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A Tradition of Caring
BWH

Optimizing Resident Education: Strategies and Evidence

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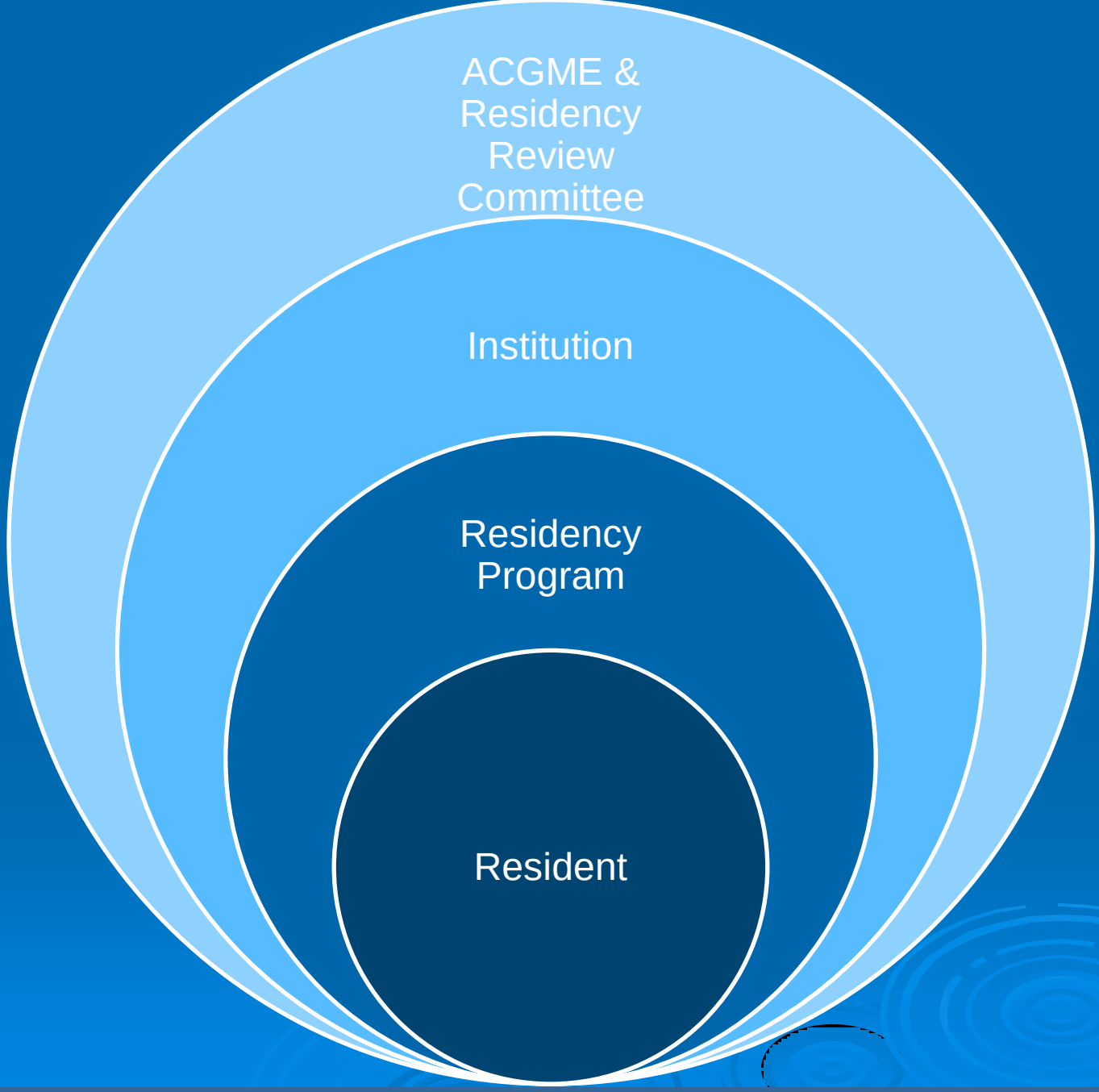
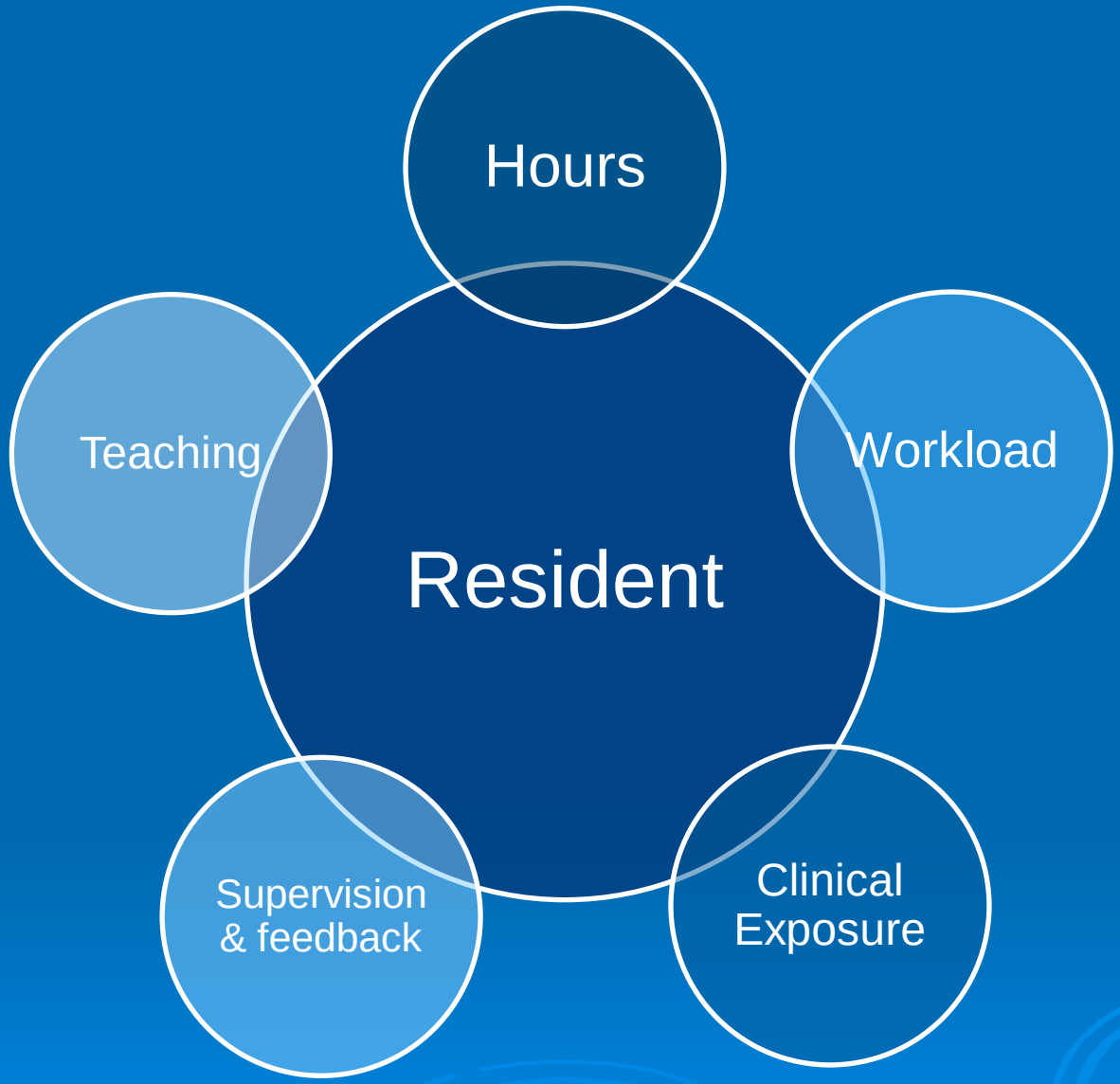
& Harvard Medical School

- Residency is an essential dimension of the transformation of the medical student to the independent practitioner along the continuum of medical education.
- It is physically, emotionally, and intellectually demanding, and requires extensive, concentrated effort.

Effective Residency Training Requires…

- Broad and deep clinical exposure
- Progressive responsibility
- Oversight and teaching from more experienced faculty
- A broad curriculum
- Assessment and feedback

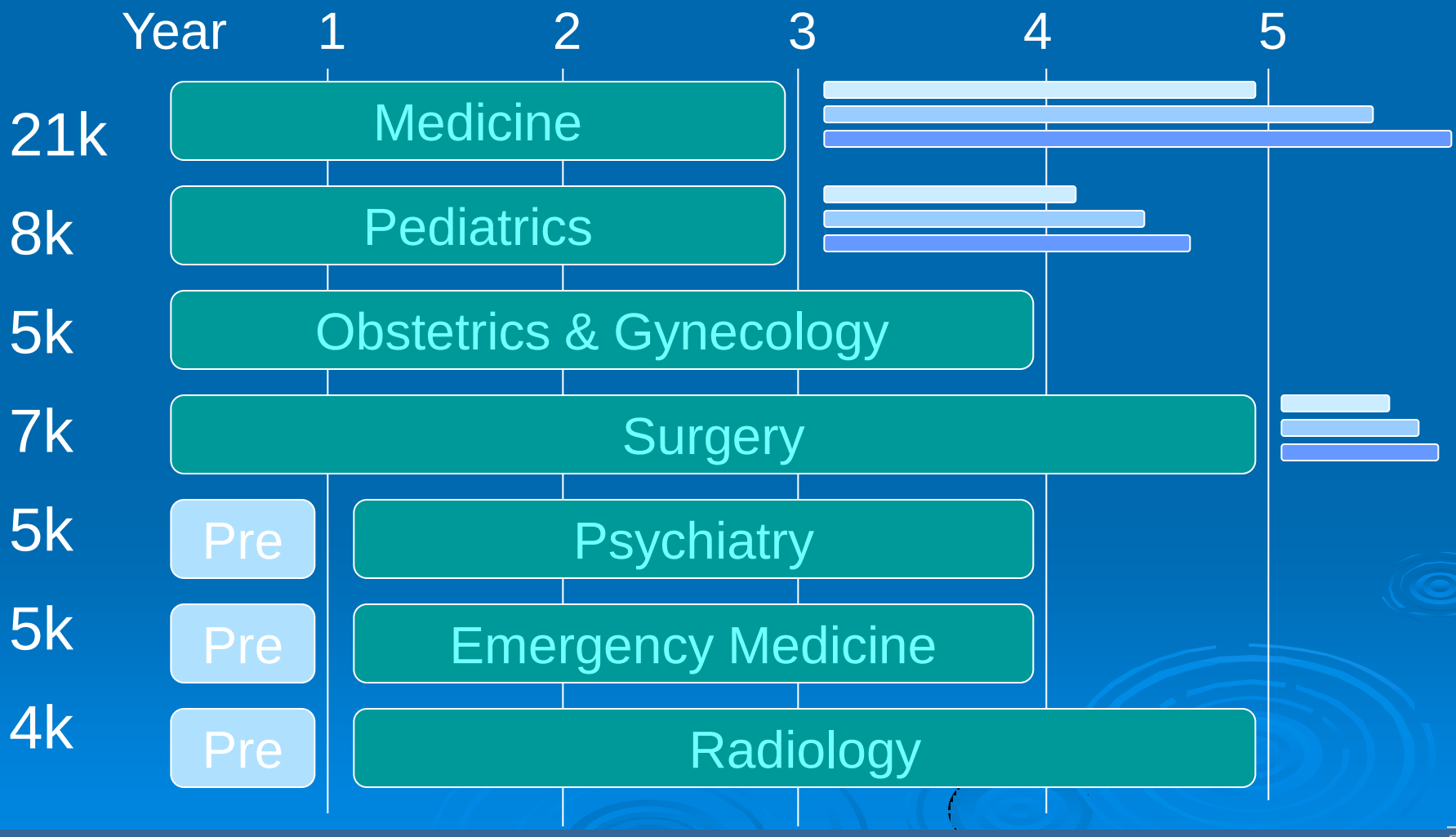

ACGME &
Residency
Review
Committee
Institution
Residency
Program
Resident


Hours
Teaching
Workload
Resident
Supervision
& feedback
Clinical
Exposure

Residency Programs in the US and Japan

	US	Japan
Physicians	~820,000	~278,000
PGY 1 Residents	26,218	7,998
Teaching Hospitals	680	1,029
Residency Programs	8,800	1,418

