Sleep in your trainees and YOU!

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Sept 24, 2016
Fall APPD Meeting


Associate program director
Director of Pediatric Fellowships
APPD FPD Exec Committee
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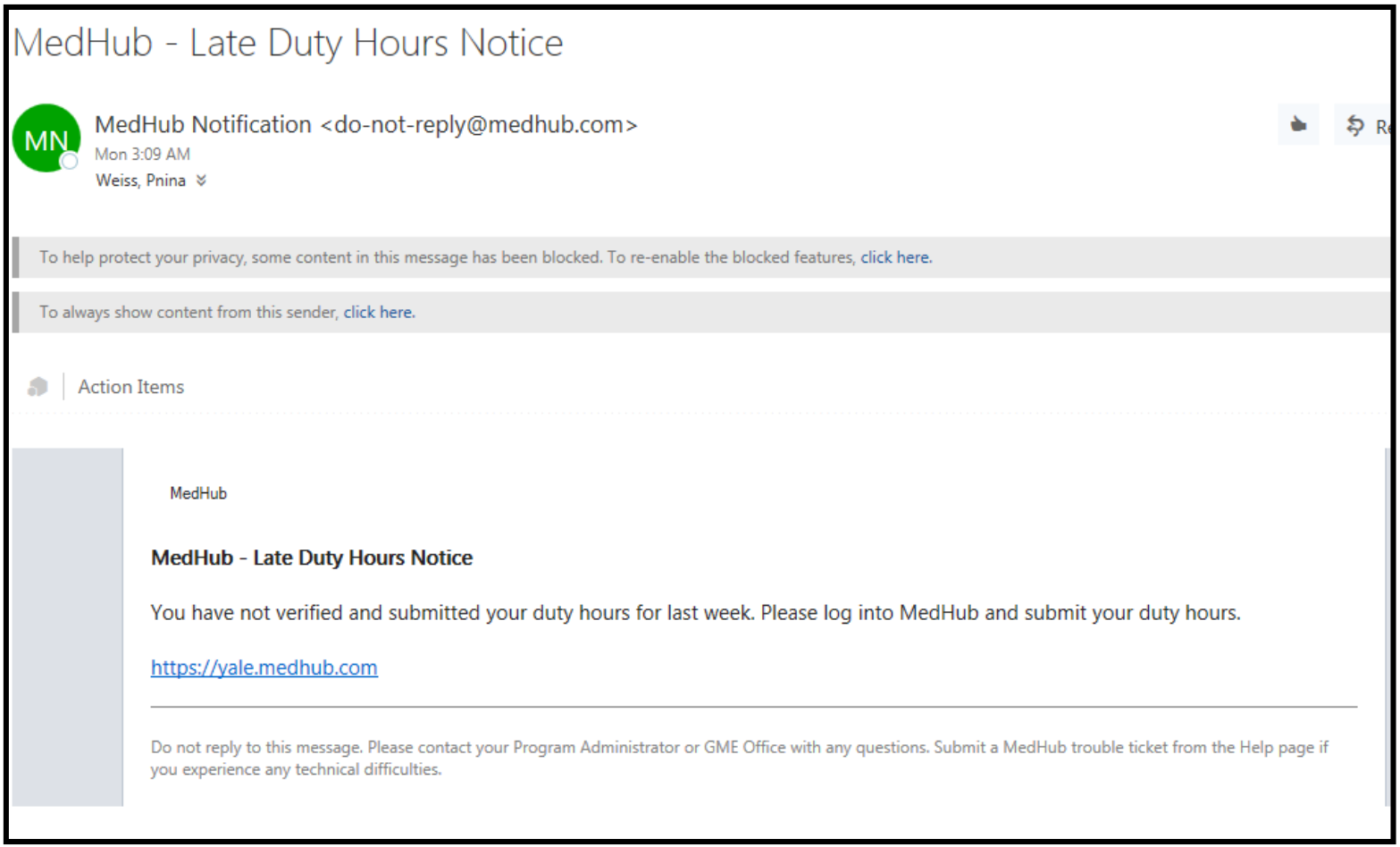
Sleep Review
APRIL 2016
www.sleepreviewmag.com
Volume 17 • Number 4
FOR SLEEP SPECIALISTS
SLEEP'S ILLUMINATOR
Meir Kryger, MD, measures his legacy not by what he personally achieved, but by how he helps others
Overnight EEG for Insomnia Patients
A reimbursable way to clear up sleep state misperception
Surviving Shift Work
Sleep anchoring explained
Optimizing EHR
How is information management transforming sleep medicine?

Objectives

Importance of adequate sleep for our trainees and US!

Rationale behind monitoring duty hours


MedHub - Late Duty Hours Notice

MN

MedHub Notification <do-not-reply@medhub.com>

Mon 3:09 AM

Weiss, Pnina

To help protect your privacy, some content in this message has been blocked. To re-enable the blocked features, click here.

To always show content from this sender, click here.

Action Items

MedHub

MedHub - Late Duty Hours Notice

You have not verified and submitted your duty hours for last week. Please log into MedHub and submit your duty hours.

https://yale.medhub.com

Do not reply to this message. Please contact your Program Administrator or GME Office with any questions. Submit a MedHub trouble ticket from the Help page if you experience any technical difficulties.

Evidence for specific duty hour restrictions

- **80 hrs, averaged over 4 wks**
- **Every 3rd night, averaged over 4 wks**
- **16 hrs for interns**
- **28 hrs for more senior residents**
- **24 hrs consecutive duty**
- **4 hrs additional allowed**
- **Should have 10 hrs and must have 8 hrs between duty periods**
- **24 hrs off in 7 days, averaged over 4 wks**

Evaluate recent literature

Flexibility In duty hour Requirements for Surgical Trainees Trial

"the FIRST trial"

ome | Study Overview | Requirements | IRB Approval | Post-Randomization | Important Dates | Enrolled Hospitals | FAQs | Study Team

The NEW ENGLAND JOURNAL of MEDICINE

National Cluster-Randomized Trial of Duty Hour Flexibility in Surgical Training

Karl Y. Bilimoria, MD MS; Jeanette W. Chung, PhD; Larry V. Hedges, PhD; Allison R. Dahlke, MPH; Remi Love, BS; Mark E. Cohen, PhD; David B. Hoyt, MD; Anthony D. Yang, MD; John L. Tarpley, MD; John D. Mellinger, MD; David M. Mahvi, MD; Rachel R. Kelz, MD MSCE; Clifford Y. Ko, MD MS MSHS; David D. Odell, MD MMSc; Jonah J. Stulberg, MD PhD MPH; Frank R. Lewis, MD

Satisfy ACGME requirements

Educate all faculty members and trainees

- to recognize the signs of fatigue and sleep deprivation
- in alertness management and fatigue mitigation processes

Adopt fatigue mitigation processes to manage the potential negative effects of fatigue on patient care and learning, such as naps or back-up call schedules

What is the average number of hours of sleep that you get/night?

National Sleep Foundation: Average recommended nightly hours of sleep

	Hours/night
Young adult (18-25 yrs)	7-9
Adult (26-64 yrs)	7-9
Older adult (≥ 65 yrs)	7-8

	Age	hrs
newborn		14-17
infant	<1yr	12-15
toddler	1-3 yrs	11-14
preschool	3-6 yrs	10-13
school	7-12 yrs	9-11
teen	> 12 yrs	8-10

Hirschkowitz et al. Sleep Health. 2015

Gallup poll 2013- 40% of adults get less than 7 hours of sleep/night

Usually, how many hours sleep do you get at night?

	1942	1990	2001	2004	2013
	%	%	%	%	%
Five hours or less	3	14	16	14	14
Six hours	8	28	27	26	26
Seven hours	25	30	28	28	25
Eight hours	45	22	24	25	29
Nine hours or more	14	5	4	6	5
NET: Six hours or less	11	42	43	40	40
NET: Seven hours or more	84	57	56	59	59
Average hours per night	7.9	6.7	6.7	6.8	6.8

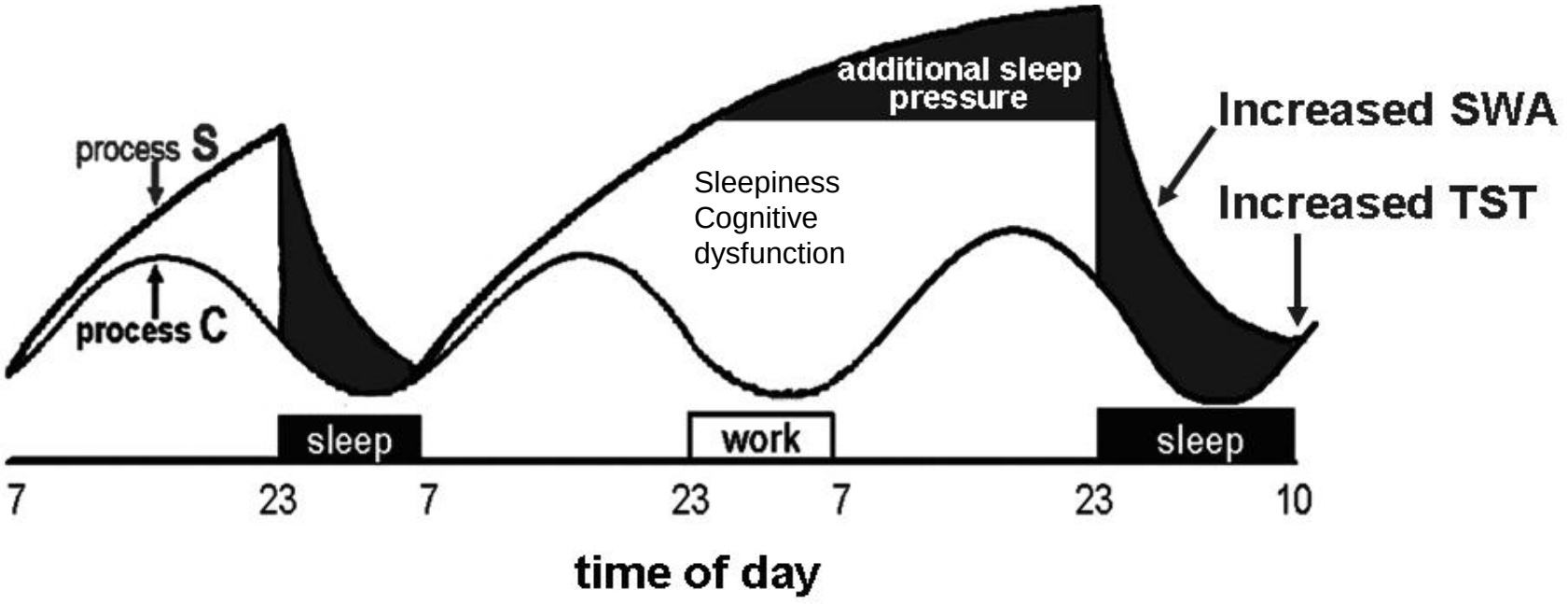
GALLUP

40% < 7 hrs Sleep/night

Why is inadequate sleep a problem?

