Post Graduate Training of Anesthesiologist-Scientists

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Disclosures:

None

Overview

Define the Challenge:
- Institutional challenges to research by anesthesiologists
- National level trends and history of concerns regarding Physician-Scientist and Anesthesiologist-Scientists

Opportunities:
- Increase in number of research-oriented applicants to anesthesiology programs

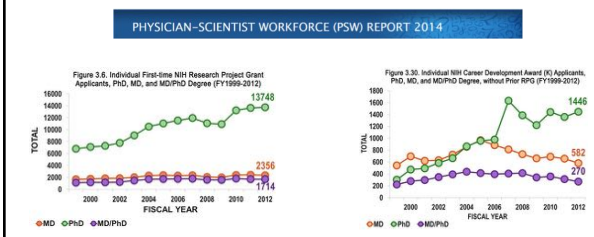
Programs for Training Anesthesiologist-Scientists at Washington University:
- Current programs
  ASAP and Scholar Tracks
- Mentoring structure
- Lessons learned to date

NIMH Director's experience with ~~perioperative care~~ surgery and related research

- Chronicles experience of healthcare, having a fracture surgically repaired
- Compares the tools for mental health to that of the orthopedist
- Discusses treatment of depression using ketamine
- Does NOT mention anesthesia care or anesthesiologist

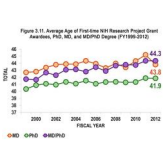
Additional cultural challenges

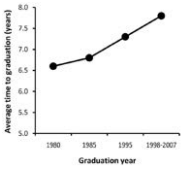
- What is the scope of research that is acceptable for an anesthesiologist?
- Need to collaborate and be accepted by other specialties (neurology, cardiology, psychiatry) for many lines of investigation
- Anesthesiology not seen as a viable path for aspiring physician-scientists
- Practice of anesthesiology poorly understood by other medical specialties

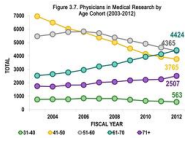


Small and not growing population of physician-scientists
- Smaller % of researchers and physicians and scientists
- Combined with growth of clinical workforce much smaller % of physicians

Age at first R01 Longer time to graduation for MD/PhD Physician-scientist age



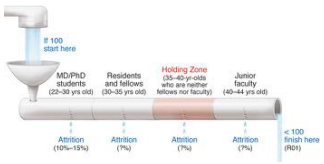




- Training taking longer/delayed independence
- Overall age of working physician-scientist older

Brass LF, Akabas MH, Burnley LD, Engman DM, Wiley CA, Andersen OS
Acad Med. 2010 Apr;85(4):692-701

Report from: Association of MD-PhD Programs Executive Committee



Action Items:

- Shorten the time to independence by at least 5 years
- Achieve greater diversity and numbers in training programs
- Better organize physician-scientist mentoring and oversight at all levels to reduce attrition

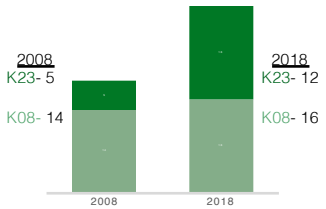
J Clin Invest. 2015;125(10):3742-3747. doi:10.1172/JCI84170

Physician-Scientist: Anesthesiologist-Scientist

2006

2007

Total active K08 and 23 awards in anesthesiology departments to clinicians 2008 vs 2018



Data from NIH Reporter 4/18

Obstacles

- Time in training increased
- Longer times to independence
- Financial disincentives
  - Debt burden
  - Delayed income
- External pressures on academic anesthesiology departments
- Aging population of working physician-scientists
- Scarcity of mentors within anesthesiology
- Difficult abrupt transitions between clinical and scientific training
- Ability to recruit medical students interested in research to anesthesiology