Length of residency training

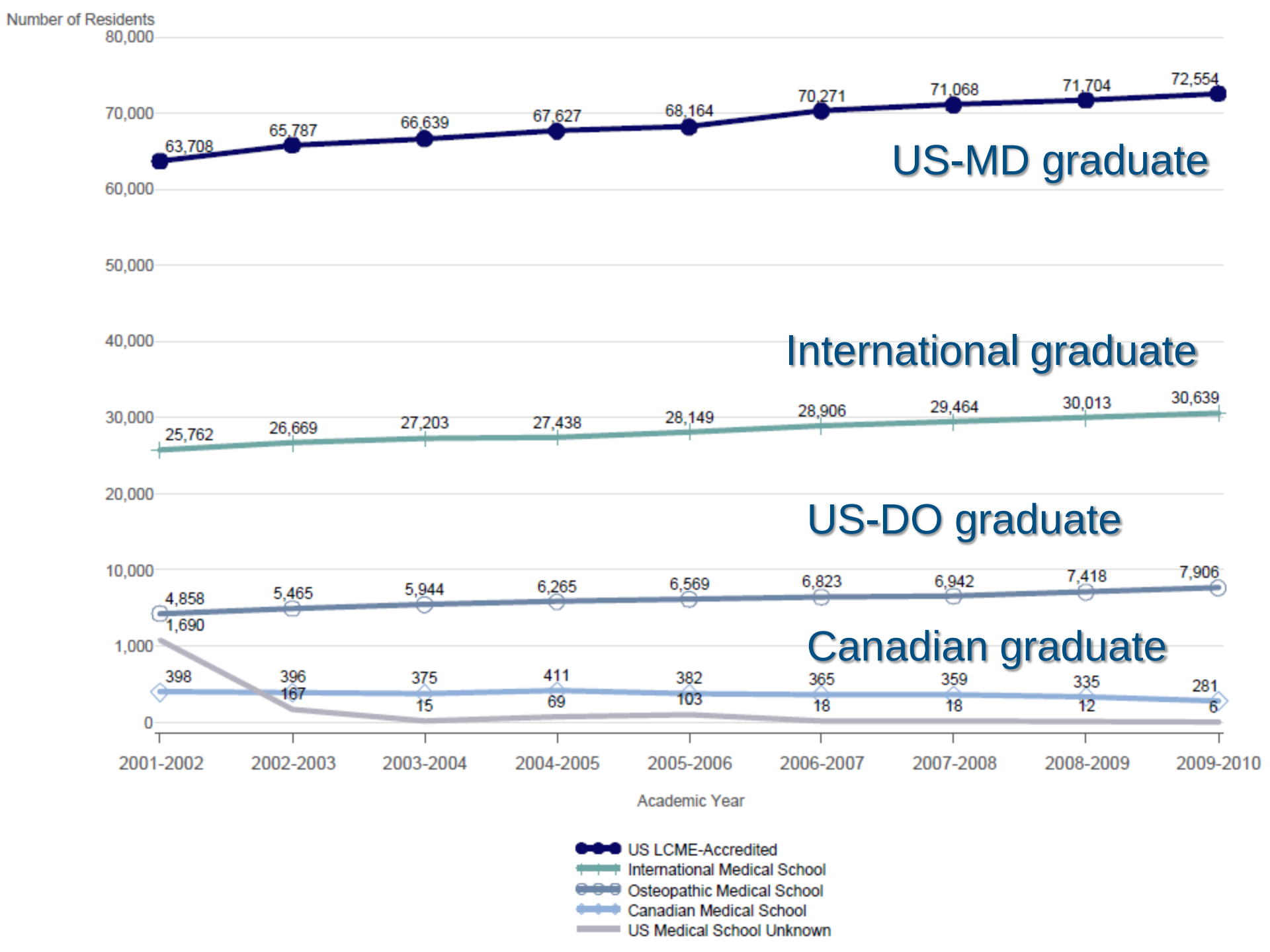


Medical specialty training

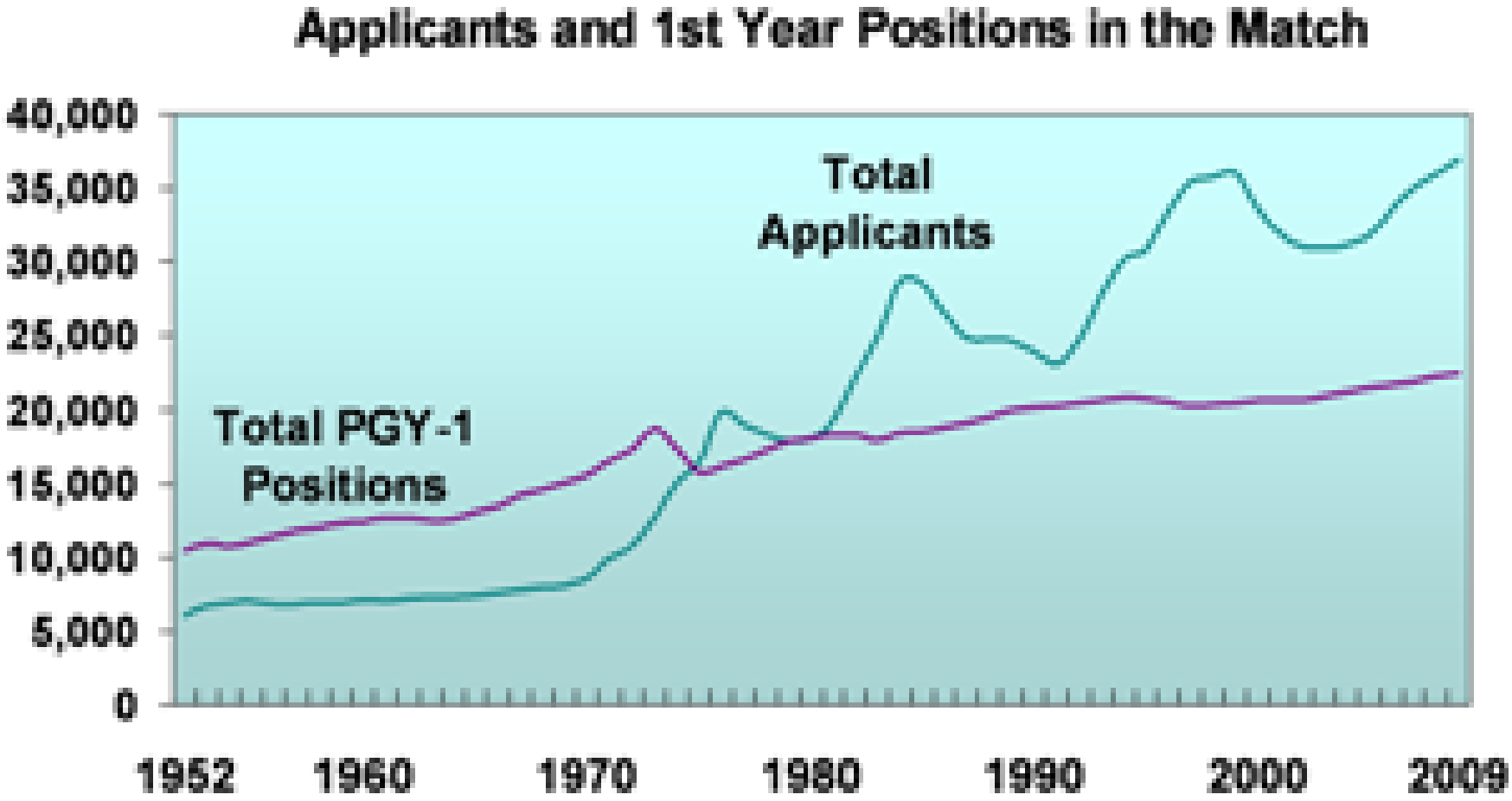
Medical Residency *Plus*

- 3 years for
  - Cardiology (4 for subspec)
  - Gastroenterology
  - Pulmonary/critical care
  - Hematology/oncology
- 1 year for
  - Critical care
  - Geriatric medicine
  - Sports medicine
- 2 years for
  - Nephrology
  - Endocrinology
  - Pulmonary
  - Rheumatology
  - Infectious disease
  - Oncology
  - Hematology

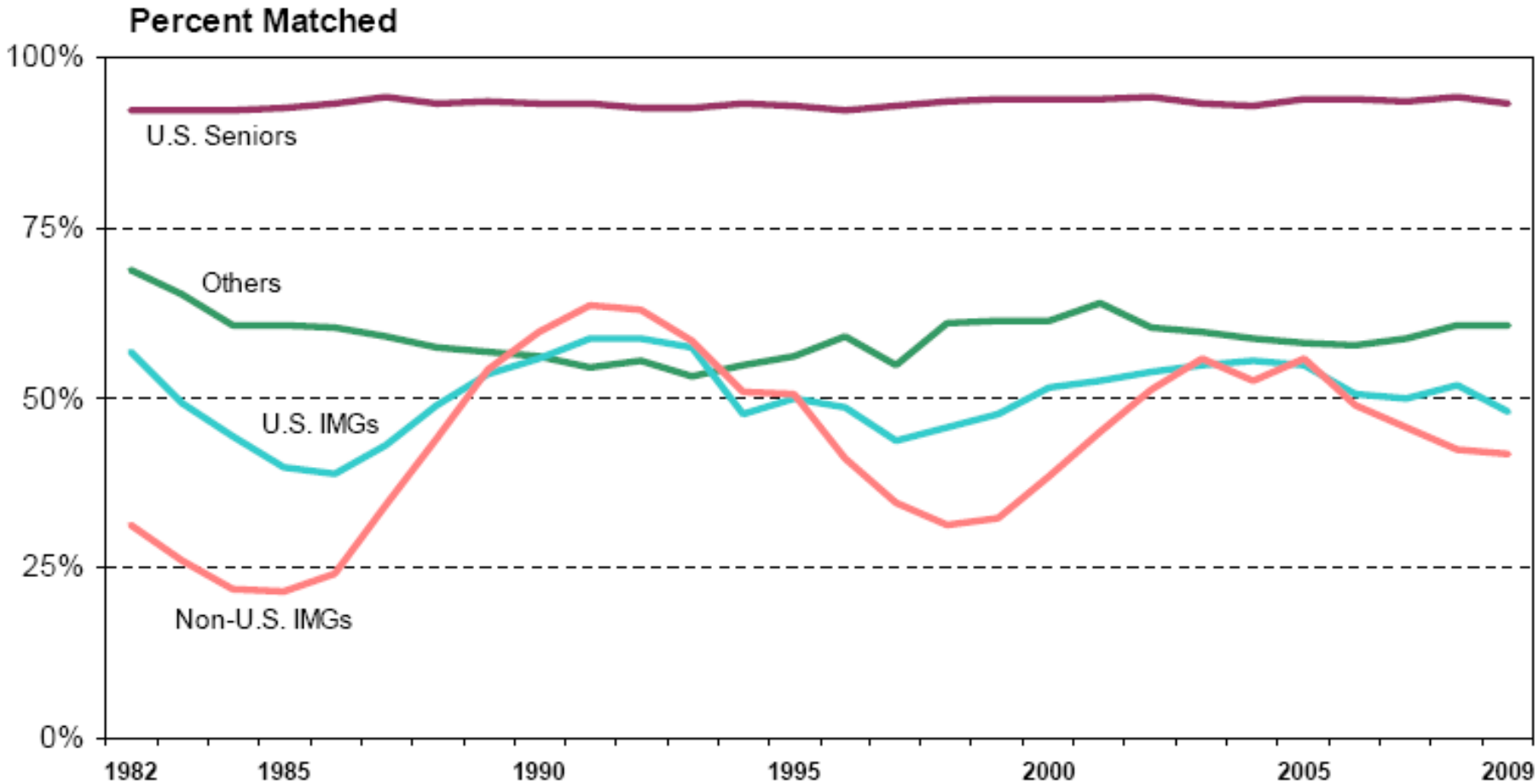
TRENDS IN US RESIDENCY


Number of Residents
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
1,000
0
63,708
65,787
66,639
67,627
68,164
70,271
71,068
71,704
72,554
US-MD graduate
25,762
26,669
27,203
27,438
28,149
28,906
29,464
30,013
30,639
International graduate
4,858
5,465
5,944
6,265
6,569
6,823
6,942
7,418
7,906
US-DO graduate
1,690
167
15
69
103
18
18
12
6
398
396
375
411
382
365
359
335
281
Canadian graduate
2001-2002
2002-2003
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
Academic Year
US LCME-Accredited
International Medical School
Osteopathic Medical School
Canadian Medical School
US Medical School Unknown

