Duty Hours: Past, Present and Future
The University of Chicago Internal Medicine Experience

Vineet Arora, MD, MAPP
The Committee on Optimizing Graduate Medical Trainee (Resident) Work Schedules to Improve Patient Safety
Tuesday, March 4, 2008 – 12:30-6:00 pm
The Beckman Center of the National Academies
Huntington Room
Internal Medicine Residency

§ 385 accredited IM programs
- 22,545 positions filled
- ~ 20% of all GME trainees (residents & fellows)

§ Categorical IM residents (3-year)
- ~ 40% International Medical Graduates
- 2/3 intend to pursue subspecialty fellowships

§ University of Chicago IM Residency Program
- ~100 residents
- South Side of Chicago
Outline

§ Past
- Difficult Choice for IM programs
  - Overnight call vs. shift work model
  - Our program experience

§ Present
- Educational challenges
- Same work in less time: workload effects
- Residents perceptions

§ Future
Pre 2003 RRC-IM Requirements

§ 4 hours of “protected sleep time” while on call
   - Our program had night residents who admitted patients and performed cross-coverage from 3am -7am so interns could sleep

§ With ACGME duty hour restrictions, the 4 h rule for protected sleep repealed
   - Residents would leave 30 h after starting shift
   - Need additional HS coverage after residents leave
Difficult Choice for IM Programs

- 80 hr/week not the problem in IM
- 30 h rule challenges the importance of “overnight call”

IM programs forced to choose between

- Preserving overnight call with 24+6 (HS go home early with float coverage during the day) “Continuity at night”
- Shift-work system with float coverage during the night for at least 10h* “Continuity during the day”
“I understand that some programs have completely eliminated "overnight" call, and have substituted night float in all aspects of the program. I am trying to understand the magnitude of the change. Does anyone have a program where residents NEVER work 24+6?”

-concerned program director
For those that chose overnight call

Concern for sleep deprivation EVEN GREATER with 24+6
   - No mandated “protected sleep time”

Could a “nap” be used to alleviate sleep deprivation and fatigue in the context of a long shift?
   - Effective at relieving fatigue in other industries
   - Allow residents to continue caring for patients without excessive fatigue
Paired crossover study

2 weeks of month interns received nap schedule—coverage from MN to 7am so that interns could finish work and get some sleep on call.
Naps on-call

Provision of night float coverage led to 41 more minutes of sleep
- More sleep if forwarded their pager (70 min)
- Reluctance to sign-out patients they had just admitted due to concerns of miscommunication

Little increase in sleep led to substantial reductions in fatigue
- Esp post-call fatigue restored levels to that of a normal intern before experiencing acute sleep loss

<table>
<thead>
<tr>
<th>Category (n)</th>
<th>Sub-category (n)</th>
<th>Representative Incident (n=25)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure Prone Communication Processes (9)</td>
<td>No Face to Face Communication (4)</td>
<td>He had to go to clinic so he just put the sign-out on the wall and then called from there...would prefer that sign-out was face to face so I had a chance to ask questions.</td>
</tr>
<tr>
<td></td>
<td>Double Sign-out (“Night Float”) (3)</td>
<td>“---it just said &quot;will need bx&quot;--I did not know where, who recommended it or if I was to schedule... I needed to know before I saw my patient so I called the primary intern covering before the float came on.</td>
</tr>
<tr>
<td></td>
<td>Illegible or Unclear Notes (2)</td>
<td>The writing from the prior intern was illegible. Later on, I found them and figured out what it meant.</td>
</tr>
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</table>

Challenge to Required Ambulatory Experiences

§ Required continuity clinic once/week
§ Programs used to have a weekly clinic day with the same preceptor
§ Same weekday clinic no longer feasible
  - post-call and on-call days not eligible
  - Loss of “continuity” with patients and with preceptor
§ Experiments with fixed annual clinic schedule with inpatient call built around clinic…
## Inpatient Week (Jan 08)

