management of Patient Messages

The Capstone Experience

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*From Students...
...to Professionals*

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Project Sponsor Overview

- Corewell Health is the Largest Nonprofit Health System in Michigan
- Employs over 12,000 physicians and 16,000 nurses
- Provides medical school education for 3rd-year clerkship and 4th-year elective rotations



Project Functional Specifications

- Allowing students to order medications and testing safely
- Generating realistic USMLE Step 2 exam questions for practice
- Generating pediatric patient data for simulated patient interaction
- Giving health administrators more flexibility in adjusting case scenarios

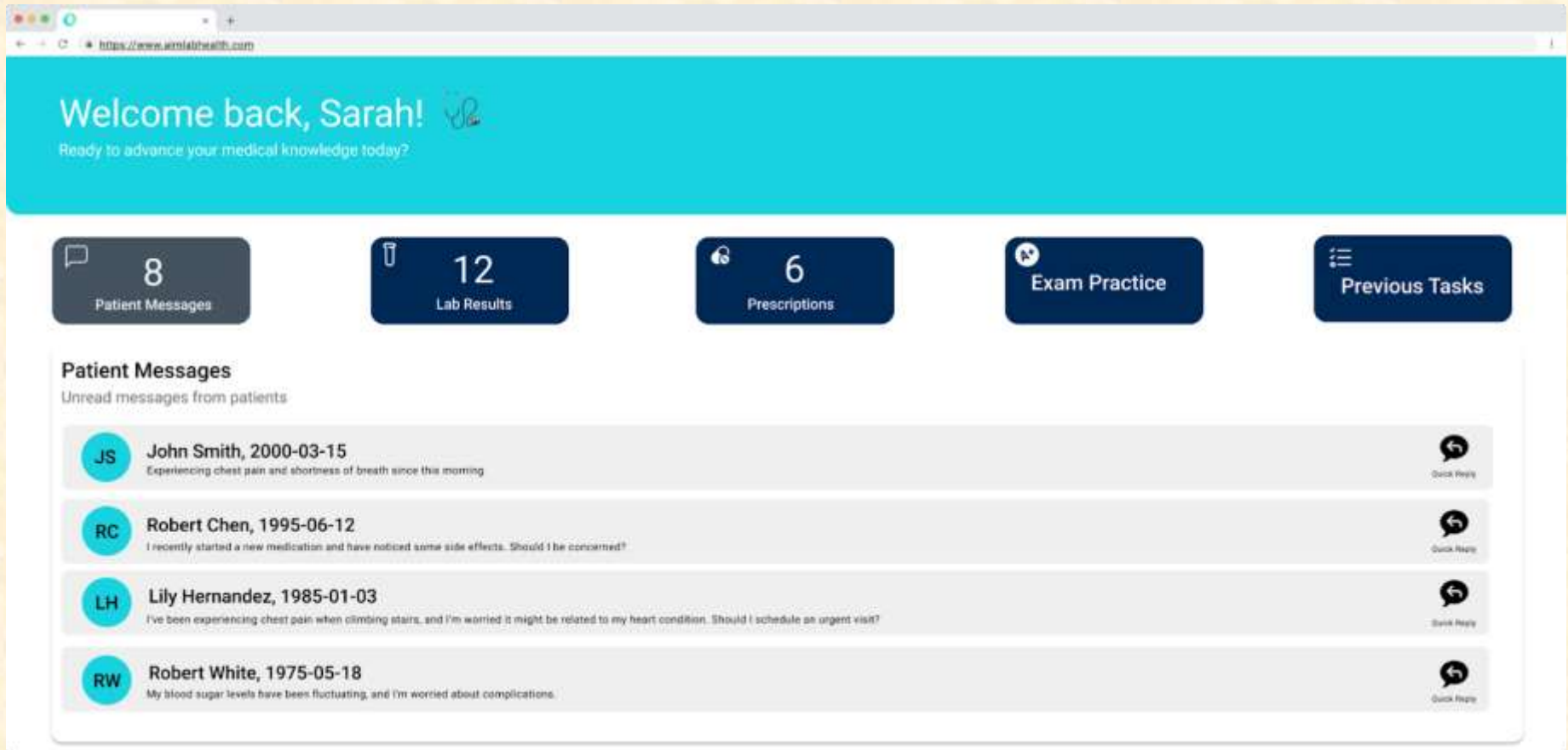


Project Design Specifications

- Student dashboard including patient messages and access to other pages
- Patient details including lab orders, prescriptions, and general patient information
- Exam dashboard with realistically generated USMLE Step 2 practice questions
- Customized AI evaluation available for usage on specific pages



