

Estimating the impact of implementing a pre-emptive pharmacogenetic screening program to guide prescribing in English community pharmacies

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Background

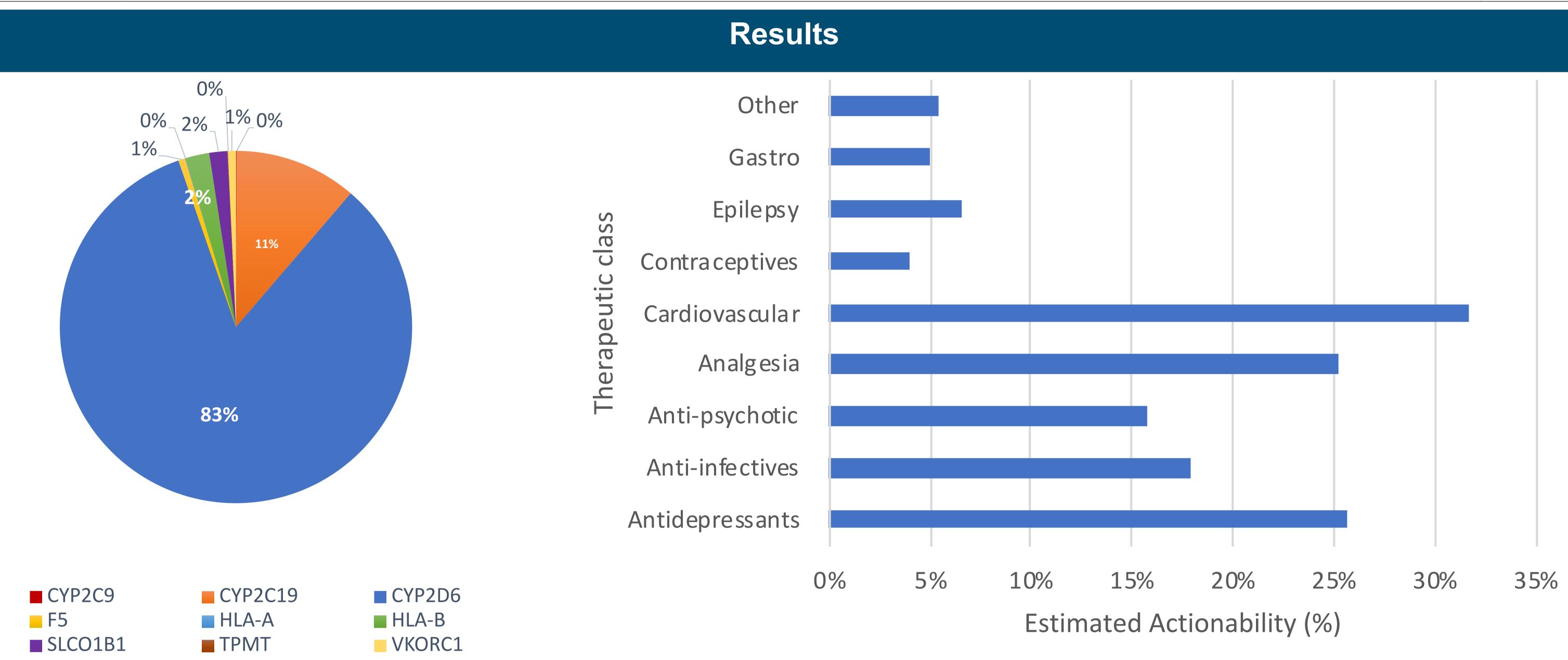
- ➤ 95% of the population carry at least one genetic variant that confers an actionable phenotype.¹
- ➤ A high volume of drugs frequently prescribed in primary care have a genedrug interaction as endorsed by the Dutch Pharmacogenetics Working Group (DPWG) and the Clinical Pharmacogenetics Implementation Consortium (CPIC).²

Aim

➤ To estimate the national volumes of new prescriptions with gene-drug interactions, which, if the patient were tested for a panel of genes, would lead to an actionable recommendation of change in drug regimen.

