

The MD/PhD Faculty Member

**November 3, 2007
SAAC/AAPD
Washington, D.C.**

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University of Colorado Denver
School of Medicine**



The MD/PhD Faculty Member

Do MD/PhDs result in enhanced research?

Can MD/PhDs result in enhanced research?

Does Anesthesiology get its fair share of MD/PhDs?

What can we do to enhance our research programs with MD/PhDs?



Do MD/PhDs result in enhanced research?

NIH-sponsored Medical Scientist Training Program

Started with 3 in 1964, as of 2005 listed 41

118 of 126 medical schools have MD-PhD programs

Despite this apparent 'endorsement', not much evidence that it helps.

We have no specialty-specific data.

Much anecdotal belief (e.g., R. Traystman)

MD/PhDs perform poorly compared to MDs (burned out)

Still must do a post-doctoral fellowship, just like an MD

Why not train physician-scientists in the European model with an extended, intense post-doc and confer a PhD after that?



Can MD/PhDs result in enhanced research?

To answer this question we need to examine recent data regarding the medical science workforce :

JAMA

The Physician-Scientist Career Pipeline in 2005

Build It, and They Will Come

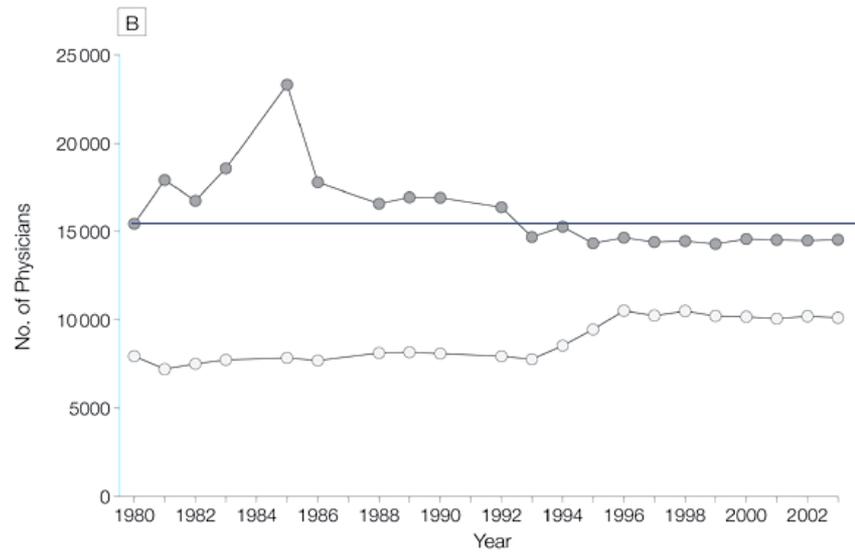
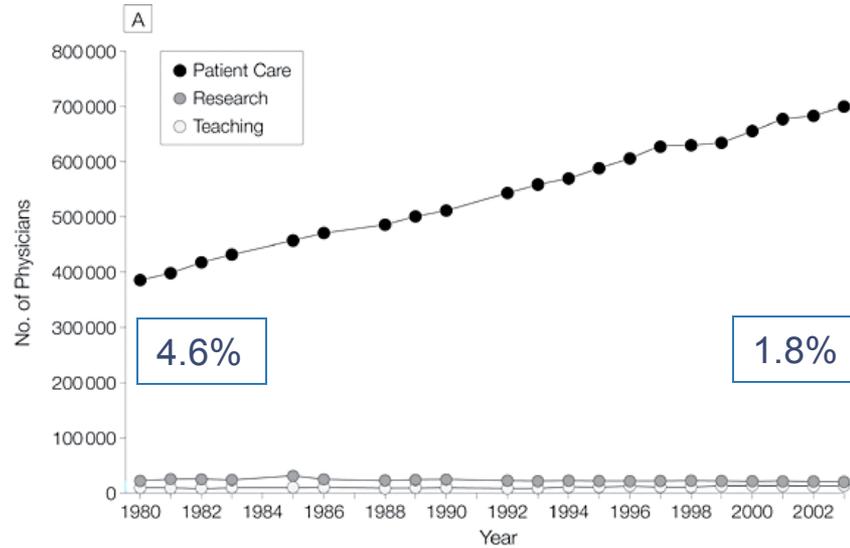
Timothy J. Ley, MD and Leon E. Rosenberg, MD

JAMA. 2005;294:1343-1351.

Composition of the Physician Workforce in the United States, 1980-2003



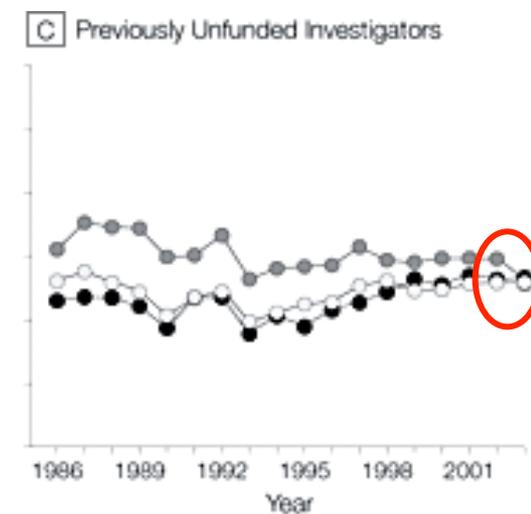
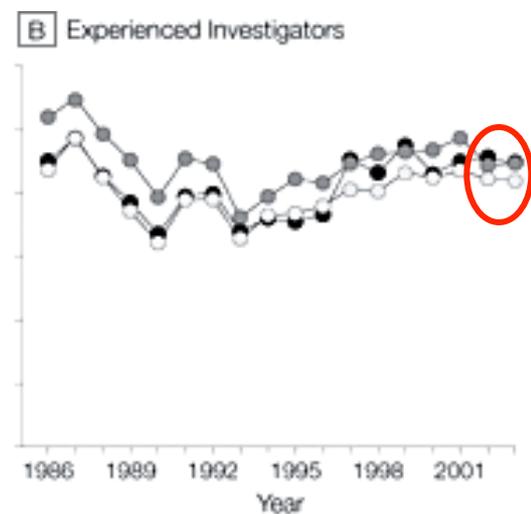
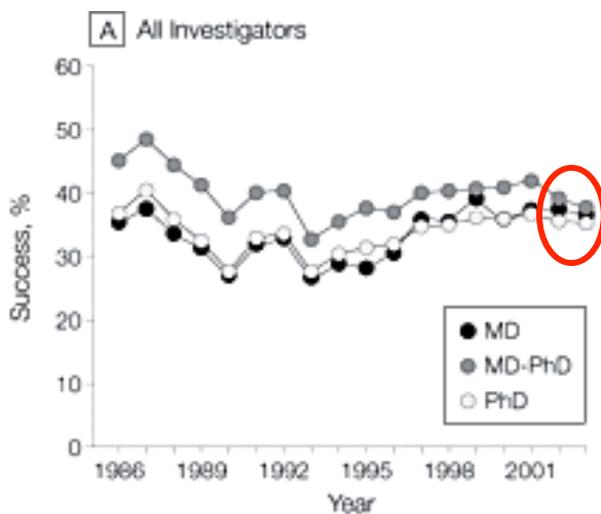
Ley, T J and Rosenberg, LE JAMA 2005;294:1343-1351.