Screen Mockup: Student Dashboard



Screen Mockup: General Information

← Back to Dashboard

Patient Details

John Smith - DOB: 2000-03-15

Logged in as Dr. Sarah

Respond to the patient's message!

- General Info
- Lab Results
- Orders/Referrals
- Prescriptions
- PDMP
- AI Assistant

Demographics

Date of Birth: 2000-03-15
Gender: Male

Immunizations

Influenza (2023-09-15)
Tetanus (2021-04-10)

Surgical History

Appendectomy (2005)

Problem List

Hypertension

Medical History

Anxiety

Vitals

Cholesterol: 195 mg/dL
Blood Pressure: 140/90 mmHg

Allergies

None

Family Medical History

Mother had hypertension

Measurements

Height: 5'6
Weight: 160 lbs

Patient Message

"I have been experiencing chest pain and shortness of breath since this morning. Should I be concerned?"

Response:

oh no

Submit

The response 'oh no' is inadequate and unprofessional for a medical student addressing a patient's concerns. A proper response should include acknowledgment of the patient's symptoms, reassurance, and guidance on how to manage or monitor the condition. It should also invite the patient to provide additional details that might help in further managing their asthma.

Improving this response involves addressing the patient's concerns directly, offering medical advice based on the patient's history and current symptoms, and maintaining a professional tone.



Screen Mockup: Lab Results

[← Back to Dashboard](#)

Patient Details

John Smith - DOB: 2000-03-15

Logged in as
Dr. Sarah

[Review the lab results](#)

General Info

Lab Results

Orders/Referrals

Prescriptions

PDMP

[AI Assistant](#)

Lab Results

Select a test to view the results

[Lipid Panel](#) [X-ray | Knee joint](#) [Iron Panel](#)

Date: 2025-03-01

Test	Result
HDL	38 mg/d
LDL	165 mg/dL
Total Cholesterol	260 mg/dL
Triglycerides	210 mg/dL

Your cholesterol looks high

[Submit](#)

The response 'your cholesterol looks high' is too vague and lacks detail, which might not fully inform the patient of their health condition or necessary actions. It would be more effective to include specific values from the lipid panel, explain what these values mean, and suggest next steps or adjustments to their treatment.

Providing a clearer explanation and more detailed response would help the patient understand their condition better and encourage them to engage proactively with their health management.



Screen Mockup: Orders/Referrals

The mockup shows a web browser window with the URL <https://www.aimlabhealth.com>. The page has a teal header bar. On the left of the header is a button labeled "Back to Dashboard". On the right is the text "Patient Details" with a small icon, "John Smith - DOB: 2000-03-15", and "Logged in as Dr. Sarah". Below the header is a dark blue button that says "Determine what lab to order for the patient!". A horizontal navigation bar contains five tabs: "General Info", "Lab Results", "Orders/Referrals" (which is active and highlighted in dark blue), "Prescriptions", and "PDMP". To the right of these tabs is a button with a plus icon and the text "AI Assistant". The main content area is divided into two columns. The left column has a section titled "Search for an order or referral" with a search input field containing a magnifying glass icon. Below this is a list of search results: "Complete Blood Count (CBC) without Differential", "Complete Blood Count (CBC) without Differential soon lab collect", "Complete Blood Count (CBC) w/Differential soon lab collect" (which is highlighted with a light blue background), "CBC no diff 6-12 months", and "CBC no diff 10-13 months". An "Order" button is at the bottom right of this list. The right column contains a text box with the instruction "Respond to the patient question on the General Info page to receive your evaluation".

Back to Dashboard

Patient Details
John Smith - DOB: 2000-03-15
Logged in as Dr. Sarah

Determine what lab to order for the patient!