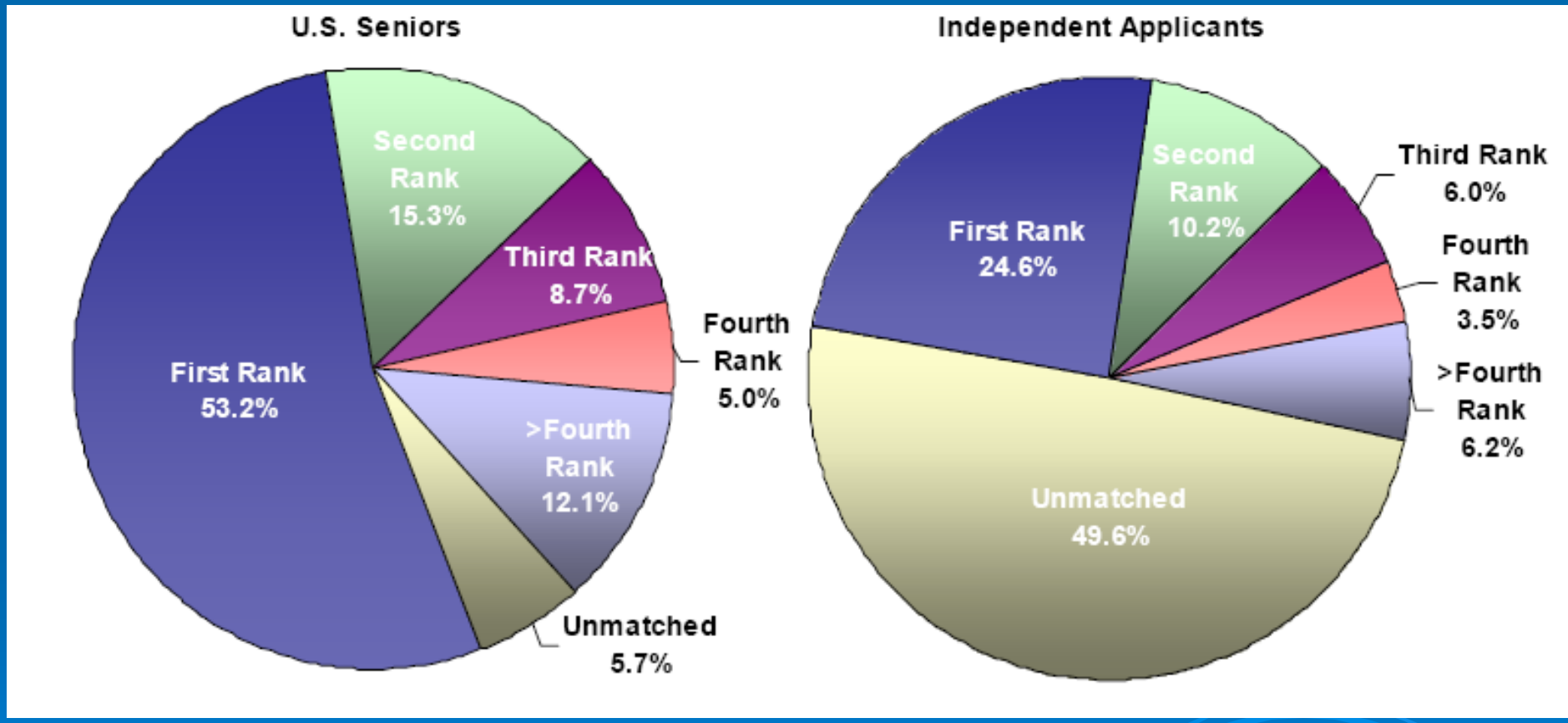
Increasing Competition



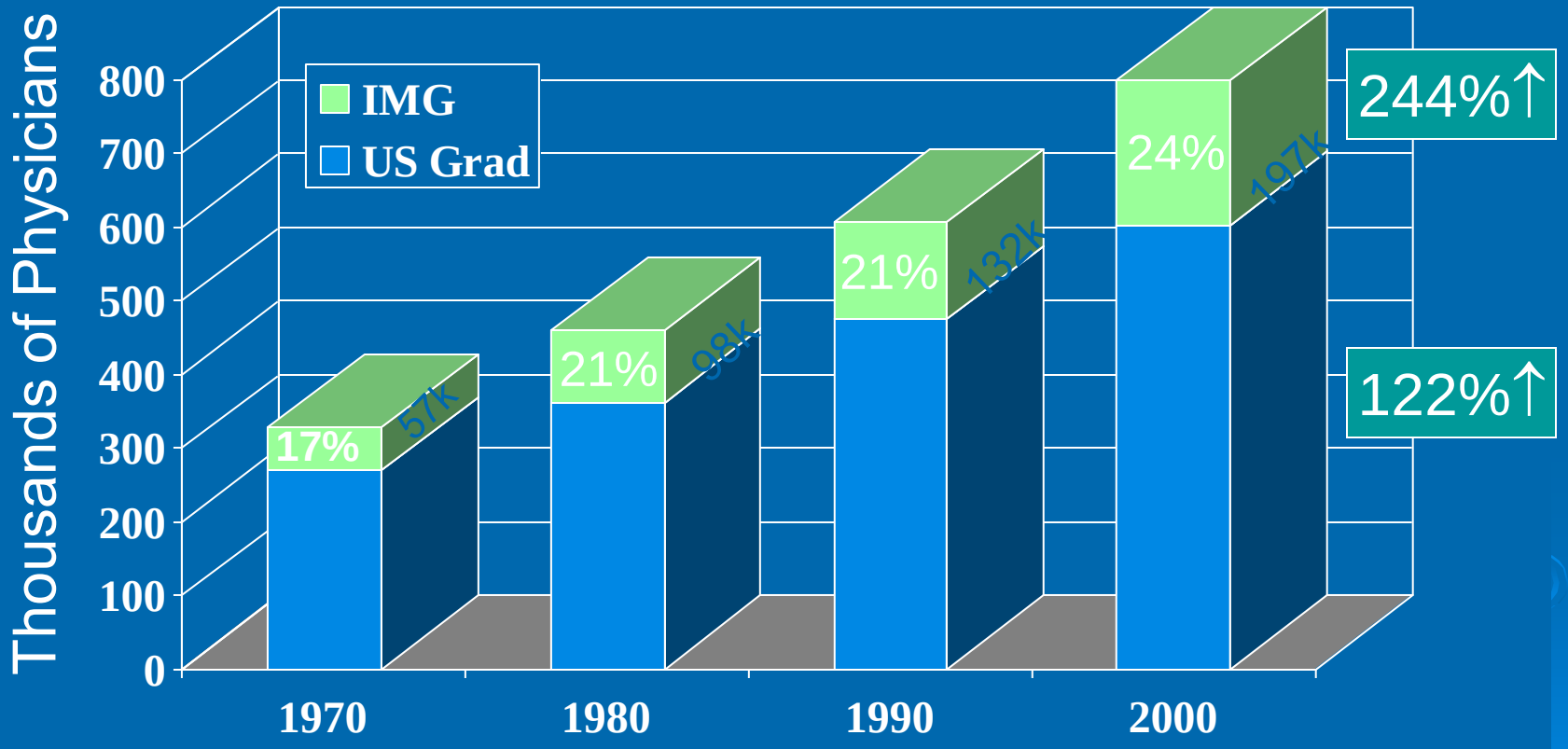
Match Rate by Applicant Type



Percent Matches



Relative prevalence of IMGs among physicians in America



Physician Characteristics and Distribution, AMA, 2009ed

Trends in US residencies

- Progressive
  - Decline in preferences for primary care (especially family medicine)
  - Rise in preferences for dermatology, radiation oncology, and ophthalmology
- These reflect financial and quality of life incentives associated with these fields

Japanese Residency Training Positions

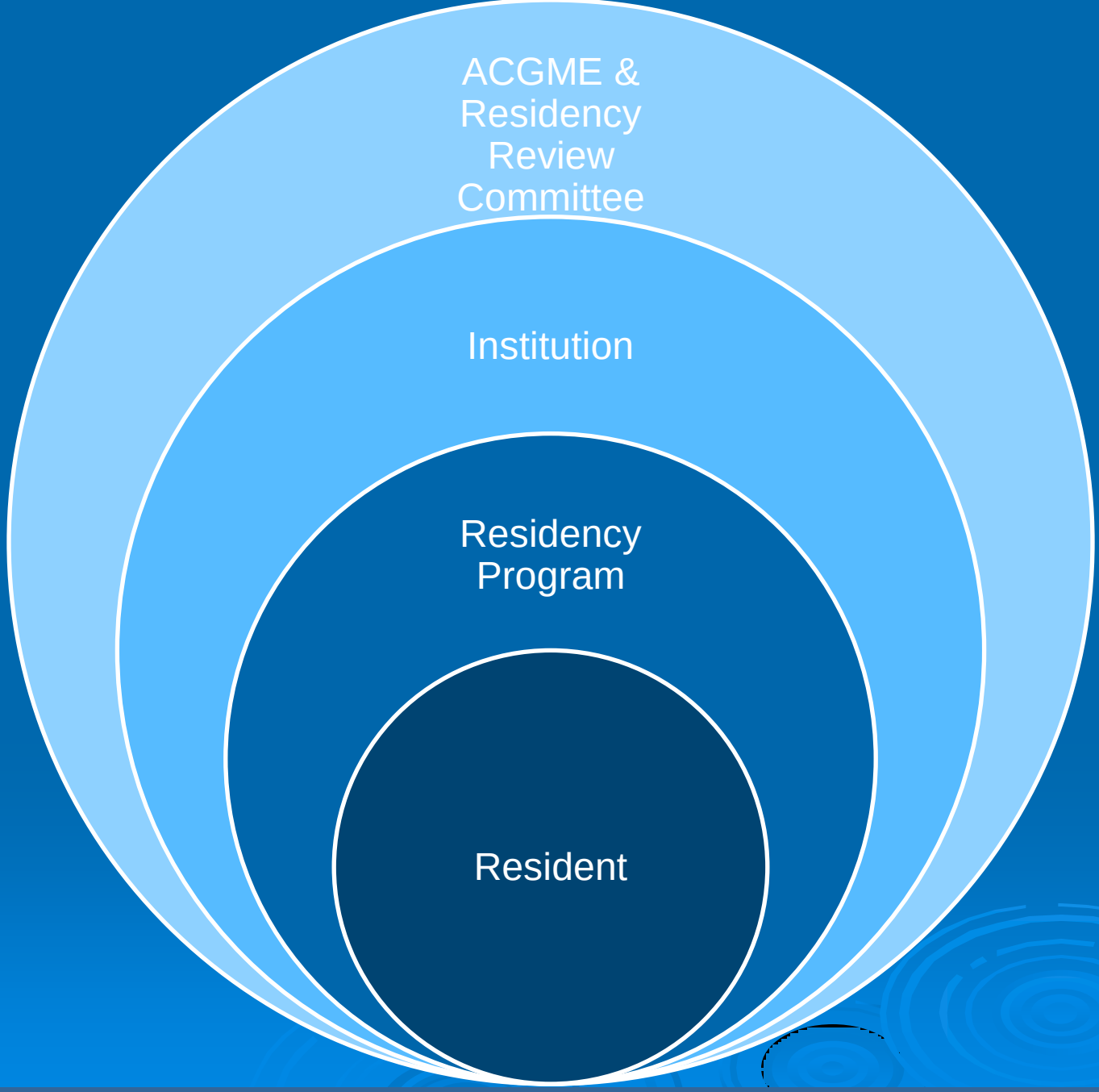
2010	Teaching	University
Hospitals	915	114
Programs	1028	390
Capacity	5570	5122
Matched	4170 (74%)	3828 (74%)
Vacancies	1400	1294
Fraction matching to #1 preference	82%	78%

Match Rate to Japanese University Programs

	2003	2004	2005	2006	2007	2008	2009	2010
Number	8166	7756	8000	8100	8094	8030	7875	7998
University	72.5	58.8	49.2	44.7	45.3	46.4	46.8	47.9
Unfilled							1035	1294

- Reasons given for choosing teaching programs:
  - Better teaching
  - Less administration
- Reasons given for choosing university programs:
  - Access to post-graduate training
  - Reputation

RESIDENCY OVERSIGHT


ACGME &
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Program
Resident

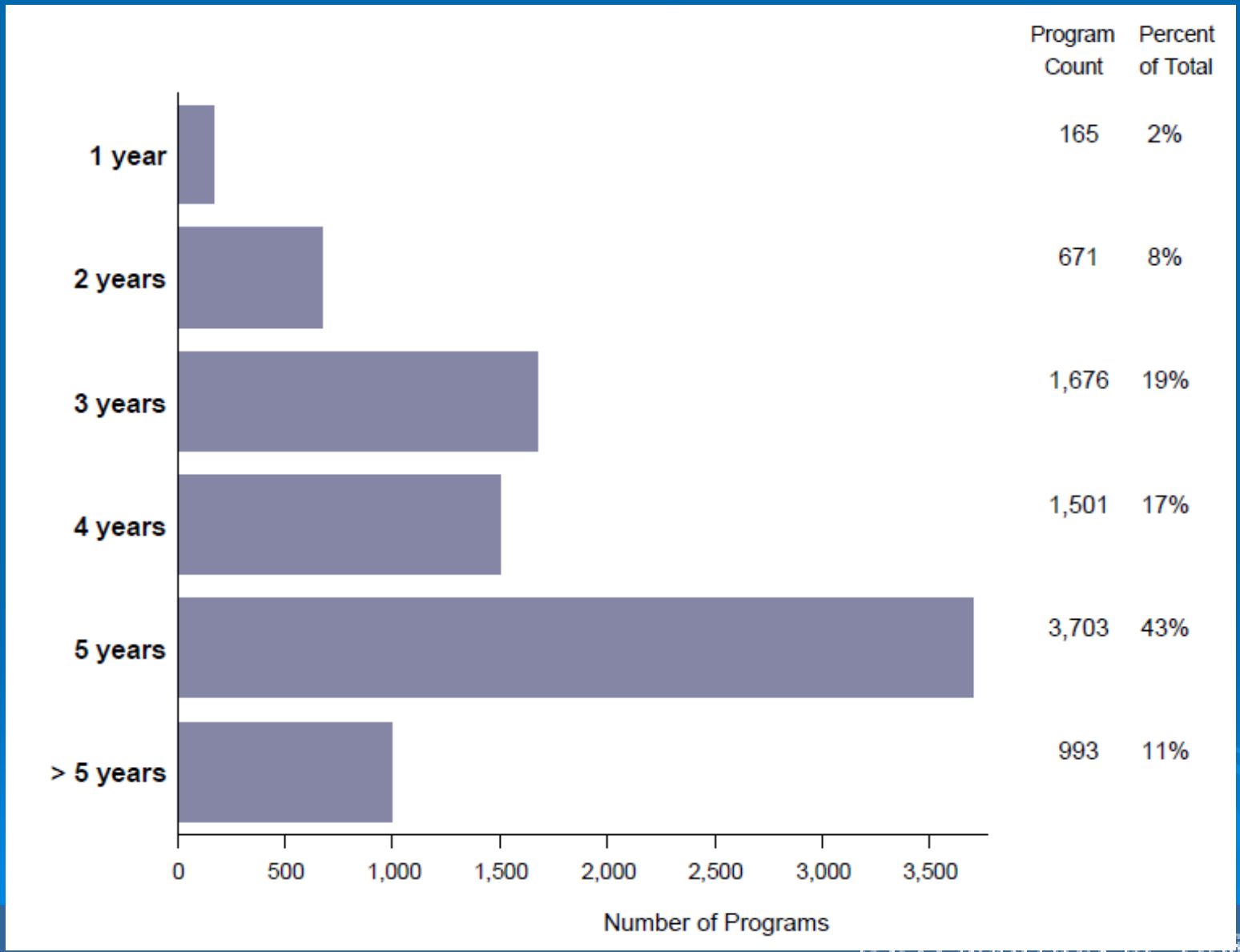
Organization of Residency Programs in the USA

- ACGME
  - Federally funded
  - Sets standards
  - Issues approvals and citations
  - ACGME accreditation necessary for
    - Board certification
    - State licensure
    - Funding for resident salaries

Organization of Residency Programs in the USA

- Residency Review Committee
  - Convened by ACGME
  - Sets standards for each type of program
  - Approves size of the program
  - Investigates complaints
  - Formally inspects programs
    - Review of documents
    - Inspection of facilities
    - Interviews with director, faculty and trainees
  - Publicly publishes reports

Accreditation Cycle Lengths

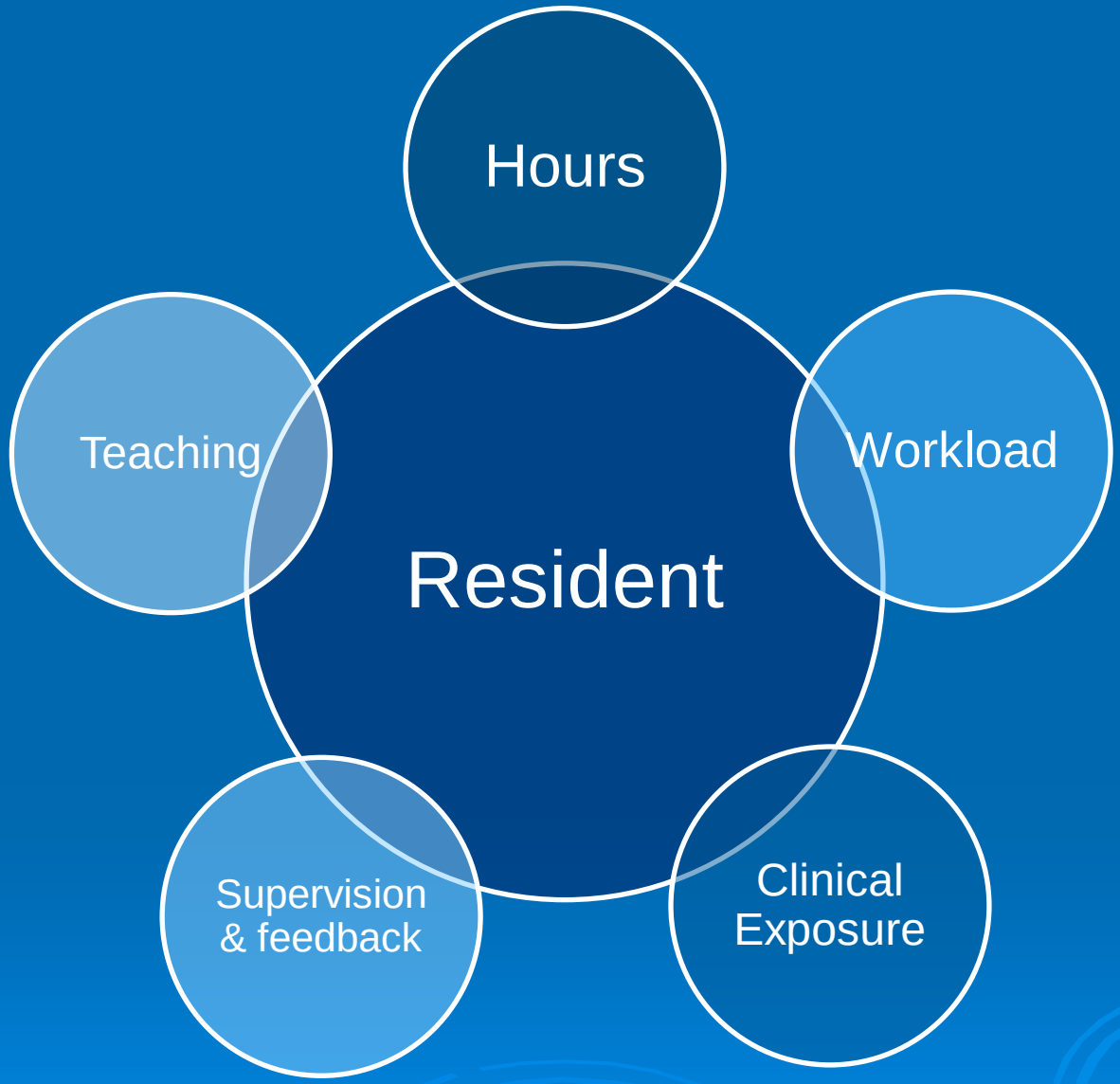


Organization of Residency Programs in the USA

- Sponsoring Institution
  - Must demonstrate a commitment to education sufficient to support the program
  - Provide faculty, facilities, and resources for education, clinical care and research as directed by the program director
  - Provide 50% salary support for the program director
  - Provide 20% salary support for any associate program directors