- **Sleepiness**
- **Mood**
- **Cognitive function**
  - **Impairs performance**
    - **Mistakes**
    - **Safety**
    - **Productivity**
- **Health risks**
  - **Cardiovascular**
  - **Endocrine**
  - **Psychiatric**
  - **? Cancer risk**

Two process model of acute total sleep deprivation



https://smoens.files.wordpress.com/2010/12/class1_sleephomeostasis31.jpg

Sleep deprivation impairs cognitive function

- Lapse hypothesis
  - Microsleeps
  - Decreased alertness and attention

- Selective impact
  - "Prefrontal vulnerability hypothesis
    - Language, executive functions, divergent thinking and creativity
    - Simple task performance impaired by boredom

Priest et al. *Am J Respir Crit Care Med* 2001; Doran et al. *Arch Ital Biol* 2001
Babkoff et al. *J Sleep Res* 2005; Horne. *Br J Psychiatry* 1993

October 4, 1984

You don't need kindergarten to know that a resident working a 36-hour shift is in no condition to make any kind of judgment call -- forget about life-and-death.

Sidney Zion

Timeline of work hour restrictions

- 1989- 80 hr work week in NY (Bell commission)
- 2003- ACGME: 80 hour work week; 24 + 6 hrs shift
- 2008- IOM: Resident duty hours: Enhancing sleep, supervision and safety
- 2011- ACGME: revision

Comparison of duty hour limitations between the 2003 and 2011 ACGME requirements and the 2009 IOM Recommendations

	ACGME 2003 Requirements	IOM 2009 Recommendations	2011 ACGME Requirements
Maximum hr/wk	80 hrs, averaged over 4 wks	80 hrs, averaged over 4 wks	80 hrs, averaged over 4 wks
Maximum duration of duty period	30 hrs 24 hrs consecutive duty 6 hrs additional allowed	16 hrs without nap 30 hrs (5 hr nap required after 16 hrs)	16 hrs for interns 28 hrs for more senior residents 24 hrs consecutive duty 4 hrs additional allowed
In hospital on-call frequency	Every 3rd night, averaged over 4 wks	Every 3rd night, no averaging	Every 3rd night, averaged over 4 wks
Minimum time off between scheduled duty periods	Should have 10 hrs off between all daily duty periods and in-house call	Must have 10 hrs after regular daytime duty 12 hrs off after night duty 14 hrs off after extended duty and must not return before 6 am.	Should have 10 hrs and must have 8 hrs between duty periods* 14 hrs after extended duty
Minimum off-duty time	24 hr off in 7 days, averaged over 4 wks	24 hrs off in 7 days, no averaging, plus golden weekend (48 hrs/month)	24 hrs off in 7 days, averaged over 4 wks

(*exceptions for residents in final yrs)

Consequences of duty hour restrictions on programs

- Shorter shifts
- Less frequent call
- Night float system
- Home call
- Protected sleep periods
- Increase the # of residents
- Hire ancillary staff
- Shift work to attending physicians
- Restructure educational curriculum

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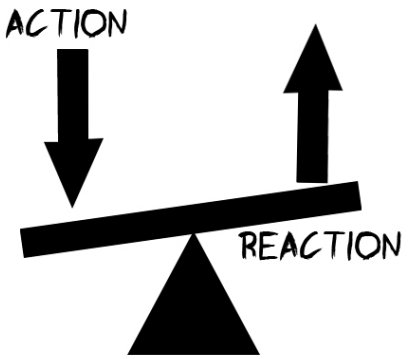
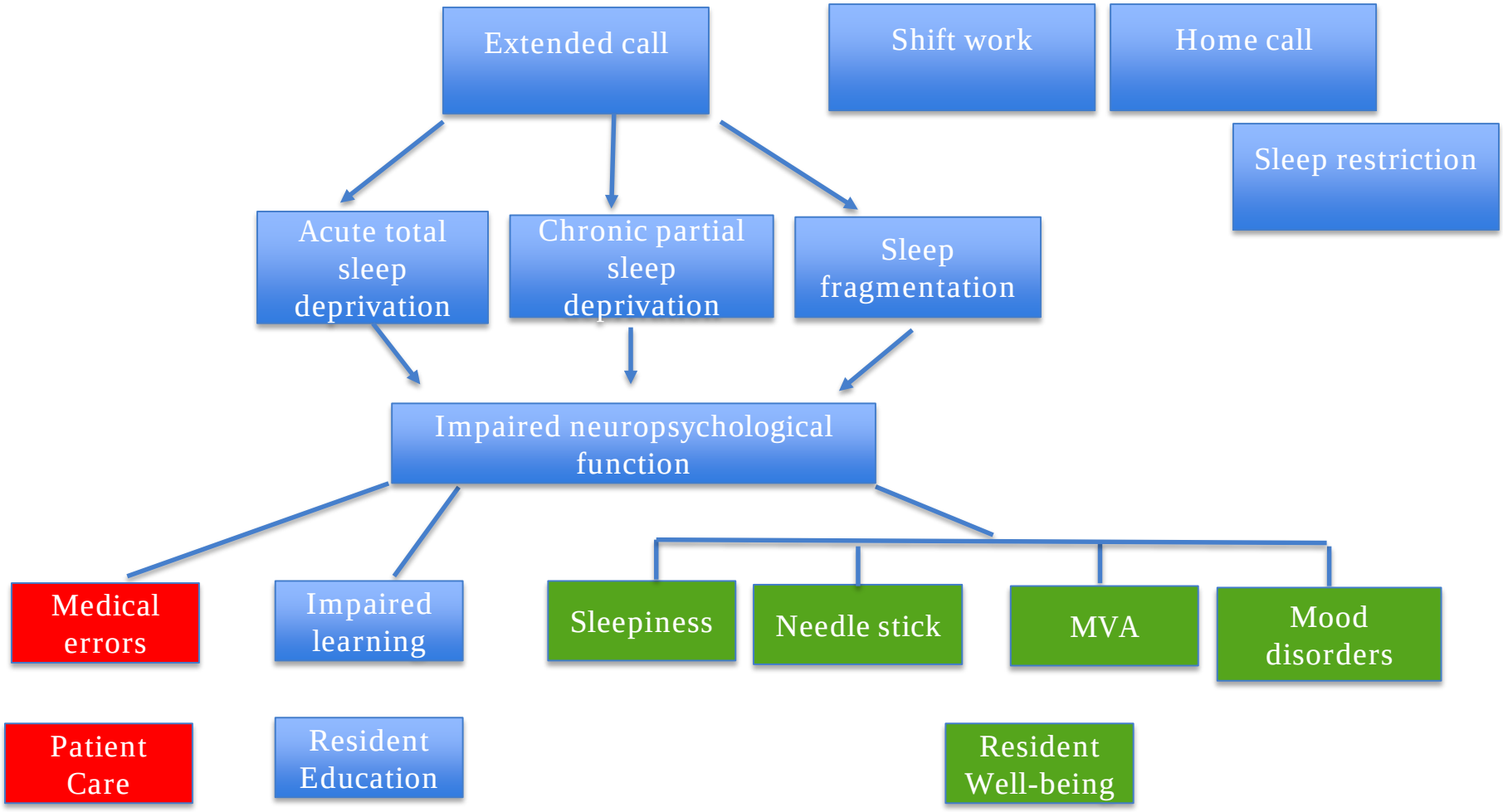


- More transitions of care
  - errors in communication = adverse impact patient safety
- Impaired resident education
  - interruptions in continuity of care
  - fewer educational opportunities
  - decrease in patient volume and procedures
- "Shift mentality"
  - adverse impact on professionalism
  - residents poorly prepared
- *Insufficient attention to the educational environment (supervision, transitions of care, etc)*
- *One size fits all model*
- *Changes are expensive*
- *No mechanism to measure the impact of the changes*

Where's the beef?

Sleep in Medical Trainees (and you!)



