

## **Implementing Genomics in Clinical Care: A Personalized Medicine Educational Curriculum for Graduate Medical Trainees & Practicing Clinicians**

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**Background:** Clinicians are being asked with increasing frequency to interpret and discuss genetic test results with their patients, but providers have low levels of knowledge related to genetic testing and feel underprepared to integrate genomic medicine into clinical care. Currently, there are limited educational opportunities for clinicians to learn and apply the skills inherent in personalized medicine (PM). In a recent survey of graduate medical trainees (GMTs) at the University of Colorado (CU), 40% of respondents were unaware of any of the resources available to clinicians to help them integrate PM into clinical care.

**Objective:** To develop an online PM curriculum for GMTs and practicing clinicians that provides an overview of this evolving field and serves as a point-of-care reference when providers encounter questions related to genomics and PM. Through participation in the curriculum, attendees will improve their knowledge of PM and thus, will be better prepared to integrate PM into the clinical setting.

**Methods:** A PM curriculum consisting of six 20-40 minute modules was developed and piloted with second and third year internal medicine residents in Spring and Fall 2020. The content was developed around clinical scenarios that GMTs would likely encounter in their practice, but may not recognize as examples of PM. Topics covered included provider ordered genetic testing, direct-to-consumer genetic testing, biobanking at CU, pharmacogenetics, and ethical and legal concerns around genomics. Although the curriculum was developed to be completed in an independent, online, asynchronous format, the pilot was delivered in a synchronous, virtual classroom over a four hour period. Voluntary participation in questionnaires offered pre and post curriculum was used to assess improvements in resident knowledge of and attitudes towards PM, as well as impressions of the modules.

**Results:** Among the 120 residents who participated in the curriculum, 114 (95.0%) residents completed the pre-curriculum questionnaire and 90 (75.0%) completed the post-curriculum questionnaire. Agreement with the statement "I am confident in my knowledge of PM" increased from 20.2% pre-curriculum to 70.0% post-curriculum ( $p < 0.0001$ ). Similarly, participants' confidence in their knowledge of the influence of genetics on medication therapy and their ability to interpret a pharmacogenetic test increased significantly pre- and post-curriculum (28.1% pre, 83.3% post and 22.8% pre, 81.1% post, respectively;  $p < 0.0001$ ). When respondents were asked to rate the usefulness of the content covered, 85.5% of the participants rated the material "moderately or very useful".

**Discussion:** A majority of GMTs and practicing clinicians have received limited genomics education and lack confidence in their ability to integrate PM into clinical care. Educational modules developed around clinical scenarios familiar to clinicians allow providers to recognize how PM is currently being utilized in practice and to identify resources available to promote evidence-based PM practices. A pilot of this curriculum significantly improved participants'

confidence in their knowledge of PM and ability to apply these concepts in the clinical setting. Further research is needed to determine how best to disseminate this education to other trainees and practicing clinicians.

**Word Count:** 489