Organization of Residency Programs in the USA

- Program Director
  - One person, board-certified and based at the institution
  - Responsible for establishing and maintaining the educational environment
    - Select residents
    - Select and supervise teaching faculty
    - Ensure balance of service and education
    - Oversee resident evaluation and feedback
    - Implement fair policies and grievance procedures
  - Responsible for periodic formal reports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Organization of Residency Programs in the USA

- Program Curriculum
  - Written document
  - Distributed widely
  - Lists knowledge skills and other attributes to be attained during each assignment at each level.
  - Lists pedagogy for each competency
  - Provides an opportunity for residents to engage in scholarship

Organization of Residency Programs in the USA

- Clinical Exposure
  - At least 33% of training time spent in ambulatory care (108 weekly continuity sessions)
  - Up to 3 months in emergency medicine
  - Adequate exposure to all of the major disciplines of medicine

Organization of Residency Programs in the USA

- Volume
  - No more than 5 new pts per admitting day
  - No more than 12 pts at any time
  - No more than 5 pts in a half-day ambulatory session

Organization of Residency Programs in the USA

- Hours
  - No more than 80 hrs per week
  - No more than 16 hrs per shift for PGY1s
  - No more than 24 hrs per shift for others (+4hrs to transfer care)
  - On call overnight no more than every 3rd day
  - At least one full 24 hrs off per 7 day period

Organization of Residency Programs in the USA

- Supervision
  - Faculty functioning as supervising physicians should delegate portions of that care to resident physicians
  - PGY1 residents must have an attending with them, or at minimum in the building at *all* times of the day and night
  - Senior residents should serve in a supervisory role of junior residents

Differences in Residency Regulation in US and Japan

	US	Japan
Residency completion required for license	✓	✓
Residency programs are inspected	✓	✗/✓
Work-hour standards are enforced	✓	✗
Quality standards are enforced	✓	✗
Results are made public and known to applicants	✓	✗

WORK HOURS

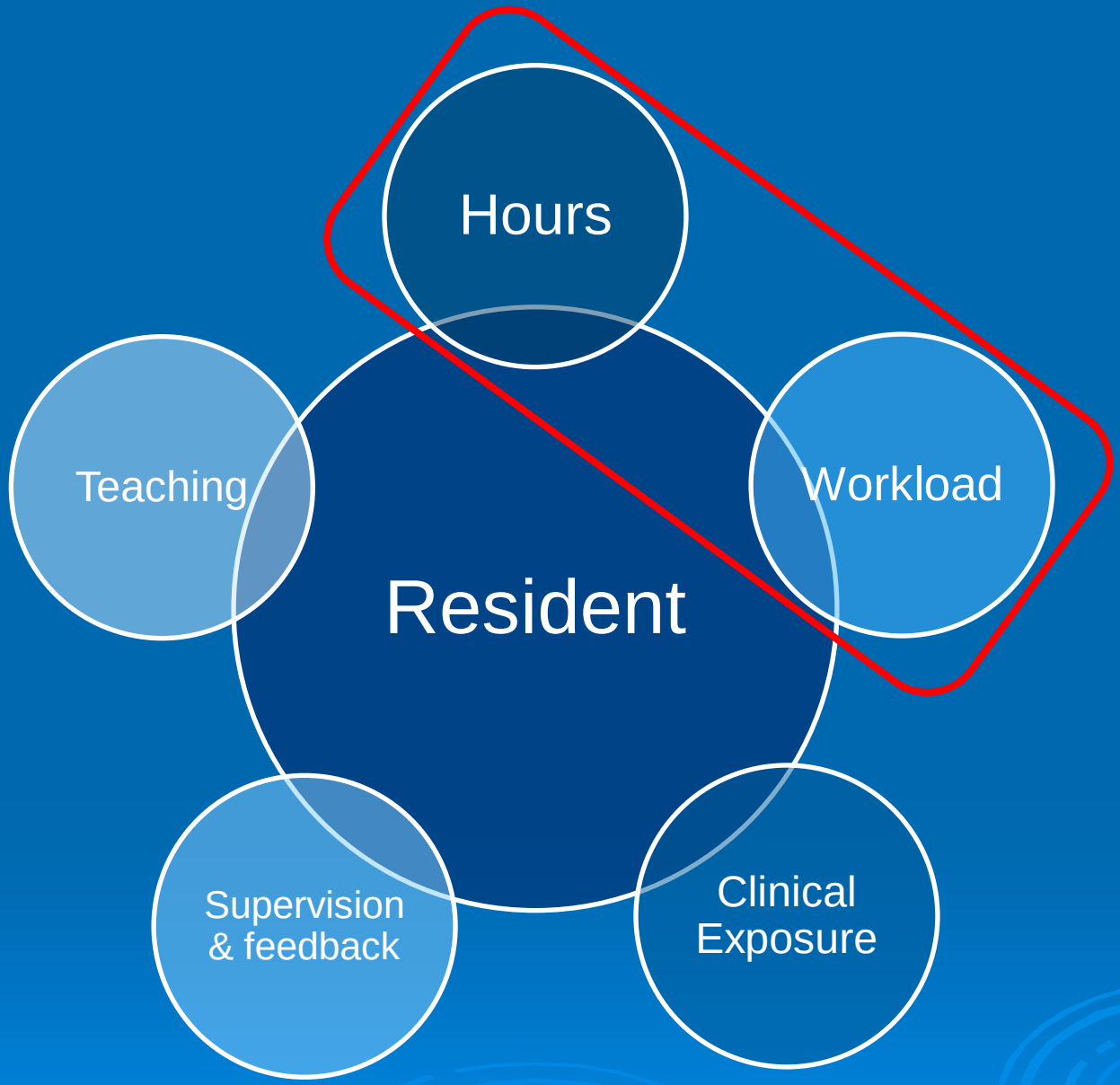
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Table 3. Incidence of Serious Medical Errors.

Variable	Traditional Schedule	Intervention Schedule	P Value
	no. of errors (rate/1000 patient-days)		
Serious medical errors made by interns			
Serious medical errors	176 (136.0)	91 (100.1)	<0.001
Preventable adverse events	27 (20.9)	15 (16.5)	0.21
Intercepted serious errors	91 (70.3)	50 (55.0)	0.02
Nonintercepted serious errors	58 (44.8)	26 (28.6)	<0.001
Types of serious medical errors made by interns			
Medication	129 (99.7)	75 (82.5)	0.03
Procedural	11 (8.5)	6 (6.6)	0.34
Diagnostic	24 (18.6)	3 (3.3)	<0.001
Other	12 (9.3)	7 (7.7)	0.47

Landrigan, C. et al. N Engl J Med 2004;351:1838-1848

Mean (+SE) Number of Attentional Failures among the 20 Interns as a Group and Individually while Working Overnight (11 p.m. to 7 a.m.) during the Traditional Schedule and the Intervention Schedule.

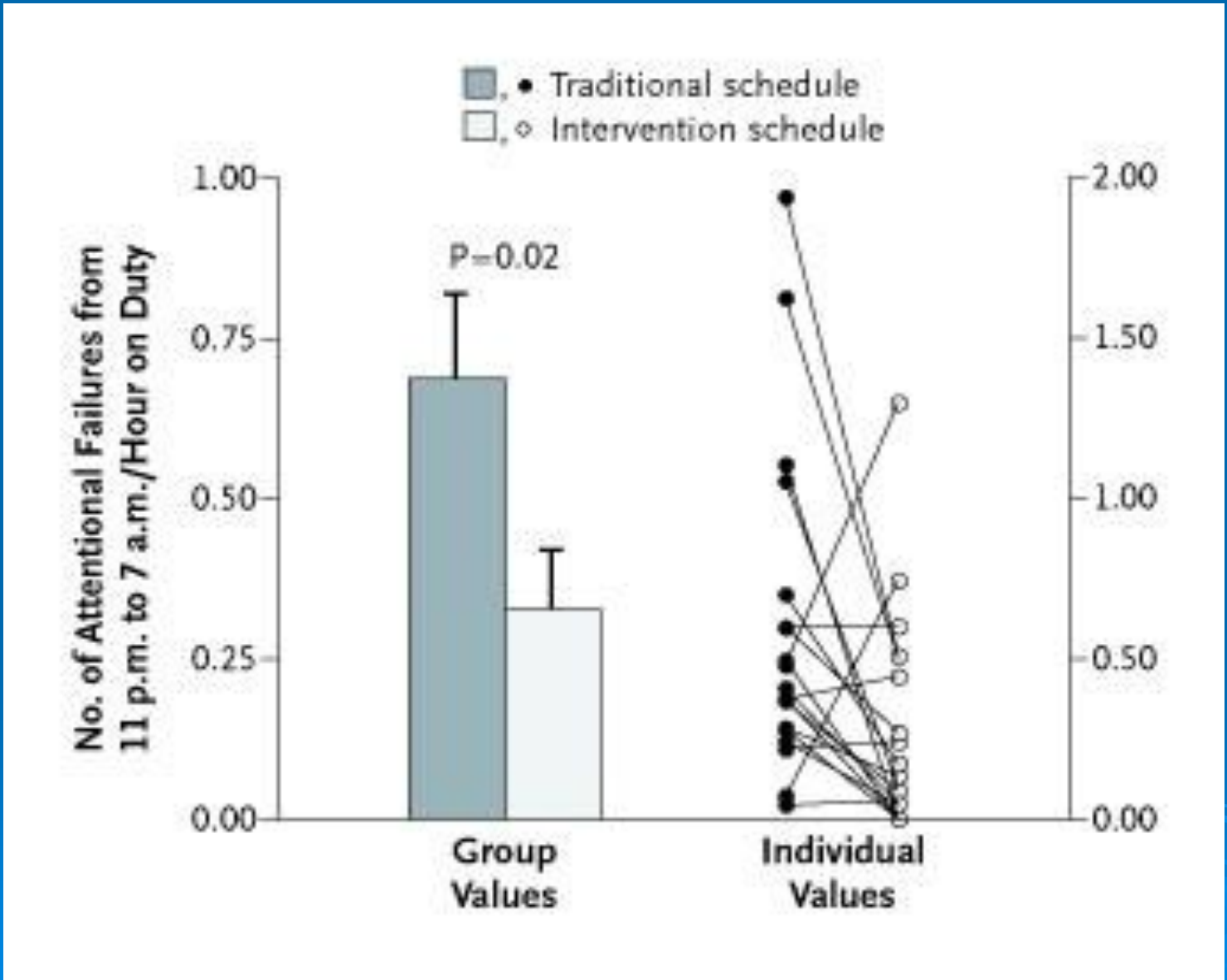
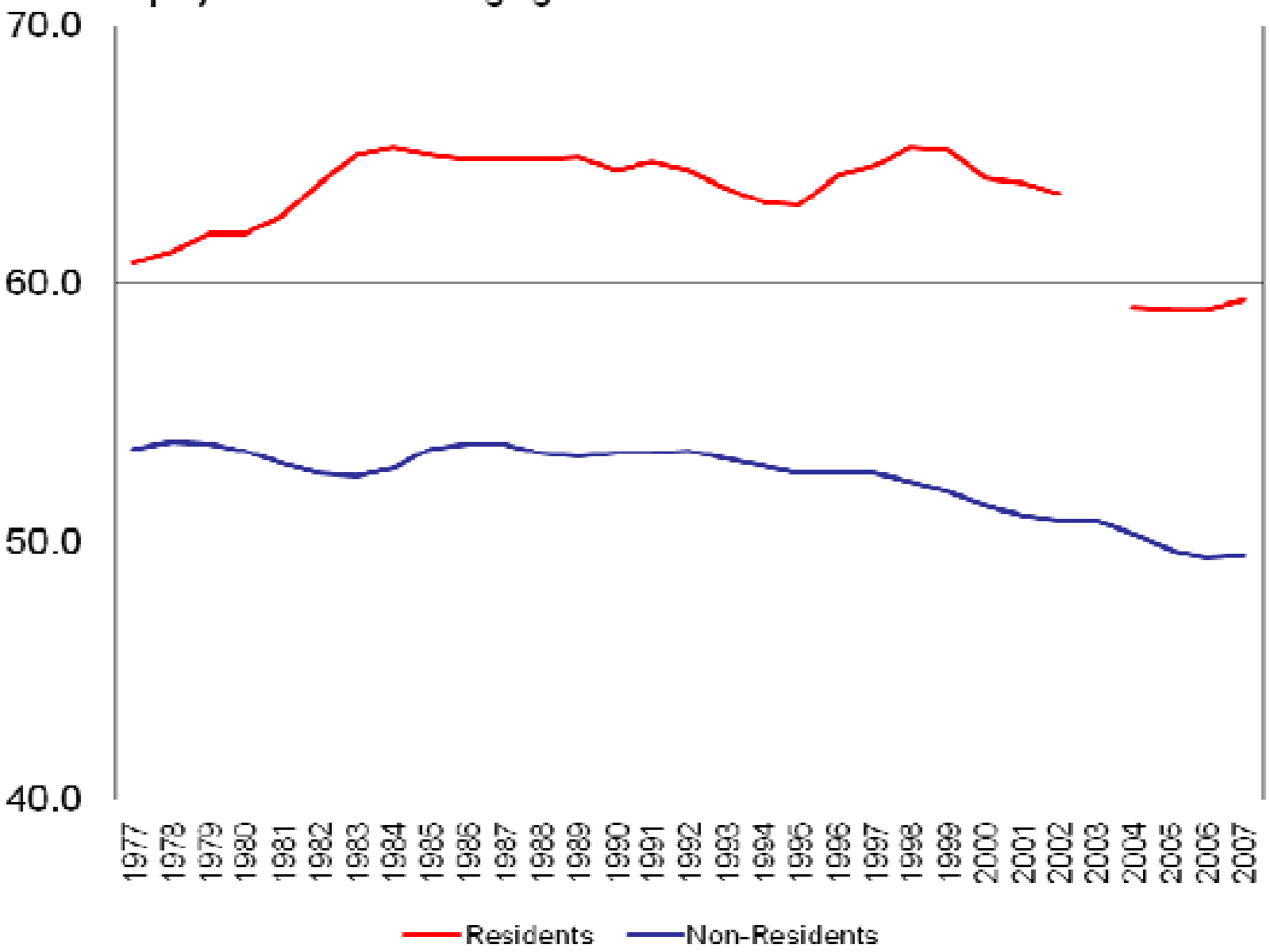


