

Pharmacogenetic Decision Making Tool

Medical tool designed for minimum clutter, maximum focus and displaying accurate data



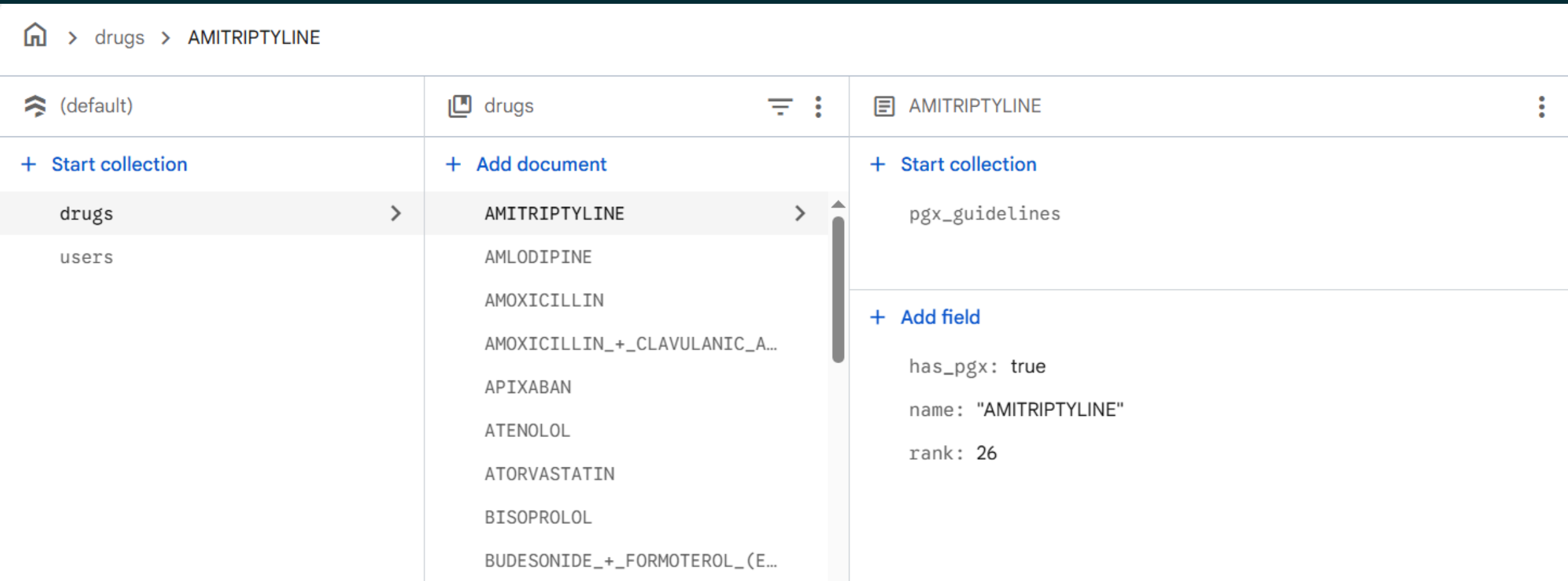
1. The Clinical Gap: Why This Tool Matters

Fragmented: Pharmacogenetic (PGx) data is currently fragmented across multiple manual sources, making it time consuming to access at the point of care.

Medical Impact: Genetic diversity significantly influences drug efficacy and the risk of adverse drug reactions (ADRs).

The Goal: To bridge the gap between complex genomic data and clinical practice by providing a unified, searchable prototype for GPs and Pharmacists.

Firestore Database



Database panel containing the drugs and user account data

2. The Solution: A Personalised Clinical Guide

Core Utility: A decision-support tool that supplements clinical judgement by flagging medications with known genetic implications.

Pilot Scope: Focused on the top 50 PBS drugs, mapping clinical implications, prevalence information, and recommended professional actions.

Unified Interface: Replaces fragmented Excel and Word documents with a single "Source of Truth".

4. Design and Security Philosophy

UCD Principles: Guided by Don Norman’s principles, including high visibility, immediate feedback, and intuitive affordances to suit fast-paced clinical workflows.

Principle of Least Privilege (PoLP): Granular Firestore Security Rules ensure clinicians have *read* access while only authenticated administrators can *write* or *delete* data.

RBAC Architecture: Implemented role-based access control to protect the integrity of sensitive medical recommendations.