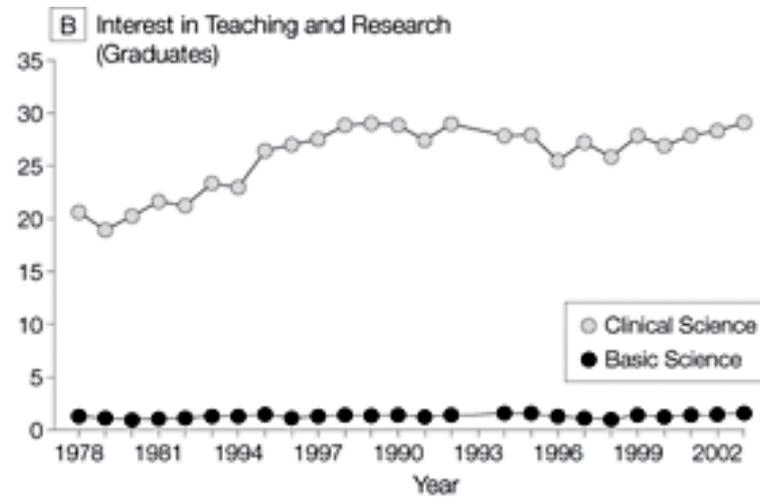
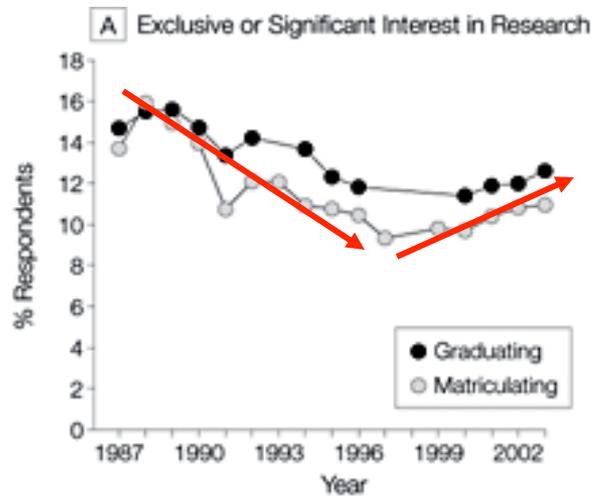


NIH RPG Funding Success Rates for MD, MD-PhD, and PhD Investigators, 1985-2003



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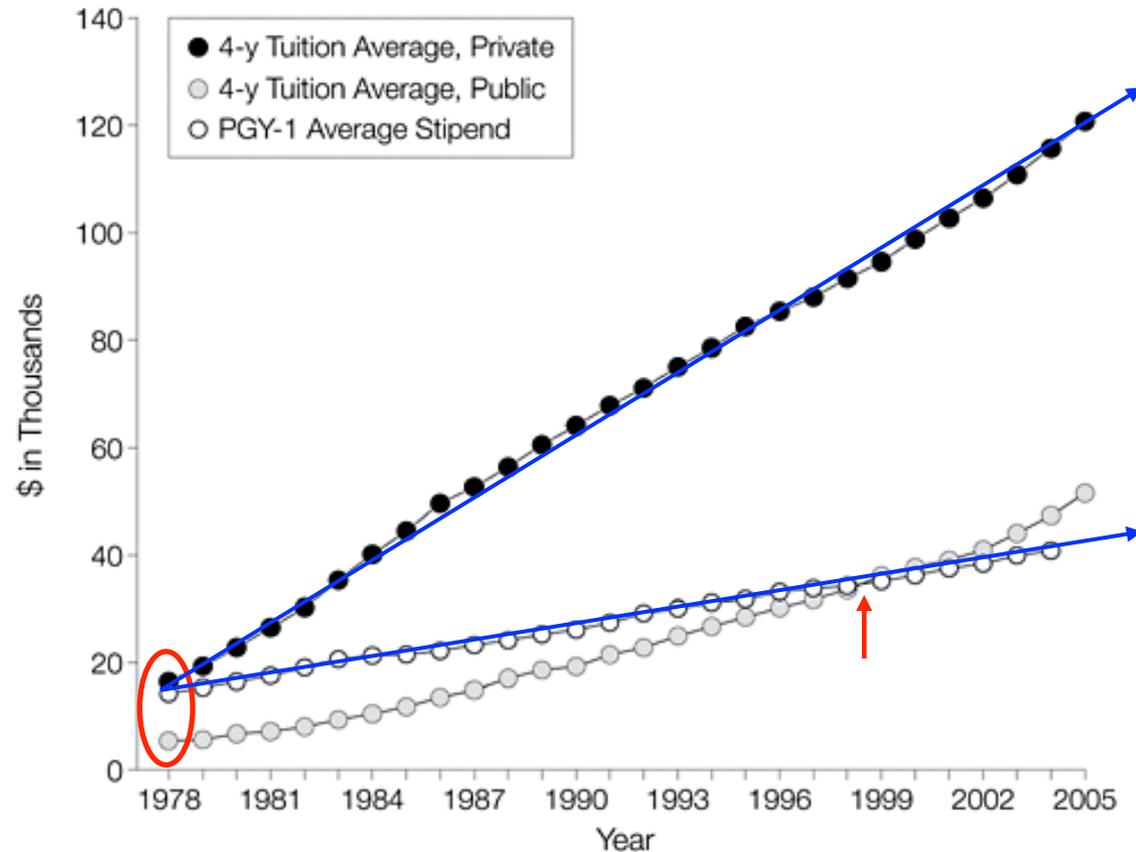
Ley, T. J. et al. JAMA 2005;294:1343-1351.

