Educating Future Physicians in an Era of Genomic Medicine

APHMG
Medical Genetics Course Directors Special Interest Group
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Shoumita Dasgupta, PhD
dasgupta@bu.edu
@prof_dasgupta
Association of Professors of Human and Medical Genetics

Mission: To promote human and medical genetics educational programs in North American medical and graduate schools
APHMG Institutional Members

- Allopathic Medical Schools
- Osteopathic Medical Schools
- Academic Medical Centers
APHMG Special Interest Groups

- Allopathic Medical Schools
- Osteopathic Medical Schools
- Laboratory Fellowship Program Directors
- Residency Program Directors
- Medical School Course Directors
- Academic Medical Centers
Genetic Tests Can Help to:

- Diagnose Your Disease
- Pinpoint Genetic Factors That Caused Your Disease
- Predict How Severe Your Disease Might Be
- Choose the Best Medicine and Correct Dose
- Discover Genetic Factors That Increase Your Disease Risk
- Find Genetic Factors That Could Be Passed to Your Children
- Screen Newborns for Certain Treatable Conditions
Training future physicians in the era of genomic medicine: trends in undergraduate medical genetics education

Jevon Plunkett-Rondeau, MD, PhD¹, Katherine Hyland, PhD² and Shoumita Dasgupta, PhD³

- Examines methods of teaching medical genetics in US and Canadian allopathic medical schools
- Makes recommendations for training a genomically-literate physician community
Training future physicians in the era of genomic medicine

Table 1 Course director and learner characteristics of medical genetics courses taught in US and Canadian medical schools, 2013–2014

<table>
<thead>
<tr>
<th>Course director and learner characteristics</th>
<th>Respondents, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise of course/curriculum director&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Geneticist with PhD</td>
<td>40 (39)</td>
</tr>
<tr>
<td>Geneticist with MD</td>
<td>33 (32)</td>
</tr>
<tr>
<td>Basic and clinical sciences team</td>
<td>23 (23)</td>
</tr>
<tr>
<td><strong>Expert in other (nongenetics) discipline</strong></td>
<td>23 (23)</td>
</tr>
<tr>
<td>Genetic counselor</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Clinical sciences team</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>
Training future physicians in the era of genomic medicine

Table 2: General characteristics of medical genetics courses taught in US and Canadian medical schools, 2013–2014

<table>
<thead>
<tr>
<th>Course/curricular characteristics</th>
<th>Respondents, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of curriculum in which majority of genetics content was taught</td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>77 (75)</td>
</tr>
<tr>
<td>Second</td>
<td>8 (8)</td>
</tr>
<tr>
<td>Equal split between first and second</td>
<td>16 (16)</td>
</tr>
<tr>
<td>Third</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Medical genetics incorporated into third- and fourth-year clinical teaching</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27 (26)</td>
</tr>
<tr>
<td>No</td>
<td>58 (57)</td>
</tr>
<tr>
<td>Not sure</td>
<td>17 (17)</td>
</tr>
</tbody>
</table>
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<th>Respondents, n (%)</th>
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</thead>
<tbody>
<tr>
<td>Type of course</td>
<td></td>
</tr>
<tr>
<td>Stand-alone</td>
<td>25 (25)</td>
</tr>
<tr>
<td>Integrated</td>
<td>77 (75)</td>
</tr>
</tbody>
</table>
Training future physicians in the era of genomic medicine: trends in undergraduate medical genetics education

Jevon Plunkett-Rondeau, MD, PhD¹, Katherine Hyland, PhD² and Shoumita Dasgupta, PhD³

• Need to advocate for curricula to continue to evolve alongside genomic science
• Impact of integrated curricula on teaching of genetics concepts?
• Genetics and genomics are underrepresented during clinical years of training – opportunity for synergy with ISCC and other organizations with initiatives to educate (non-geneticist) physicians
CD SIG Activities

• Genetics Education Resource Exchange
  – Question bank
  – Cases, sample lab reports, etc.
  – Video review

• Best practices in Medical Genetics Education
  – Strategies for active learning
  – Team-based learning and flipped classroom tutorials
  – Peer evaluation and mentoring of teaching
  – Participatory Genomic Testing as an Educational Experience (Trends in Genetics, June 2016)

• Workshop Activities
  – Competencies working group
  – Case development / writing in genomic medicine
    • Session at ASHG 2016
  – Mentoring for scholarly project design
APHMG CD SIG Partnerships

– NIH/NHGRI ISCC (Inter-Society Coordinating Committee)
– ClinGen Education Workgroup
– ABE (Association of Biochemistry Educators)
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• Developing Cases and Assessments for Integrated Biochemistry and Genetics/Genomics Curricula

• Strategies for Including Ethics in Integrated Medical Curricula

• Introducing Genetics Content into Clinical Education
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- ClinGen Education Workgroup
- ABE (Association of Biochemistry Educators)
- IAMSE (International Association of Medical Science Educators) MedU Science
- UTRIG (Training Residents in Genomics) medical school teaching committee: focus on cancer cases
  - Rich Haspel
APHMG CD SIG Future Directions

• Ongoing efforts:
  – Genetics Education Resource Exchange
  – Joint meeting with ABE in 2017

• Looking forward:
  – Curriculum management & integration of content across four (especially clinical) years
  – Developing materials with ClinGen Education Workgroup and UTRIG
  – Applying EPAs to competencies and creating associated assessments
## APHMG CD SIG Initiatives

<table>
<thead>
<tr>
<th>We have active programs addressing provider genomic literacy – here’s what’s working</th>
<th>We are developing and planning programs addressing provider genomic literacy – Here’s what we are doing and what we need</th>
<th>We are not addressing provider genomic literacy – here’s why and what, if anything, we prioritize to change that</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics Education Resource Exchange</td>
<td>APHMG 2017 Annual Workshop</td>
<td>Materials for clinical (clerkship) training</td>
</tr>
<tr>
<td>Curricular resources</td>
<td>Resource development</td>
<td>Context of genomics in specialty care beyond Medical Genetics itself</td>
</tr>
<tr>
<td>Questions, case materials (PBL, TBL, small groups), sample clinical test reports, news articles for teaching</td>
<td>Integration of genetics/genomics with biochemistry, introduction of ethics, creation of clinical training materials</td>
<td>Operational difficulties in having genetics educators embedded in other clerkships</td>
</tr>
<tr>
<td>Includes assessment materials for trainees</td>
<td>Draft cases and assessments in these areas</td>
<td>Are these areas assessed on shelf exams?</td>
</tr>
<tr>
<td>Created by and for APHMG members</td>
<td>Created by attendees, to be deposited in GERE</td>
<td>SEEKING VOLUNTEERS!</td>
</tr>
<tr>
<td>Currently available to members</td>
<td>May 2017</td>
<td>Future direction, ASAP</td>
</tr>
</tbody>
</table>

aphmg.org
Thank you!

Jon Bernstein, Stanford
Kate Garber, Emory
Shoumita Dasgupta, Boston U
Andrew Sobering, St. George’s
Darrel Waggoner, Chicago
Kathy Hyland, UCSF
Tracey Weiler, Florida
International U
Vicki Park, UTHSC