Adverse impact of extended shifts in medical residents

Resident Well-being	**Sleepiness**	**ESS** (Pikovsky, et al. Isr Med J 2013; Woodrow, et al. Med Ed 2008; Rose, et al. Behav Sleep Med 2008) **VAS, SSS** (Arnedt et al. JAMA 2005) **MSLT** (Howard, et al. Acad Med 2002)
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	Patient outcomes	**Medical errors, fatigue related adverse events** (Barger et al. PLoS Med. 2006)

Studies on extended shifts in medical residents

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Educa		
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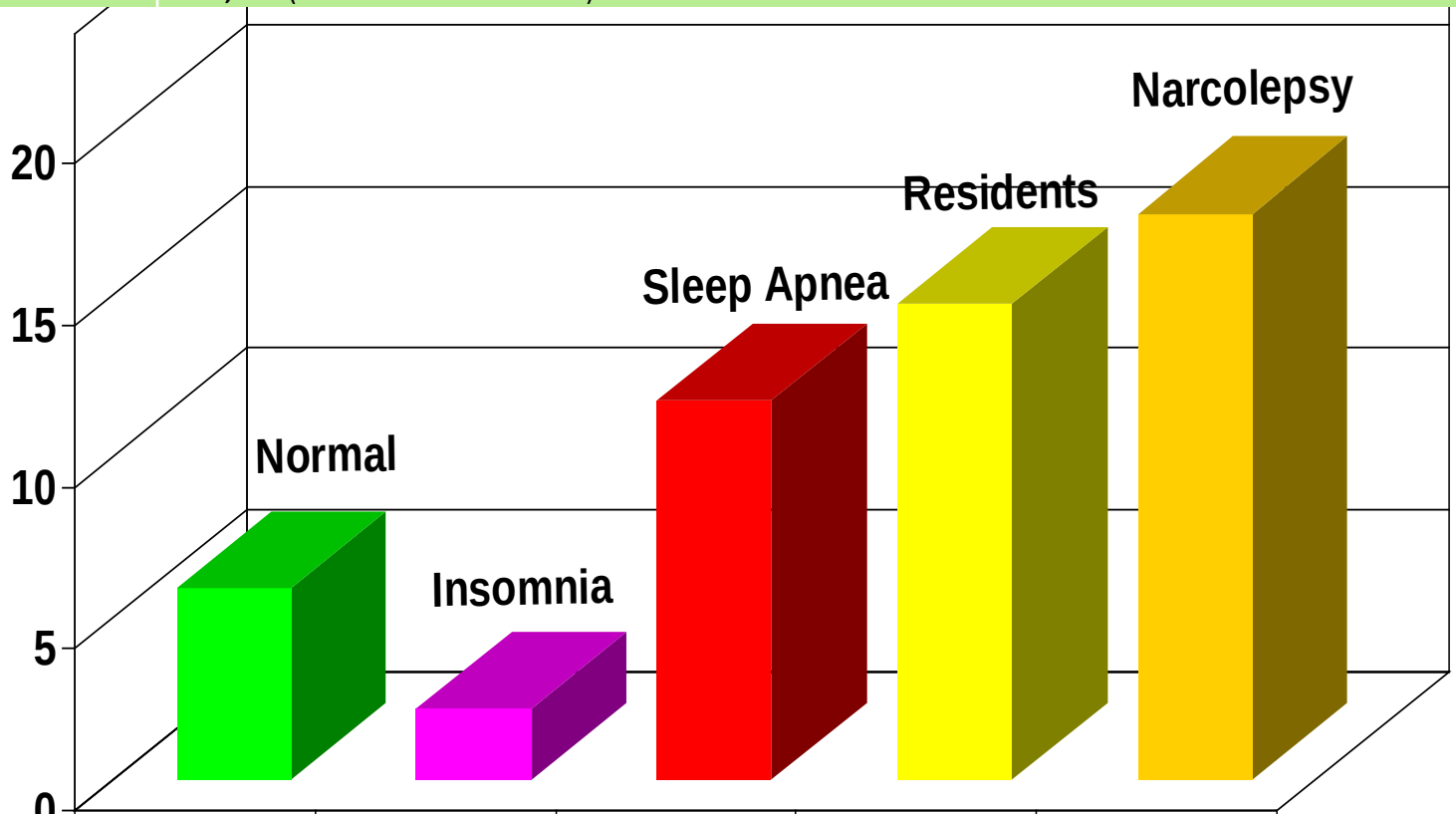

	Normal	Insomnia	Sleep Apnea	Residents	Narcolepsy
Mean	5.90	2.20	11.70	14.70	17.50

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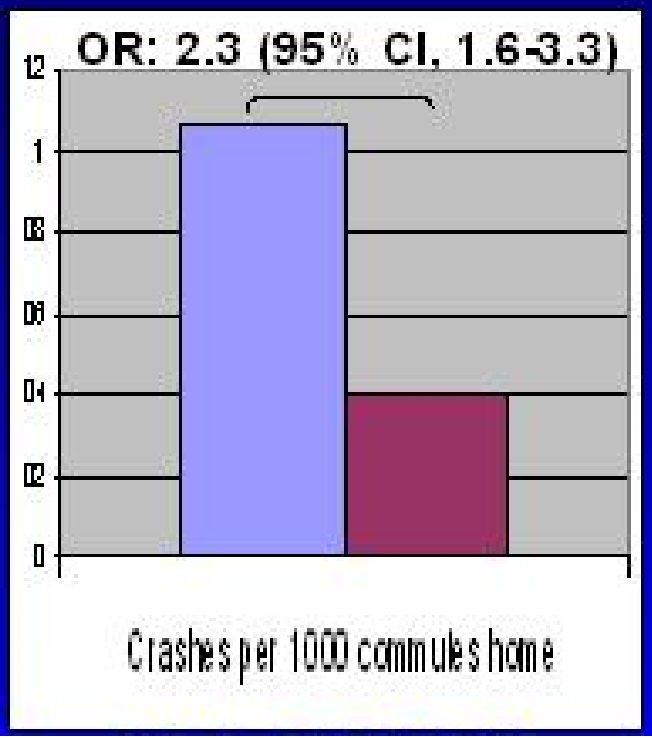
Effect of Extended Duty Shifts on Resident Safety: Harvard Work Hours, Health and Safety Study



- Odds ratio for near miss- 6
- Every extended work shift/month increased risk of crash during commute from work by 16%
- During months with 5 or more shifts, the risk of falling asleep while driving or stopped in traffic increased (OR 2.3)

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hifts

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ospective
37 interns
over 1 year

Barger et al. *NEJM* 2005

Ayas et al. *JAMA* 2006

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Meta-analysis of effect of sleep restriction on physician performance

60 studies in 959 physicians

Sleep loss of less than 30 hrs reduced physician's overall performance by nearly 1 standard deviation and clinical performance by more than 1.5 standard deviations

Philibert. *Sleep* 2005

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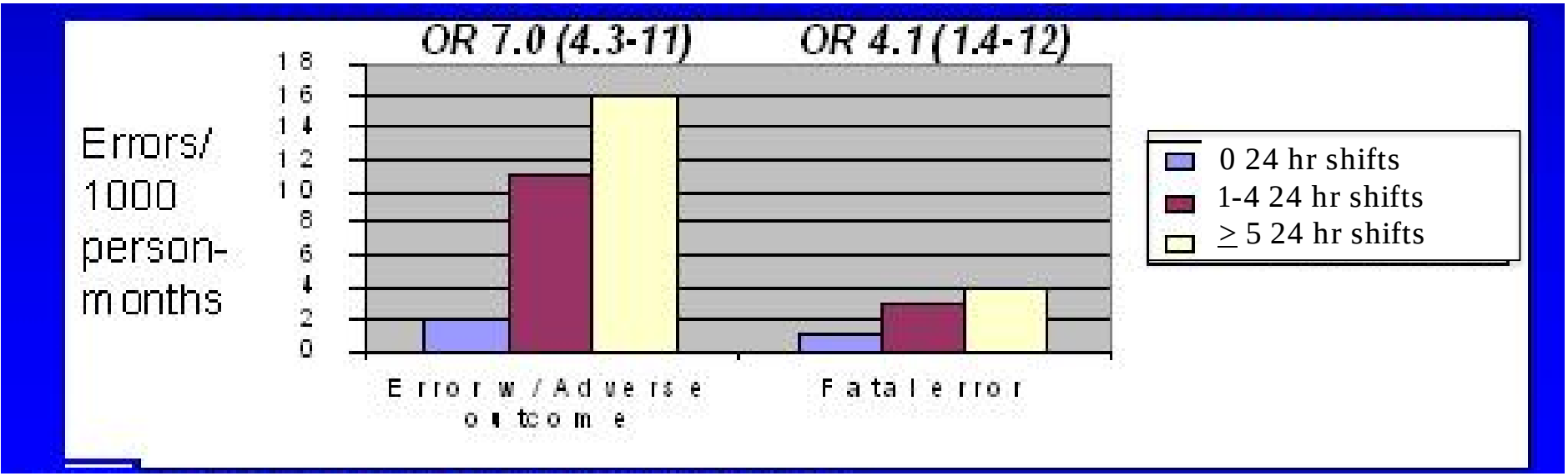


Barger et al. *PLoS Medicine* 2006

Residents don't perceive their impairment

- Anesthesiology residents demonstrated poor ability to detect microsleeps documented by EEG (MSLT)
  - Failed to report sleep in 49% of episodes of sleep
- Pediatric Residents
  - After 24 hr call, had impairment in verbal recall and logic memory, concentration, reaction time, vigilance and hand eye coordination and attention lapses, but they did not appreciate the deterioration in performance

Howard et al. *Acad Med* 2002
Qureshi et al., *J Pak Med Assoc* 2010

Effect of extended shifts is NOT uniform!

	EFFECT	NO EFFECT!
Sleepiness	**ESS VAS, SSS** **MSLT**	
Mood	**Sadness, decreased vigor, egotism, social affection, difficulty thinking, depression, irritability, depersonalization, inappropriate affect, anger, tension, depression, fatigue** **Burnout** **Emotional reactivity**	**Burnout** (Thomas, JAMA 2004, Tzischinsky J Hum Ergol 2001)
Cognitive testing	**Psychomotor vigilance, working memory, visuomotor performance, fine motor skills, creative thought, response inhibition** **In-training exam**	**Psychomotor vigilance, working memory, problem solving, visuomotor performance, motor tasks, verbal skills** (Bartle et al., Surg 1988, Deasonson et al., JAMA 1988) **Knowledge test** (Browne et al, Surg 1994; Storer et al., Acad Med 1989, Reznick et al., Am J Surg 1987)
Simulated and actual clinical performance	**ECG interpretation** **Fetal wt** **Umbilical artery catheterization** **Simulated patient monitoring** **Simulated procedures** **Clinical procedures**	**Epidural placement** (Hayter et al., Br J Anaesth 2010) **Structured clinical interviews** (Engel et al., S Med J 1987) **Lab form testing** (Reznick Am J Surg 1987) **Simulated suturing** (Reznick et al., Am J Surg 1987) **Endotracheal intubation, vein catheterization** (Storer et al, Acad Med 1989)
Patient outcomes		**Surgical complications, morbidity, mortality** (Haynes et al., South Med J 1995; Ellman et al., Ann Thorac Surg Yaghoubian et al., J Surg Educ 2010)

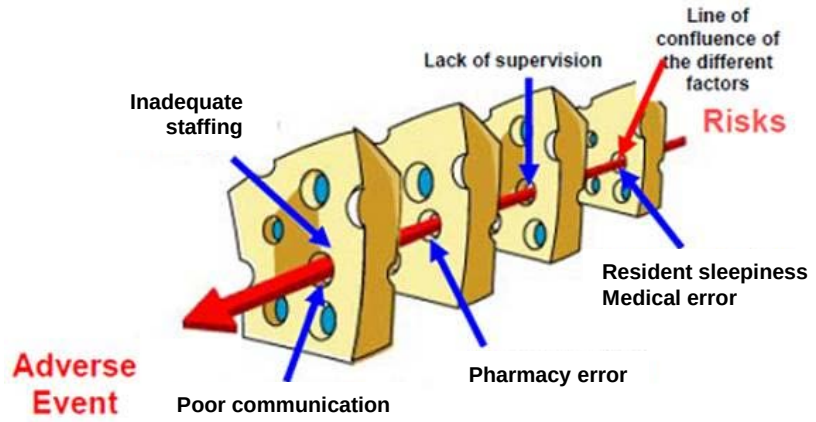
Why no effect of extended duty hours in some studies?