Average 4-Year Medical School Tuition Costs Compared With Average Postgraduate Year 1 (PGY-1) Wages, 1977-2004



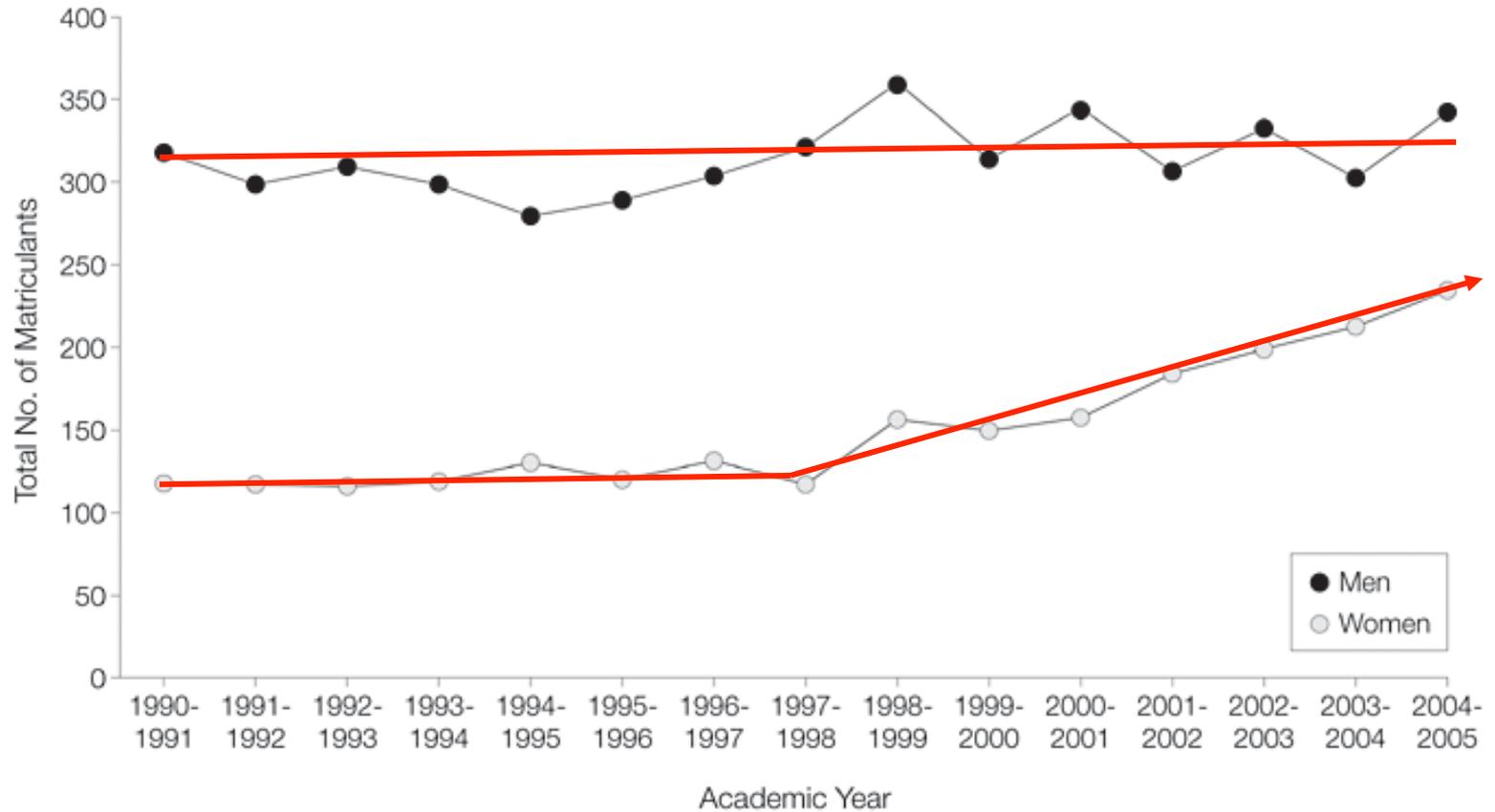
Median debt Private
>\$130,000

Median Debt Public
>\$100,000



Ley, T. J. et al. JAMA 2005;294:1343-1351.

