National Human Genome Research Institute

National Institutes of Health

U.S. Department of Health and Human Services

Genomic Medicine Working Group Update

U.S. Department of Health and Human Services

National Institutes of Health

National Human Genome Research Institute

Teri Manolio, M.D., Ph.D.

National Advisory Council on Human Genome Research

February 9, 2015

Genomic Medicine Working Group of National Advisory Council on Human Genome Research

Assist in advising NHGRI on research needed to evaluate and implement genomic medicine

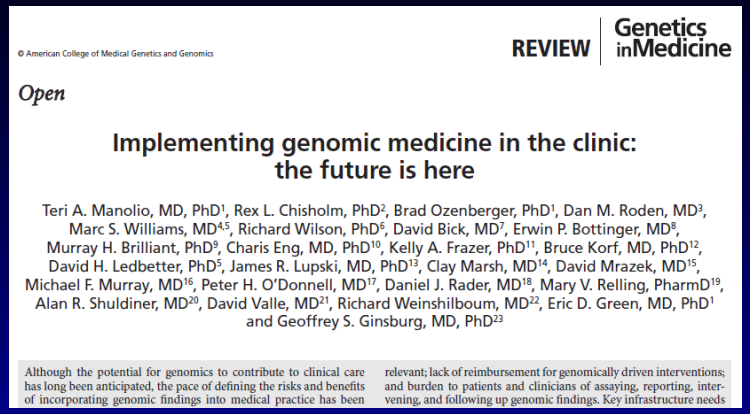
- Review current progress, identify research gaps and approaches for filling them
- Identify and publicize key advances
- Plan genomic medicine meetings focusing on timely themes
- Facilitate collaborations, coordination
- Explore models for long-term infrastructure and sustainability of groups arising from genomic medicine meetings.

NACHGR Genomic Medicine Working Group Members

Rex Chisholm	Northwestern
Geoff Ginsburg	Duke
Howard Jacob	Med Coll Wisconsin
Howard McLeod	Moffitt
Mary Relling	St. Jude
Dan Roden	Vanderbilt
Marc Williams	Geisinger

Eric Green
Teri Manolio
Laura Rodriguez

Genomic Medicine Colloquium, June 2011



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REVIEW | Genetics inMedicine

Open

Implementing genomic medicine in the clinic: the future is here

Teri A. Manolio, MD, PhD[1], Rex L. Chisholm, PhD[2], Brad Ozenberger, PhD[1], Dan M. Roden, MD[3], Marc S. Williams, MD[4,5], Richard Wilson, PhD[6], David Bick, MD[7], Erwin P. Bottinger, MD[8], Murray H. Brilliant, PhD[9], Charis Eng, MD, PhD[10], Kelly A. Frazer, PhD[11], Bruce Korf, MD, PhD[12], David H. Ledbetter, PhD[5], James R. Lupski, MD, PhD[13], Clay Marsh, MD[14], David Mrazek, MD[15], Michael F. Murray, MD[16], Peter H. O'Donnell, MD[17], Daniel J. Rader, MD[18], Mary V. Relling, PharmD[19], Alan R. Shuldiner, MD[20], David Valle, MD[21], Richard Weinshilboum, MD[22], Eric D. Green, MD, PhD[1] and Geoffrey S. Ginsburg, MD, PhD[23]

Although the potential for genomics to contribute to clinical care has long been anticipated, the pace of defining the risks and benefits of incorporating genomic findings into medical practice has been relevant; lack of reimbursement for genomically driven interventions; and burden to patients and clinicians of assaying, reporting, intervening, and following up genomic findings. Key infrastructure needs

GM II: Forming Collaborations, Dec 2011

metree™

Welcome to MeTree. This program will ask questions about your health and your family's health. Your answers will be used to give you personalized suggestions for your health care. Please answer as best you can.