- Methodological (low power)
- Sleep history (acute on chronic sleep deprivation)
- Circadian rhythms
- Arousing factors (activity, bright light, caffeine, motivation)
- Test
- Individual characteristics (sex, vulnerability (surgeon))

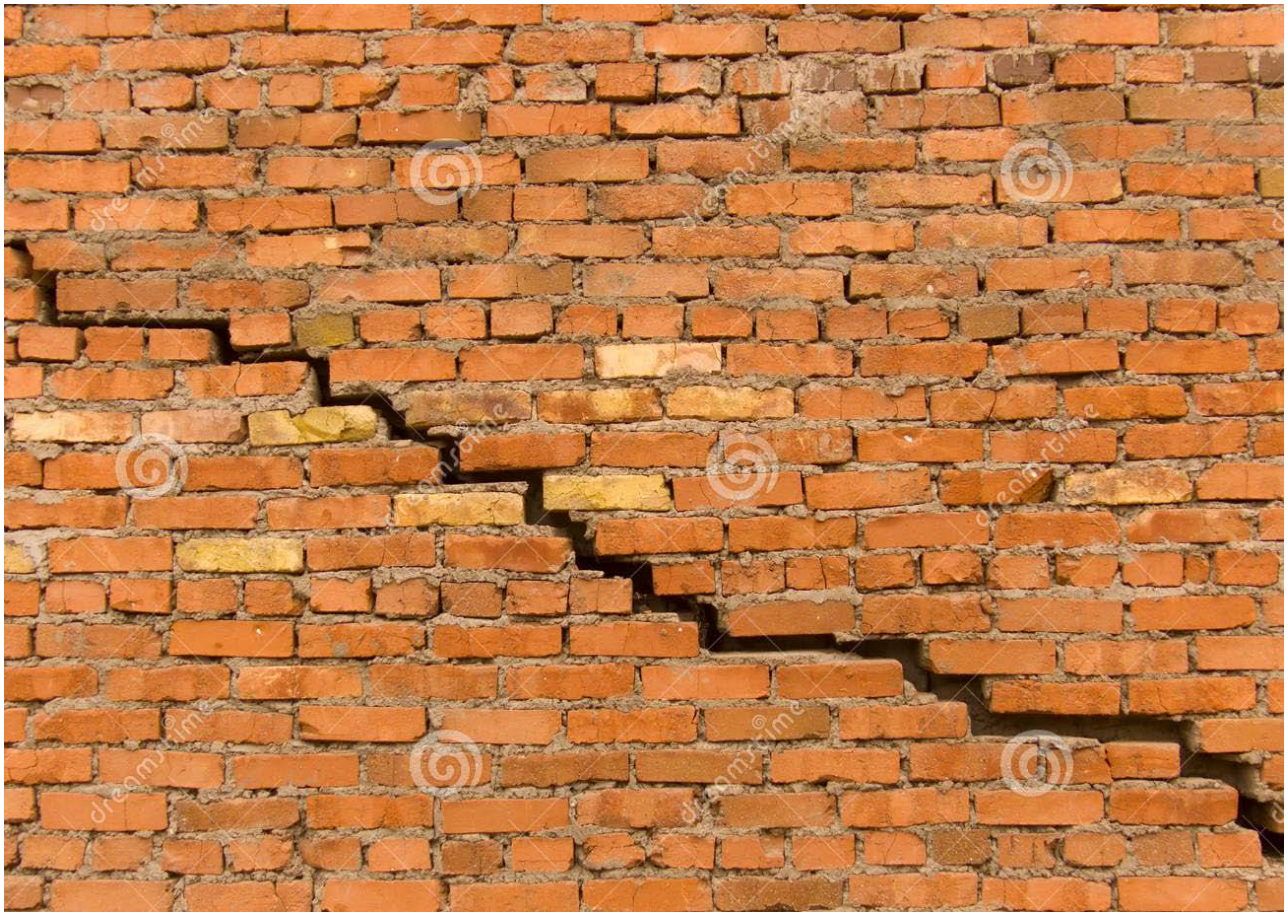
- Patient outcomes (ie mortality)

Why no effect of extended duty hours in some studies?

- Patient outcomes (ie mortality)
  - Rare
  - Reflects
    - Patients (severity of illness)
    - Task (educational value, caseload)
    - Work and learning environment (supervision)
    - Organizational factors (workflow)



Crack in foundation.....



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Why 80 hrs?

- 80 hrs is “a number with some general acceptance, without much scientific underpinning”

  Dr. Paul Friedmann, co 2002-chair of ACGME duty hours working group

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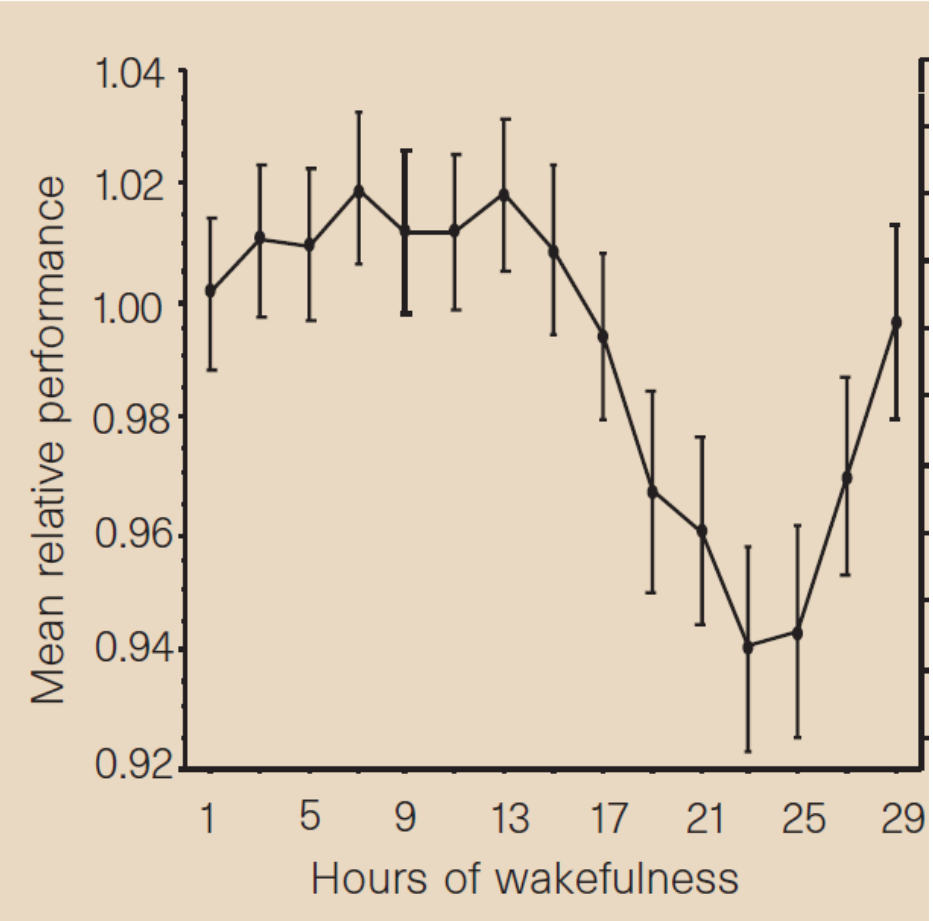
Why 16 hrs?

