

**NHGRI International Genomics Education Meeting**  
**National Institutes of Health, Lawton Chiles International House**  
**Bethesda, Maryland**  
**August 4-5, 2016**

The NHGRI International Genomics Education Meeting brought genomics education leaders and innovators together to: 1) provide an overview of primary care oriented education programs; 2) review lessons learned for meeting the changing educational needs of healthcare providers; 3) share best practices for genomics education implementation; and 4) identify synergies, challenges, and opportunities to share and collaborate, with a focus on physicians and healthcare practitioners. The expected outcomes of the meeting were awareness of the landscape for international genomics education, identification of synergies and opportunities for collaboration, and the development of an agenda for the ISCC (Intersociety Coordinating Committee) International Education Working Group to pursue.

The meeting had presentations from leaders in genomics education from the United States, Australia, the United Kingdom, and Canada. These presentations were used to inform attendees about the genomics education landscape and gaps in education programs.

**Lessons Learned and Best Practices:**

First, participants expressed the importance of identifying and engaging key partners, particularly those willing to champion genomics education and those who are early adopters. Only a portion of the education programs presented included an evaluation component. Of those with evaluations, the majority were focused on trainee evaluation. Discussants emphasized the importance of also evaluating the burdens facing program instructors.

To create a team based approach, there is a great need to engage relevant healthcare professionals including lab scientists and faculty. Adding implementation scientists and incorporating spiral curricula with multiple entry points for subspecialists will aid in these educational efforts. To further these efforts, online formats that are attractive to millennial learners should be implemented and curricula should reflect real-world applications. Having clear educational goals for any educational resource is essential and should dictate the medium in which the knowledge is delivered.

**Potential Synergies & Collaborations and Next Steps:**

Many potential synergies were identified at this meeting. These include: developing training materials and programs, improving report presentation, engaging labs and systems engineers, defining educational taxonomy, creating evaluation methods, engaging relevant healthcare professionals and societies, convincing funders of the importance, reaching non-research intensive practices, and mainstreaming genomics into existing education.

Participants expressed interest in a possible collaboration with Geisinger Healthcare and their 100,000 Genome Project. Geisinger has developed education modules dedicated to 27 common conditions. Other possible collaborations include: Health Education England's Masters' modules, University of Miami's Masters'/MD coursework, NHGRI Genetics/Genomics Competency Center (G2C2), insurers' webinars, The Australia Genomics Health Alliance

(AGHA) Program 4, The American Society of Human Genetics (ASHG) Cancer Genetics' virtual meetings, and the Global Genomics Medicine Collaborative (G2MC) via WebEx. When considering inter-professional collaborations, it is important to assess how information will be presented across the spectrum of healthcare professionals.

There are plans to create an International Education working group of the ISCC, which would have an NIH chair and non-NIH co-chair. The ISCC would welcome more international members. Also, a joint research project to assess the effectiveness of various education models would be of interest to many programs.

### **Recommendations:**

- Educators should work with clinicians and laboratories to standardize clinical reports and evaluation methods. Templates should be created for workshops and online tools. Report presentations should be improved by including experts in form design and presentation. Well-designed reports should obviate the need for clinicians to be an expert when interpreting the report.
- Case studies should be developed with professionals working in the field. To reduce the time needed to prepare case studies, it is possible to use elements of case studies, rather than whole cases.
- Relevant healthcare professionals including lab scientists, professional societies, systems engineers, and faculty should be engaged. Presenting at professional societies chapter or national meetings is a good way to engage them.
- Compare continuing medical education requirements internationally.
- The genomics education community should utilize unique opportunities for engaging with all healthcare professionals such as general practitioners or nurses who don't participate in research. Mock genetic counseling sessions and pairing experienced sites with new adopter sites could be a way to increase interest in the field.
- When considering inter-professional collaborations, it is important to assess how the information will be presented to medical and non-medical professionals.
- To convince health ministries and other funders to provide funding for educational initiatives, there needs to be evidence of a need for education, since there is a glaring absence of genomics in current curricula. The trainings cost need to be minimal and proven effective. To provide evidence for the need for this education, one could look at cases of misinterpretation and inappropriate ordering and the associated costs.
- Engaging institutional leaders would provide them with direct evidence of return on investment. Creating leaders in other medical specialties would allow for the creation of a network of champions. Advocates for genomics among junior doctors and patients could help drive interest in the field.
- Setting standards for disease gene panels and subsequent laboratory reports would promote consistency of interpretation across different medical settings.
- Adopting spiral or staged curriculum programs, like those implemented through HEE, in other countries might be beneficial. Similarly, it might be beneficial to implement the University of Miami's Master's/MD program in other schools or countries.