Numbers of Matriculating MD-PhD Students in the United States, 1990-2004



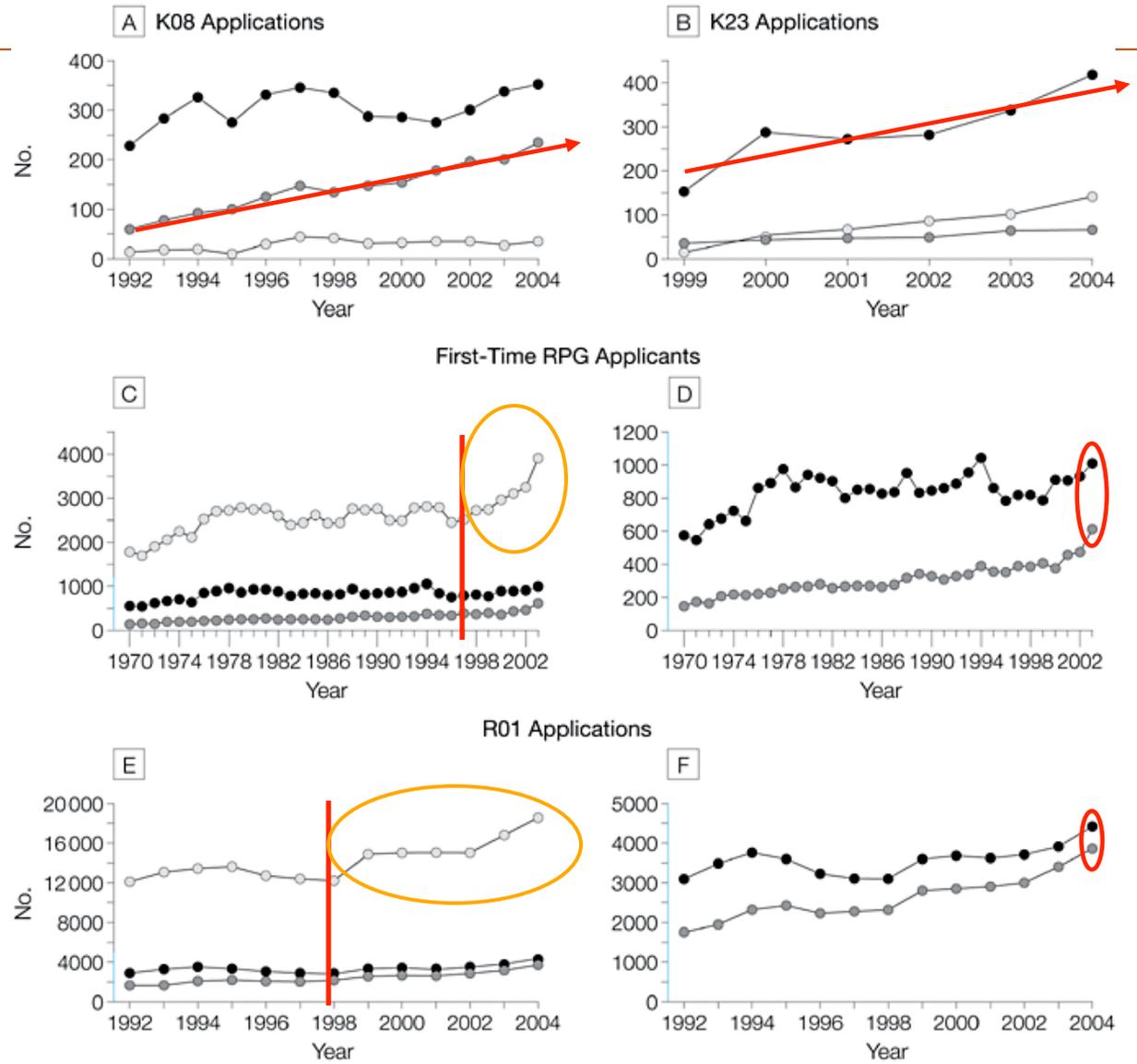
Ley, T. J. et al. JAMA 2005;294:1343-1351.

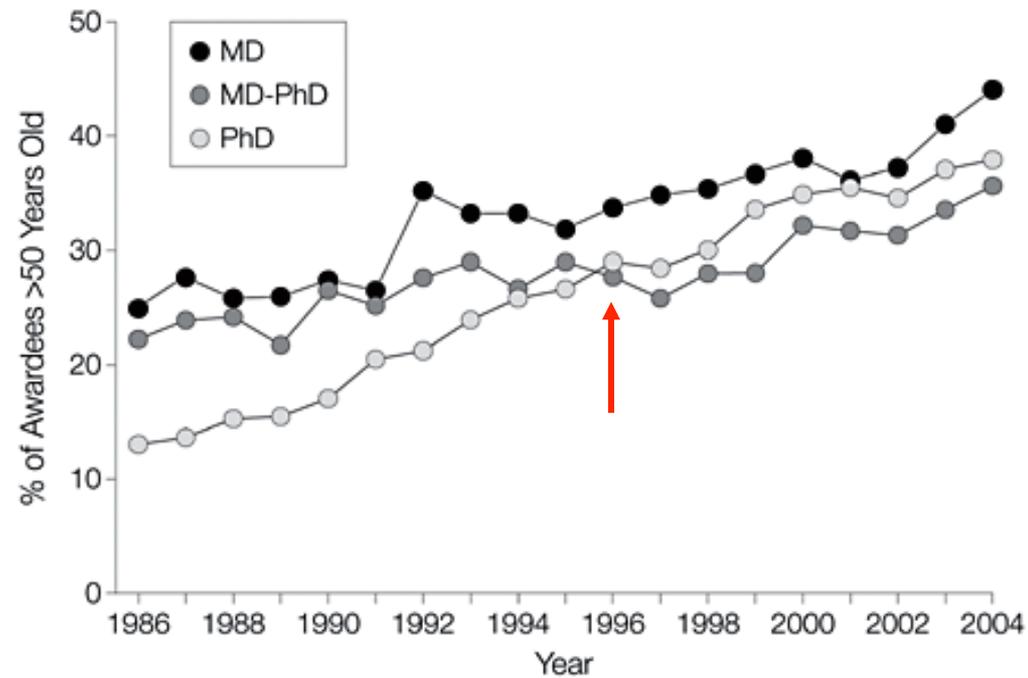
Application Trends for NIH Grants



Ley, T. J. et al. JAMA 2005;294:1343-1351.

Applicants
● MD ● MD-PhD ○ PhD





Ley, T. J. et al. JAMA 2005;294:1343-1351.



