The Medical Genetics Workforce: Getting to Where We Need to Be From Here

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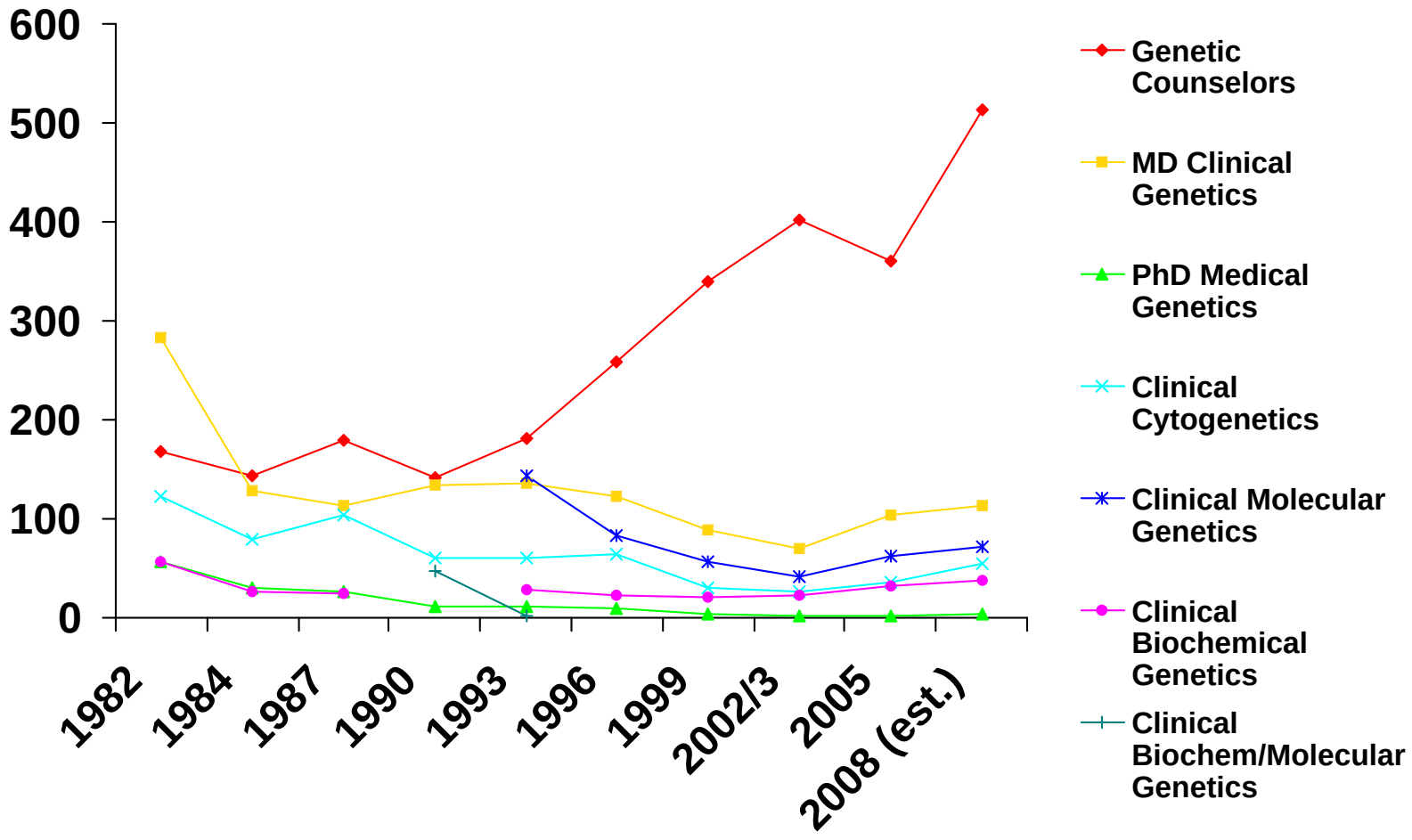
Today's Medical Genetics Workforce

- As of November 2007:
  - 2,341 individuals hold 2,772 certificates from AMBG
    - In 2003, 13% represented minority populations
  - 2,513 genetic counseling certificates issued; with an estimated 2437 genetic counselors actively practicing (ABGC, 2007)
    - Certification by ABMG until 1990; ABGC after 1993
  - Not all of these ~4700 individuals are alive, and a portion live and work outside the USA
- Genetic counselors are the fastest growing cohort, BUT only:
  - 6% are men
  - 9% represent minority populations (2006 NSGC PSS)
- Assuming GCs all are alive and practicing in the USA
  - 1 GC for every 123,600 population
    - Based on US population of 301,140,000

The Clinical Geneticist Workforce

- 1,253 ABMG certified clinical geneticists (November 2007)
  - This represents 0.18% of the 700,000 physicians in the US
- ~1,100 active in the US (estimated) spend ~45% of their time seeing genetics patients (ACMG, 2007)
  - ~1 FTE certified MD geneticist per ~560,000 people; or ~1.8 clinical geneticists per million population
- Royal College of Physicians estimates 1 FTE per 250,000 population as ideal
  - Based on current population of roughly 301,140,000 the US needs 1200 FTE MDs.
  - We are only half way there!