General Info Lab Results **Orders/Referrals** Prescriptions PDMP

AI Assistant

Search for an order or referral

Complete Blood Count (CBC) without Differential

Complete Blood Count (CBC) without Differential soon lab collect

Complete Blood Count (CBC) w/Differential soon lab collect

CBC no diff 6-12 months

CBC no diff 10-13 months

Order

Respond to the patient question on the General Info page to receive your evaluation




Screen Mockup: Prescriptions

The mockup shows a web browser window with the URL <https://www.ainadhealth.com>. The page has a teal header with a 'Back to Dashboard' button, 'Patient Details' for John Smith (DOB: 2000-03-15), and 'Logged In as Dr. Sarah'. Below the header is a navigation bar with tabs: General Info, Lab Results, Orders/Referrals, Prescriptions (active), and PDMP. An 'AI Assistant' button is on the right. The main content area has a 'Determine if the prescription should be refilled' button. Under 'Current Prescription', there's a table with 'Medication' (Lisinopril) and 'Dose' (20 mg once daily). Below this is a 'Specify dose, route, frequency' section with dropdowns for Dose (20 mg), Route (Oral), and Frequency (Daily), and date pickers for Start (12/1/2025) and End (01/01/2026). 'Refill' and 'Don't Refill' buttons are at the bottom. An AI Assistant panel on the right provides a recommendation: 'Your choice to refill the prescription Lisinopril 20 mg orally once daily is a reasonable one, assuming the patient's condition is stable and they have no recent adverse effects.'

https://www.ainadhealth.com

← Back to Dashboard

Patient Details 
John Smith - DOB: 2000-03-15

Logged In as
Dr. Sarah

Determine if the prescription should be refilled




General Info Lab Results Orders/Referrals **Prescriptions** PDMP


AI Assistant

Current Prescription

Medication	Dose
Lisinopril	20 mg once daily

Specify dose, route, frequency Free response

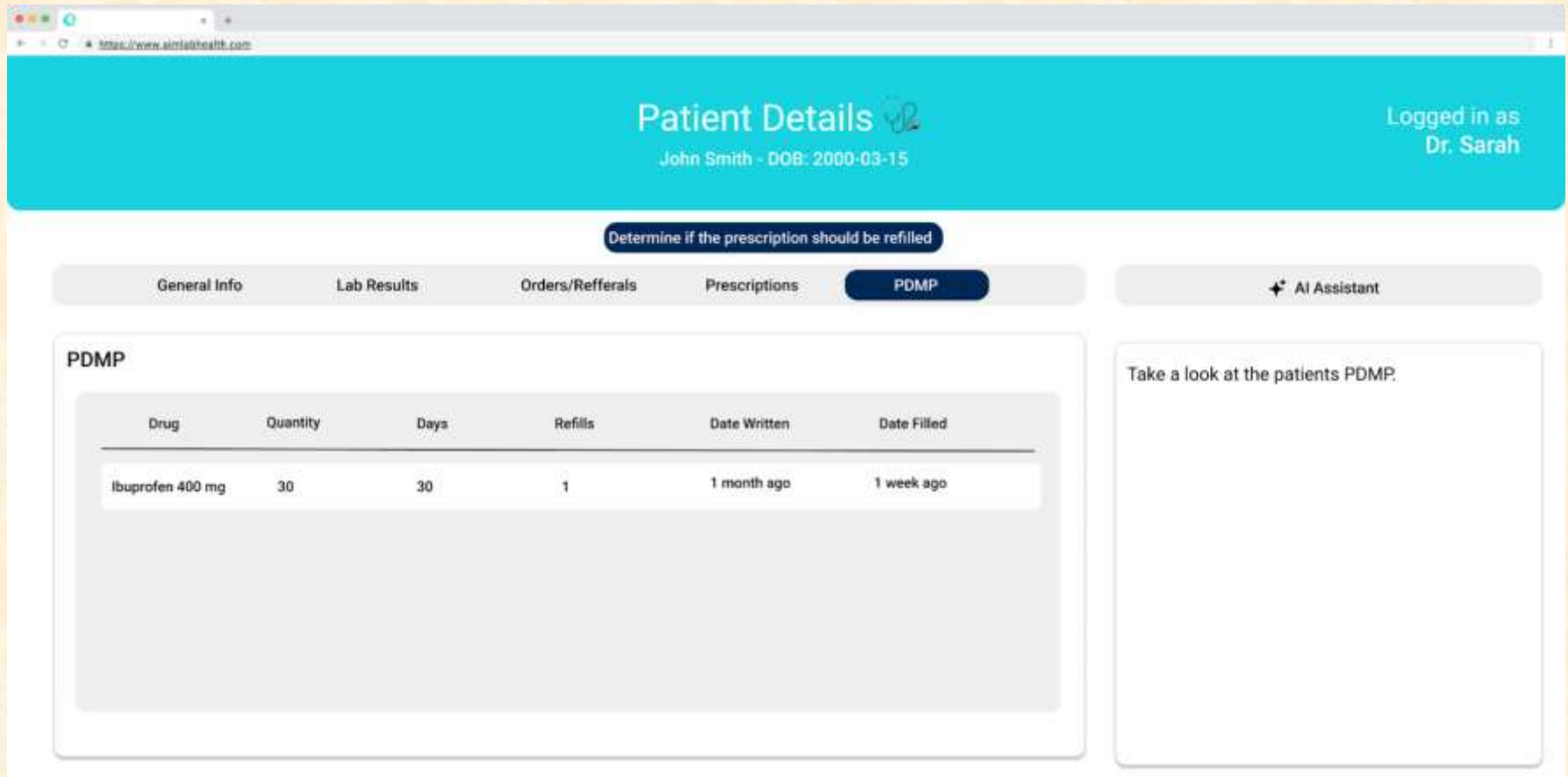
Dose	Route	Frequency	Duration
20  mg	Oral 	Daily 	12/1/2025 01/01/2026
			Start End