Performance on spatial PVT with extended wakefulness



Dawson, D et al. *Nature* 1997

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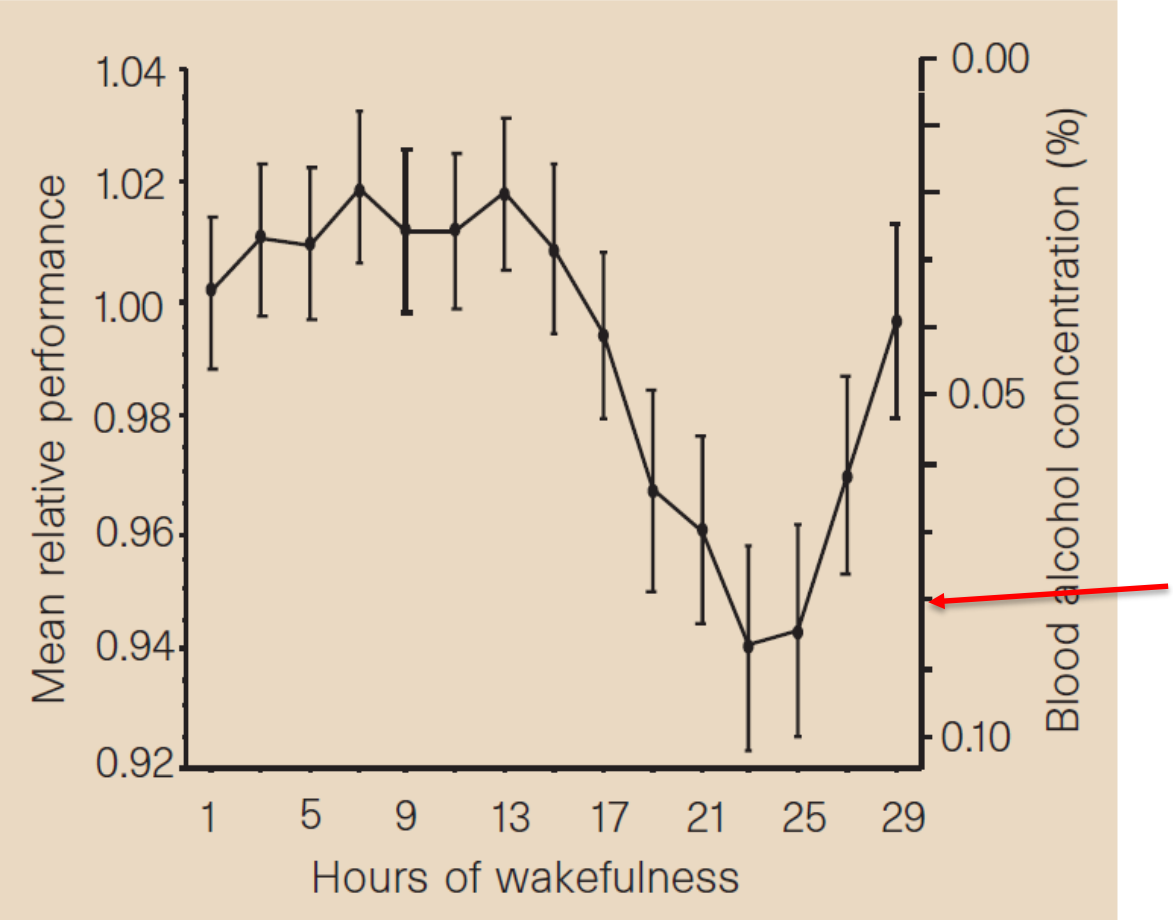
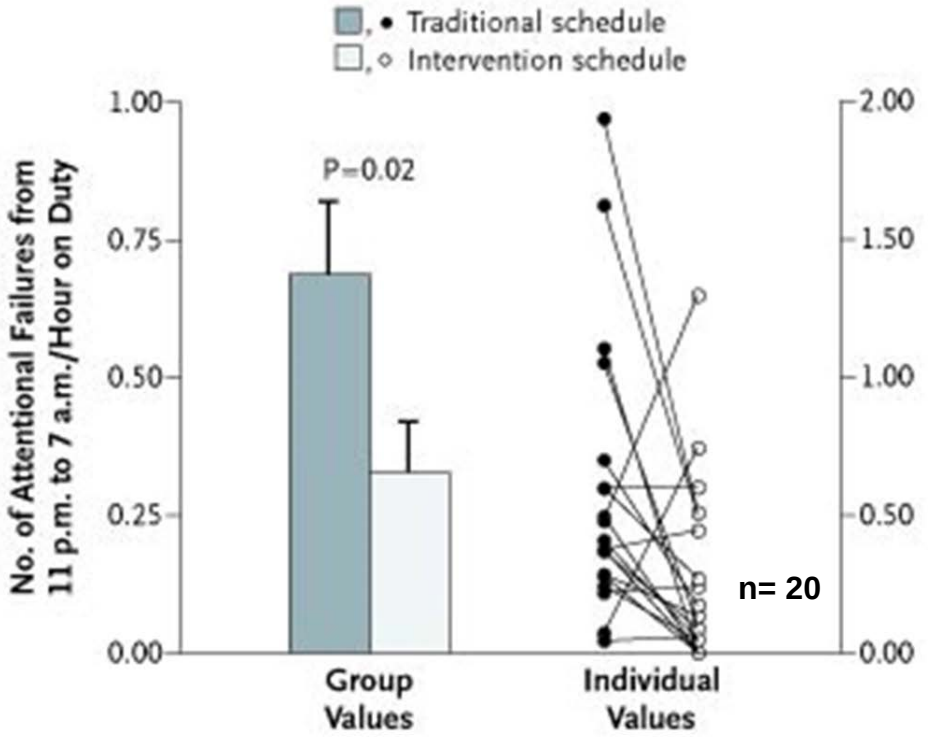


Dawson, D et al. *Nature* 1997.

Why are interns more at risk?

Why are interns more at risk?

Attentional Failures among the Interns as a Group and Individually while Working Overnight during the Traditional Schedule (q3 days) and the Intervention Schedule (16 hrs)



20 interns studied in an ICU during 2- three week rotations-

Sleep
16 hr limit: 52 hrs/week; 7.4 hrs/day
Traditional: 46 hrs/week; 6.6 hrs/day

Lockley SW et al. *NEJM* 2004

Incidence of serious medical errors in interns on extended vs limited schedule

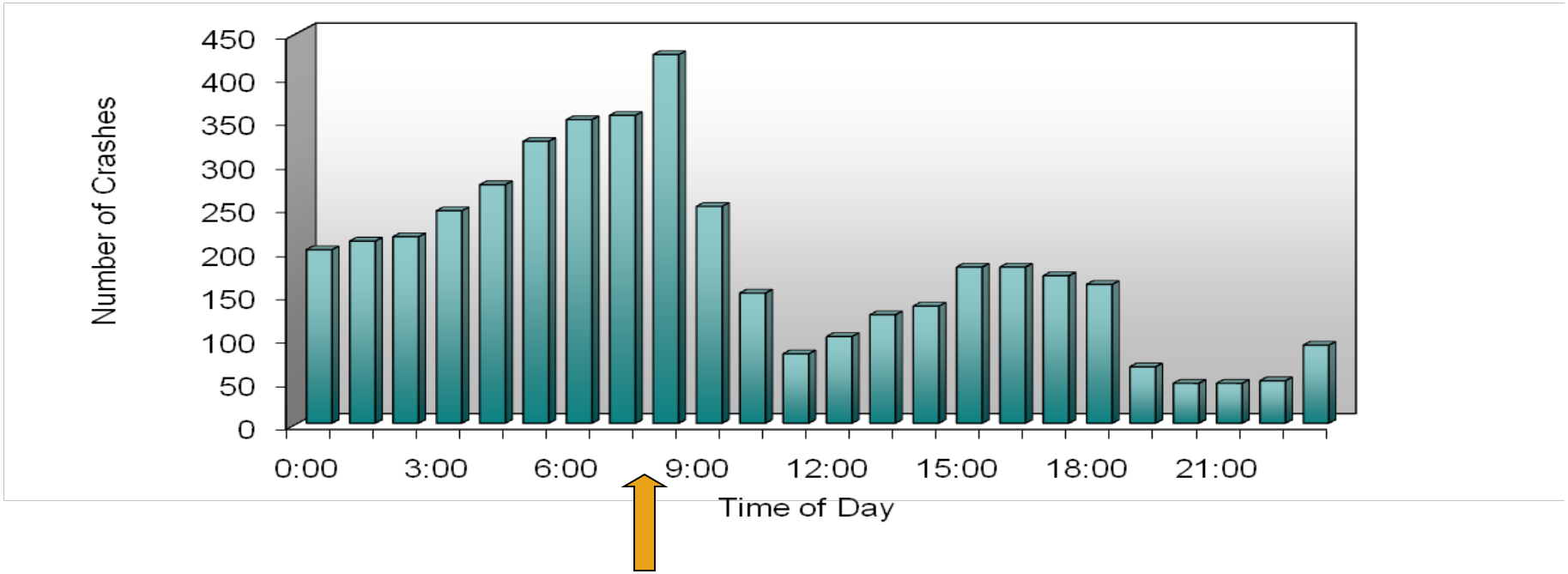
Variable	Traditional Schedule	Intervention Schedule	P Value
	no. of errors (rate/1000 patient-days)		
Serious medical errors made by interns			
Serious medical errors	176 (136.0)	91 (100.1)	<0.001
Preventable adverse events	27 (20.9)	15 (16.5)	0.21
Intercepted serious errors	91 (70.3)	50 (55.0)	0.02
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 CP et al. *NEJM* 2004

Why 24+6?

- Added *to provide time for learning and handover and to prevent residents from driving home at their circadian nadir*

High risk times of day for MVAs due to drowsy driving



Pack et al/ Accid Anal Prev 1995

Why naps

Fatigue Management and Countermeasures

- The most effective countermeasure for sleepiness is **SLEEP.**
  - Preventative naps prior to 24 hours of sleep loss
  - Operational: during shift
    - 15-minute naps every 2 to 3 hours can reduce the performance decrements during 48 hours of total sleep deprivation.
    - 2-hour naps every 12 hours help sustain performance over 80 hours of sleep deprivation
  - DOSE RESPONSE!

Matsumoto, Ergonomics, 1994; Dinges et al. Sleep, 1987; Bonnet et al. Sleep, 1991

Management strategies

- Strategic consumption of caffeine
  - Effects
    - **Within 15-30 minutes**
    - **Half life 3-7 hours**
    - **Temporary**
  - Problems
    - **Tolerance can develop**
    - **Disrupts subsequent sleep**
- Avoid use of drugs
  - Hypnotics, stimulants or alcohol

Comparison of duty hour limitations between the 2003 and 2011 ACGME requirements and the 2009 IOM Recommendations

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Why need protected time (8-10 hrs) in between shifts?