Opportunities

- Apparent marked increase in interest in research-oriented residency
- Sustained increase in research track applicants to anesthesiology
- Growing community of **e**arly **S**tage **A**nesthesiology **S**cholars (eSAS)
- Opioid abuse epidemic increased awareness and concern around pain management
- New technologies for tracking and quantifying patient trajectories

Washington University in St. Louis

Research tracks in our residency program:

- Scholars track
- Academic Scholars Advancement Program (ASAP)

ABA Innovative Education Proposal Guidelines and Requirements

Fellowship Level (CA-4) Training Requirements

- At most, three months of fellowship level training may occur during the CA-3 year.
- A minimum of nine months of clinical training must be completed during the CA-4 year of training.
- Physicians must be an ABA diplomate to qualify for admission to the Board's subspecialty examination system.

Scholars track

Research - ABA Requirements for Protected Research Time

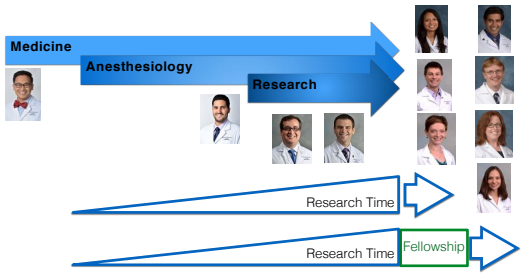
IEP that adhere to the following guidelines do not need additional Credentials Committee approval for this research curriculum:

- 36 months (three months in CA 1-2 years, six months in CA 3 year, nine months maximum total (25 percent of total time)
- 48 months (two months in CBY of anesthesiology-relevant research time, three months in CA 1-2 years, six months in CA-3 year; 11 months maximum total (23 percent of total time)
- 60 months (two months in CBY of anesthesiology-relevant research time, three months in CA 1-2 years, six months in CA-3 year, 12 months in CA-4 year (23 months, maximum total 38 percent of total time)

Scholars track

Year	PGY-1 (Intern)	PGY-2 (CA-1)	PGY-3 (CA-2)	PGY-4 (CA-3)	PGY-5	PGY-6
Curriculum	Anesthesiology rotation or Lab rotation/project planning	Core anesthesia rotations	Subspecialty anesthesia rotations (10 blocks) **Protected research (3 blocks)**	**Protected research (6 blocks)** Subspecialty anesthesia rotations (7 blocks)	Protected research or clinical fellowship	Protected research after clinical fellowship

Washington University Scholars Program

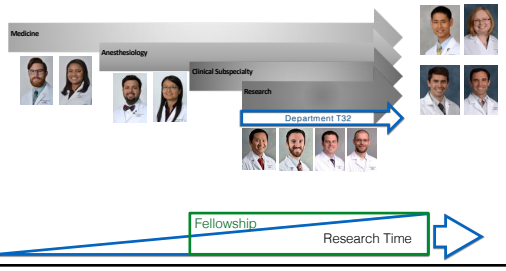


Academic Scholars Advancement Program [ASAP]

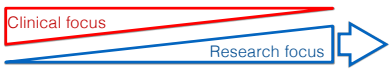
Washington University/BJH/SLCH Consortium Anesthesiology/Fellowship Program [0402811081]

Year	Anesthesia	CCM	100% Clinical Fellowship	80% Research + 20% Clinical Fellowship	Simulation	Medicine + Surgery + Emergency Medicine	Total Blocks (4 weeks)
PGY-1	2 (tutorial)	2			1	8	13
PGY-2	12	1					13
PGY-3	6	1	6				13
PGY-4			3	10			13
PGY-5				13			13
Total	20	4	9	23	1	8	65

Academic Scholars Advancement Program [ASAP]



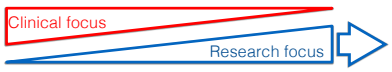
Approach to Mentorship



Clinical mentorship and monitoring:

- Promote and monitor clinical development
- Residency program and fellowship directors
- Assigned clinical faculty mentor
- Evaluation of milestone achievement
- Clinical simulation testing days