Refill  Don't Refill

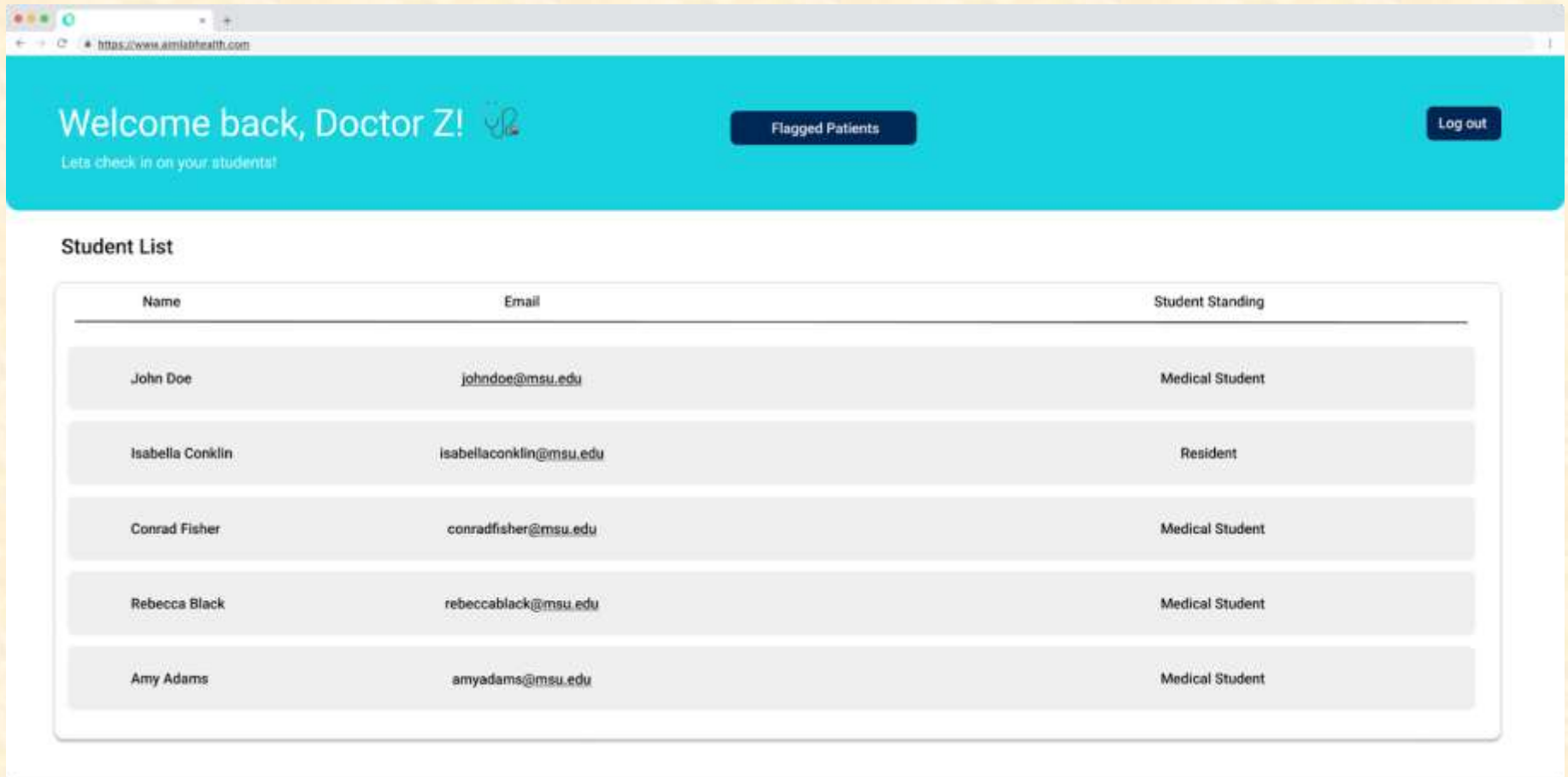
Your choice to refill the prescription Lisinopril 20 mg orally once daily is a reasonable one, assuming the patient's condition is stable and they have no recent adverse effects.