3. Technical Framework: The Architecture

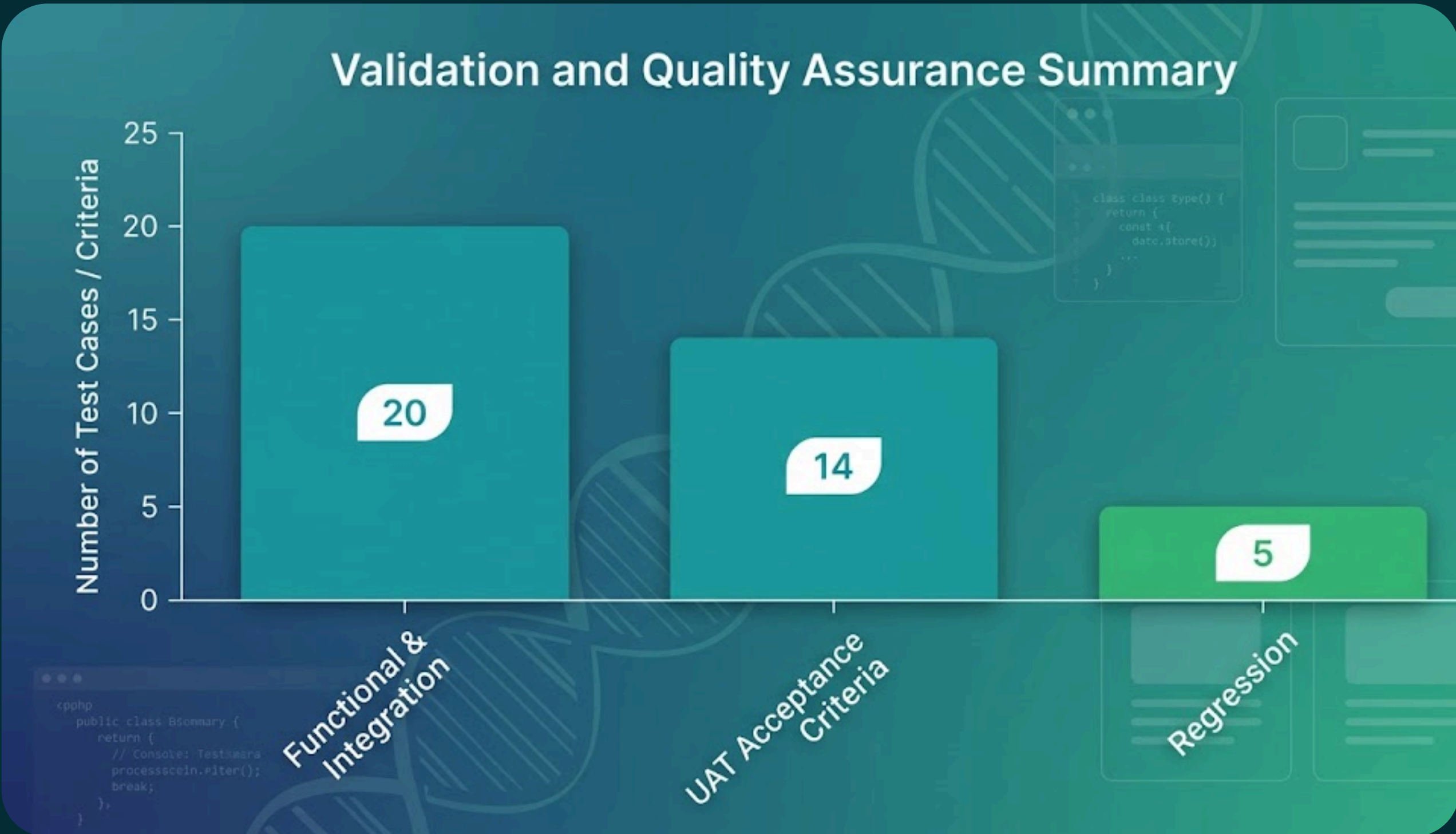
Frontend (Flutter): A component-based mobile architecture ensuring cross-platform responsiveness and UI/UX consistency.

Backend (NoSQL Cloud Firestore): Selected for its schema flexibility, allowing the system to handle semi-structured medical data that varies in depth.