Table 1

Demographic Characteristics and Background of 492 Students in 13 MD-PhD Programs, by Program Size, 2003

Characteristic (measure)	All programs	Program size*			P value [†]	Test
		Small	Medium	Large		
No. students	492	74	179	239		
Average age (years ± SD)	26.6 ± 3.1	26.6 ± 2.7	26.3 ± 3.0	26.8 ± 3.4	NS	ANOVA
Women (%)	32.3	36.5	29.1	33.5	NS	χ ²
Minority (%)	11.4	13.5	10.6	11.3	NS	χ ²
>1 year of prior research (%)	29.7	39.2	23.5	31.4	0.03	χ ²
Program length (years ± SD)	8.0 ± 0.9	7.8 ± 0.8	8.0 ± 0.8	8.1 ± 1.1	NS	ANOVA
Full funding (%)	79.9	83.8	93.3	68.6	<0.001	χ ²
>\$50,000 debt (%)	9.8	12.2	5.6	12.1	NS	χ ²

* Small programs (n = 6) had fewer than 50 students (range 8–32); medium programs (n = 4) had 50 to 100 students (range 60–93); large programs (n = 3) had more than 100 students (range 138–161).

† NS = not statistically significant at P > 0.05.



Table 2

Opinions of 492 MD-PhD Students on Definition of the Physician-Scientist Model and Distribution of Professional Time

Question	All (n = 462): % agree/ disagree	Surgery (n = 393): % agree/ disagree	Nonsurgery (n = 69): % agree/ disagree	P value
1. A physician-scientist holds at least an MD and performs research as his/her primary professional activity	59.3/26.2	49.3/36.2	61.8/23.7	<0.05*
2. Being "successful" as a researcher requires more than 50% of one's professional time	74.4/15.0	53.6/27.5	79.1/12.7	<0.001*
3. Being "successful" as a clinician requires more than 50% of one's professional time	30.9/47.8	33.3/47.8	31.6/47.8	NS*
	$P < 0.001^\dagger$	$P < 0.01^\dagger$	$P < 0.001^\dagger$	

* Comparison of chi-square statistic between surgery and nonsurgery groups; NS = not statistically significant at $P > 0.05$.

† Comparison of chi-square statistic between questions two and three.



Table 3

The Views and Attitudes of 96 Students in the Combined Degree Program (MD-PhD) on Being a Physician-Scientist, University of Pennsylvania School of Medicine, 2002

Statement	% of students who		
	Agreed	Were neutral	Disagreed
The physician-scientist model			
The primary goal of a physician-scientist should be to bridge the gaps between basic science and clinical medicine	83.4	11.5	5.2
Job opportunities for physician-scientists appear promising	78.1	21.9	0.0
MD-PhD programs are the best way to train physician-scientists	67.7	22.9	9.4
★ The majority of physician-scientists are <i>not</i> MD/PhDs	64.6	13.5	21.9
I intend to become a physician-scientist	60.4	29.2	10.4
The number of physician-scientists being trained needs to be increased	47.9	41.7	10.4
★ An MD-PhD graduate <i>should</i> become a physician-scientist	33.3	35.4	31.3
Importance of time in being a researcher and a clinician			
Being "successful" as a researcher requires more than 50% of one's professional time	82.3	9.4	8.3
Being "successful" as a clinician requires more than 50% of one's professional time	47.9	21.9	30.2

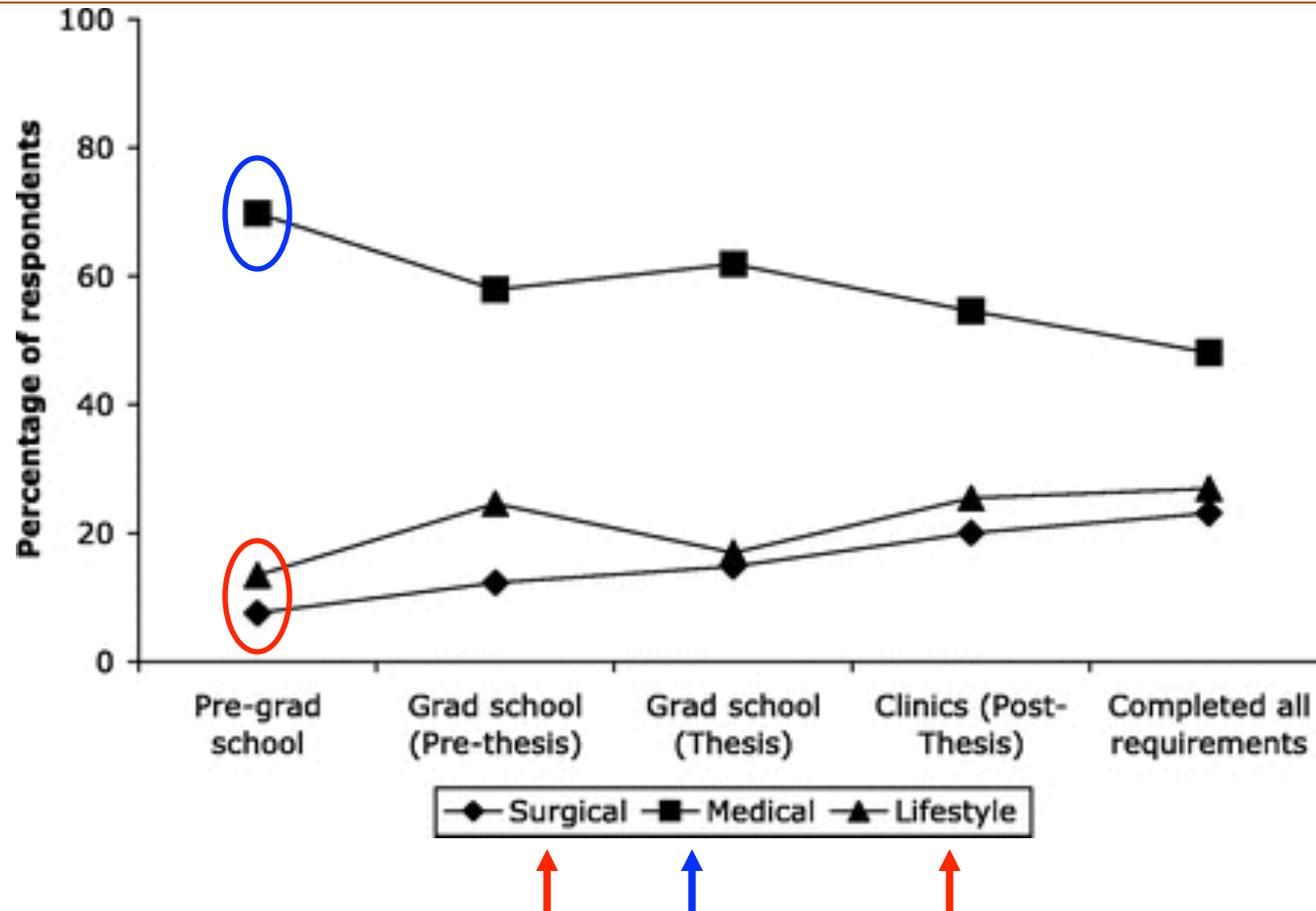


Figure 4 MD-PhD students' future residency goals. Students' primary clinical interests (grouped according to surgical, medical, or lifestyle) are reported as percentages of all respondents at each stage of training.



