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The Challenge of Maintaining our Physician-Scientist Workforce
(Rare Breed/Endangered Species): Epidemiology & Anecdotes

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The Challenge of Maintaining our Physician-Scientist Workforce
(Rare Breed/Endangered Species)

Epidemiology & Anecdotes

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Disclosure

- I have no actual or potential conflict of interest in relation to this program/presentation.
Outline

- Who makes up the P-S workforce?
- What are their demographics?
  - Age
  - Gender
  - Race/Ethnicity
  - Specialty
- What Challenges do P-S face?
History

1979: James Wyngaarden, NIH Director - rang warning bells that PS with medical degree was ‘an endangered species’ (*NEJM*)

1996: ‘Nathan Committee’ to address perceived shortfall of PS. Recommended career development grants and LRPs to offset PS education debt and encourage research careers.
Physician-Scientist – Who are they?

- Scientists
- With professional degrees
- With training in clinical care
- Engaged in independent research (basic or clinical)
- MD, DO, DDS, DVM ± PhD
- (Not necessarily simultaneous efforts)
- “Bridge” – Bench ↔ Bedside
Size and Composition

- Numbers hard to capture
- NIH-funded workforce
- ‘Invisible’
  - Industry
  - Non-NIH funded
  - Unfunded
- 2 categories:
  - Clinical research with patients in practice
  - Laboratory-based research

NIH PSW-WG, 2014
P-S Pool is Decreasing

Figure 3.1. Number of Physicians Reporting Medical Research, Medical Education as Primary Practice Areas (2003-2012)

SOURCE: Those MD-holding Physicians that indicated they were in primarily Medical Education or Medical Research from the American Medical Association (AMA) Physician Masterfile Annual Year-end Snapshots.

AMA data from NIH PSW-WG, 2014
Pipeline

If 100 start here

MD/PhD students (22–30 yrs old)
Residents and fellows (30–35 yrs old)
Holding Zone (35–40-yr-olds who are neither fellows nor faculty)
Junior faculty (40–44 yrs old)

Attrition (10%–15%)
Attrition (?%)
Attrition (?%)
Attrition (?%)

< 100 finish here (R01)

J Clin Invest 2015 Oct 1;125(10):3742-7
Pipeline: NIH P-S Pathway

MEDICAL/DENTAL/NURSING/VETERINARIAN SCHOOL

CLINICAL TRAINING, FELLOWSHIP, RESIDENCY, APPOINTMENTS

T32 · T35 · F30 · F31

T32 · F32

LRP · K08 · K23 · K12/KL2 · K99/R00

INDEPENDENT INVESTIGATOR

JUNIOR FACULTY

SENIOR FACULTY

RPG · R01

INDUSTRY RESEARCH

• Mentoring
• Exposure
• Education

• Time
• Mentoring
• Debt
• Regulatory Requirements

• NIH Success rate
• Demands on time
• Institutional support

CLINICAL PRACTICE

OTHER ACADEMIC OR GOVERNMENT RESEARCH ROLES

NIH PSW-WG, 2014

University of Massachusetts Medical School
P-S Pool is Aging

- Age profile has increased over past decade.
  - Decline 31-60 years
  - Increase ≥60 years

NIH PSW-WG, 2014
NIH Funded P-S Pool is Aging

- Average Age of P-S with NIH RPGs (Research Project Grants) has increased
  - Decline 31-50 years
  - Increase ≥50 years

NIH PSW-WG, 2014
Average Age of First Time RPG Awards Increasing

Figure 3.11. Average Age of First-time NIH Research Project Grant Awardees, PhD, MD, and MD/PhD Degree (FY1999-2012)

- MD
- PhD
- MD/PhD

FISCAL YEAR

NIH PSW-WG, 2014
P-S Pool is Aging

- Longer training times
- Higher grant success rates for established investigators
- Postponement of retirement
Unequal Participation by Women

- 42% F MD/PhD Grads
- Gender gap with entrance into and promotion in AMC

AAMC, 2013-2014
Unequal Participation by Women

- Large difference in number of M and F applicants.

- No difference in NIH RPG award rates by gender.

NIH PSW-WG, 2014
Unequal Participation by Women

- Work – Life Balance
- Women still share disproportionate burden for family care responsibilities
  - Child-bearing
  - Start of Lab
- Boundaries
### Unequal Participation by Minorities

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>US Population*</th>
<th>NIH Applicants†</th>
<th>NIH Awardees†</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>64%</td>
<td>70%</td>
<td>74%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>16%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>African Am</td>
<td>12%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Asian</td>
<td>5%</td>
<td>23%</td>
<td>20%</td>
</tr>
</tbody>
</table>

* Wikipedia (Demography of the United States)
† NIH PSW-WG, 2014
(rounded to nearest whole numbers)
Unequal Participation by Minorities

- Sig growth of Asian and Hispanic awardees
- Less growth of African-American and Native Am
Disparities by Specialties

- 5 career groups:
  1. Medical Specialties (Allergy, Cards, Derm, GI, Neuro)
  2. Surgical specialties (Surg, Urol, Ophtho, Otolaryn)
  3. Other (Phys Med & Rehab, Psych, Other)
  4. Primary care (FP, IM, OBG, Peds)
  5. Hospital-based (Anesth, ED, Path, Rad)
Challenges

- **Financial**
  - **Individual:**
    - Increasing education cost & training length - ↑ Debt
    - MD vs MD/PhD
    - ↓ Income Potential
  - **Institutional:**
    - Certainty of Clinical Revenue – Salary support
    - Uncertainty of Research Funding – Expensive hobby
  - Funding Environment
Challenges

• Time
  – Increased training length
  – All things to all people? – mission tensions
  – Pressures related to finances
  – Work-life balance
  – ‘Tyranny of the Urgent’

• Timing
  – Start clinical care, lab, & family and lab
  – Age out of young investigator perks
Challenges

• Confidence
• Contribution
• Competitiveness
  – RVUs
  – Grants
  – Reviewer perceptions
• Competence
• Coaching (mentors; protectors)
Rewards

• The Bridge
• Personal satisfaction
  – Greater good, more than the individual
  – Intellectual stimulation
  – Thrill of discovery
• Perseverance, tenacity, grit
• Future leadership relevance
Summary

• PS are a rare breed/endangered species.
• PS workforce is aging.
• Women and minorities are underrepresented.
• The challenges are numerous.
• The rewards are great.
• We need to redefine the PS and address supports.
DEAN - Summary

• Value of Physician-scientists remains central to mission of academic medicine

• Challenges have stabilized but require ongoing affirmative efforts

• Specific purposeful mechanisms must be developed to ensure ongoing viability of physician-scientist role