Medical Genetics Certification Trends
1982 - 2008 (estimated based on 2007 boards)

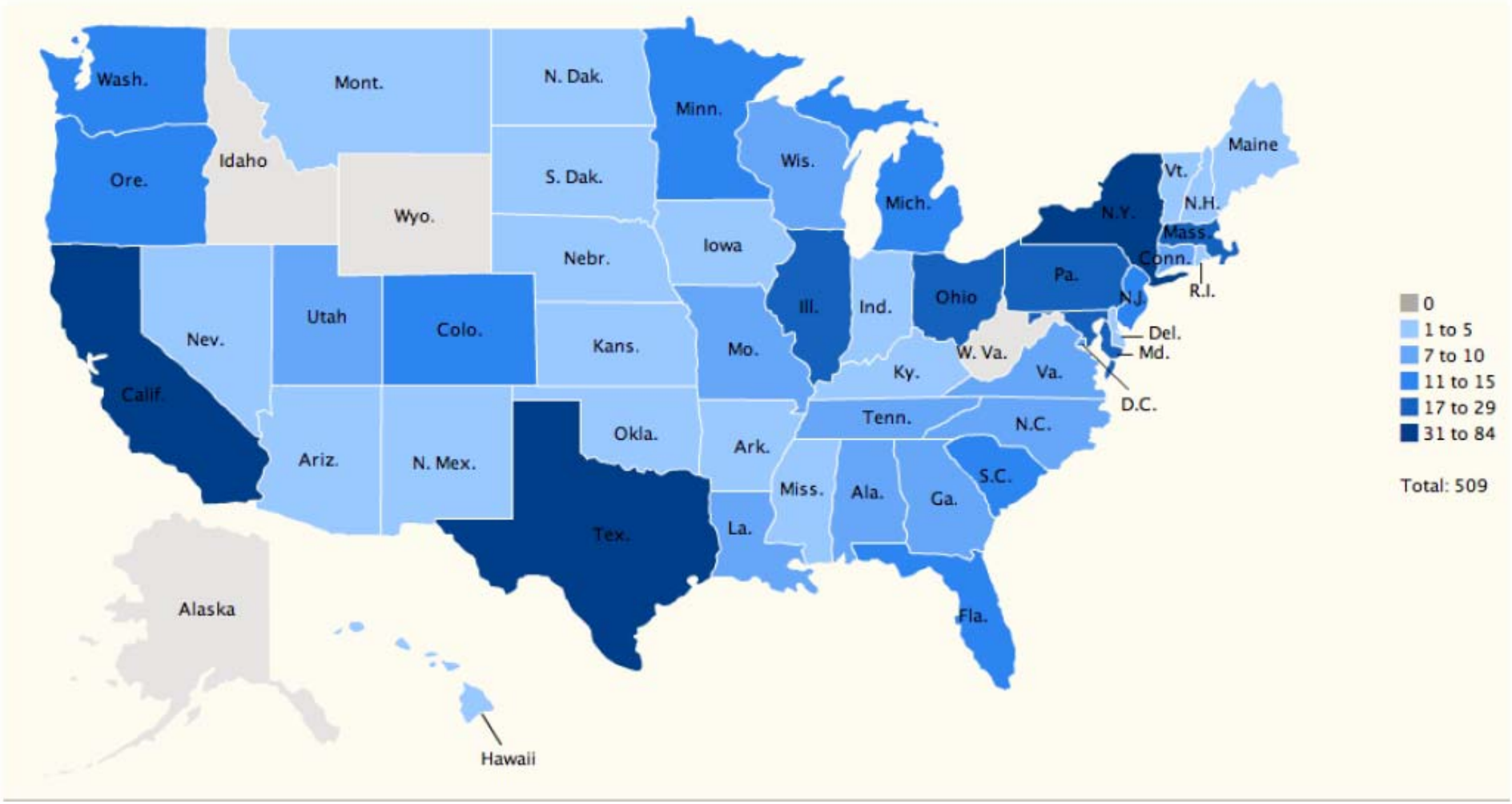


Genetics Workforce Study: Conclusions (1)

The medical genetics workforce situation is critical!