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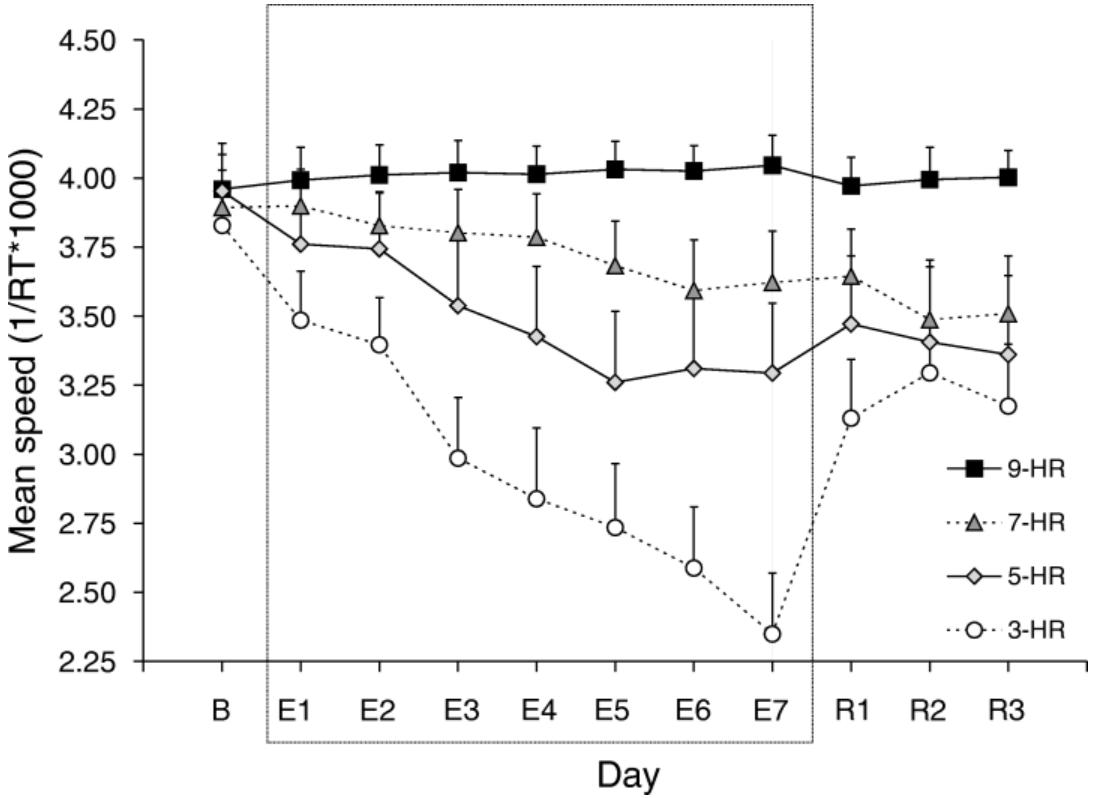


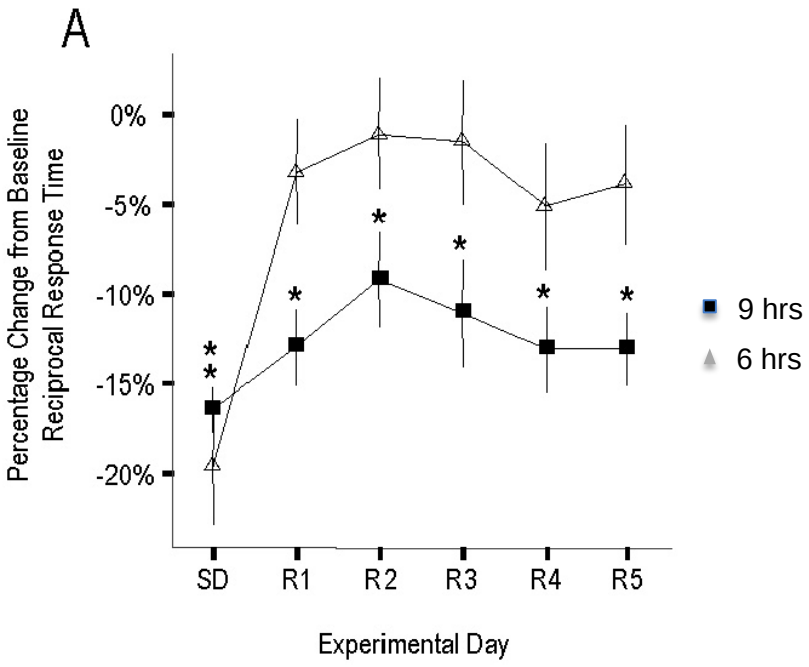
Need 7-8 hrs to prevent chronic partial sleep deprivation

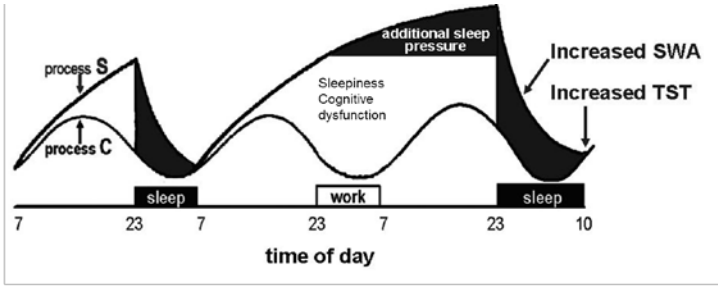
Belenky et al. *J Sleep Res* 2003

How long of a recovery period after extended call (14 hrs)?

How long of a recovery period after extended call (14 hrs)?

After 24 hr SD – need 9 hours of recovery sleep





https://smoens.files.wordpress.com/2010/12/class1_sleephomeostasis31.jpg

Ergo- 14 hrs to ensure
8-9 hours in bed at night

Jay et al. *Sleep* 2007

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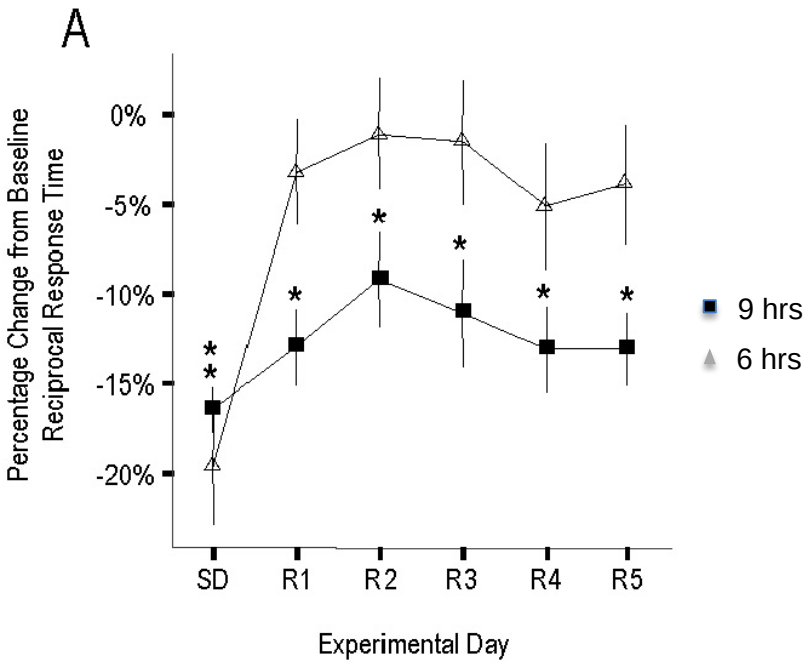
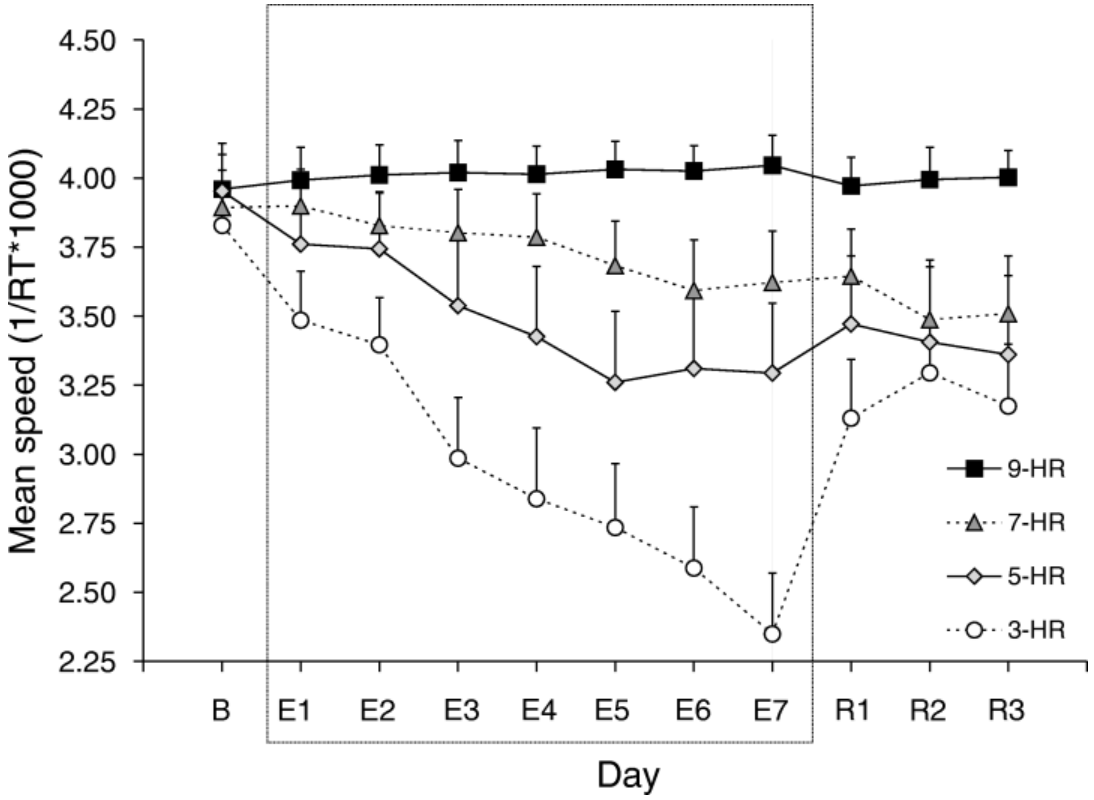
Recovery of 24 hrs after sleep deprivation



Jay et al. *Sleep* 2007

Recovery time after chronic SD



More than 24 hrs?

Belenky et al. *J Sleep Res* 2003

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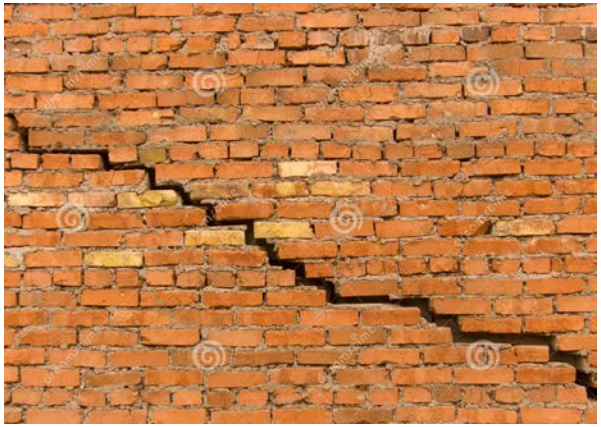
Effect of duty hour restriction?