Methods

- For this study, dispensing data concerning all drugs with an actionable drug-gene interaction for the period January 1-December 31, 2019, in England, were combined with phenotype frequency data obtained in the 'U-PGx' study³ and first prescription frequency data from a community pharmacy dispensing database to estimate the occurrence of actionable gene-drug interactions nationally in community pharmacies.
- > Ages for patients newly dispensed drugs with actionable drug- gene interactions in England for the period January 1- December 31, 2019 were extracted from a large community pharmacy dispensing database.
- > Ethical and governance approvals were obtained from the Faculty of Medicine and Health Sciences Research Ethics Committee, University of East Anglia.



change sorted by therapeutic areas.

Figure 1 % Volumes of dispensed medicines sorted by gene

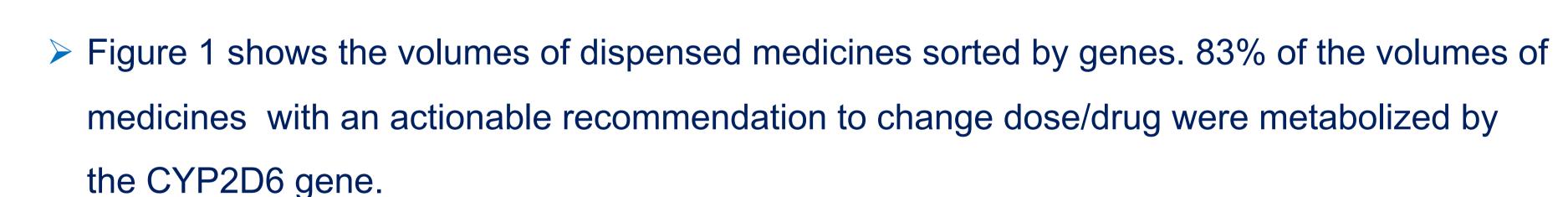


Figure 2 Estimated proportion of dispensed medicines that would require a dose/drug



- Figure 2 shows the estimated percentage of newly dispensed medicines in each therapeutic area that are predicted to be actionable e.g. require a change from normal prescribing.
- **Current Patient Medications** Tramadol, Simvastatin, Sertraline Simvastatin Intermediate Myopathy Risk (SLCO1B1: Decreased Function) Simvastatin plasma concentrations are expected to be elevated. Consider avoiding simvastatin, and prescribe an Zocor alternative statin or another hypolipidemic drug, or consider prescribing simvastatin at a lower starting dose (20 mg/day). Routine creatine kinase (CK) monitoring is also advised. The FDA recommends against the 80 mg daily dose. Although the association between the SLCO1B1 521C>T variant and myopathy risk is not clearly established for other statins such as atorvastatin, pitavastatin, rosuvastatin, and pravastatin, caution is advised if high doses of these statins are used in this patient. Fluvastatin plasma levels are not affected by the SLCO1B1 521C>T variant. Potentially Impacted Medications CONSIDER ALTERNATIVES CATEGORY Atorvastatin (Lipitor) Fluvastatin (Lescol)

Lovastatin (Mevacor, Altoprev.

Pitavastatin (Livalo)

Figure 3 is a sample pharmacogenetic report. A traffic light system is often employed to aid in test interpretation and alert prescribers and pharmacists to medicines with significant druggene interactions.

Figure 3 Example Pharmacogenetic report

Conclusion

> High volumes of medicines dispensed in community pharmacy have actionable drug-gene interactions.

Simvastatin (Zocor)

- > National screening programmes targeting patients on antidepressants, analgesics or cardiovascular medicines may provide the most cost-effective approach to testing.
- > This is a pilot study; the next step will be to extract dispensing volumes for the whole of the UK and undertake a health economics analysis.

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- 3. CECCHIN E, RONCATO R, GUCHELAAR HJ, TOFFOLI G. Ubiquitous pharmacogenomics (U-PGx): The time for implementation is now. an horizon2020 Program to drive pharmacogenomics into clinical practice. Current Pharmaceutical Biotechnology. 2017;18(3):204-9.