Resident Fatigue

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ACGME regulations – 1

- An outgrowth of concerns from Libby Zion death in NY in 1984
- Growing concern about impact of resident fatigue
- ACGME response at a time of concern for potential federal regulation

ACGME regulations – 2

- Initial Duty Hour limits put in place in 2003
- Maximum of 24 hours continuous duty plus 6 hours for transitions – effectively a 30 hour limit
- Minimum 10 hours off between shifts
- At least 1 day in 7 off duty, averaged over rotation
- Maximum 80 hours on duty per week averaged over rotation
- Overnight no more than q 3, averaged

  (IM standard, no averaging)

Duty hours in other professions

- Transportation
  - Airlines
  - Railroads
  - Trucking

Studies related to Duty Hours

- Brigham & Women's 2002-03
- MVAs, PGY 1s & Duty Hours 2002-03
- Duty Hours, Alcohol & performance 2001-03
- Hopkins 2011 vs 2003 ACGME Standards
- I-COMPARE & FIRST 2015-16

Critical Care and Errors – 1

- Brigham & Women's ICU study
- Landrigan CP, Rothschild JM, Cronin JW, et al. Effect of reducing interns' work hours on serious medical errors in intensive care units. *N Engl J Med*. 2004;351:1838-1848.
- PGY 1s assigned 16 hours vs approx 30 hrs
- 1 additional PGY 1 required per rotation

Critical Care and Errors – 2

Errors per 1000 patient-days during traditional 24+6 vs 16 hour rotating schedule

- PGY 1 serious medical errors
  - 136 vs 100
- Total serious errors
  - 193 vs 158
- PGY 1 serious medication errors
  - 99.7 vs 82.5
- PGY 1 serious diagnostic errors
  - 18.6 vs 3.3

MVAs, PGY 1s & Duty Hours – 1

- National study of PGY 1s, MVAs & call ≥24 hours

After extended shifts ≥24 hours vs other shifts

- Odds ratio of crash 2.3,
- Odds ratio of near miss 5.9

Months with ≥5 extended shifts,

- Odds ratio of falling asleep
  - While driving 2.39
  - While stopped in traffic 3.69

MVAs, PGY 1s & Duty Hours – 2

For every extended shift

- monthly MVA risk increased by 9.1%
- MVA risk during commute home increased by 16.2%

Barger LK, Cade BE, Ayas NT, et al. Extended work shifts and the risk of motor vehicle crashes among interns. *N Engl J Med*. 2005;352:125-134.

Duty Hours, Alcohol & Performance

- Post-call performance impairment during a heavy call rotation is comparable with impairment associated with a **0.04 to 0.05 g% blood alcohol** concentration during a light call rotation, as measured by sustained attention, vigilance, and simulated driving tasks.
- **Residents' ability to judge this impairment may be limited and task-specific.**
- Arnedt JT, Owens J, Crouch M, et al. Neurobehavioral performance of residents after heavy night call vs after alcohol ingestion. *JAMA*. 2005;294:1025-1033

Revised ACGME Standards 2011

- 16 hour Maximum Shift Length for PGY 1s
- Maximum Shift Length other residents 24 hours + 4 hours for transitions – effectively 28 hours
- Minimum 8 hours off between shifts, should be 10 hours off
- 80 hours max per week, averaged over rotation
- 1 day in 7 off duty, averaged over rotation
- Night Float max 6 consecutive nights on duty
- Overnight no more than q 3, averaged

  (IM standard, no averaging)

Revised ACGME Standards 2017

- Major change in national rules
- Minimal change in Summa IM residency approach to duty hours
- Tracking Duty Hours
  - All residents in July & Feb
  - All residents during ICU & CCU rotations
- Must include time spent at home in doing clinical work (i.e. notes in CarePath)

Highlights of RRC Duty Hours Rules

- Minimum 4 days OFF per month (1 day = 24 hours)
  - Preferably 5 days OFF during most subspecialty months
- NEVER see New Patients after 24 hours on duty
- NEVER on duty in the hospital beyond 28 hours
- Maximum 80 hours per week averaged over rotation or month

Summa Health

Some Duty Hours standards that have changed as of July 1, 2017

- Minimum time out of hospital has been changed to:
  - SHOULD be out of the hospital a minimum of 8 hours

- Standards that have been removed:
  - 16 hour limit for PGY 1s
  - The 6 consecutive night maximum
  - Call no more often than every third night (excluding Night Float)