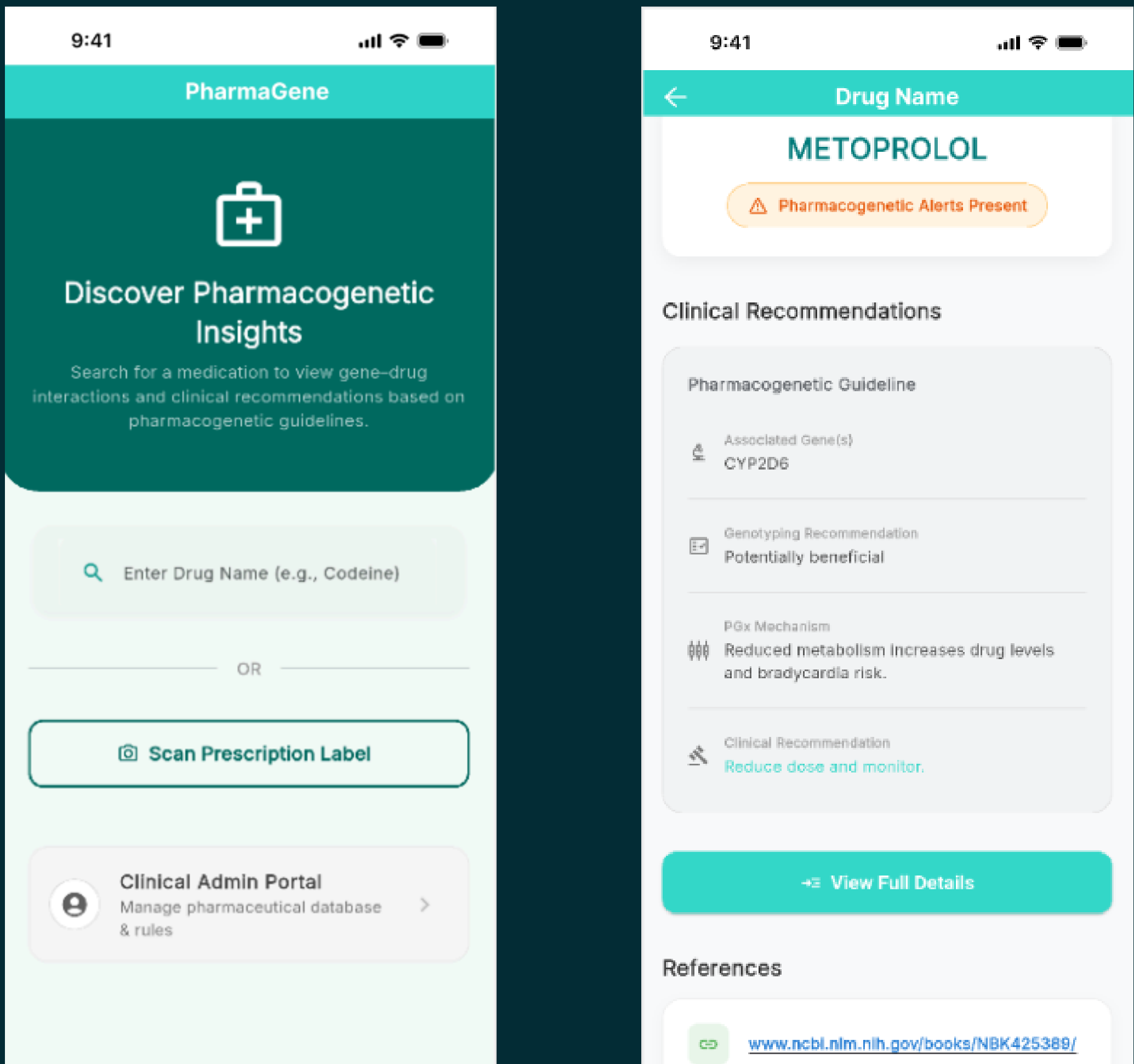
ETL Pipeline (Python): Automated scripts using *python-docx* and *json* libraries to ensure 100% data integrity during the transformation of client records.

5. Validation: Proving Performance

To ensure the clinical safety and technical robustness of the Pharmacogenetic Decision-Making Tool, a multi-tiered testing strategy was employed. The project achieved a 100% pass rate across all identified functional and integration scenarios.



Figma / App Design



Home Screen

Recommendation Screen

6. Future Outlook and Impact

Expansion: Future phases aim for institutional integration with electronic health record (EHR) systems and national genetic databases.

Data Consolidator: In the future the tool can act as a single point of contact for updating new Pharmacogenetic discoveries that can be used throughout all medical software.

Team members: Chhunly Chhek, Rizwana Sultana Runi, Linh Ngoc Huynh, My Xuan, Gazi MD Wasi-UL-Hoque Eusha