TOUCH HERE TO START

GM III: Stakeholders, May 2012

Technology Assessment Supports Health Plans and Other Stakeholders in Developing Evidence-based Policies

Tec

Medical Policy

Coverage Policy

Payment Policy

GM IV: Physician Education, Jan 2013

GM V: Federal Strategies, May 2013

cap

A Genomic Medicine Policy Framework

The College of American Pathologists

Debra G.B. Leonard, MD, PhD, FCAP

GM VI: Global Leaders, Jan 2014

Global leaders in Genomic Medicine 2014

Genomic Medicine Colloquium, June 2011

GM IV: Physician Education, Jan 2013

GM VII: Genomic CDS, Oct 2014

GM VIII: NHGRI's Genomic Medicine Programs, June 2015

Policy Framework

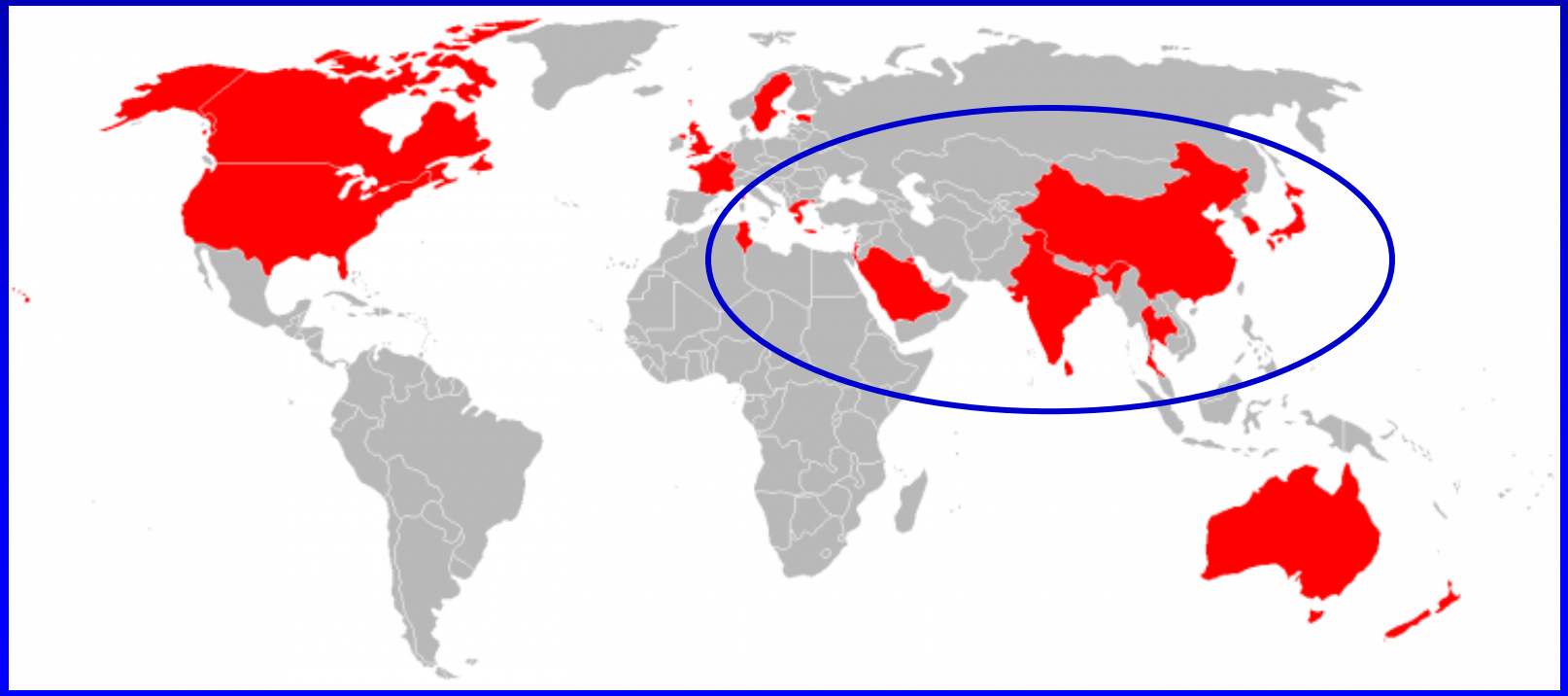
The College of American Pathologists
Debra G.B. Leonard, MD, PhD, FCAP

GM III: Stakeholders, May 2012

GM VI: Global Leaders, Jan 2014

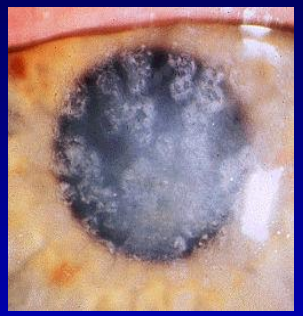
NHGRI Genomic Medicine Meetings, 2014-2015