Can MD/PhDs result in enhanced research?

Their much lower rate of debt is an increasingly important factor.

Similar to Foreign-trained Clinician-Scientists

Look at FAER and our journals to see their influence in research

Late selection of specialty is a plus and can be exploited.

Better success rate in obtaining R01s than MDs

Do it at a younger age.

May reflect the growing complexity of Biomedical Research and the MD/PhD's ability to cross disciplinary lines to collaborate.



Does Anesthesiology get its fair share of MD/PhDs?



"While we have only a small piece of the pie, we own the whipped cream."

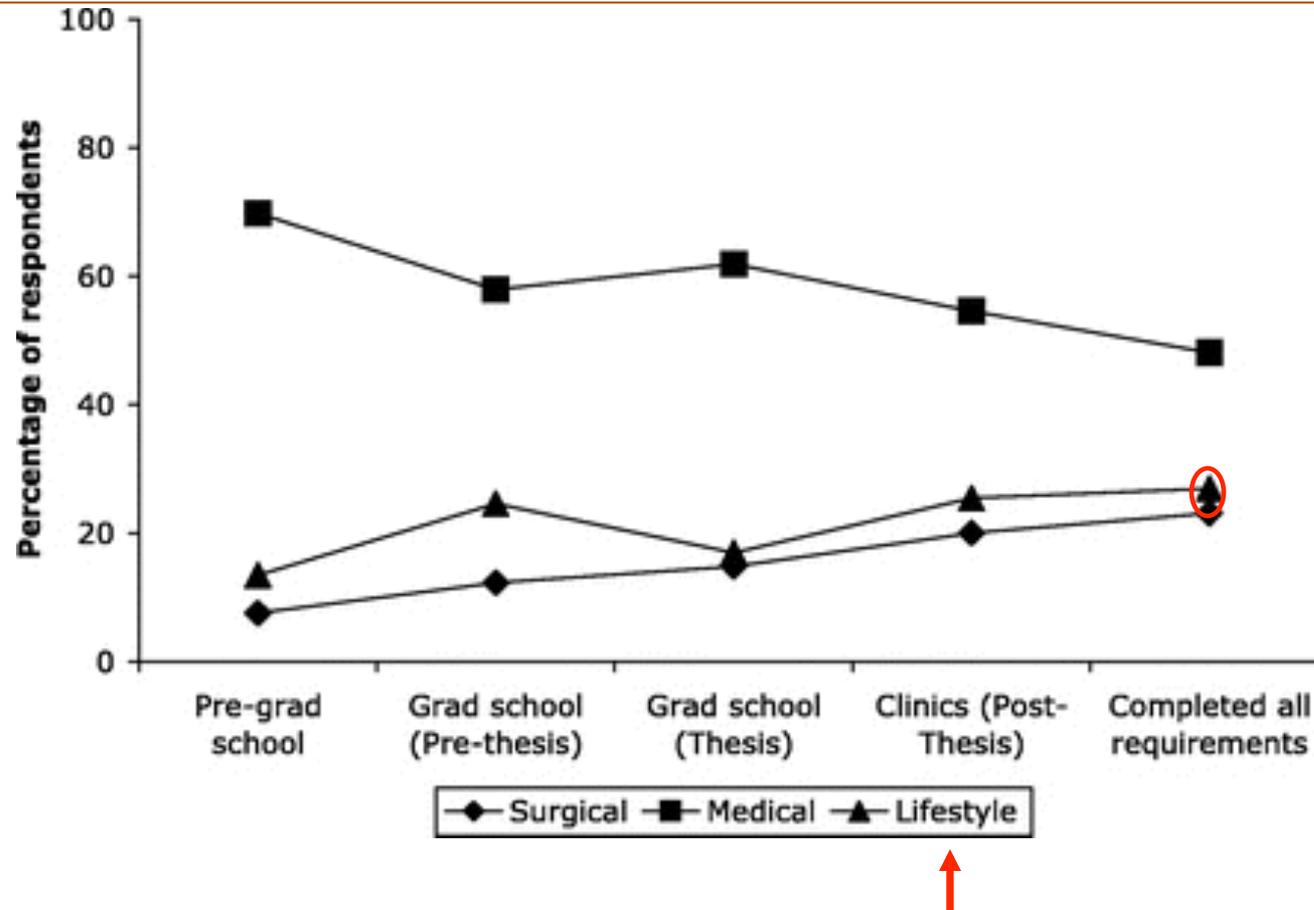


Figure 4 MD-PhD students' future residency goals. Students' primary clinical interests (grouped according to surgical, medical, or lifestyle) are reported as percentages of all respondents at each stage of training.