Effect of ACGME duty hour restriction? Systematic reviews

Source	Patient Care	Resident Well-being	Resident Education
Fletcher et al 2004	Inconclusive		
Fletcher et al 2005		Favorable	Inconclusive
Ulmer et al 2009	Favorable	Favorable	
Fletcher et al 2011	Inconclusive	Favorable	Inconclusive
Moonesinghe et al 2011	No impact		No impact
Baldwin et al 2011	Inconclusive		
Philibert et al 2013	Inconclusive	Favorable	No impact
Jamal et al 2012	No impact		
Reed et al 2010	Favorable	Inconclusive	Unfavorable

Limitations of reviews

- Heterogeneous subjects, schedules, environments
- Different outcomes
- Limitations of studies
  - Sleep history
  - Circadian rhythms
  - Arousing factors (activity, bright light, caffeine, motivation)
  - Test
  - Individual characteristics (sex, vulnerability (surgeon))
  - Patient outcomes (ie mortality)



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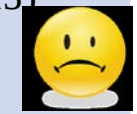
Jamal et al 2012	N		
Reed et al 2010	Favorable	Inconclusive	Unfavorable

Recent metaanalysis 2010-2014

Type of intervention	Patient care	Resident Well-being	Resident education
Duty hr restriction (n=25)	No impact (6/11) Favorable (4/11) 	No impact (6/17) Favorable (4/17) Unfavorable (8/17)	Unfavorable (9/13) 

Bolster and Rourke J Grad Med Educ. 2015

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Duty hr restriction (n=25)	No impact (6/11) Favorable (4/11)	No impact (6/17) Favorable (4/17) Unfavorable (8/17)	Unfavorable (9/13)
Reduced shift length (n=13)	Favorable (4/7) No impact (2/7)	Favorable (4/6) No impact (3/6)	Unfavorable (6/8)
Night float (n=12)	No impact (4)	Unfavorable (8/11)	Unfavorable (3/5)

Bolster and Rourke J Grad Med Educ. 2015

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

National Cluster-Randomized Trial of Duty-Hour Flexibility in Surgical Training

Karl Y. Bilimoria, M.D., M.S.C.I., Jeanette W. Chung, Ph.D., Larry V. Hedges, Ph.D., Allison R. Dahlke, M.P.H., Remi Love, B.S., Mark E. Cohen, Ph.D., David B. Hoyt, M.D., Anthony D. Yang, M.D., John L. Tarpley, M.D., John D. Mellinger, M.D., David M. Mahvi, M.D., Rachel R. Kelz, M.D., M.S.C.E., Clifford Y. Ko, M.D., M.S.H.S., David D. Odell, M.D., M.M.Sc., Jonah J. Stulberg, M.D., Ph.D., M.P.H., and Frank R. Lewis, M.D.

N Engl J Med 2016; 374:713-727 | February 25, 2016 | DOI: 10.1056/NEJMoa1515724

FIRST trial

- National, cluster-randomized, pragmatic, noninferiority trial
- 117 surgical training programs

FIRST trial

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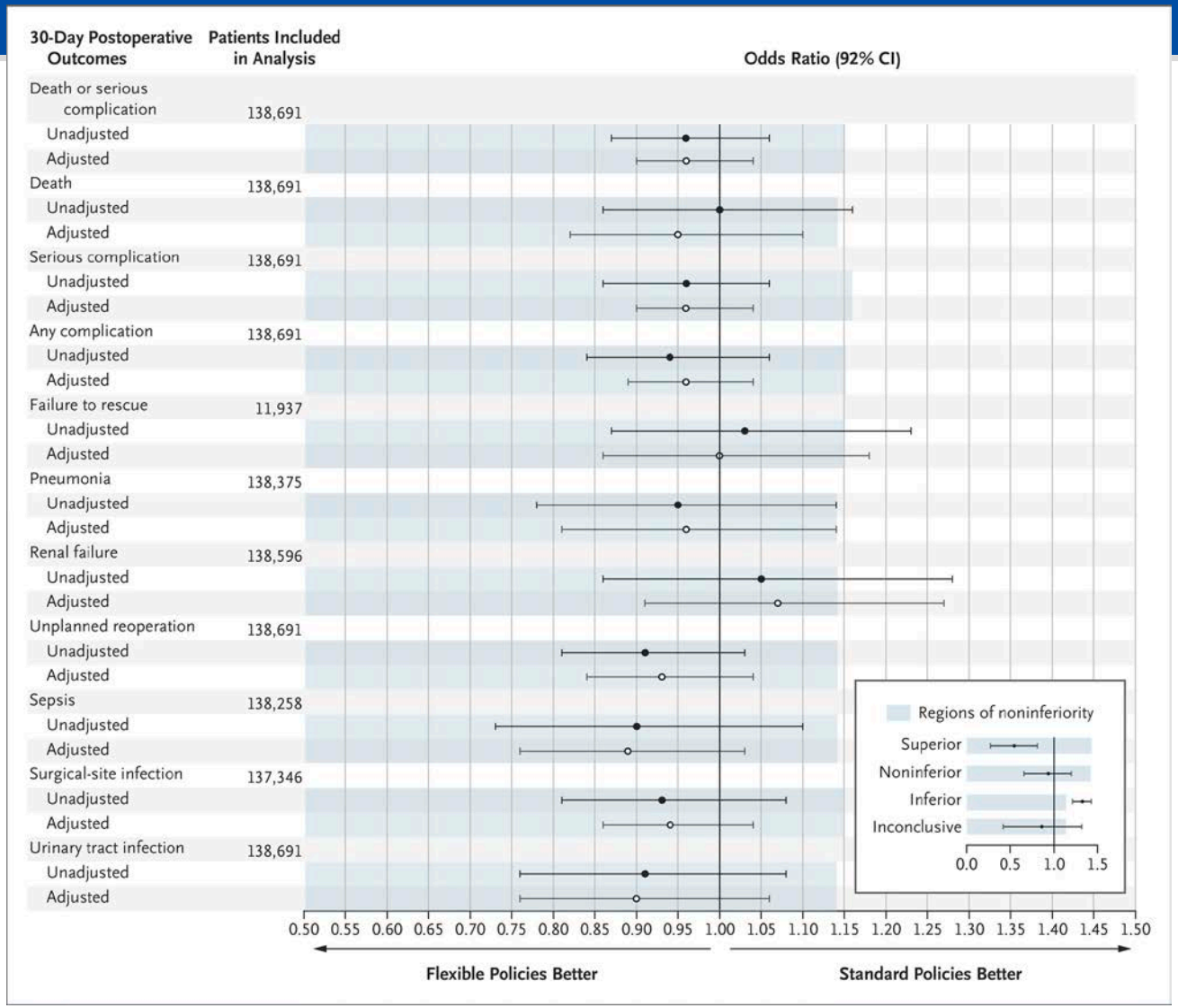
FIRST trial

- **Outcomes**
  - **Patient: 30-day rate of postoperative death or serious complications (ACS NSQIP composite outcome measure)**
    - 30-day rate of postoperative death, serious complications, any complication, failure to rescue, pneumonia, renal failure, unplanned reoperation, sepsis, surgical-site infection, and urinary tract infection
  - **Resident: self reports of satisfaction with well-being and education**
    - Perceptions and satisfaction regarding the effect of 2014–2015 institutional duty-hour policies on aspects of patient care, residency training, and personal well-being; how often fatigue affected personal safety and patient safety; and how often in the past month residents had breaks in continuity of care and education because of duty-hour policies

Comparison of Postoperative Outcomes between Flexible, Less-Restrictive Duty-Hour Policies and Standard Policies.



Resident-Reported Satisfaction and Perceptions of Well-Being, Education, and Patient Safety.