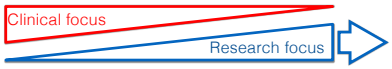
Approach to Mentorship



Research mentorship and monitoring:

- Early focus on identifying mentor and research interests
- Promote reading of literature to establish knowledge base
- Done by program director and assistant program directors at 6- month evals
- Primary mentors inside and outside of department based on research interests

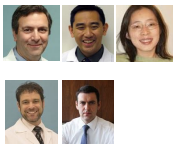
Approach to Mentorship



Scholarship oversight committee: Meet q6 months

Departmental Representation

Michael Avidan MBBS (clinical)
Alex Evers MD (basic)
Aaron Norris MD PhD(Assistant PD)
Ben Palanca MD PhD
Simon Haroutounian PhD (clinical)
Yu-Qing Cao PhD (basic)
Primary mentor for resident



Community

- Develop and maintain community of early stage investigators locally
- Connect junior and established investigators
- Build collaborations with other departments and early stage physician-scientists
- Support medical and MD/PhD students interested in anesthesiology

Community building for trainees

Started with monthly journal club/wip

- Difficult to maintain faculty and resident engagement
- Diverse research interests

Developed into 3 annual events for all research residents and recent graduates

- Fall Residency Research Retreat
  - Half day event with rapid-fire short presentations by interns and all residents that have had research time
- Interview and recruitment weekend
- Resident invited speaker

Matched Residents 2012-2018

Scholars track
Total: 11
MD/PhD: 5
Masters degree: 2
Women: 4
Men:7

ASAP
Total: 14
MD/PhD: 13
Masters degree: 1
Women: 3
Men:11

Outcomes 2012-2018

Scholars track
Graduates: 5
Fellowships: 7 of 7*
Faculty at WashU: 3 of 5
100% academic
100% of those completed clinical training had extramural funding

ASAP
Graduates: 4
Fellowships: required
Faculty at WashU: 4 of 4
100% academic
75% of those completed clinical training had extramural funding

Post graduation funding:
- IARS MTRG
- FAER MTGR
- FAER RFG
- K08
- PhARMA Foundation

Outcomes 2012-2018

Scholars track

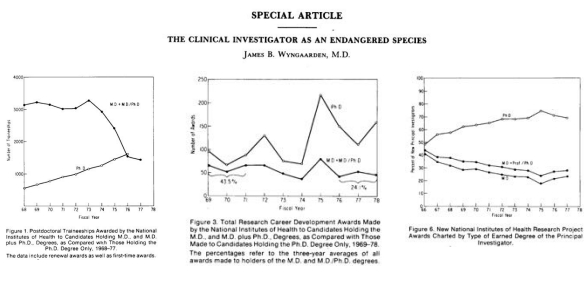
Fellowship Choices:
- Pain: 3 (1 Stanford)
- ICU: 1
- Peds: 1
- Neuro: 1
- Transplant: 1 (UCLA)
- CT: 1 (UCLA)
- AP/Regional: 1 (following research year)

ASAP

Fellowship Choices:
- Pain: 2
- CT: 2
- ICU: 2
- Peds: 1
- Transplant: 1

Lessons Learned

- Important to maintain close connection of resident, department and mentor
- Dynamic committee meeting based on progression
- Fluid transition from clinical training to research important
- Start early and closely monitor progression
- Need for clear milestones in both clinical and research domains
- Critical to carefully recruit candidates to accelerated pathways
- Flexibility is important
- High rate of clinical fellowships among those on the Scholars track



SPECIAL ARTICLE

THE CLINICAL INVESTIGATOR AS AN ENDANGERED SPECIES

JAMES B. WYNGAARDEN, M.D.

Figure 1. Postdoctoral Traineeships Awarded by the National Institutes of Health to Candidates Holding M.D., and M.D. plus Ph.D., Degrees, as Compared with Those Holding the Ph.D. Degree Only, 1968–78.
The data include renewal awards as well as first-time awards.