Table 1. Risk of Motor Vehicle Crashes and Near-Miss Incidents after Extended Shifts.*

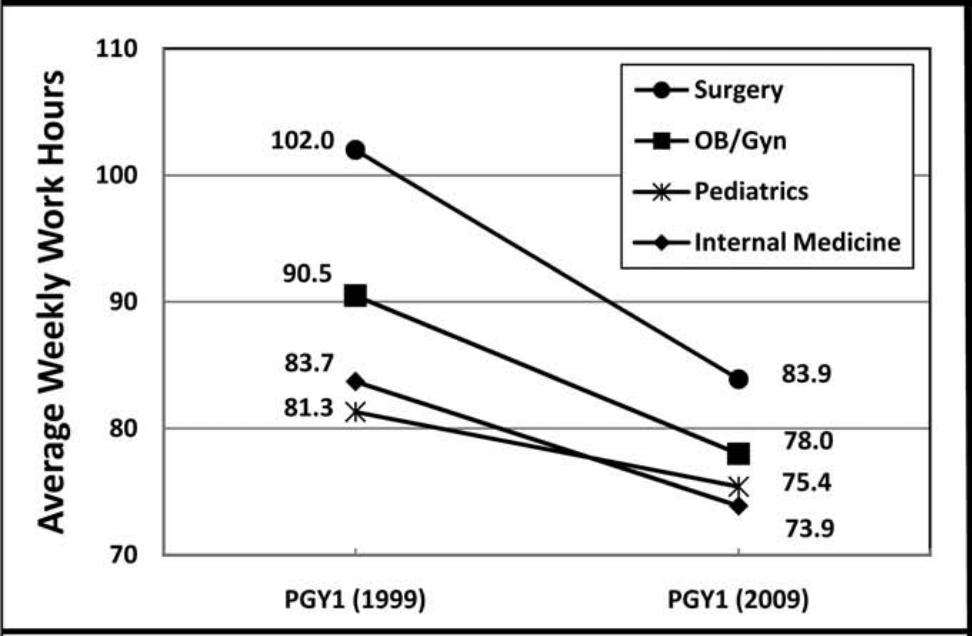
Variable	Extended Work Shifts (≥24 hr)	Nonextended Work Shifts (<24 hr)
Crashes		
No. reported	58	73
No. of commutes	54,121	180,289
Rate (per 1000 commutes)	1.07	0.40
Odds ratio (95% CI)	2.3 (1.6–3.3)	1.0
Near-miss incidents		
No. reported	1,971	1,156
No. of commutes	54,121	180,289
Rate (per 1000 commutes)	36.42	6.41
Odds ratio (95% CI)	5.9 (5.4–6.3)	1.0

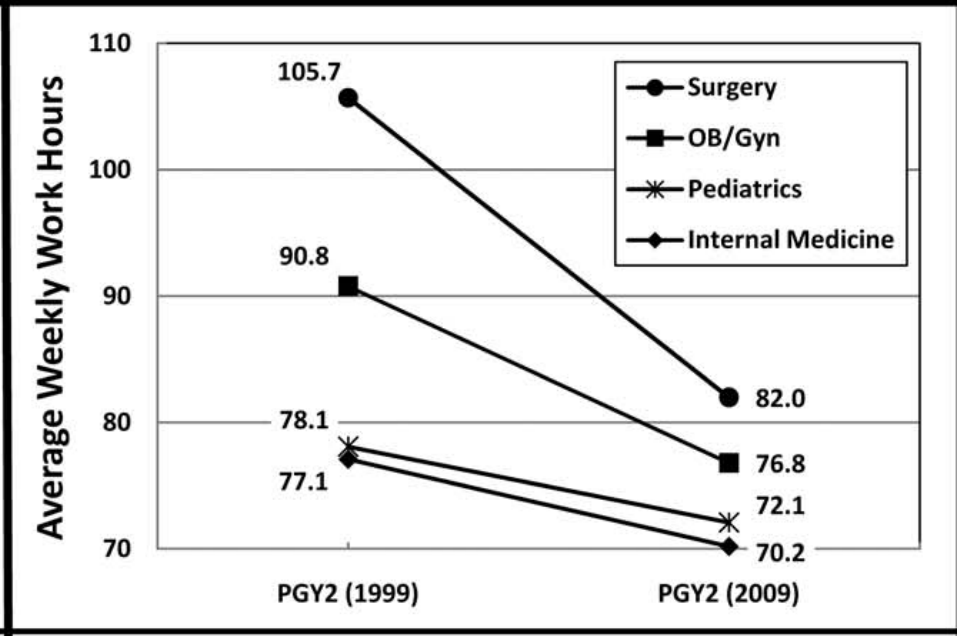
Barge L. N Engl J Med 2005;352:125-34

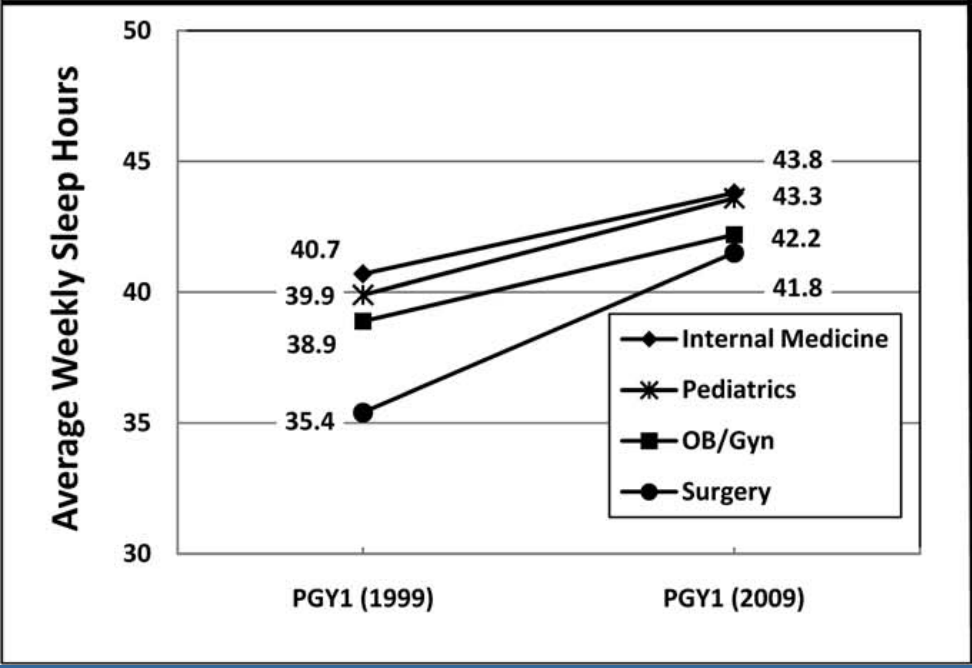
Staiger DO, Auerbach DI, Buerhaus PI. Trends in the Work Hours of Physicians in the United States. *JAMA*. *2010;303(8):747-753.*
http://jama.ama-assn.org/cgi/data/303/8/747/DC1/1

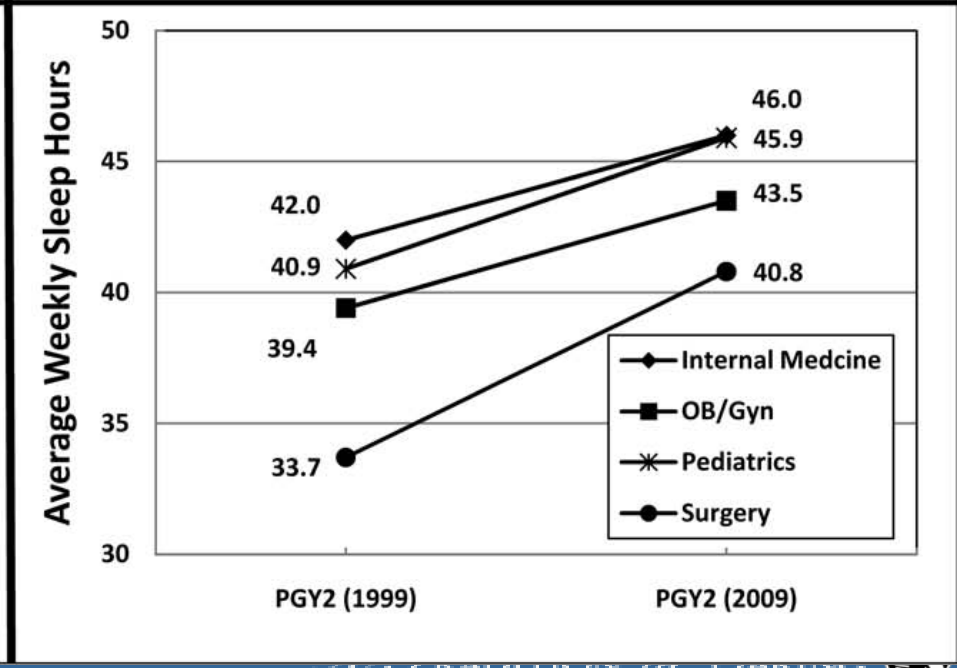


Changes in Work and Sleep from 1999 to 2009 by Specialty









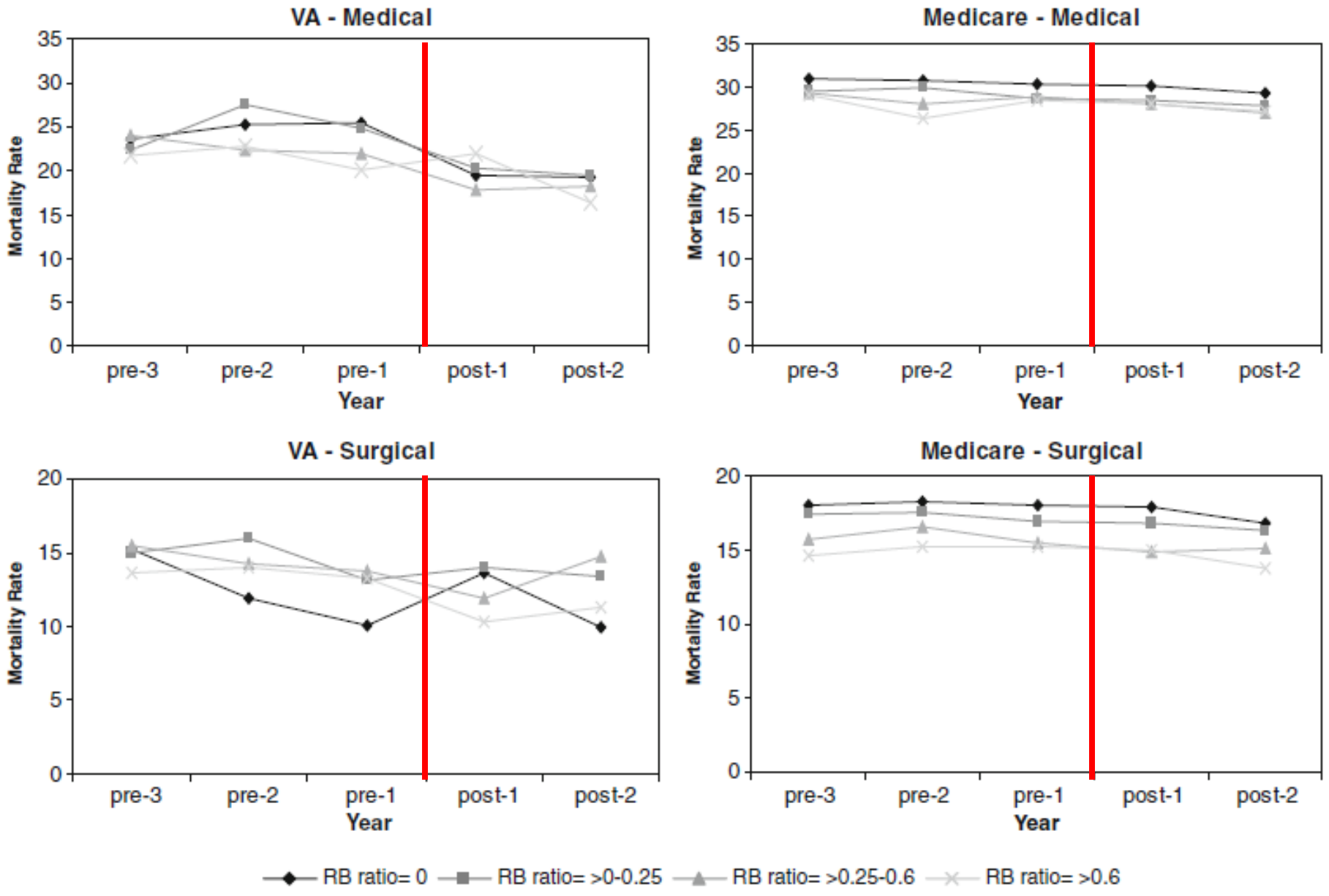
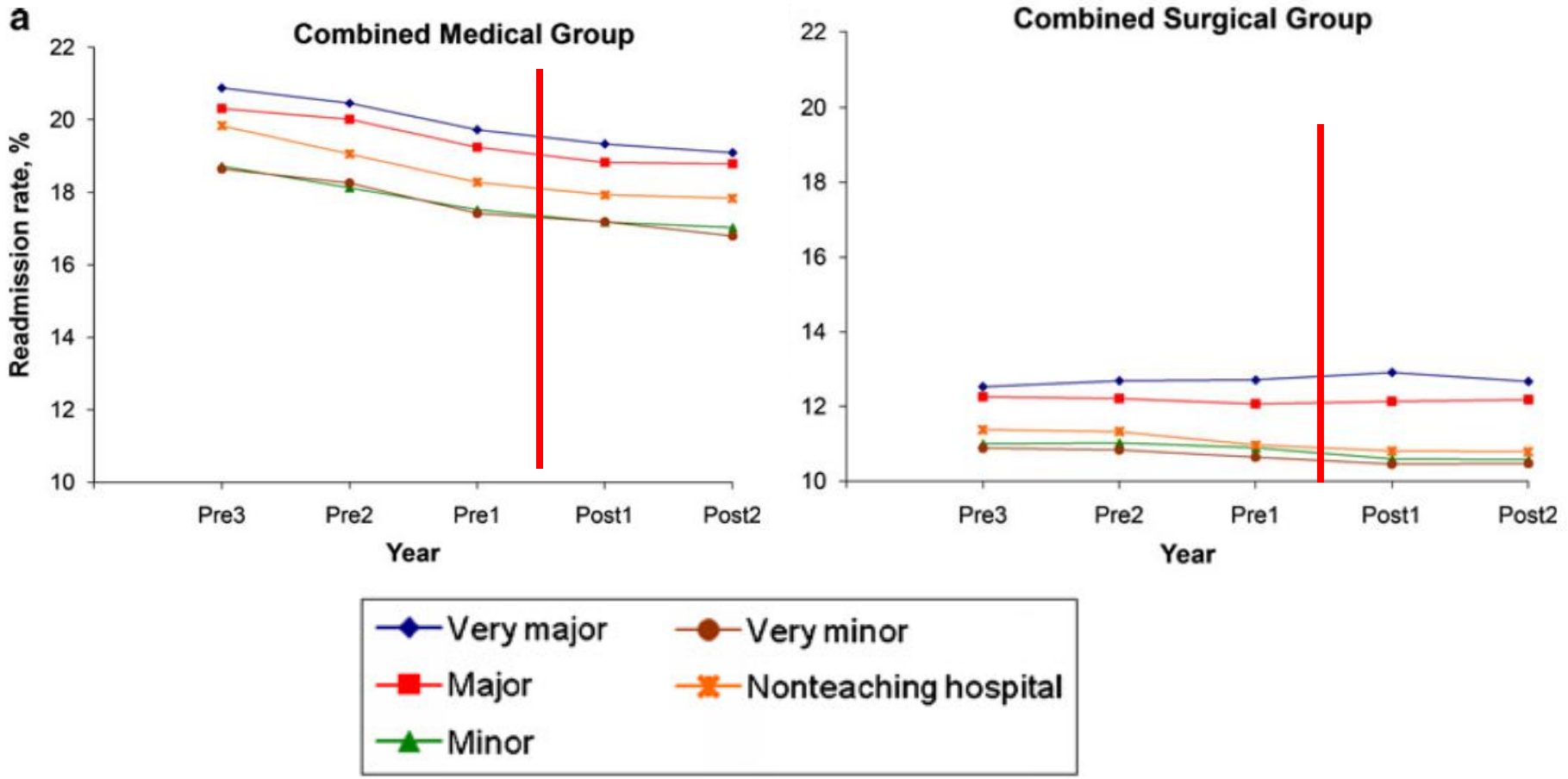


