

DEVELOPMENT OF CLINICAL DECISION SUPPORT TOOLS INTEGRATING PHARMACOGENOMIC RESULTS FOR PERSONALISED MEDICATION MANAGEMENT



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Background:

Pharmacogenomics (PGx) is a key part of personalized medicine. PGx studies how our genome affects response to drugs. Clinical use of PGx results can be used to guide safer medication selection and dosing.

The Problem:

PGx adoption in the clinic has been limited because of unstandardised PGx data reporting, poor electronic health record (EHR) interoperability and lack of clinician knowledge for PGx-informed prescribing.

Our Solution:

We propose to develop a seamlessly integrated platform that translates PGx results from laboratories to the point-of-care, providing clinicians with personalized evidence-based recommendations. Our platform will pioneer PGx utilization in Hong Kong.

TECHNOLOGY

Data Preparation

- > Establish database structure using HKGI data
- > Establish multidisciplinary team for drug-gene pair approval
- > Pair selection guided by CPIC and HKGI population findings

PGx Extraction

- > Develop bioinformatics pipeline for in-house results, using Aldy tools and PharmCat
- > Manual entry or NLP algorithm for external results

Database Development

- > Develop cloud-based repository for secure storage
- > HKU PGx IT team will integrate PGx in standardised, structured format, compliant with HKCCT terminology

API & CDS Tools

- > HKU PGx IT Team build API to facilitate data exchange between our PGx repository and local interface
- > Implement CDS (Clinician Decision Support) hooks in workflow with integrated native alerts (Fig. 1)

OVERVIEW

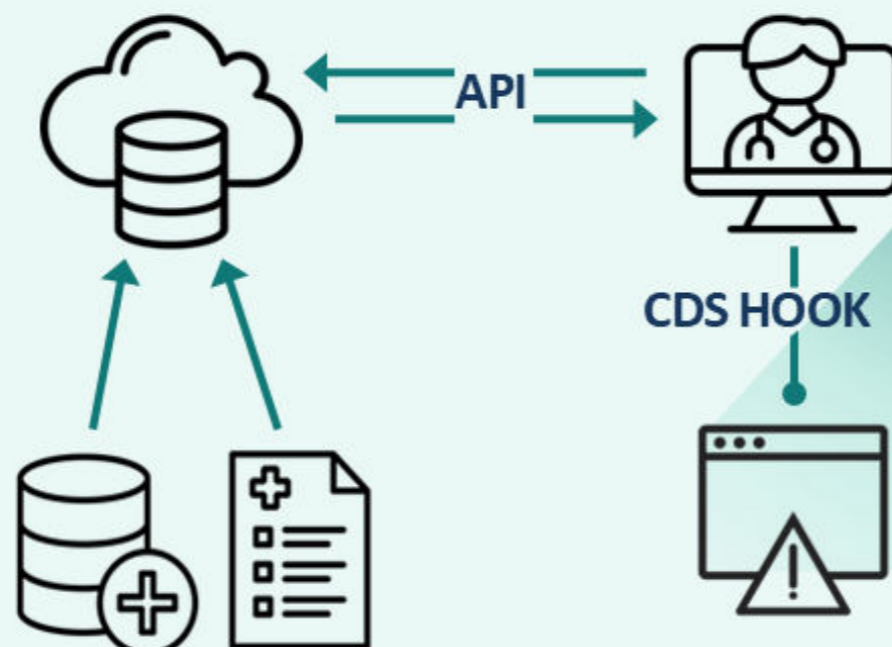


Fig. 1

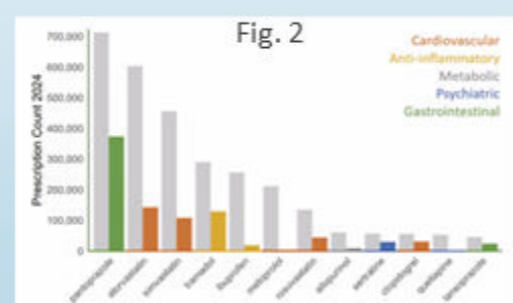
PRODUCT

- Secure cloud-based repository that can process PGx results for storage in interoperable, standardised format.
- Adaptable API that facilitates information transfer and applies clinical logic, dependent on evidence-based guidelines.
- Embedded CDS integration, service will deliver native-style CDS alerts to local user interface.