Figure 3. Total Research Career Development Awards Made by the National Institutes of Health to Candidates Holding the M.D., and M.D. plus Ph.D., Degrees, as Compared with Those Made to Candidates Holding the Ph.D. Degree Only, 1969–78.
The percentages refer to the three-year averages of all awards made to holders of the M.D. and M.D./Ph.D. degrees.

Figure 6. New National Institutes of Health Research Project Awards Charted by Type of Earned Degree of the Principal Investigator.

Retention of MD/PhDs in academics?

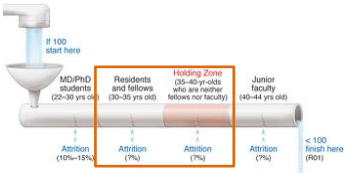
Residency Choice as a Predictor of Eventually Choosing Private Practice*

Department	MD–PhD program alumni		
	Total no.	No. in private practice	% in private practice
Family medicine	13	8	62
Emergency medicine	13	6	46
Dermatology	70	31	44
Ophthalmology	101	44	44
Radiology	69	28	41
Obstetrics–gynecology	26	8	31
Surgery	167	45	27
Anesthesiology	57	12	21
Physical medicine and rehabilitation	5	1	20
Internal medicine	578	93	16
Radiation oncology	27	4	15
Neurology	173	23	13
Pediatrics	243	32	13
Psychiatry	94	11	12
Pathology	226	17	8

* Summary of data provided by 22 MD–PhD programs on 1,062 alumni, each of whom had completed postgraduate training at the time of this study in 2007–2008. Note that overall, 16% of the alumni who had completed training were in private practice at the time that the survey data were collected. The columns indicate the total number of alumni who completed a residency in each department and the number of those who subsequently entered private practice. The percentage for each department is the number who entered private practice divided by the total number who completed a residency in that department.

Brass LF, Akabas MH, Burnley LD, Engman DM, Wiley CA, Andersen OS

Anesthesiologist-Scientists: How leaky is our pipeline?



J Clin Invest. 2015;125(10):3742-3747. doi:10.1172/JCI84170

MD-PhD Program Graduates Choice of Residency
Data from 2007-2008

Completed Training

Department	MD-PhD program alumni No. (%)*
Internal medicine	427 (26.3)
Pediatrics	203 (12.5)
Pathology	192 (11.8)
Neurology	153 (9.4)
Surgery	116 (7.2)
Psychiatry	85 (5.2)
Ophthalmology	61 (3.8)
Anesthesiology	50 (3.1)
Obstetrics–gynecology	19 (1.2)
Emergency medicine	7 (0.4)
Physical medicine and rehabilitation	5 (0.3)
Nonclinical	175 (10.8)
Unknown	18 (1.1)
Total	1,621 (100.0)

* Summary of data provided by 22 MD–PhD programs on 1,621 alumni, each of whom had completed postgraduate training and was employed full-time in academia at the time that the survey data were collected in 2007–2008. "Surgery" includes all of the related disciplines. "Nonclinical" includes, but is not limited to, basic science departments.

In training

Department	MD–PhD alumni in training No. (%)*
Internal medicine	270 (28.8)
Surgery	107 (11.4)
Pediatrics	98 (10.4)
Pathology	79 (8.4)
Neurology	71 (7.6)
Radiology	61 (6.5)
Psychiatry	54 (5.8)
Dermatology	51 (5.4)
Anesthesiology	19 (2.0)
Emergency medicine	7 (0.7)
Postdoctoral training without residency	47 (5.0)
Total	939 (100.0)

* Summary of data provided by 21 MD–PhD programs on 939 recent graduates who were still in postgraduate training at the time that the survey data were collected in 2007–2008.

Brass LF, Akabas MH, Burnley LD, Engman DM, Wiley CA, Andersen OS. Acad Med. 2010 Apr;85(4):692-701