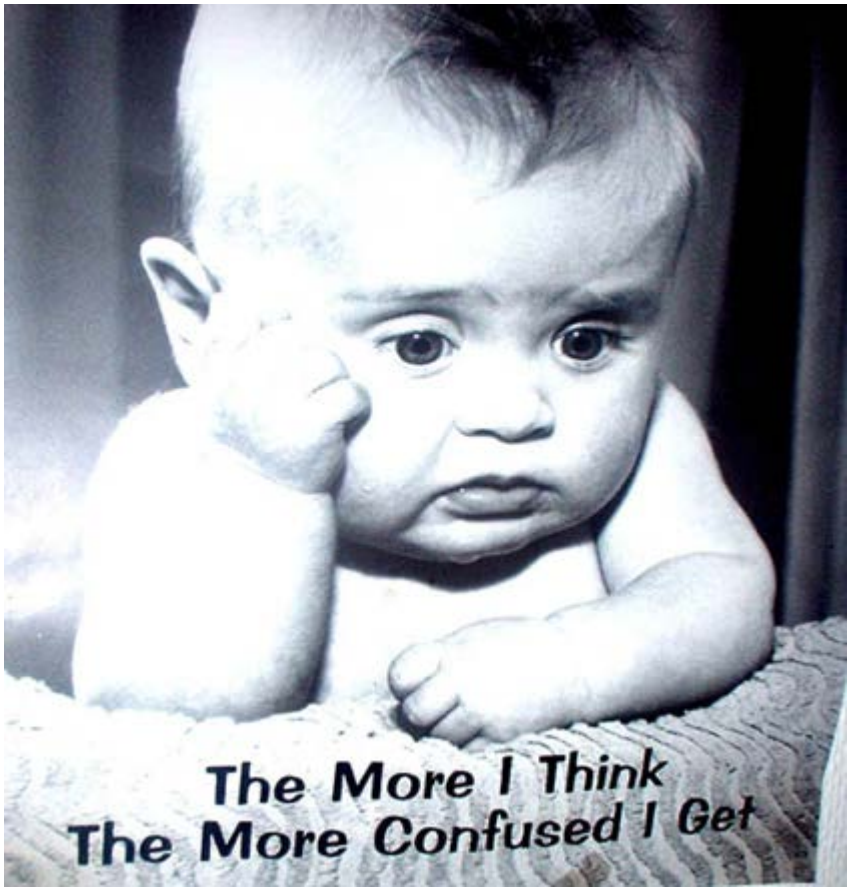
Outcome	Standard-Policy Group	Flexible-Policy Group	P Value†	Odds Ratio for Flexible-Policy Group (95% CI)‡	P Value
	no./total no. (%)				
Primary outcomes					
Dissatisfaction with overall quality of resident education§	200/1874 (10.7)	194/1768 (11.0)	0.86	1.08 (0.77–1.52)	0.64
Dissatisfaction with overall well-being§	226/1876 (12.0)	263/1769 (14.9)	0.10	1.31 (0.99–1.74)	0.06
Secondary outcomes					
Dissatisfaction§					
With patient safety	77/1875 (4.1)	62/1770 (3.5)	0.48	0.85 (0.55–1.31)	0.46
With continuity of care	188/1876 (10.0)	83/1769 (4.7)	<0.001	0.44 (0.32–0.60)	<0.001
With quality and ease of handoffs and transitions in care	190/1873 (10.1)	124/1766 (7.0)	0.009	0.69 (0.52–0.92)	0.01
With duty-hour regulations of the program	161/1876 (8.6)	144/1768 (8.1)	0.74	0.99 (0.71–1.40)	0.97
With work hours and scheduling	236/1874 (12.6)	214/1767 (12.1)	0.76	0.95 (0.71–1.27)	0.72
With time for rest	280/1875 (14.9)	329/1768 (18.6)	0.08	1.41 (1.06–1.89)	0.02
Perception of negative effect of institutional duty hours¶					
On patient safety	491/1891 (26.0)	223/1782 (12.5)	<0.001	0.40 (0.32–0.51)	<0.001
On continuity of care	1053/1892 (55.7)	339/1786 (19.0)	<0.001	0.16 (0.12–0.21)	<0.001
On clinical-skills acquisition	688/1888 (36.4)	232/1777 (13.1)	<0.001	0.24 (0.19–0.31)	<0.001
On operative-skills acquisition	928/1885 (49.2)	337/1781 (18.9)	<0.001	0.22 (0.17–0.27)	<0.001
On resident autonomy	663/1888 (35.1)	232/1782 (13.0)	<0.001	0.26 (0.20–0.34)	<0.001
On operative volume	915/1887 (48.5)	330/1778 (18.6)	<0.001	0.22 (0.17–0.28)	<0.001
On availability for urgent cases	845/1890 (44.7)	266/1783 (14.9)	<0.001	0.20 (0.16–0.25)	<0.001
On availability for elective cases	651/1889 (34.5)	264/1781 (14.8)	<0.001	0.30 (0.24–0.39)	<0.001
On attendance at educational conferences	431/1886 (22.9)	218/1780 (12.2)	<0.001	0.47 (0.36–0.62)	<0.001
On relationship between interns and residents	488/1892 (25.8)	199/1782 (11.2)	<0.001	0.38 (0.29–0.49)	<0.001
On time for teaching medical students	523/1888 (27.7)	262/1781 (14.7)	<0.001	0.45 (0.37–0.56)	<0.001
On case preparation away from hospital	176/1887 (9.3)	427/1781 (24.0)	<0.001	3.37 (2.54–4.47)	<0.001
On participation in research	172/1888 (9.1)	373/1780 (21.0)	<0.001	2.81 (2.12–3.73)	<0.001
On professionalism	240/1891 (12.7)	148/1780 (8.3)	0.002	0.65 (0.49–0.87)	0.003
On job satisfaction	262/1888 (13.9)	226/1782 (12.7)	0.43	0.94 (0.73–1.23)	0.67
On satisfaction with career choice	172/1887 (9.1)	164/1777 (9.2)	0.92	1.03 (0.79–1.33)	0.84
On morale	301/1892 (15.9)	294/1782 (16.5)	0.73	1.09 (0.85–1.40)	0.51
On time with family and friends	168/1888 (8.9)	441/1779 (24.8)	<0.001	3.66 (2.70–4.97)	<0.001
On time for extracurricular activities	172/1886 (9.1)	458/1779 (25.7)	<0.001	3.81 (2.84–5.11)	<0.001
On rest	178/1887 (9.4)	470/1781 (26.4)	<0.001	3.85 (2.88–5.15)	<0.001
On health	128/1883 (6.8)	326/1778 (18.3)	<0.001	3.22 (2.37–4.36)	<0.001
Fatigue always or often affects personal safety‖	175/1878 (9.3)	188/1774 (10.6)	0.26	1.15 (0.91–1.47)	0.25
Fatigue always or often affects patient safety‖	118/1878 (6.3)	133/1774 (7.5)	0.17	1.18 (0.91–1.53)	0.21
Occurrence during past month owing to duty-hour regulations**					
Left during an operation	256/1944 (13.2)	128/1821 (7.0)	<0.001	0.46 (0.32–0.65)	<0.001
Missed an operation	817/1944 (42.0)	544/1821 (29.9)	<0.001	0.56 (0.45–0.69)	<0.001
Handed off an active patient issue	901/1944 (46.3)	583/1821 (32.0)	<0.001	0.53 (0.45–0.63)	<0.001

DO AWAY with work hour limits

Limitations of study

- Noninferiority trial
- Self-reports of dissatisfaction and perception of negative effect of institutional duty hours as well as patient outcomes.
- In flexibility group- variability in adherence to some of the extended duty periods
- No data re: on-call schedules, duty-hour logs, sleep duration, cognitive testing, handoff protocols, or supervision
- No assessment of effect on MVAs, blood borne pathogen exposure, medication errors or other resident-sensitive outcomes,
- No objective measures of educational performance (ie. in-training exam scores)
- Mortality is rare event, subject to other factors

iCOMPARE
INDIVIDUALIZED COMPARATIVE EFFECTIVENESS OF MODELS OPTIMIZING PATIENT SAFETY AND RESIDENT EDUCATION


The More I Think
The More Confused I Get

ARE WE DOING ENOUGH?
Comparison of duty hour limitations between the 2011 ACGME requirements, the 2009 IOM recommendations and FAA rules

	IOM 2009 Recommendations	2011 ACGME Requirements	FAA
Maximum hr/wk	80 hrs, averaged over 4 wks	80 hrs, averaged over 4 wks	100 hrs/month (average 25/wk) 1000/hrs/yr (average 19/wk)
Maximum duration of duty period	16 hrs without nap 30 hrs (5 hr nap required after 16 hrs) No new patients after 16 hrs	16 hrs for interns 28 hrs for more senior residents 24 hrs consecutive duty 4 hrs additional allowed Napping recommended No new patients after 24 hrs	8-9 hrs of flight duty (depending on pm or am) 16 hrs of reserve 30 hr total time
In hospital on-call frequency	Every 3rd night, no averaging	Every 3rd night, averaged over 4 wks	
Minimum time off between scheduled duty periods	10 hrs after regular daytime duty 12 hrs off after night duty 14 hrs off after extended duty period and must not return before 6 am.	Should have 10 hrs and must have 8 hrs between duty periods (exceptions for residents in final yrs) 14 hrs after in-house call	10 hrs of rest (8 uninterrupted)
Minimum off-duty time	24 hrs off in 7 days, no averaging, plus golden weekend (48 hrs/month)	24 hrs off in 7 days, averaged over 4 wks	30 hrs in 7 days, no averaging

Role of work duration?

What to do (trainees)?

FACTS

- Recommended sleep duration - 7-9 hrs/night
- Acute and chronic sleep deprivation impair cognitive performance
  - Performance deteriorates after 16 hrs
  - Lowest performance- early morning, early afternoon
  - Sleep deprived individuals don't recognize their impairment
  - Inadequate tools to monitor impaired performance
- Extended duty hours – resident safety, education, patient safety
- Naps help
- You don't "get used" to sleep deprivation
- Sleep deprivation does not make one more resistant to future episodes

Fatigue mitigation- action plan

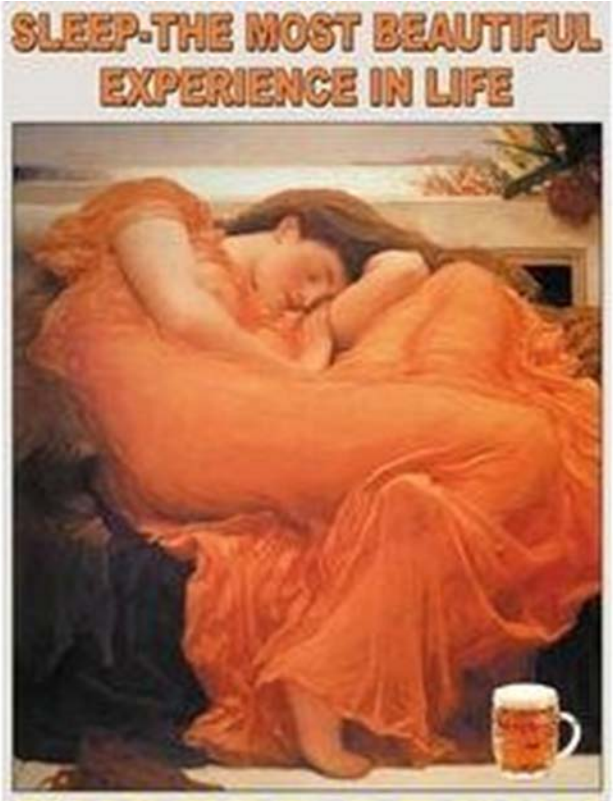
- Appreciate effect of sleep deprivation
- Joint responsibility (PD/PC/faculty/Sr trainees/trainee)
- Observe trainees for signs of fatigue
  - Some are more vulnerable (i.e., new parent)
- Monitor work hours- surrogate marker
- Discuss fatigue with trainees- meetings, semiannual meetings, part of wellness program, after “bad night”
  - Recognize the hidden curriculum

Fatigue mitigation- action plan

- For sleepy trainees
  - Call rooms available- during night (home-call), day
  - Public transportation
- Backup schedules
- Supervision and sign-out
- Practice what you preach!

Summary

- Importance of adequate sleep for our trainees and US!
- Evidence for specific duty hour restrictions
- Rationale behind monitoring duty hours
- Evaluate recent literature
- Satisfy ACGME requirements



Thanks!

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