Innovative Approaches Working Group
Universal Team-Based Learning Activity
Exercise 2
Use of Multigene Assays

Objectives: By the end of the session, you will be able to:

1. Describe the factors that determine the utility of inclusion of a specific gene in a multigene assay
2. Determine, using online genomics tools, the appropriateness of gene inclusion in a commercially available gene panel
3. *Possible objective: Interpret a gene panel testing report*

Team-Based Learning Activity:

<u>**Case Presentation**</u>

Given the results from the first exercise, you would like to explore other possible genetic causes of the patient's *(diagnosis)*.   You begin to look into commercially available gene panels.

1. **List 2 criteria to guide the selection of variants that should be on the gene panel for this patient. (REVEAL)**

2. **You notice that two different reference laboratories offer gene testing for this patient.**

   a. **List the genes tested for using *(laboratory 1)* (search online)**

   b. **List the genes tested for using *(laboratory 2)* (search online)**

   c. **The *(geneA)* is tested for in both laboratories but *(geneB)* is only tested for at laboratory 1 but not laboratory 2. Using OMIM (http://www.ncbi.nlm.nih.gov/omim), for each gene:**

      i. **List the first 3 studies cited in the OMIM entry for this gene.**
      ii. **Determine how many participants in these studies, carried your patient's diagnosis?**

      Would use PubMed and possibly full free access articles.

iii. **Determine how many participants in these studies carried your patient's diagnosis and carried a variant in the gene?**

iv. **Are there other important details from the studies that suggest or go against a role of this gene in your patient's diagnosis?**

   Possible answers: functional data, methodological issues?

v. **Would you include this gene on a gene panel for your patient's diagnosis? Explain your answer in no more than 3 sentences**

Possible additional questions:

1. *You notice that some laboratories utilize sequencing-based and othersr use PCR-based assays for their gene panels. What are the advantages and disadvantages of each methodology (list one advantage and one disadvantage for each): (REVEAL)*

   a. *Sequencing-based*

   b. *PCR-based*

2. *Using clinicaltrials.gov, of the first 3 genes included in the laboratory 1 gene panel (based on your answer to question 2a), for which ones are there ongoing clinical trials? For each gene with multiple associated trials, assuming the patient harbors mutations, which trial would you select for your patient?*

3. *The following report is from (<u>laboratory 1</u>).*

   a. *What method does the laboratory use?*

   b. *What metrics listed on the report ensure accurate and precise testing?*

   This question would get at how to read a report (which can sometimes be complicated) and introduce some important testing terminology/methods.