Table 2

The Primary Clinical Interests of 92 Students in the Combined Degree Program (MD-PhD) and the Factors in Determining These Interests, University of Pennsylvania School of Medicine, 2002

Watt et al. Acad Med 80:193-8, 2005

Primary clinical interest	% students	% recent graduates*	Factor in determining primary clinical interest	% of students who rated factor extremely important
Internal medicine	21.7	23.1	Interest in clinical subject matter	72.6
Neurology	10.9	7.7	Gut feeling	56.8
Pediatrics	9.8	16.9	Field or type of research interest	56.8
Pathology	8.7	7.7	Personal/family issues	54.7
Dermatology	5.4	10.8	Faculty/role models in a clinical setting	35.1
Radiology	5.4	3.1	Hours worked	34.7
Obstetrics-Gynecology	5.4	1.5	Protected time for academic activities	31.6
Otolaryngology	4.3	4.6	Social dynamics of the field	21.1
<u>Anesthesiology</u>	4.3	0.0	Procedures performed	21.1
Ophthalmology	3.3	9.2	Availability of funding for academic activities	21.1
Psychiatry	4.3	4.6	Faculty/role models outside of a clinical setting	18.9
Emergency medicine	3.3	0.0	Residency program length	17.9
General surgery	3.3	0.0	Opinions of mentors	13.7
Orthopedic surgery	3.3	0.0	Earning potential	12.6
Other residency	3.3	0.0	Need for more physician-scientists in a field	9.5
Neurosurgery	2.2	0.0	Ease of obtaining a residency position	6.3
No residency	1.1	4.6	Prestige	3.2
Radiation oncology	0.0	6.2	Opinions of other students	3.2
Family medicine	0.0	0.0	Need for more clinicians in a field	2.1
Plastic surgery	0.0	0.0	Matching patterns of students at your school	1.1
Rehabilitation	0.0	0.0		
Urology	0.0	0.0		

* Students who graduated from the Combined Degree Program at the University of Pennsylvania School of Medicine between 1998 and 2002.



What can we do to enhance our research programs with MD/PhDs?

Our fair share of MD/PhDs should be at or, optimally, well above the current 8% of graduating medical students selecting anesthesiology.

- It is clearly less than that.**
- This is probably also a surrogate marker for the number of MDs with research interests selecting anesthesiology (it's low).**

The first item of business is to attract more MD/PhDs (less debt, better(?) prepared for grant success).

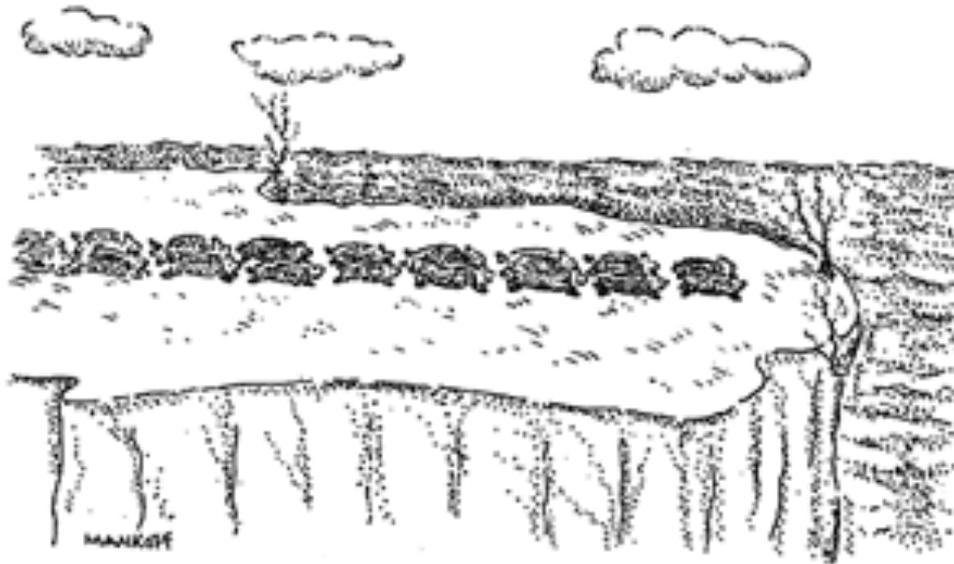
- and by extension, MDs with research interests.**

The second item of business is to keep them in a research continuum throughout residency.



Keeping them in Research

© Cartoonbank.com



"Look, I have my misgivings, too, but what choice do we have except to stay the course?"



Keeping MD/PhDs in research

Get them committed early.

- Virginia Apgar Scholarship (Columbia)
- Henry Beecher Scholarship (MGH)
- Robert Virtue Scholarship (Colorado)
- Research Scholarship (Oregon)





Department of Anesthesiology Columbia University



[Home](#)

Virginia Apgar Society



We wish to continue to attract students who want to be terrific physicians - the clinical training at Columbia is second to none given the case mix of the hospital; however, in addition a major part of our role is to train physicians not only for private practice but to be cutting edge master clinicians within the academic medical center. Quite simply, our goal is to attract medical students who know they want to remain in academic medicine - and to enter either clinical subspecialty or research fellowships following residency. To that end, in November 2002 we instituted the Virginia Apgar Scholars Program. Medical students commit to either a two year clinical or research fellowship program following residency - they have to designate whether they wish to be a clinical or basic science scholar. Basic Science Scholars will enter our NIH T32 program. They become members of the Virginia Apgar Society, are on the committee to select the Virginia Apgar Annual Lecturer, and receive a \$15,000 annual supplement during their CA1, CA2, and CA3 years. In 2003 during the NRMP match, we received 15 applications and selected and matched with 3. It is of interest that three scholar applicants who were not accepted for the scholars program (but whom we liked) matched with us. In 2004, we had for the first time three Virginia Apgar Scholars entering the program, following their internships. In July 2007, we had 5 Apgar Scholars entering the program - the largest ever. Our total match complement is 24, so this is a small but special part of our residency program

Commit to either a two year clinical or research fellowship



- Greetings from the Chairman
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- Rounds & Conferences
- Faculty
- Research
- Electives
- Virginia Apgar Society
- NIH T32 Research Fellowship
- Medical Student Teaching
- Pain Center
- Patient Education
- Clinical Information

Virginia Apgar Society Members



Margaret Wood, MD
(Honorary President)



Rebecca Bauer
2007



Connie Chung
2007



May Hua
2007



Sarah Smith
2007



Steven Yap
2007



Christopher Gay
2006





Keeping MD/PhDs in research

Get them committed early.

- Virginia Apgar Scholarship (Columbia)
- Henry Beecher Scholarship (MGH)
- Robert Virtue Scholarship (Colorado)
- Research Scholarship (Oregon)

Announces to MD/PhDs that your department (and specialty) is committed to developing young researchers.

Identifies a subset of residents as research-committed.