Summa Health

Summa Internal Medicine response to Change in ACGME Duty Hours

No Substantive Change

- We stayed with our then current scheduling system rather than expanding the number of hours residents are on duty
- We have been less strict with insisting PGY 1s leave no later than 16 hours
- If your time on duty is approaching 19 hours I want to hear from you

Summa Health

Hopkins 2011 vs 2003 study

- JAMA Intern Med. 2013;173(8):649-655.
- 4 month study 2011
- Med Teams increased from 2 to 3 seniors and 4 to 5 PGY 1s
- Increased sleep duration during the on-call period
- Deteriorations in educational opportunities, continuity of patient care, and perceived quality of care.
- Night Float abandoned

Surgical Outcomes

- Outcomes of Daytime Procedures Performed by Attending Surgeons after Night Work
- N Engl J Med 2015; 373:845-853
- No Difference in death, readmissions, complications related to Night Work before daytime procedures

I-COMPARE & FIRST

- ACGME approved I-COMPARE trial 2015-16
- ACGME approved FIRST trial (Surgery) 2014-15
- 3 Duty Hours rules:
  - 80 hours maximum duty per week*
  - 1 day off in 7*
  - In-house call no more frequent than q3 nights*

  *averaged over a 4-week period

FIRST Trial

- N Engl J Med 2016; 374:713-727
- Less restrictive duty hours rules associated with:
  - Non-inferior patient outcomes (death, serious complications, secondary postoperative outcomes)
  - No significant difference in resident satisfaction with overall well-being and education quality

iCOMPARE – 1

- NEJM 378;16: 1494-1508 – Patient Safety
- No difference in educational outcomes
  - Time spent in direct patient care
  - Balance of clinical demands & education
- Difference in satisfaction with educational experience (Flexible arm vs Standard)
  - Interns less satisfied
  - Program Directors more satisfied

iCOMPARE – 2

- NEJM 380;10:905-914 – Patient Safety
- No difference in 30 day mortality change
- Though not statistically significant, <1% difference in
  - Readmission or death at 7 days
  - Readmission or death at 30 days
  - Patient Safety indicators
  - Prolonged length of stay
  - Payment in 2016 dollars

iCOMPARE – 3

- NEJM 380;10: 915-923 – Sleep & Alertness
- No significant difference in
  - Average sleep time per 24 hours
    - Flexible group 6.85 hours
    - Standard group 7.03 hours
  - Karolinska Sleepiness Scale scores
  - Alertness on PsychoMotorVigilance testing

Summa IM Call System

- Developed 2004-06, refinements 2007, 2010
- Moved from 30 hours to 24 to 19 to 16 hours
- 2006 ACGME National Presentation:

	For Overnight Shifts, Maximum Hours of Patient Care					
Timeline	13	16	19	24	26	30
Nov 2004	22%			12%	22%	44%
Nov 2005	52%		24%	24%		
Projected 2006	78%	22%				

Major Points of Summa IM Call System

- Split Shifts for Med Teams
- Day and Night Medicine for ICU & CCU
- Night Float for weekday Night AR2, AI2, AI3
- No cross cover weeknight calls during subspecialty rotations
- Calls during Med Team are only Admitting calls (except PGY 1s in July)
- Sat overnight cross cover for admitting team

Impact of Sleep Deprivation

- Sleep Debt
- MSLT testing, residents fall asleep within 5 min
- Poor judgment of degree of impairment
- Increased risk taking
- Poor social interactions
- 24 hours on duty equivalent to ETOH level 0.05-0.1

Circadian Sleep Cycles

- Most people need 7-8 hours sleep / night
- Sleep Debt is 1 hour needed for every hour less than 7-8 hours
- Feel more alert in mid morning – may be a false sense of alertness however
- More fatigued early afternoon

Sleep Strategies

- Pre-Call
  - Sleep in later
  - Afternoon nap
- Post Call
  - Nap before driving if too tired
  - For a ride home the resident should call **330-375-3277** and if necessary, Chief Keith Blough can be contacted at **330-375-4077 or cell phone at 330-351-9236.**
  - Coffee 30 min before driving (it doesn't work immediately)
  - Go to sleep on arrival home

Key Points

- We are poor judges of degree of sleepiness
- Count your hours, arrange to get enough sleep
- Caffeine 30 min before driving
- Sleep in later & take nap before night call
- Night Float
  - Sleep during the day
  - Don’t count on getting to sleep at night
- You can always Nap in Call Rooms before going home