- Current clinical services workforce not expected to meet patient care needs in next 5-15 years
- Serious mismatch exists between expansion of knowledge and workforce size
- Young physicians not entering field
  - Competition expected to increase with emerging national physician shortage
- Many states (≥17) and parts of US have inadequate supply of MD clinical geneticists to meet demand
  - Metabolic genetics physicians are the most critical need
- Issues of how MD geneticists work also a factor
  - Banbury Conferences II and III addressing this

Geographic Maldistribution of MD Geneticists



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The State of Our Metabolic Specialists

- At a time when expanded NBS is expected to detect 10,000 affected infants annually needing chronic disease management…
  - There are 200 metabolic physicians in USA
    - Some conditions so rare, only a handful of experts exist
  - This group is least able to expand services (2003 data)
    - 3/4 report practices "nearly full"
    - 20% expect to retire in next 5 years
  - States unable to expand NBS panels due to this shortage
    - (E.g., Michigan and West Virginia)
- Solutions need to take many approaches
  - Funding for training in S. 1858 (NBS legislation)
  - 1 ACMGF/Industry-sponsored MD fellowship position annually
  - Creation of Medical Biochemical Genetics ABMG certification
    - First of many Clinical Geneticist subspecialties

Banbury Conference on the Evolving Role of the Clinical Geneticist (2006)

- **Banbury I (October 2004):**
  - Sponsored by ACMG to discuss training of medical genetics physicians and recruitment strategies
- **Banbury II (February 2006):**
  - Convened by ACMG, with broad representation, to define the domain of medical genetics practice and develop principles that underpin this practice
  - Report with principles and recommendations forthcoming in *Genetics in Medicine*
    - Sets foundation for "Banbury III" (2008) to develop core competencies and curriculum for medical genetics training

Banbury II: Principles

1. Medical genetics is a primary medical specialty dedicated to the use and interpretation of genetic information to maintain and improve the health of individuals, their families, and their communities.

2. The primary medical specialty, as recognized by the American Board of Medical Specialties (ABMS), is comprised of board certified physician geneticists and clinical laboratory geneticists.

3. The purview of medical genetics services includes all of the following:
   a. Clinical and laboratory diagnosis, risk assessment, pedigree analysis, counseling, provision of therapy and longitudinal medical care
   b. Care to patients across the age spectrum and for conditions involving any organ system
   c. Patients and their families
   d. Practices and policies pertaining to public health and disease prevention

4. The rapid pace of discovery in medical genetics necessitates a dynamic approach to training and implementation of new paradigms of care.

Banbury II: Points to Consider
To facilitate quality care, optimize geneticists' skills and position field for the future (1)

1. Medical genetics services are best provided by a physician geneticist working together with a team of professionals, including clinical laboratory geneticists, genetic counselors and/or genetics nurses.

2. The realization of an integrated model is best achieved through establishment of a consolidated administrative unit that has equal status in the academic institution and/or health system with other primary medical specialties.

3. Medical geneticists should provide leadership in the responsible introduction of new technologies, their integration into medical care, and monitoring of outcomes. Current examples include:
   a. Prenatal and newborn screening for an expanding range of genetic conditions
   b. Application of genomic technologies to high throughput diagnostic testing
   c. Development and application of informatic approaches to incorporate genetic and genomic data into patient care
   d. Predictive testing to assess genetic risk of common disorders and to guide prevention and management
   e. Clinical applications of pharmacogenetics
   f. New approaches to therapy of inherited disorders

Banbury II: Points to Consider
To facilitate quality care, optimize geneticists' skills and position field for the future (2)

4. Genetics training and certification should recognize the competencies expected of medical geneticists as well as the rapid pace of change of the discipline.

5. The medical genetics community should actively promote its services and educate colleagues in other specialties and should facilitate the integration of genetics into medical and public health policy and practice.

6. Medical genetic services must be made accessible to the entire population.

7. The medical genetics workforce must be increased to meet current and anticipated needs.

8. To prepare for the future practice of medical genetics, training and continuing education programs should include substantial exposure to molecular and population genetics, epidemiology, and bioinformatics.

9. The pool of trainees who enter the field of medical genetics must be increased and broadened, and training pathways and the certification process must be aligned with this goal.

In Conclusion:
Getting to Where We Need to Be From Here

- Opening the medical geneticist tent to expand workforce
  - Increasing joint training programs and clinical genetics subspecialties
  - Re-aligning medical genetics training to reflect emphasis on common traits and genetic healthcare over the lifespan
- Being aware of how genetic services will be distributed in healthcare, based on complexity
  - Roles of primary care and specialty care
  - Roles of consumer genetics and personalized medicine movements
- Positioning the profession to:
  - Provide adequate clinical support in a range of service settings
  - Adapt medical student education to future genetics needs
  - Welcome new practice and training modalities and paradigms
  - Anticipate future needs and develop tools to address these