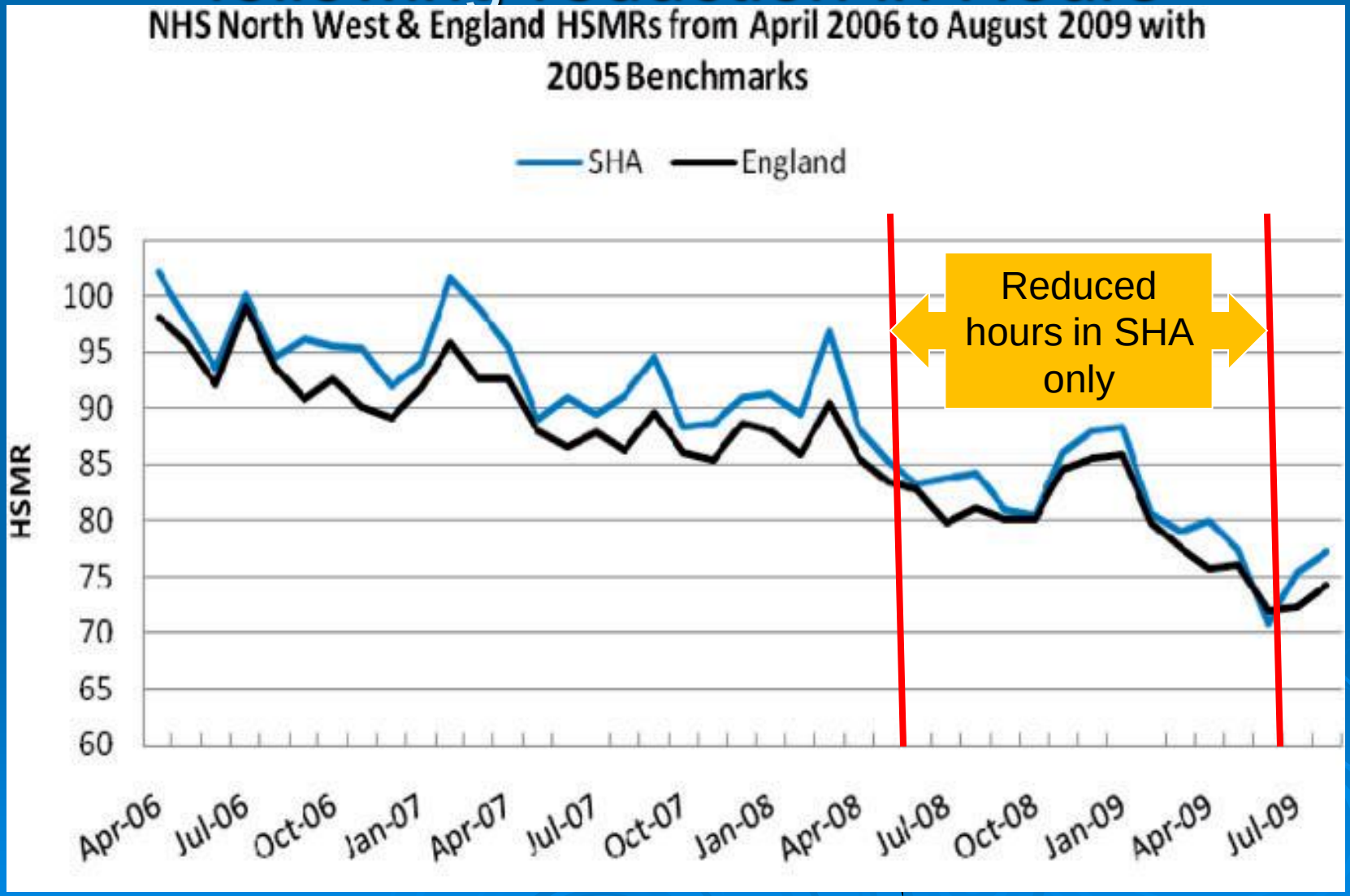
Figure 1. Changes over time in unadjusted mortality for very high severity patients in hospitals of different teaching intensity.

Readmission Rates over Time



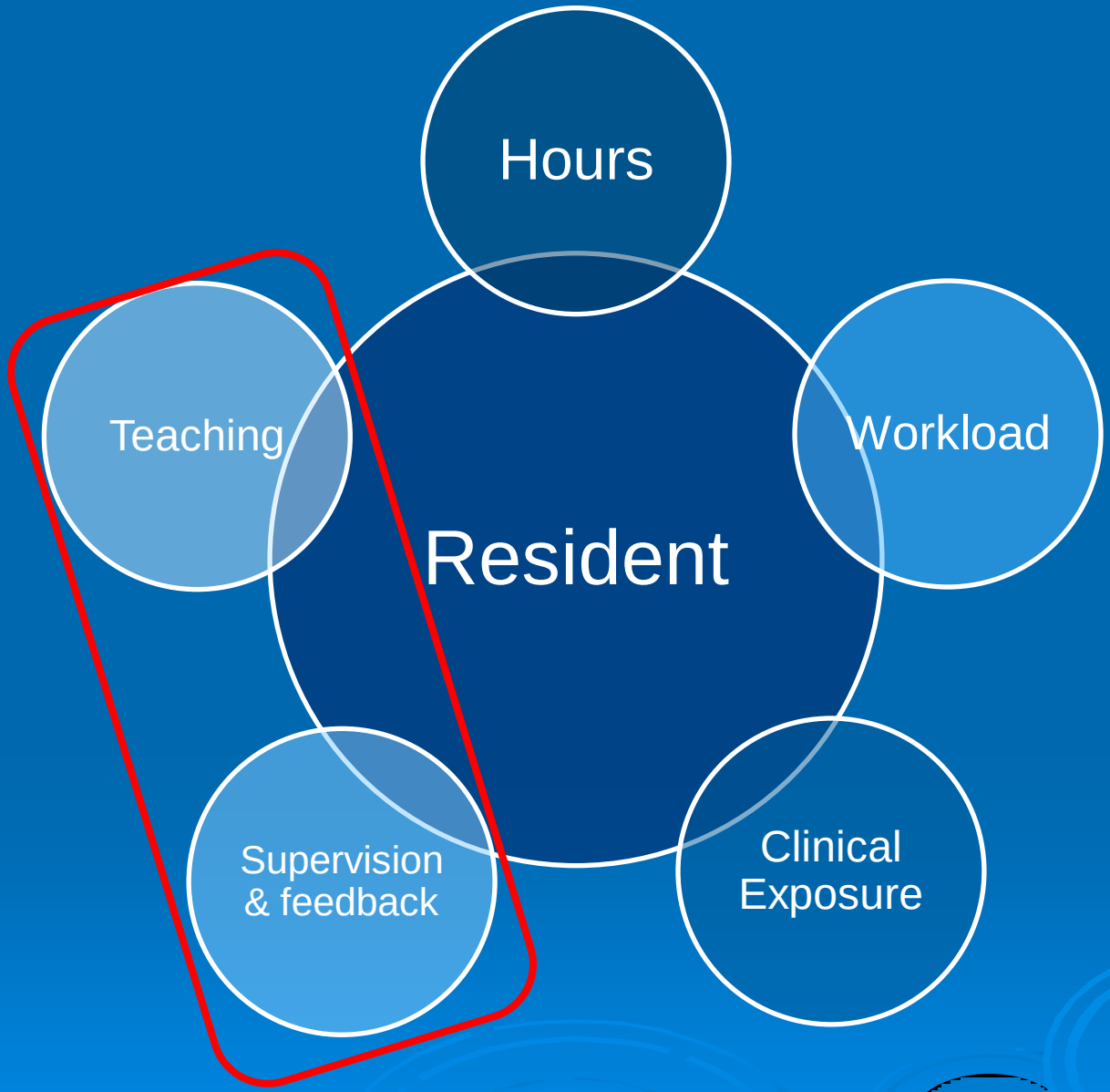
Press MJ. JGIM 2010 online first

Standardized Mortality Ratios in UK following reduction in Hours



Q J Med 2010; 103:929–940

STRATEGIES FOR TEACHERS


Hours
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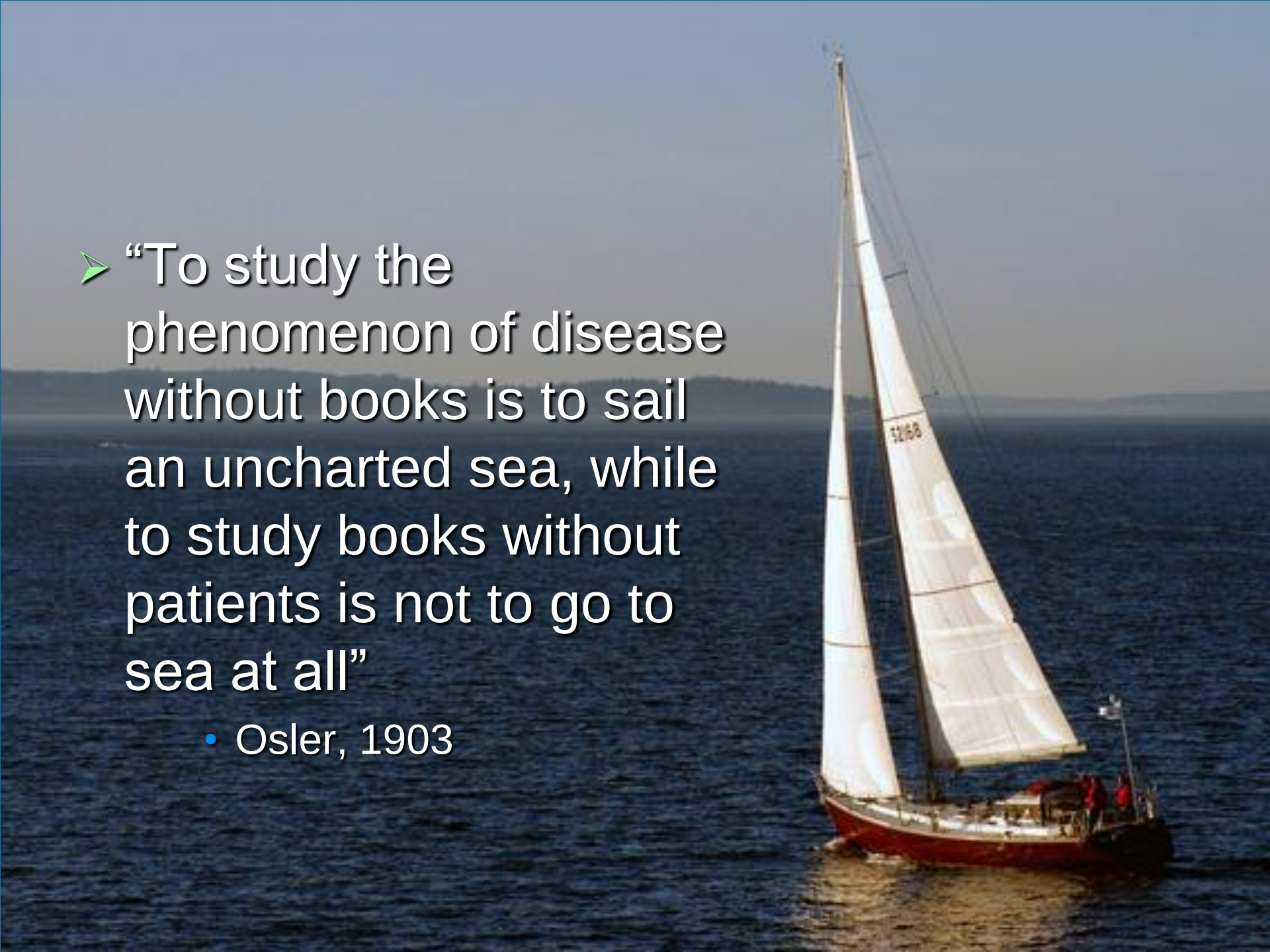
Key Principles of Effective Clinical Education

