Pharmacogenomic Characteristics and IDgenetix-Guided Medication Management for Older Adults with Depression and Anxiety

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Background

- Pharmacogenomic (PGx) testing determines genetic variations in pharmacokinetic and pharmacodynamic genes that impact medication efficacy and tolerability.[1,2]
- IDgenetix is an advanced 3-in-1 PGx test that incorporates the results of multi-gene testing along with drug-drug interactions and lifestyle factors to optimize medication selection for patients with major depressive disorder (MDD), anxiety, or other neuropsychiatric illnesses.[3]
- The potential of IDgenetix in older adult populations that are more prone to polypharmacy and adverse drug events has not been fully elucidated.[4,5]

Methods

- Castle Biosciences laboratory information management system was queried for age, gender, order dates, and ICD-10 diagnosis codes, which included ADHD, anxiety, bipolar disorder, MDD, OCPD, pain, PTSD, and schizophrenia (SCZ).
- Genotypes, phenotypes, and concomitant medications were analyzed for genetic variations, non-genetic interactions, and overall drug recommendations. Drugs were considered actionable if they appeared in the yellow "use with caution and/or increased monitoring" section of the IDgenetix report.

Results

- 737 reports for patients aged 65 and older were analyzed.
- 72% of the patients were female, and the average age was 76 (range 65-103).
- 58% of the patients were on 5 or more medications (average 7).
- Patients averaged 1.6 (range 1-9) ICD-10 diagnosis codes (**Figure 1**).
- All reports in this study had genetic polymorphisms that could impact medication selection in at least 3 of the 15 genes included in the IDgenetix report (**Figures 2-4**).
- Drug-gene interactions accounted for 66% of all drug recommendations, drug-drug interactions accounted for 27%, and lifestyle factors contributed 7% (**Figure 5**).
- The most common antidepressants with actionable recommendations in this population were citalopram and sertraline, while sertraline and escitalopram were the most common concomitant antidepressants (**Table 1**).

Figure 1. ICD-10 Diagnostic Codes

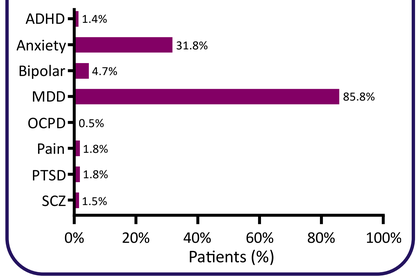


Figure 2. Actionable Genes

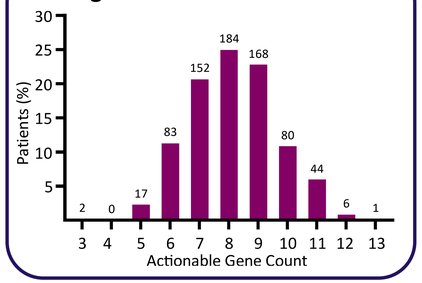


Figure 3. CYP Genetic Polymorphisms

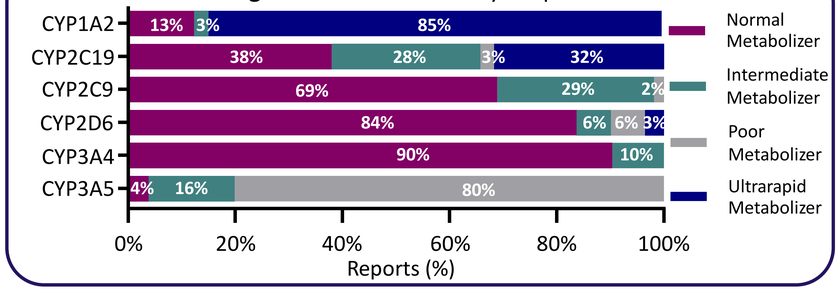
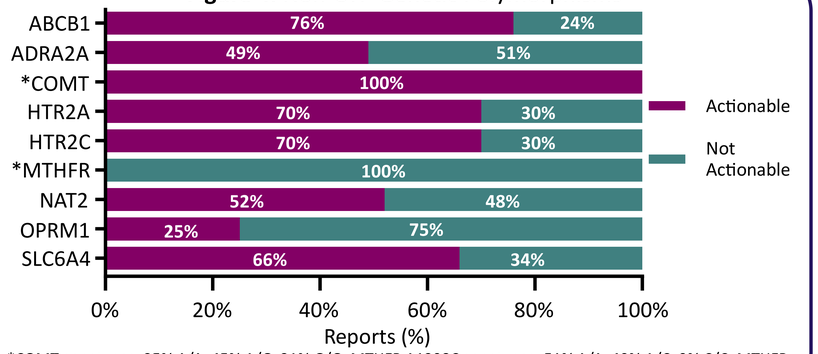


Figure 4. Non-CYP Genetic Polymorphisms



*COMT genotypes: 25% A/A, 45% A/G, 31% G/G; MTHFR A1298C genotypes: 51% A/A, 40% A/C, 9% C/C; MTHFR C677T genotypes: 47% C/C, 41% C/T, 12% T/T; MTHFR enzyme activity: 16% normal, 55% reduced, 29% low

Figure 5. Sources of Medication Recommendations

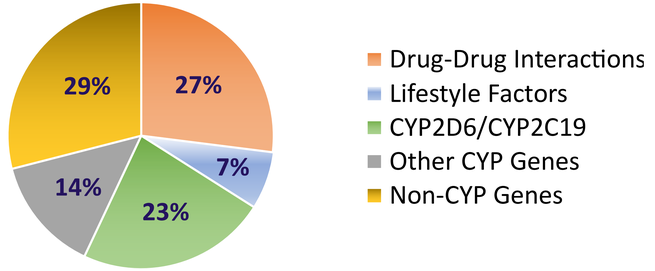


Table 1. The most common antidepressants (left) and the most common concomitant antidepressants (right) with actionable recommendations in the sample population (n=737).

All Antidepressants	Concomitant Antidepressants
citalopram (98%)	sertraline (14%)
sertraline (96%)	escitalopram (9%)
fluoxetine (96%)	duloxetine (8%)
paroxetine (95%)	fluoxetine (4%)
fluvoxamine (95%)	bupropion (4%)

Conclusion

- In patients 65 and older, IDgenetix is being ordered mainly to guide treatment selection for patients with depression and anxiety.
- All patients in this study had multiple genetic polymorphisms potentially impacting medication selection.
- One-third of the IDgenetix-guided medication recommendations were due to drug-drug and lifestyle factor interactions, which is especially important considering the real-world evidence that polypharmacy occurs in almost half of the elderly population.[6]
- Including additional pharmacokinetic and pharmacodynamic genes, beyond CYP2C19 and CYP2D6, along with drug-drug and drug-lifestyle interactions, more than triples the number of clinically relevant medication recommendations.

References

1) Brown et al. *Clin Pharmacol Ther.* 2022. 2) Swen et al. *The Lancet*. 2023. 3) Bradley et al. J Psychiatr Res. 2018. 4) Saldivar et al. *PGPM.* 2016. 5) Sugarman et al. *Drugs Aging*. 2016. 6) Wang et al. *Glob Health Res Policy*. 2023.

Disclosures

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