



Clinical Pharmacology & Toxicology Pearl of the Week

~ Pharmacogenomics: Pros and Cons ~

- ✓ Adverse drug events are responsible for up to 6% of all hospital admissions, is estimated to cost the healthcare system up to 5000\$, and increase hospital length of stay by up to 3 days.
- ✓ Just as clinicians consider a patient's co-morbidities, laboratory values, and drug allergies when deciding on a drug choice and dosage; pharmacogenomics can be introduced to improve a patient's response, while decreasing adverse effects from medications.
- ✓ Studies in the US assessing for 12 high risk pharmacogenetics mutations identified between 91-99.1% of all patients had at least one actionable genotype.
 - Meaning: Pharmacogenomic testing is applicable to nearly every patient

Pros	Cons
Identify high risk medications that should not be used or should have significant dose adjustments	Financial cost to patient and/or system
Decrease adverse effects from drug therapies	Variable (long) turn-around time (median = 7 days)
Improve clinical response and outcomes	Clinical expertise required to interpret and implement results into daily practice
Decreased time to response to treatment and decreased length of treatment through dose optimization	Need for additional testing as additional actionable genotypes are identified and made available
Improve quality of life	Some insurance companies are piloting pharmacogenomic testing as part of their coverage
Decrease hospitalization rates and duration from adverse drug events	False-negative reporting of rare genotypes (a limitation of some testing approaches)

References:

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3. Dunnenberger HM, Crews KR, Hoffman JM, et al. Preemptive clinical pharmacogenetics implementation: current programs in five US medical centers. Annu Rev Pharmacol Toxicol. 2015;55:89-106. doi:10.1146/annurev-pharmtox-010814-124835
4. Peck RW. Precision Medicine Is Not Just Genomics: The Right Dose for Every Patient. Annu Rev Pharmacol Toxicol. 2018;58:105-122. doi:10.1146/annurev-pharmtox-010617-052446
5. Maruf AA, Fan M, Arnold PD, Müller DJ, Aitchison KJ, Bousman CA. Pharmacogenetic Testing Options Relevant to Psychiatry in Canada. Can J Psychiatry. 2020;706743720904820. doi:10.1177/0706743720904820

The Clinical Pharmacology (CP) physician consultation service is available Mon-Fri, 8am-5pm. The on-call physician is listed in ROCA on the AHS Insite page. CP consultations are also available through Netcare e-referral and Specialist Link. You can also find us in the [Alberta Referral Directory](#) (ARD) by searching "Pharmacology" from the ARD home page. Click [HERE](#) for more details about the service.

The Poison and Drug Information Service (PADIS) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414 (AB and NWT) or 1-866-454-1212 (SK). Information about our outpatient Medical Toxicology Clinic can be found in [Alberta Referral Directory](#) (ARD) by searching "Toxicology" from the ARD home page.

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