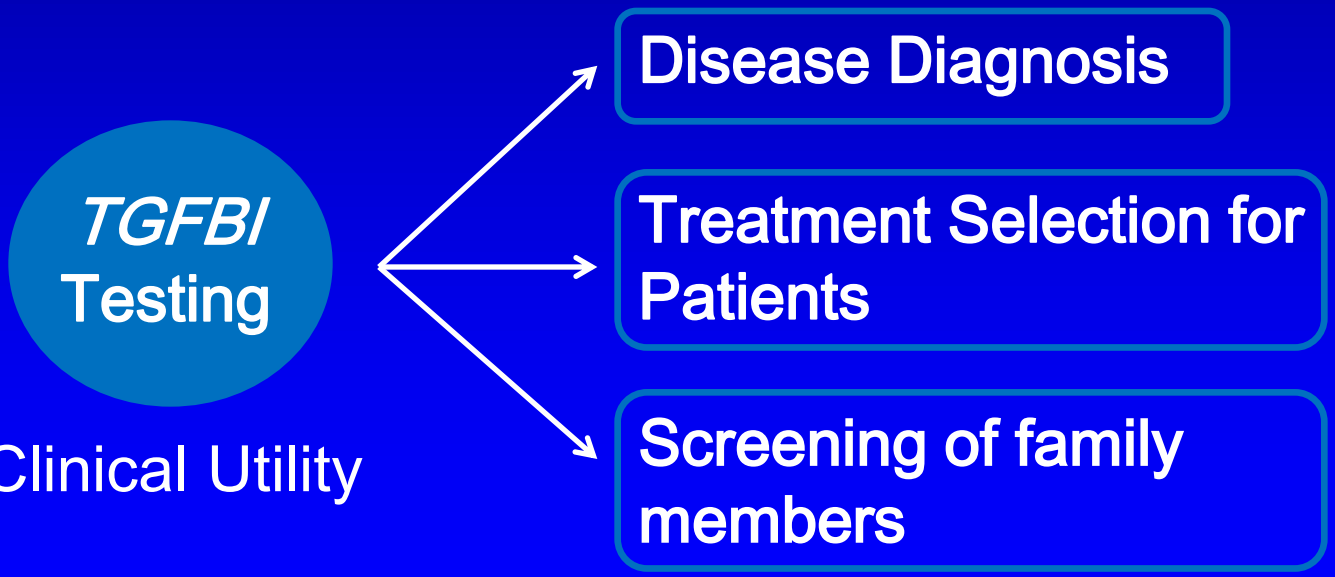
- GM VI, Jan 8-9, 2014, Bethesda MD
  - Engage international agencies
  - Explore current activities, needs, obstacles
  - Identify common research gaps to ensure evidence only need be generated once
  - Develop plans for international collaboration



Singapore: Stromal Corneal Dystrophies and *TGFBI* Testing

- Inherited disorders leading to loss of corneal transparency.
- *TGFBI* mutations underlie the majority of stromal corneal dystrophies.





Courtesy P Tan, Duke-Natl U Singapore

POLARIS

Estonian Program for Personalized Medicine

Pilot project for 2015-2018 approved by the Estonian Government on 15.12.2014.