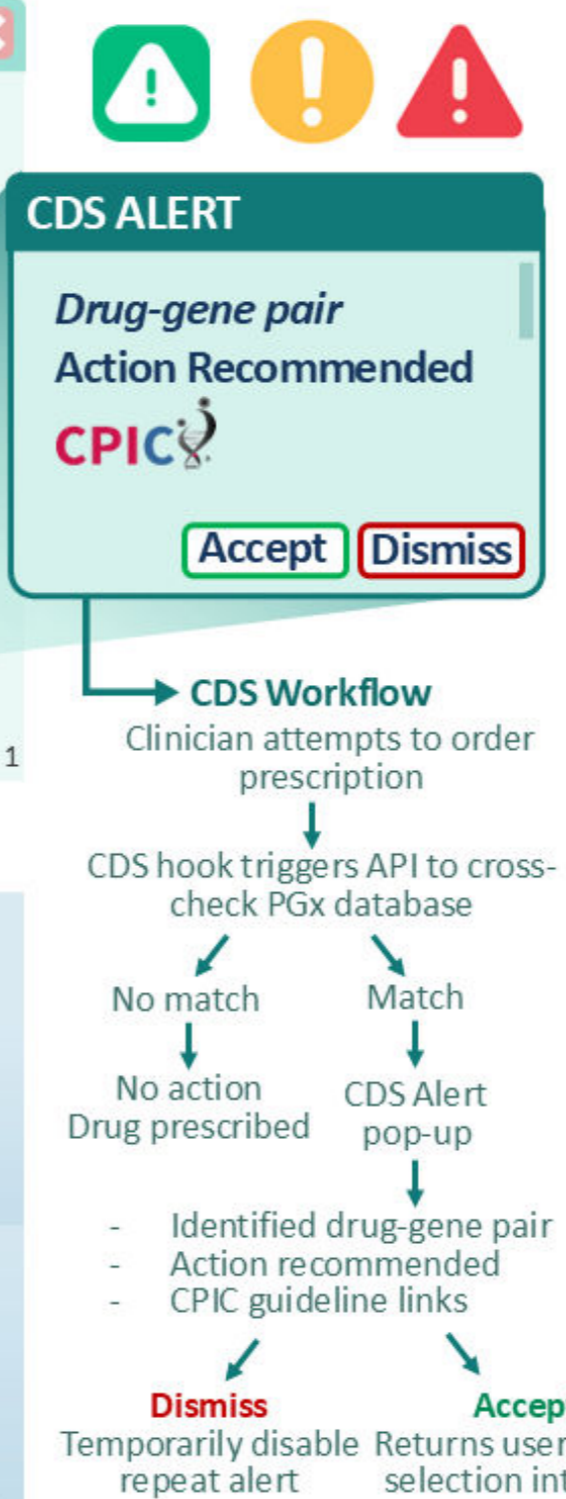
TARGET AUDIENCE

- Designed to be utilised by prescribers and pharmacists.
- Optimise drug selection and dosing for population-specific allele frequency and medication use.
- Piloted first at HKUMed Community Pharmacy, but aim to be implemented across Hong Kong hospitals, clinics and pharmacies.
- Data can also facilitate further PGx clinical and academic research.

IMPACT EVIDENCE



- 99.98% of 18,261 HKGP Chinese participants have at least one actionable metaboliser phenotype.
- Based on HK 2024 data, 30.8% of 2.9M prescriptions could benefit from PGx test (Fig. 2).



DEVELOPMENT PLAN

Phase 1: Pilot

- > Develop PGx database, API and integrated CDS tools
- > Implement at HKU Community Pharmacy with Scribo CMS
- > Assess feasibility, clinician utility and patient outcomes

Phase 2: Early Commercialisation

- > File for provisional patents, IP for system architecture
- > Begin HA compliance auditing for cloud-service
- > Annual tiered subscription model, with initial setup fee

Phase 3a: Scaling Strategy

- > Develop advanced features and analytics reporting system
- > Launch marketing campaign targeting:
 - > Specialty clinics (cardiology, psychiatry)
 - > Hospitals, community pharmacies and academic institutions

Phase 3b: Market Entry

- > Pursue partnerships with:
 - > EHR, Pharmacy, or clinic management systems
 - > Genetic laboratories, testing facilities and private clinics

Future Direction:

- > Partnership with HA and adoption in affiliated practices
- > Offer partnered genetic testing services
- > Consider entry to biobanking market

SUPPLEMENTARY

Involved Organisations:
The University of Hong Kong (HKU)
HKUMed Community Pharmacy
Hong Kong Genome Institute (HKGI)

TEAM MEMBERS

Prof. Joseph Blais

- Assistant Prof. (Dept. of Pharmacology & Pharmacy, HKU)
- Clinical Associate Prof. (Dept. of Pediatrics & Adolescent Medicine, HKU)
- Clinical Geneticist
- Chief Medical and Scientific Officer (HKGI)

Prof. Ian Wong

- Prof. (Dept. of Pharmacology & Pharmacy, HKU)
- Board Member (HKGI)
- Ms Cynthia Wu
 - Pharmacist (HKUMed Community Pharmacy)
- Mr Jacky Chung
 - Pharmacist (HKUMed Community Pharmacy)