Screen Mockup: PDMP



Screen Mockup: Instructor Dashboard



Screen Mockup: Flagged Patients Dashboard

← Back to Dashboard

Logged in as Dr. Z

Flagged Patients

Name	Flagger	Actions
John Doe	Sarah Lee	<div>Update Patient Case</div> <div>View Message</div>

Choose Field To Update

Vitals - Cholesterol

Old Data

5,0000 mg/dL

New Data

195 mg/dL

Update



Screen Mockup: Exam Dashboard

https://www.gimlabhealth.com

← Back to Dashboard

USMLE Practice

Logged in as Dr. Sarah

USMLE Step 2 Practice Question

Pediatrics Easy

A 6-year-old child presents with fever, sore throat, and difficulty swallowing. Physical examination reveals enlarged tonsils with white exudate and tender anterior cervical lymphadenopathy. What is the most appropriate diagnostic test?

☐ A. Throat culture

☒ B. Rapid strep test

☐ C. Monospot test

☐ D. Complete blood count

Submit

+ AI Assistant

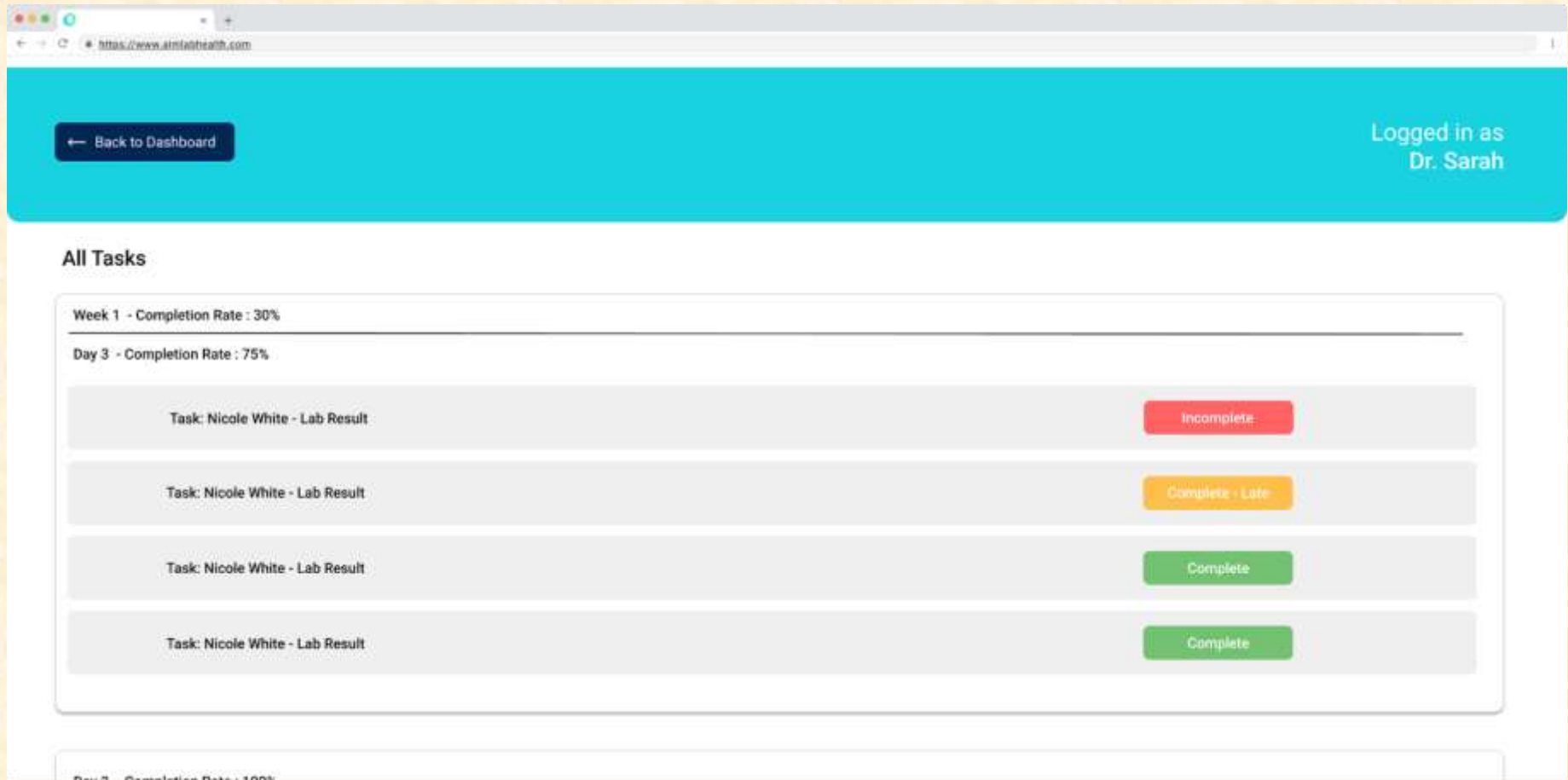
Nice job! The correct answer is

B. Rapid strep test.

In a child with fever, sore throat, tonsillar exudates, and tender anterior cervical lymphadenopathy, streptococcal pharyngitis is suspected. The rapid antigen detection test (RADT) provides immediate results. Throat culture is the gold standard but takes longer.