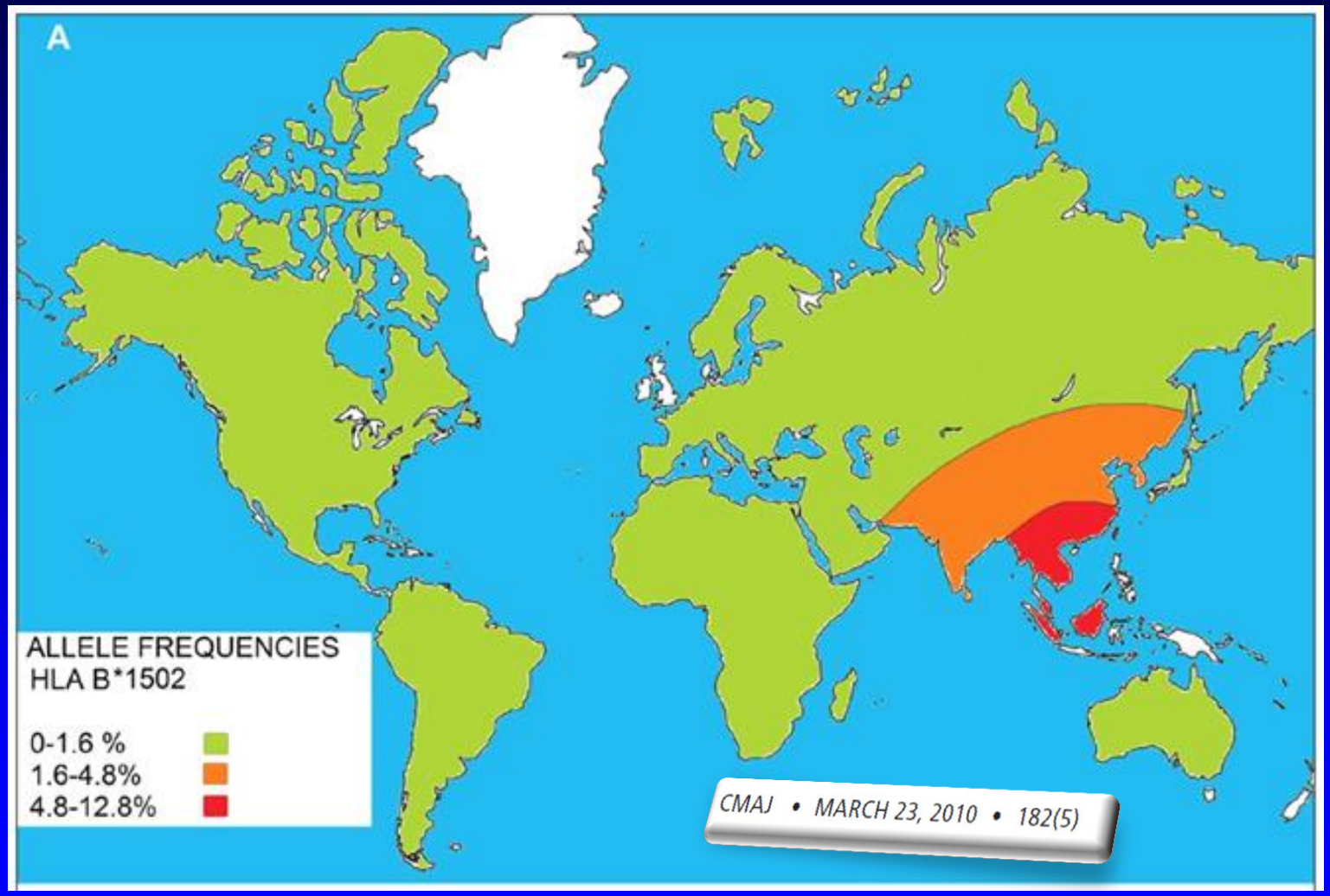
- **Health care**
  - Educating health care professionals
  - Educating patients
  - Further development of the eHealth including decision support systems
- **Research and Development**
  - Sequencing 5,000 individuals, Estonian Chip and analysis software
  - International collaboration
- **Commercialization**

Courtesy A Metspalu,

estonian genome center
university of tartu

U Tartu

Carbamazepine and SJS/TEN: Allele Frequency of HLA-B*15:02



Courtesy W Chantratita, Ramathibodi Hospital

High Incidence of SJS/TEN in Thailand

Drug induced SJS/TENs in Thailand 1998-2008

(Reference: Thai FDA 2008)

Drug name	Count
1. SULFAMETHOXAZONE+ TRIMETHOPRIM	1,234
2. CARBAMAZEPINE	703
3. ALLOPURINOL	664
4. PHENYTOIN	451
5. AMOXYCILLIN	342
6. STAVUDINE + LAMIVUDINE+NEVIRAPINE	313
7. PHNOBARBITAL	189
8. IBUPROFEN	156
9. NEVIRAPINE	122
10. TETRACYCLINE	113

Genomic markers have been found and utilized as predictive tools by our group.

Courtesy W Chantratita, Ramathibodi Hospital

Name & Family Name

Outcome of the PGX assay

8 Jan 2014

PGx Interpretation

High Risk of SJS/TEN from Carbamazepine, according to update information

Suggestion: According to update information, this person has HLA-B*1502 which has a high risk to develop a severe skin disorder (SJS/TEN), if he takes carbamazepine or drug structurally similar.

Need more information: please contact our PGx laboratory. Tel 02-200-4330-3…

Courtesy W Chantratita

Signature of molecular clinical pharmacist.

