

Strategies for Infusing Pharmacogenomics into NP Education

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Background

We need to move the pharmacogenomics conversation beyond grapefruit juice and simvastatin!!!

The National Human Genome Project has mapped the human genome (NHGRI, 2015). Genomics knowledge has been increasing exponentially in the past decade and poised to continue to expand dramatically moving forward.

The Food and Drug Administration (FDA, 2015) has 130 plus drugs listed on the “Table of Pharmacogenomic Biomarkers in Drug Labeling.” Many drugs frequently prescribed in primary care are on the list including: carvedilol, metoprolol, citalopram, clopidogrel, codeine, esomeprazole, omeprazole, galantamine, fluoxetine, **glimepiride**, pravastatin, rosuvastatin, tolterodine, tramadol, warfarin and venlafaxine.

Why?

NP’s order pharmacological agents to manage a myriad of client health problems. To effectively implement the prescribing role, NP’s knowledge of pharmacogenomics must be increased. Pharmacogenomics impacts prescribing decisions and designing personalized pharmaceutical treatment plans.

The required knowledge and skills for pharmacogenomics exceeds the scope of what can be taught in an Advanced Pharmacology course. Pharmacogenomic learning opportunities must be integrated across the Nurse Practitioner (NP) curriculum. The goal of pharmacogenomics is to “prescribe the optimal treatment/medication for a particular individual” (Calzone,2014).

This is a synthesis of a variety of learning resources to begin to integrate pharmacogenomics learning activities across the NP curriculum

Evidence Based Practice

What is the evidence for genetic testing for certain drugs such as clopidogrel or warfarin?

Review and respond to Reeling and Veenstra’s (2015) commentary “Implementation of Pharmacogenomics: The Evidence Needs”

Review and respond to Francis Lam (2012) commentary “How Much Evidence is Necessary for Pharmacogenomic Testing Implementation?”

PharmGenEd Economic Issues (Garrison & Veenstra, 2010)

Epidemiology/Biostatistics

Review and critique “Genotype-Guided vs Clinical Dosing of Warfarin and Its Analogues: Meta-analysis of Randomized Clinical Trials” (Stergiopoulos & Brown, 2014)

Advanced Health Assessment

Is there a family history of severe adverse drug reactions? What are the ethnic groups which have demonstrated pharmacogenomic differences in drug response and describe the differences?

Review the patient's prescribed drugs with the FDA Table of Pharmacogenomic Biomarkers in Drug Labeling (2015) and identify potential pharmacogenomic drug therapy concerns.

How do health risk behaviors, such as tobacco use, impact drug metabolism?

Advanced Physiology/Pathophysiology

Strong review of liver metabolism with introduction to Cytochrome p450 enzymes and substrates. What are inhibitors and inducers? What are outcomes of inhibitors and inducers? (Indiana University, 2015)

Mental Health

G3C Interactive Case "Peggy" (2015). Case focused on Post Traumatic Stress Disorder

PharmGenEd Psychiatry I: Depression Cardiovascular (Ellingrod, 2010)

PharmGenEd Psychiatry II: Antipsychotics (Bishop, 2010)

Cardiovascular

G3C Interactive Case "Larry" (2015). Case focused on acute coronary syndrome and clopidogrel

G3C Interactive Case "Gabe" (2015) Case focused on warfarin RX.

PharmGenEd Cardiovascular I: Warfarin and Statins (Shin & Cavallari, 2010)

PharmGenEd Cardiovascular II: Clopidogrel and Beta-Blockers (Cavallari & Shin, 2010).

Respiratory

PharmGenEd Asthma (Gardner, 2010).

Neurology

Trigeminal neuralgia case study treated with carbamazepine

Peripheral neuropathy treated with desipramine or amitriptyline

Infectious Diseases

Case study with patient on simvastatin who is prescribed ketoconazole

Pain Management

Case study with codeine prescription.

Geriatrics

Polypharmacy case study, furosemide, simvastatin, azithromycin, warfarin, metoprolol, tramadol, acetaminophen, Lisinopril, omeprazole and citalopram

Pediatrics

G3C Interactive Case “Stephanie” (2015). Case focused on codeine use in children.

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