

Pharmacogenomics & Drug–Gene Interaction Analytics — Hands-on

Translate genomic variation into safer, effective prescribing. This module builds end-to-end pharmacogenomics (PGx) capability: star-allele calling (including complex loci), guideline-driven interpretation (CPIC/DPWG), structured reporting, and integration of PGx knowledge into clinical decision support (CDS) within EHR workflows.

Pharmacogenomics & Drug–Gene Interaction Analytics

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Session 1

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PGx Foundations & Guidelines

ADME pharmacogenes & phenotypes

CYPs, TPMT/NUDT15, DPYD **UGT/SLCO1B1**
metabolizer status

Guidelines & resources

CPIC / DPWG **PharmGKB levels** **drug labels (high-level)**

Nomenclature & translation

HGVS & star alleles **activity score → phenotype**
ethnic variability

Session 2

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Star-Allele Calling & Annotation

Data & tools

genotype arrays / NGS **PharmCAT** **annotation**
pipelines

Complex loci (CYP2D6 etc.)

CNVs/dups & hybrids **Aldy / Stargazer** **QC &**
confirmation

Phenotype translation

activity scores **IM/PM/UM calls** **edge cases & VUS**

Session 3

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Drug–Gene Interaction Analytics & CDS

Dose adjustments & alternatives

CPIC/DPWG rules **actionability tiers** **label**
considerations

DDGIs & co-medications

drug–drug–gene logic **inhibitors/inducers** **risk flags**

EHR integration & CDS hooks

FHIR resources **alerts & summaries** **provenance &**
audits

Session 4

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Reporting, Implementation & QA

Report templates & language

phenotype & recommendation **limitations** **citations**

Implementation & governance

consent & ethics **population screening** **updates & reanalysis**

Quality & validation

LoD & proficiency **change control** **audit trails**