NIH Research Directions in Genetically-Mediated SJS/TEN, Mar 3-4, 2015

Objectives:

1. Review current state of knowledge of surveillance, pathogenesis, and treatment
2. Examine role of genomics and PGx in etiology, treatment, and eradication of preventable cases
3. Identify gaps, unmet needs, and priorities for future research to eliminate SJS/TEN globally

Mark Avigan, FDA
Ricardo Cibotti, NIAMS
Robert Davis, U Tenn
Josh Denny, Vanderbilt
Carolyn Hutter, NHGRI
Lois La Grenade, FDA
Neil Shear, U Toronto
Lisa Wheatley, NIAID

50 International Genomic Medicine Leaders

40 US Genomic Leaders and NHGRI Staff

Facilitating Collaborations

GA4GH

Global Alliance
for Ge

Global Genomic
Medicine Collaborative

G2MC

Goals of the Global Genomic Medicine Collaborative (G2MC)

An international genomic medicine community hosted by the Institute of Medicine and formed to:

- Serve as nexus, clearinghouse, and knowledge base for GM activities globally
- Develop opportunities for global GM demonstration projects (implementation and outcomes research)
- Capture and disseminate best practices for GM (IT, education, evidence, Pgx, policy) across the global GM community
- Develop a financial model for sustained efforts

Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC)

Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC)

Share Print

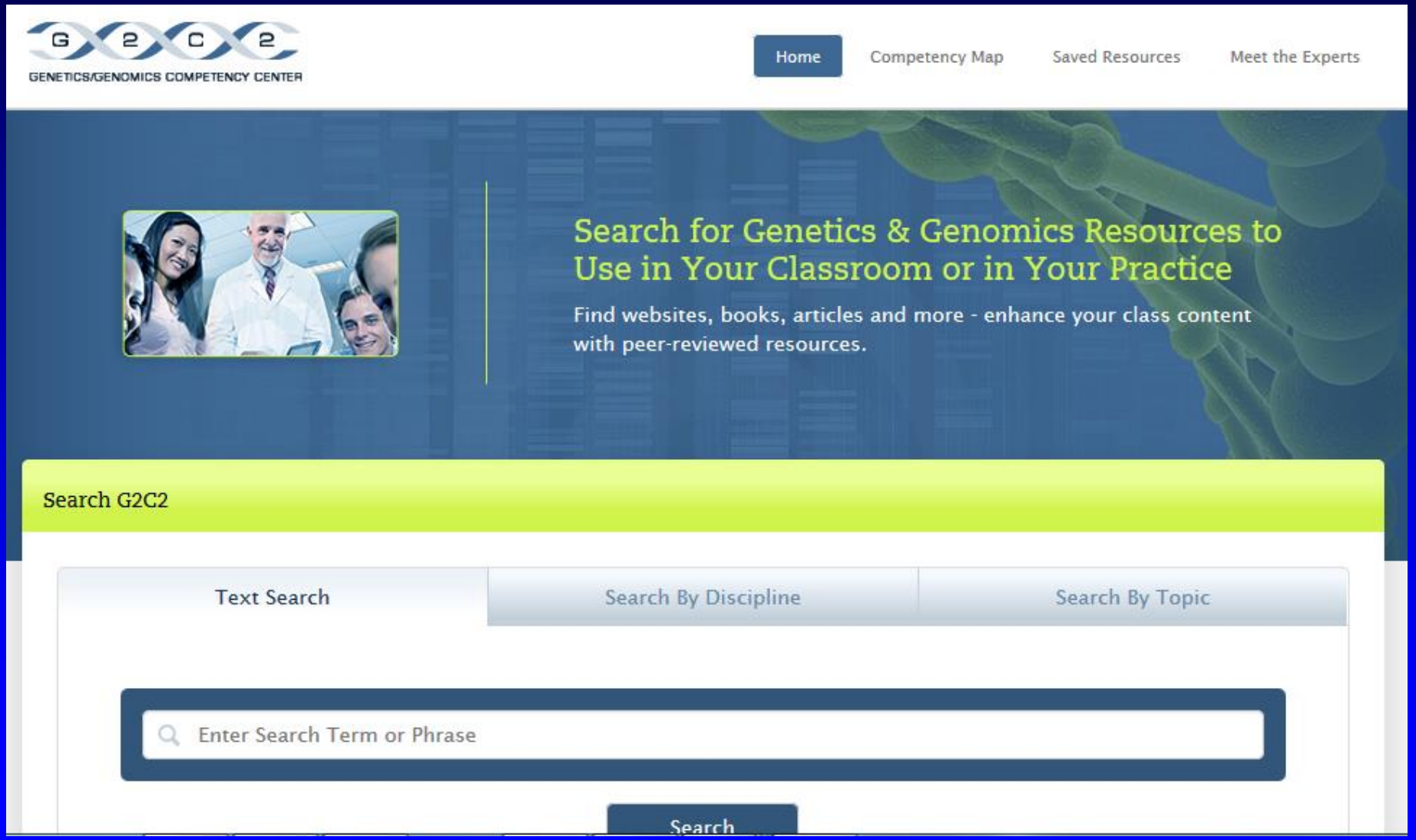
- Overview
- Members
- Working Groups
- ISCC Meetings and Activities
- Links and Resources
- Contact