- Let the trainee decide what to do before correcting them
- Think out loud
- Teach with patients
- Encourage trainees; avoid embarrassment
- Don’t lecture: use Q&A
- Make time for feedback



- “To study the phenomenon of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all”
  - Osler, 1903

Advantages of Bedside Teaching

- Adult learning principles
  - Active involvement
  - Relevant, meaningful
- Patients like it
- Motivates learners
- Important domains of learning integrated through teaching, role modeling & observation with feedback

Preferences for Bedside Presentations

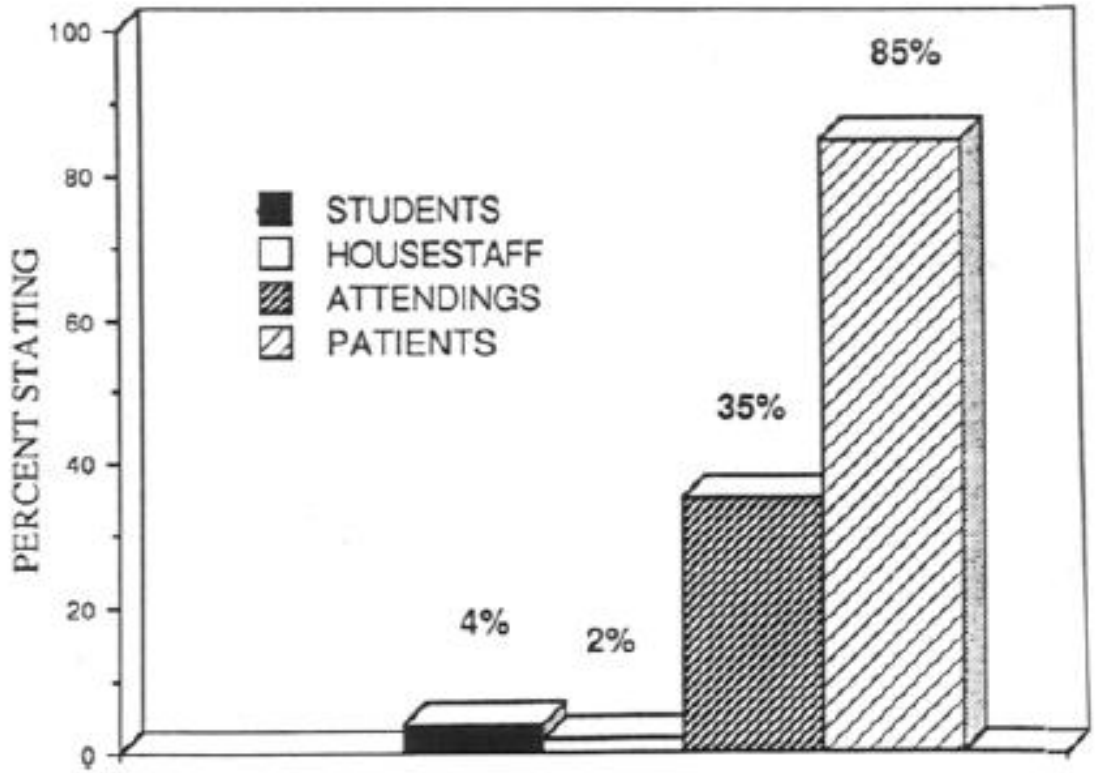


FIGURE 1. Percentages of respondents preferring the bedside for case presentations.

J Gen Intern Med. 1989 Jul-Aug;4(4):284-7.

Patients' Reactions

- 86% : it increased my understanding of my medical problems,
- 77%: I enjoyed it (only 17% did not)
- 83%: It did not make me anxious,
- 85% I do not think that bedside teaching breaches confidentiality
- 84%: I would recommend bedside teaching to other patients.

Neir, **Medical Education 1997; 31:341-346**

Perceptions of Residents and their Attendings

- Residents want more time at the bedside with faculty (94%)
- Attendings want to make bedside teaching a priority (78% vs. 22%)
- Attendings lack confidence in bedside teaching (33%), esp in physical exam (50%), and few have been trained (33%)

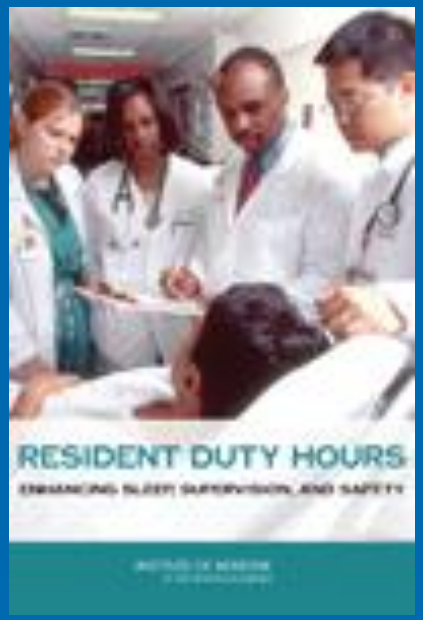
J Hosp Med 2009 May;4(5):304-7.

THE CLINICAL IMPACT OF TRAINING CHANGES: *ONE EXPERIMENT*

Background

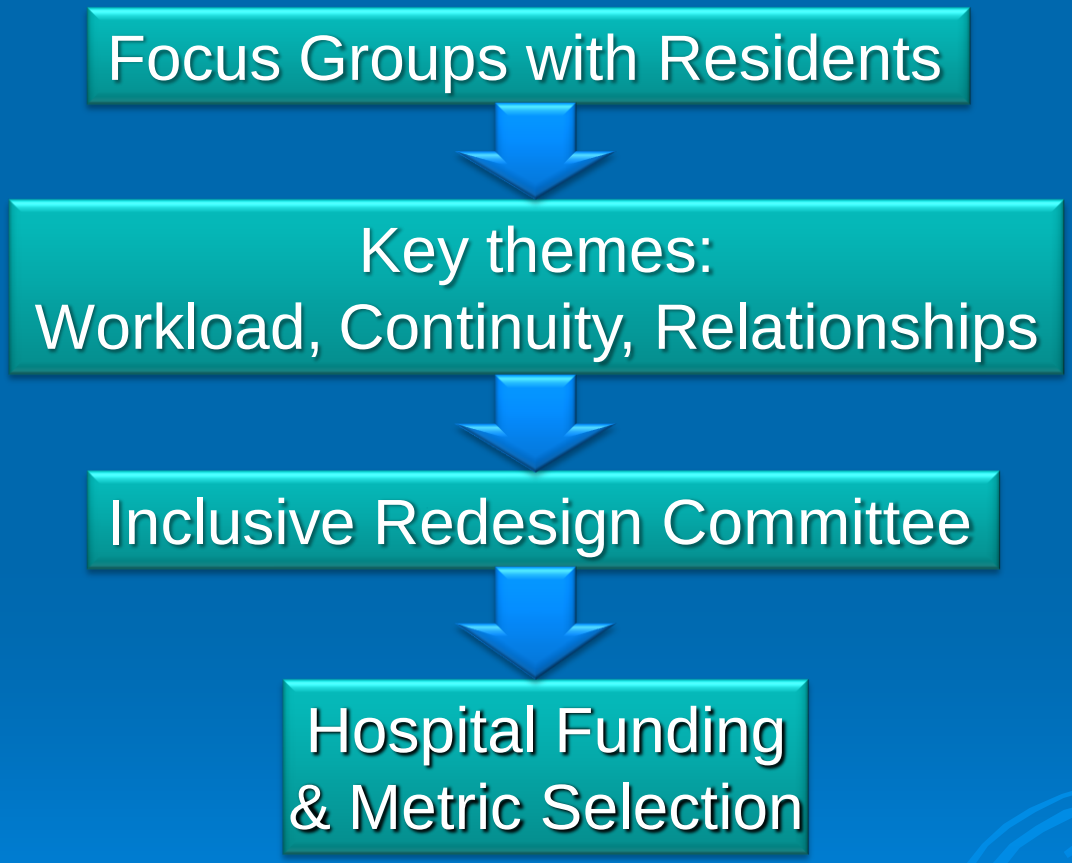
- Extended resident work hours and increased on-call workload have been associated with
  - fatigue-related errors,
  - resident dissatisfaction, and
  - reduced participation in educational activities

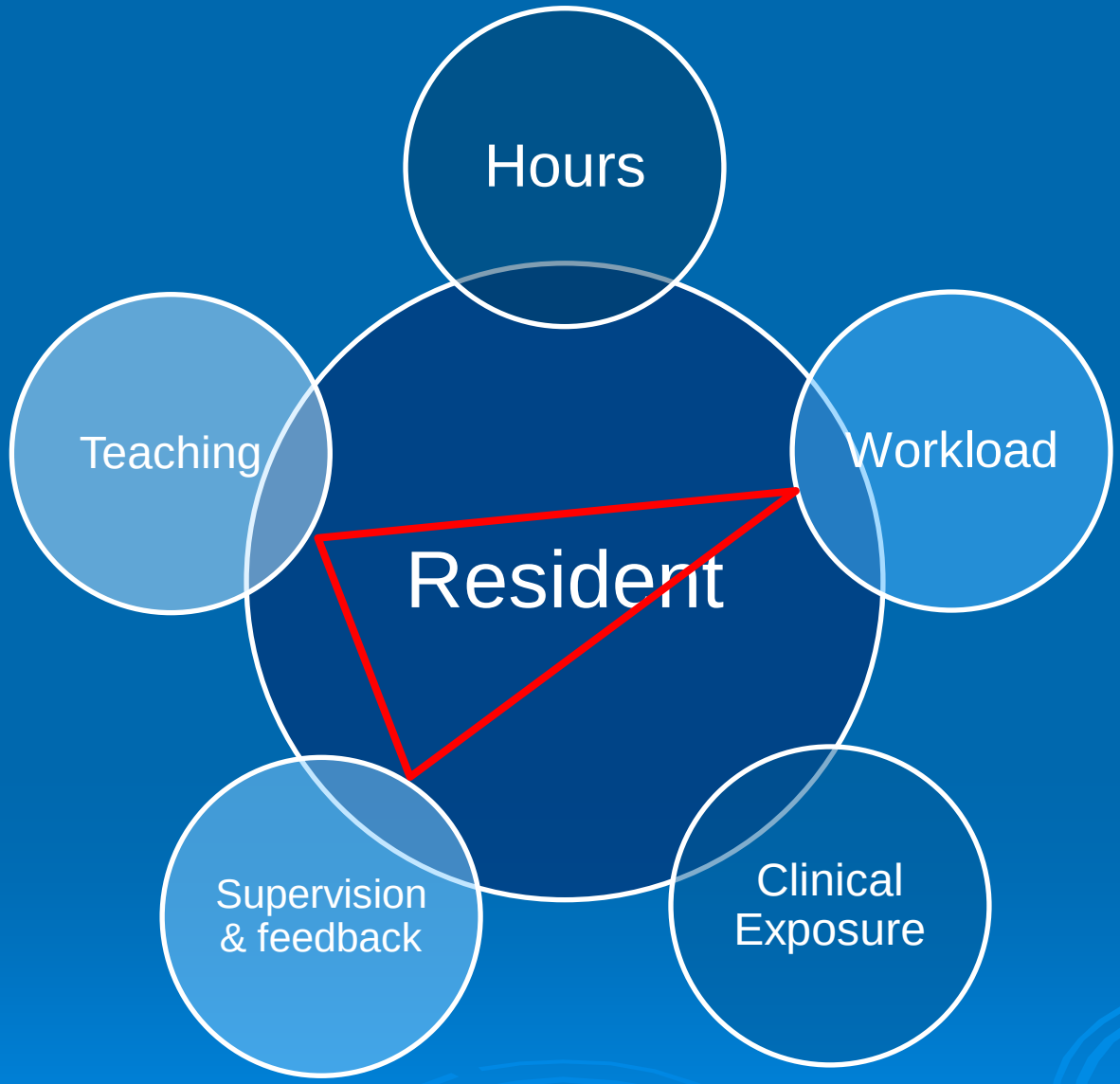
- We hypothesized that changing resident workload and supervision within established duty-hour limits could improve care quality.



