

MODULE 3
Pharmacogenomics and Evidence-Based Practice

Assignment due June 6, 2015 at 11:59PM

The Essential Competencies state that nurses with graduate degrees need to be able to provide personalized care that incorporates genetic/genomic-based technology. This may involve prescription of pharmacogenomic-based drugs and development of clinical policies. As the Ebola virus outbreak emerged as a national issue in 2014, institutions were asked to establish infection control policies even though the likelihood of exposure to the virus was low in most practice settings. Likewise all nurses need to know how to think critically to develop policies related to genomic-based care even while the integration of genomics into practice is evolving. This assignment will explore how genetics is used in drug treatment decisions. You will use a critical appraisal framework to evaluate data and evidence for the use of CYP2C19 genotyping for Clopidogrel anti-platelet therapy in Acute Coronary Syndrome and prevention of recurrent ischemic stroke.

Student Learning Outcomes:

- 1) Explain the nursing implications of personalized care related to pharmacogenomics**
- 2) Describe variation in response to specific drugs related to differing levels in metabolizing enzymes**
- 3) Develop a clinical recommendation for genotyping patients prior to drug use via a critical appraisal process**

Assignments:

- 1) **Read** Berry & Workman Chapter 15: Assessing Genomic Variation in Drug Response.
- 2) After reading the chapter, **Take quiz (84% required) Open book, multiple attempts**
- 3) **Clinical Policy Development for Pharmacogenomic Testing.** (Points =115)
(Hypothetical Practice related to your future involvement in making policy recommendations to your institution regarding genomic tests)

You have been asked by Administration to serve on a Policy Development Committee for genotyping patients for CYP2C19 variants prior to use of Clopidogrel in Acute Coronary Syndrome and prevention of recurrent ischemic stroke. You will use a **critical appraisal process** to prepare a summary of the literature on genotyping for CYP2C19 variants and a recommendation for or against genotyping for CYP2C19 variants prior to use of Clopidogrel.

Critical Appraisal Skills are essential for the Doctoral prepared nurse to enable you to assess the trustworthiness, relevance and results of published papers so that you can decide if they are believable and useful. Your assignment is to review selected literature on Genotyping for CYP2C19 variants that affect Clopidogrel metabolism. Then answer questions from a Critical Appraisal Checklist. Your answers to the Critical Appraisal Questions below are the basis for your report and recommendations whether or not to use genotyping for CYP2C19 variants prior to Clopidogrel use. The Critical Appraisal Questions have been taken from Critical Appraisal Skills Programme (CASP), Making Sense of Evidence, Retrieved at <http://www.casp-uk.net/#!/criticalappraisal/c1tsl>

- a. Familiarize yourself with the issues using two systematic reviews:
 - i. Yang, E. (2015) Current antiplatelet agents: place in therapy and role of genetic testing. *J Thromb Thrombolysis*
 - ii. AHRQ Publication No. 13-EHC117-EF. (2013) Testing of CYP2C19 Variants and Platelet Reactivity for Guiding Antiplatelet Treatment
- b. Review the literature (3 sources provided here) on CYP2C19 testing for Clopidogrel:
 - i. Tousoulis, D, et al. (2013). The impact of CYP2C19 genotype on cardiovascular events and platelet reactivity in patients with coronary artery disease receiving clopidogrel. *Int J Cardiology*
 - ii. Spokoyny, I, et al. (2014). Reduced Clopidogrel Metabolism in a Multiethnic Population: Prevalence and Rates of Recurrent Cerebrovascular Events. *Journal of Stroke and Cerebrovascular Diseases*
 - iii. Jeong, T, et al. (2014). *CYP2C19* Genotype and Early Ischemic Lesion Recurrence in Stroke Patients Treated with Clopidogrel. *Journal of Stroke and Cerebrovascular Diseases*
- c. Make use of a Critical Appraisal list below. Answers to the questions below are the summary report you are presenting to your committee based on your review of the literature **provided** on Clopidogrel CYP2C19 genotyping. Your report should include answers to the following:
 - i. Of the articles you reviewed, how many were randomized trials?
 - ii. Did the trials address a clearly focused intervention issue and what was the issue?
 Consider: An issue can be 'focused' In terms of
 - Why was the population studied
 - What was the intervention given
 - Were the researchers blinded to which patients had genotyping.
 - What outcomes were considered/expected
 - iii. Were the patients in the trial randomized and were they similar? If not, how might the patient differences (such as age, ethnicity, sex) affect the outcome?
 Consider: Look at
 - Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics
 - iv. What were the outcome results? Did the outcomes reach statistical significance or what and how large was the treatment effect?
 - Consider
 - Are the 'bottom line' results from the studies reviewed
 - Do the studies provide validation in a group of patients similar to each other?
 - How were the results expressed (Relative risk, odds ratio etc)
 - v. Can the results be applied to your patient population? If not how do your patients differ from those in the studies?
 - vi. Present any guidelines about genotyping for Clopidogrel therapy from the literature you reviewed
 - vii. Explain if there is a preponderance of high-level evidence in the articles under review? Consider the CDC Levels of Evidence and what level of evidence is given for genotyping prior to Clopidogrel.
 - viii. Based on vii., state your recommendation for, or against, a policy to genotype patients prior to receipt of Clopidogrel