new **The Inter-Society Coordinating Committee for Practitioner Education in Genomics** will hold an in-person meeting on the NIH Bethesda campus on November 18, 2014. Please see the meeting agenda for more information. new

Overview

The Inter-Society Coordinating Committee for Practitioner Education in Genomics (ISCC) formed in February 2013 from the Genomic Medicine IV meeting to improve genomic literacy of physicians and other practitioners and to enhance the practice of genomic medicine through sharing of

Educational Products Available on G2C2, Site Re-Designed, Mapped to Competencies



The TRIG Model: A structured approach to teaching…

- **Needs assessment**
  - **Targeted learner**
- **Objectives/Teaching Strategies**
  - **Knowledge-based** → **Lectures, Flipped classroom**
  - **Performance-based** → **Team-based learning**
  - **Affective** → **Focus on patient, Include ethical issues**
- **Evaluation**
- **Dissemination/Research**

Curriculum available at www.ascp.org/TRIG

Pathologists | Laboratory Professionals | Students | Board of Certification | Search site

Online Supplement

A Curriculum in Genomics and Personalized Medicine for Pathology Residents

Richard L. Haspel, MD, PhD,[1] Ramy Arnaout, MD, DPhil,[1] Lauren Briere, MS,[2] Sibel Kantarci, PhD,[1] Karen Marchand, MS,[2] Peter Tonellato, PhD,[1,3] James Connolly, MD,[1] Mark S. Boguski, MD, PhD,[1,3] and Jeffrey E. Saffitz, MD, PhD[1]

Am J Clin Pathol 2010;133-35.

We have taken a structured approach to develop a practical curriculum in genomics and personalized medicine that would also generate resident enthusiasm and interest in the subject.[1,2]

The second lecture, entitled "Next-Generation Sequencing," includes the limitations of conventional (Sanger) sequencing and the concept of next-generation sequencing. The lecturer reviews the advantages and disadvantages of the

Genomic Medicine VII – Genomic Clinical Decision Support, Oct 2-3, 2014

- Objectives
  - Define ideal state of genomic CDS, identify gaps and strategies to close them
  - Identify and engage health IT initiatives that would support recommended strategies
  - Define a prioritized research agenda for GCDS
- Potential collaborative projects
  - GCDS Use Cases
  - GCDS Sandbox
  - Open CDS Knowledge Library
  - End-to-End Project
  - Role of the Patient/Caregiver

Genomic Medicine VIII: NHGRI's Genomic Medicine Programs, June 8-9, 2015

- Objectives
  - Review NHGRI's genomic medicine portfolio, identify gaps, opportunities for collaborations
  - Identify related programs of other NIH ICs or other funders and opportunities for collaborations
  - Identify research needs in genomic medicine for NHGRI and partner agencies to pursue
  - Enhance approaches to capturing and disseminating best practices
  - Examine potential methods for assessing impact of programs
- GM IX, Winter 2016? Bethesda MD

Many Thanks…

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Joy Boyer
Lisa Brooks
Deborah Colantuoni
Cati Crawford
Eric Green
Carolyn Huetter
Lucia Hindorff
Jean Jenkins
Heather Junkins
Rongling Li
Nicole Lockhart
Jean McEwen
Jacqueline Odgis
Erin Ramos
Laura Rodriguez
Simona Volpi
Robert Wildin
Ken Wiley
Anastasia Wise
Rex Chisholm
Geoff Ginsburg
Howard Jacob
Howard McLeod
Mary Relling
Dan Roden
Marc Williams
GM Mtg Participts