IOM Report

Redesigning Our Teams

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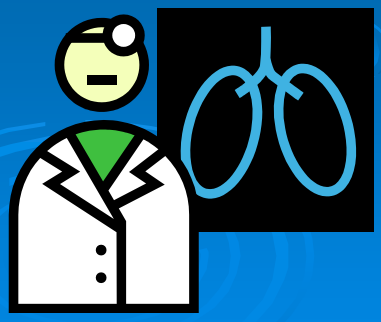
Daily Schedule

- 7:30-9:30am Team Work Rounds
- 9:30-10:30am Morning Report
- 10:30-12noon Pt care/enhanced education
- 12-1pm Resident led teaching
- 1-2pm Pt care/enhanced education
- 3-4pm Attending led teaching
- 4-4:30pm Radiology Rounds

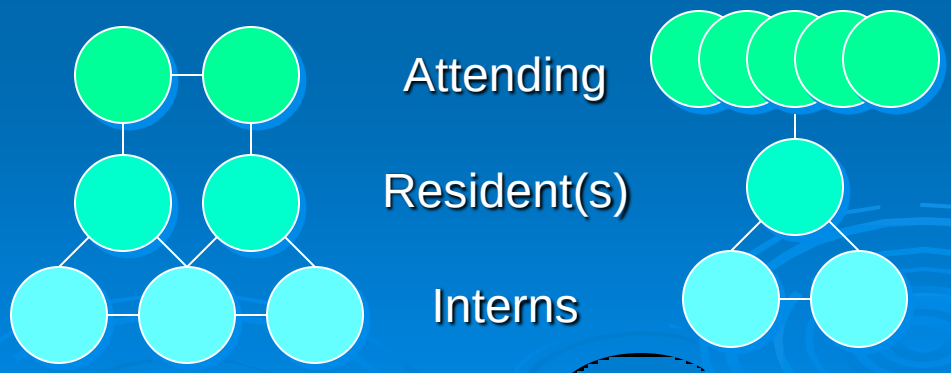


On-call schedule

- Interns
  - On call overnight every 6th night
- Residents
  - On call until 10pm every 4th night
  - Overnight coverage by night resident

Team Differences

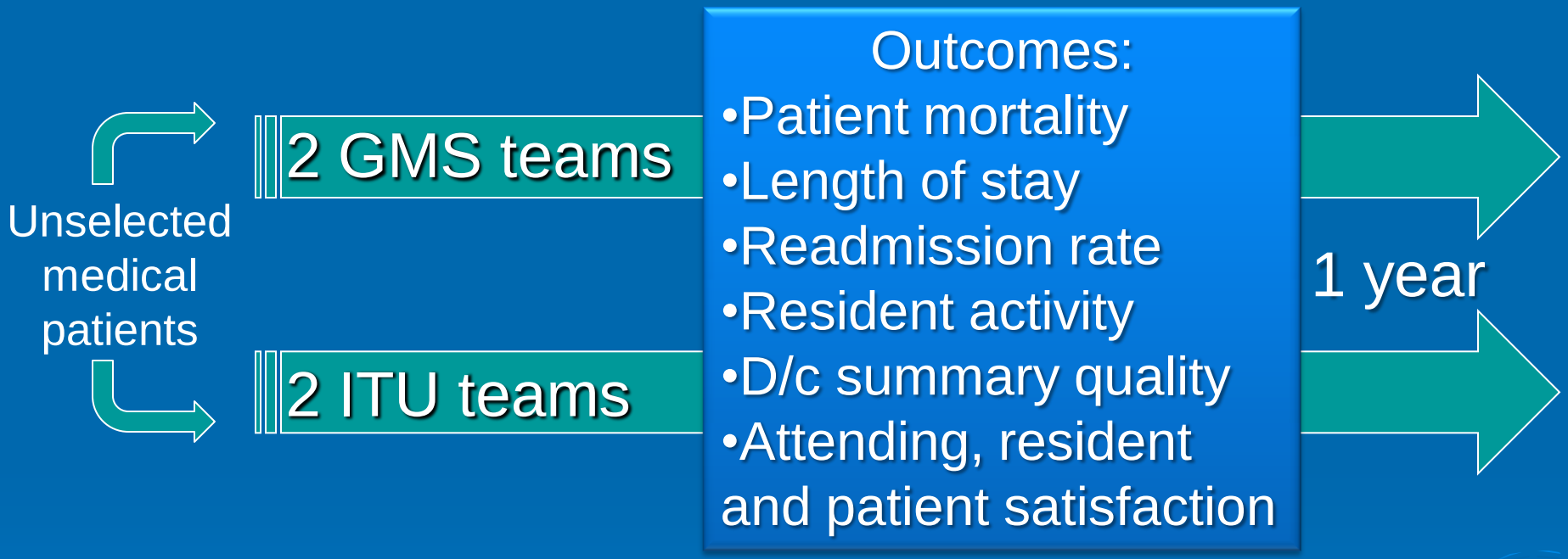
	ITU	GMS (control)
Team Structure	2 residents 3 interns	1 resident 2 interns
Supervision	2 co-attgs present on site	Multiple care attgs Variable contact
Workload	Max census of 15 pts (~4-5 pts per intern)	Max census per ACGME limits (~6-8 pts per intern)



Team Similarities

- All teams on one hospital floor
- Same nurses and other professionals
- Same residents rotated through each team
- Duty hours similar
- Attendings included hospitalists, generalists, and subspecialty attendings

Trial Schema



Resident Activity

ITU residents spent much more of their time in educational activities than GMS residents

	ITU	GMS
Direct Patient Care	12%	18%
Indirect Patient Care	36%	44%
Education**	29%	7%
Transitions of care	6%	11%
Other	17%	20%

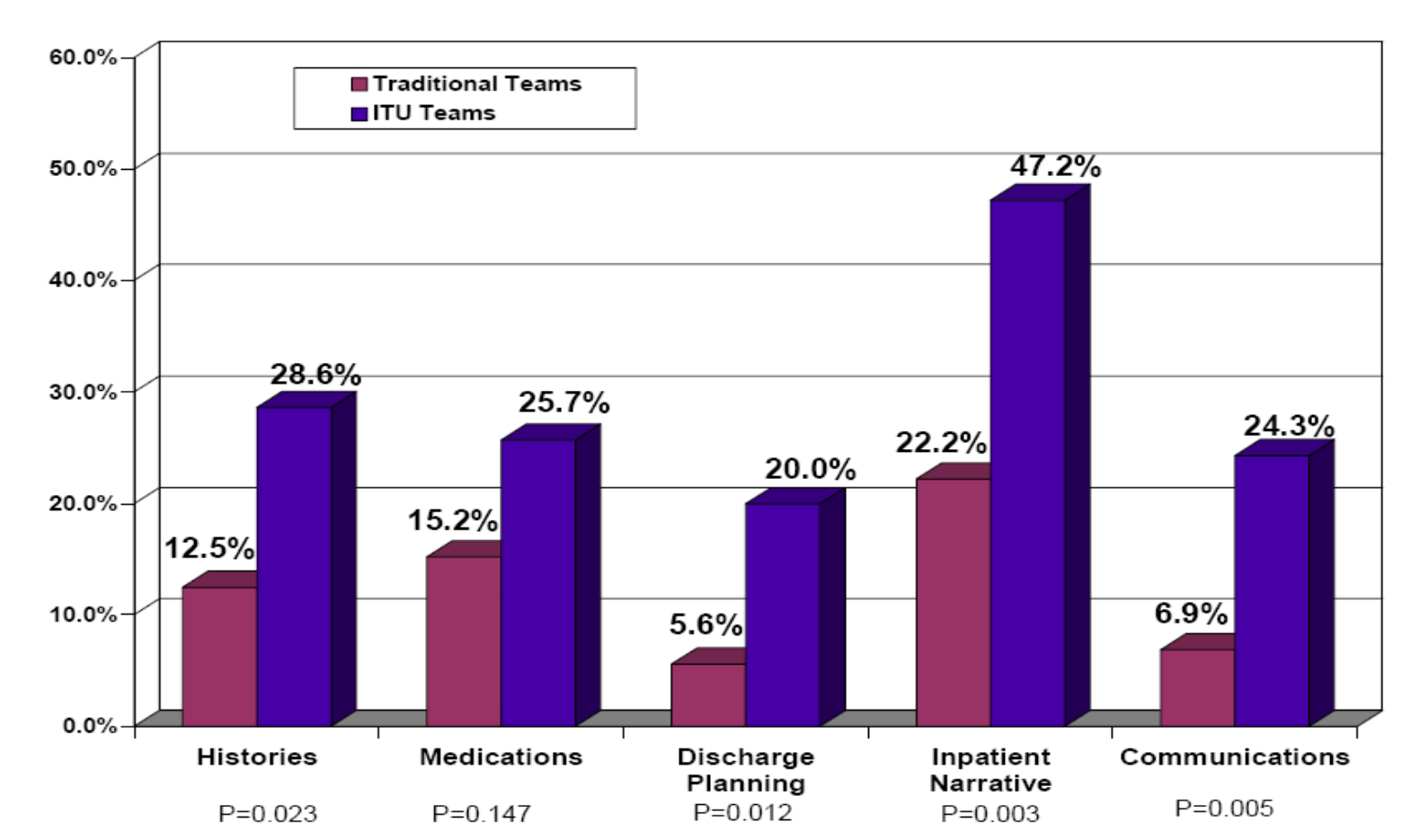
**P=0.003

Resident Survey Data

	ITU	GMS	P-value
Number of Residents Returning surveys	98	62	
Number of Surveys	104	62	
I agree with this statement (mean % agreement):			
I enjoyed the rotation	77.9	54.8	0.002
This rotation was closest to an ideal residency experience	41.4	6.4	<.0001
I had more follow-up than usual	22.1	8.1	0.02
I learned new physical exam skills	77.9	30.6	<.0001
I received feedback from my attending	85.6	30.6	<.0001
I learned a lot from this activity this month (mean % agreement)			
Morning report	95.1	58.3	<.0001
My attendings on rounds	83.6	66.1	0.009
Preparing teaching topics	78.9	74.4	0.59
Resident-led didactics	80.0	44.1	<.0001

Quality of Discharge Summaries

- Blinded evaluation of 142 random discharge summaries



	ITU	GMS	p-value
Number of Patients	1892	2096	
% Female	58.0%	60.0%	0.13
Race Category			
White	78.0%	80.7%	0.11
African-American	14.1%	13.3%	
Hispanic	4.9%	3.8%	
All Others Declared	3.0%	2.2%	
Mean age (sd)	68.9 (17.6)	69.6 (17.2)	0.22
Insurance			0.29
Private	37.7%	39.6%	
Medicare	32.3%	33.2%	
Medicaid	25.9%	23.5%	
No insurance	4.0%	3.7%	
Diagnosis Category			0.1
Cardiovascular	17.2%	15.1%	
Pulmonary	15.8%	15.0%	
Gastronenterology	12.7%	15.2%	
Renal	8.3%	7.3%	

Primary Results

	ITU	GMS	P-value
Discharge Volume (number of patients)	1892	2096	
Mean daily census per first-year resident	3.5	6.6	
In-patient mortality (%)	1.4	2.2	0.04
Expected mortality (%)	1.7	1.7	
O/E Mortality Ratio	0.79	1.26	<.0001
Average LOS (mean days [se])	4.1 (.09)	4.6 (.10)	0.0002
Expected LOS (mean days)	4.0	4.0	
O/E LOS Ratio	1.03	1.15	<.0001
Readmissions within 30 days (%)	6.9	8.0	0.19

*O/E = observed to expected; LOS = length of stay

Experimental Conclusions

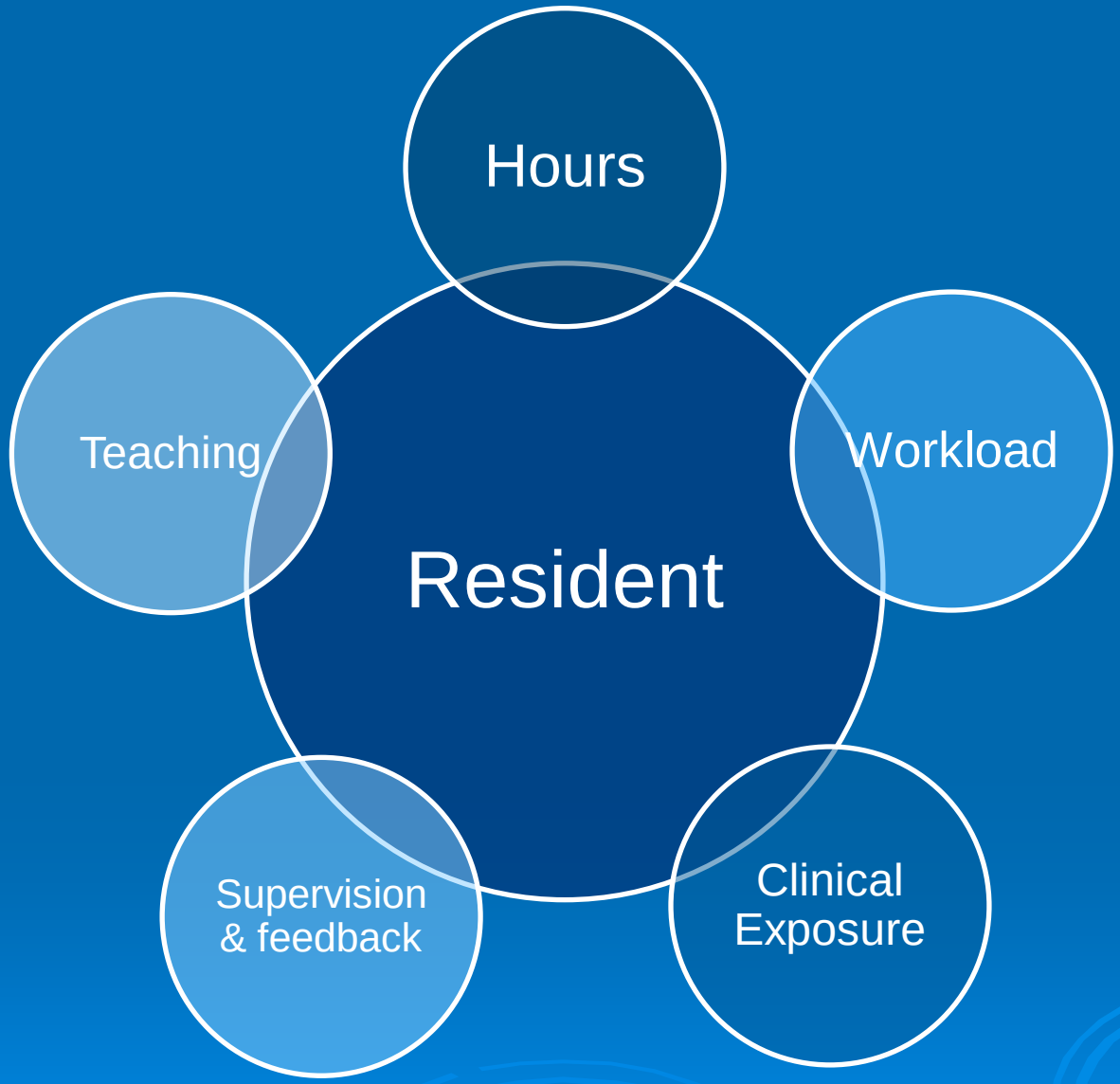
- As compared to a typical inpatient care model, reduced intern workload within a restructured team model was associated with
  - significantly increased time for educational activities
  - significantly lower inpatient mortality and length of stay,
  - significantly higher attending and resident satisfaction
- Investment in trainees results in higher quality of care

Conclusions 1

- Residency training is complex for administrators and challenging for residents
- Residents professional commitment to their patients will naturally take precedence over educational imperatives
- Programs must structure their programs so that residents have time to learn
  - Appropriate workhour and workload limits
  - Supervision and feedback
- Attention to educational quality improves care quality and patient outcomes

Conclusions 2

- If quality of GME is to improve in Japan
  - Quality standards must be further developed (workload, work hours, teaching, supervision)
  - Additional independent assessment of programs is necessary
  - Adherence to standards must be measured and reported
  - Failure to meet standards must have consequences
  - Reports must be published, accessible to applicants
  - Teaching skills must be developed
- Improved GME quality will improve patient care quality and outcomes


Hours
Teaching
Workload
Resident
Supervision
& feedback
Clinical
Exposure

BRIGHAM AND WOMEN'S HOSPITAL

A Tradition of Caring

BWH