Motivates faculty to properly tend to these residents' careers (they're making an investment).

- Stresses mentorship from the get go

Commits the resident scholar to plan their research development.

Creates opportunities for mentorship and collaboration outside the department, the importance of which is a whole other topic in itself

Promise of two years as junior faculty just might be enough of a commitment to keep them with you to form the next generation of physician-scientists for your department.



Keeping them in research

May need to restructure our residencies to accommodate a research track.

One reason listed from the Penn study as important to MD/PhD students in selecting a specialty was protected time for research.

Other specialties have created separate research training tracks with reduced clinical training and a major commitment of time for research.

only for physicians who intend to seriously pursue a career in basic science or clinical research.

design an appropriate training plan that will provide an adequate clinical experience

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renew
your certification

take the
exam
your complete guide

improve
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with PIMs



The Research Pathway is an integrated program that combines training in research with training in clinical internal medicine and its subspecialties. This pathway is recommended only for physicians who intend to seriously pursue a career in basic science or clinical research. Physicians who are interested in teaching or practicing internal medicine should pursue the standard three years of internal medicine training.

Prospective planning for the research pathway by trainees and program directors is necessary. The training experience of all physicians in this pathway will be documented through the Board's tracking program. Because this pathway integrates research and training in internal medicine, with or without subspecialty training, entry implies a commitment to its completion.

- ▶ Planning
- ▶ Responsibility for Training
- ▶ Training
- ▶ Examinations
- ▶ Impact of Changing from the Research Pathway

Planning

▲ Top

Trainees interested in a research career should work with their residency program director and research mentor to design an appropriate training plan that will provide an adequate clinical experience and meet the Board's requirements. Ideally, planning for this pathway should occur during PGY-1, and the Board must be notified through its tracking program of a trainee's intention to pursue such training by Spring of PGY-2.

Responsibility for Training

▲ Top

The internal medicine program director must be in support of a resident's request to pursue the research pathway.

ABIM requires that candidates for Certification in internal medicine are competent in: (1) patient care (medical interviewing, physical examination and procedural skills), (2) medical

Trainees in the subspecialty research pathway must be certified in internal medicine to be eligible to apply for Certification in a subspecialty. Subspecialty research trainees may be admitted to the Certification examination in internal medicine in the summer of PGY-4, as long as two required years of accredited training in internal medicine have been completed satisfactorily.

The ABIM Certification examination and the Board certificate are the same for all Board candidates whether they pursue the research pathway or standard internal medicine training.

→ **Internal Medicine Research Pathway**

Need Header Title	Need Header Title
Internal medicine training (Direct patient responsibility 20 months)	24 months
Research training (80%)	36 months
Ambulatory clinics during research training (10%)	1/2 day per week
Additional clinical training during research (10%)	May be intermittent or block time
Total training	5 years
Internal Medicine examination	Summer, R-5

Certification Examination in a Subspecialty

A subspecialty examination may be taken in the fall of PGY-6 (allergy and immunology; critical care medicine; endocrinology, diabetes, and metabolism; geriatric medicine; hematology; infectious disease; nephrology; medical oncology; pulmonary disease; or rheumatology) or in the fall of PGY-7 (cardiology, gastroenterology, hematology/oncology, pulmonary/critical care, or rheumatology/allergy and immunology). At the time of application, documentation will be required that the resident will be in full-time residency training or in a position with 80 percent involvement in mentored research for the duration of the year.

To reiterate, the ABIM subspecialty examinations and the Board certificates are the same for all Board candidates whether they pursue the research pathway or standard subspecialty training.

care medicine; endocrinology; diabetes; and metabolism; geriatric medicine; hematology; infectious disease; nephrology; medical oncology; pulmonary disease; or rheumatology) or in the fall of PGY-7 (cardiology, gastroenterology, hematology/oncology, pulmonary/critical care, or rheumatology/allergy and immunology). At the time of application, documentation will be required that the resident will be in full-time residency training or in a position with 80 percent involvement in mentored research for the duration of the year.

To reiterate, the ABIM subspecialty examinations and the Board certificates are the same for all Board candidates whether they pursue the research pathway or standard subspecialty training.

→ **Subspecialty Research Pathway**

Need Header Title	Need Header Title
Internal medicine training (Direct patient responsibility 20 months)	24 months
Subspecialty clinical training	12 to 24 months*
Research training (80%)	36 months
Ambulatory clinic during research training (10%)	1/2 day per week
Total training	6 or 7 years*
Internal medicine examination	Summer, R-4
Subspecialty/AQ examination	Fall, R-6 or 7*
* based on the subspecialty	

During internal medicine research training, 20 percent of each year must be spent in clinical experiences including a half-day per week in a continuity clinic.

During subspecialty research training, at least one half-day per week must be spent in an ambulatory clinic. Ratings of satisfactory clinical performance must be maintained annually for each trainee in the ABIM Research Pathway.



SUMMARY

Approximately 4% of medical students graduate with an MD/PhD

Not all are really interested in a research career.

MD/PhDs are more likely than MDs to:

- stay in academics (90% in the SAGE survey)**
- be able to collaborate with scientists in other disciplines**
- get an NIH K08 (as opposed to K23)**
- get an NIH RPG (e.g., R01) at a younger age; thus a more rapid road to success.**
- have less debt on graduation (similar to well-trained IMG)**
- stay away from anesthesiology**



SUMMARY

To succeed with MD/PhDs, and physician-scientists in general, our training programs need to:

- Think creatively about recruitment (data shows that a large number of MD/PhD students can be attracted away from their initial choice).**
- Start planning and mentoring the research of physician-scientists early in residency. Don't wait until they graduate.**
- Consider changes to anesthesiology residency training requirements for a research track (the RRC and ABA are not opposed to this)**

A person wearing a blue and red cycling jersey, black pants, and a red and white helmet is riding a mountain bike away from the camera on a dirt trail. The trail is surrounded by tall grasses and ferns, some of which are brown and dry. The background is a dense forest of trees with bright yellow autumn foliage. The text "The End" is overlaid in a yellow, cursive font on the back of the cyclist.

*The
End*