Screen Mockup: Previous Tasks

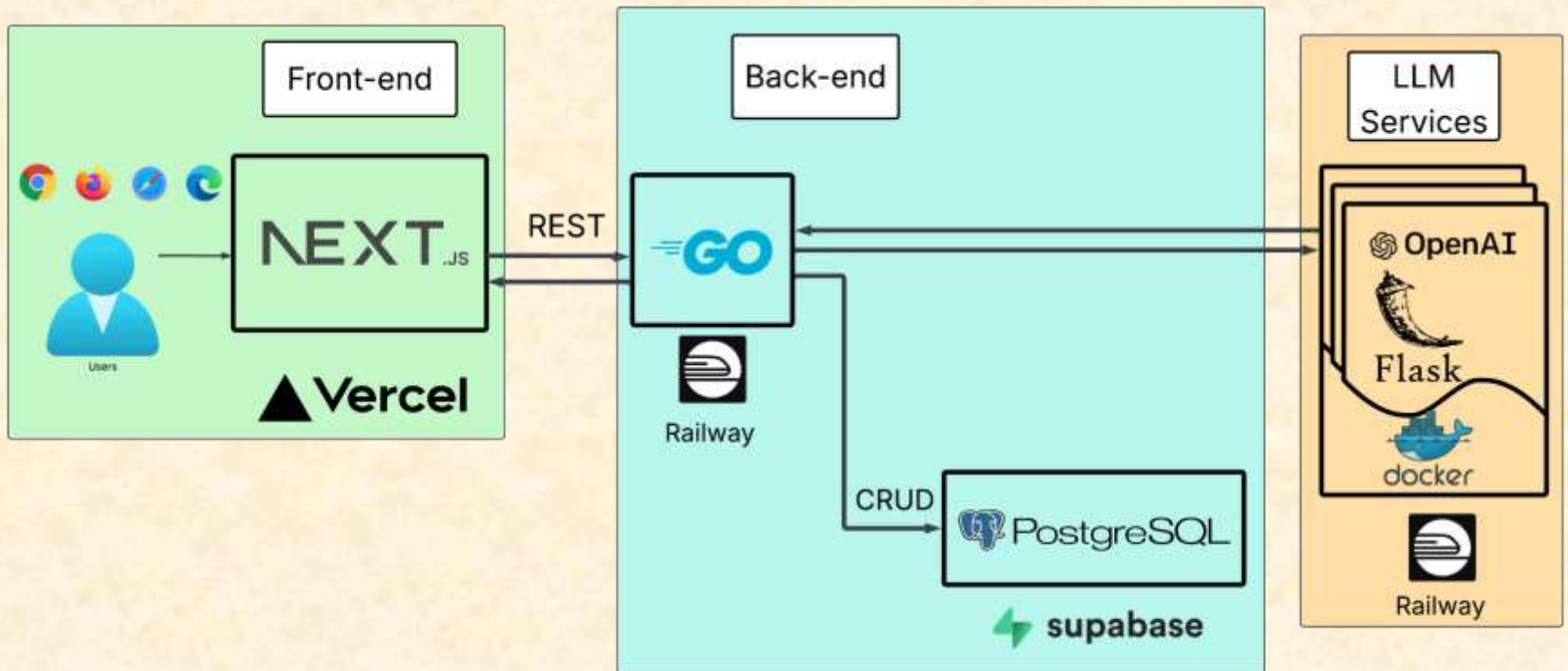


Project Technical Specifications

- Front-end is hosted on Vercel and built with React components within a Next.js framework
- Back end is hosted on Railway and is written in GoLang, with data maintained on Supabase
- LLM is a Flask microservice dockerized and hosted on Railway
- Railway serves as a communication hub between services



Project System Architecture



Project System Components

- Hardware Platforms
 - 2 iMac Computers
- Software Platforms / Technologies
 - Railway – Communication Service
 - Next.js – Frontend Framework
 - Supabase – Database
 - OpenAI – LLM
 - Vercel – Frontend Host
 - Docker - Container



Project Risks

- **Verification for Pediatric Cases**
 - Corewell is asking us to create realistic pediatric cases that would reflect real life experiences. AI struggles to factor in context with its Patient Case Generation
 - Using a statistical approach by extrapolating data from real life Pediatric Data, we are aiming to generate realistic patients which we can then prompt AI for accurate scenarios
- **Major Latency Issues**
 - Current Build of the Project runs very slow, giving off a very unrefined and unprofessional appearance
 - We have already more than halved the load times of both login and the task's pages. Efforts are being made to trim further
- **Creating Realistic USMLE Step 2 Questions**
 - Students are using our tool as a practice tool for their US Medical License Exams (Specifically Step 2), as such it is important that our questions reflect the difficulty and material covered.
 - Using Mock Exams as Models, our hope is to prompt our LLM to create challenging and engaging questions for students.
- **Tailored Family Medicine Curriculums for students**
 - Students want to work on problems that are relevant to their weaknesses in order to improve and further the educational value they get out of the application, we will need to find a way to analyze and curate specific curriculums.
 - We are looking into tagging both patient cases and questions, and then using user data to analyze student's weakpoints to send personalized problem sets.



Questions?

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