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housestaff schedule</td>
<td>Intern day off</td>
<td>On-call</td>
<td>Post-call</td>
<td>Resident in clinic</td>
<td>Resident day off</td>
</tr>
<tr>
<td>Team present</td>
<td></td>
<td></td>
<td></td>
<td>(leave early)</td>
<td></td>
</tr>
<tr>
<td>Team available for teaching</td>
<td></td>
<td></td>
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</table>
## Attending Teaching and Satisfaction

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline Period 2001-2003</th>
<th>ACGME Duty Hours 2003-2006</th>
<th>Difference</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours/week of didactic teaching</td>
<td>3.92 h</td>
<td>3.13 h</td>
<td>-0.79h (-1.28h, -0.30h)</td>
<td>0.014</td>
</tr>
<tr>
<td>Missed conferences per week</td>
<td>1.22</td>
<td>1.69</td>
<td>0.46 (0.13, 0.80)</td>
<td>0.007</td>
</tr>
<tr>
<td>Sufficient time for teaching*</td>
<td>3.40</td>
<td>2.92</td>
<td>-0.48 (-0.73, -0.24)</td>
<td>0.001</td>
</tr>
<tr>
<td>Interns truly involved in clinical decisions*</td>
<td>4.50</td>
<td>4.27</td>
<td>-0.24 (-0.37, -0.10)</td>
<td>0.001</td>
</tr>
<tr>
<td>Residents had sufficient autonomy*</td>
<td>4.57</td>
<td>4.40</td>
<td>-0.16 (-0.30, -0.02)</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Data from 300 (69%) end-of-month attending surveys over five years; Estimates from mixed effects linear regressions adjusting for within-subject attending effects and month of year

*Likert items with 1 (Completely Disagree) to 5 (Completely Agree)

Arora, et al. *in press*
Duty Hours vs. Secular Trend

“the work hours... limits interns and residents’ ability to provide continuity of care and be at the front line in decision making... increasingly dependent on attendings to make management decisions”

Arora, et al. in press
## Effect on Student Education

<table>
<thead>
<tr>
<th>Item</th>
<th>Baseline % (2002-2003) n=70 (62%)</th>
<th>ACGME % (2003-2004) n=68 (60%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall satisfaction</td>
<td>61.4</td>
<td>47.8</td>
<td>0.03</td>
</tr>
<tr>
<td>Clinical teaching</td>
<td>50.0</td>
<td>39.7</td>
<td>0.22</td>
</tr>
<tr>
<td>Emphasis education</td>
<td>60.3</td>
<td>50.0</td>
<td>0.24</td>
</tr>
<tr>
<td>Resident relationship</td>
<td>76.5</td>
<td>64.7</td>
<td>0.16</td>
</tr>
<tr>
<td>Resident availability</td>
<td>80.6</td>
<td>72.1</td>
<td>0.28</td>
</tr>
</tbody>
</table>

% of students reporting “Very satisfied” after end of general medicine rotation

Same work in less time

- Maximum on-call workload of internal medicine interns has not changed
  - ACGME cap of 5 new patients per intern in 24 h during “call”

- More intense work periods for HS
  - Worsen sleep loss during overnight call?
  - More difficult to comply with duty hours?
### On-Call Sleep & Shift Duration with Number of Patients Admitted

<table>
<thead>
<tr>
<th>Admission On-Call</th>
<th>On-Call Sleep Time (minutes)</th>
<th>Total Shift Duration (hours)</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>192.5 (190.6-194.5)</td>
<td>29.3 (29.2-29.3)</td>
</tr>
<tr>
<td>1</td>
<td>185.3 (183.4-187.2)</td>
<td>29.5 (29.4-29.5)</td>
</tr>
<tr>
<td>2</td>
<td>178.0 (176.1-180.0)</td>
<td>29.7 (29.6-29.7)</td>
</tr>
<tr>
<td>3</td>
<td>170.8 (168.9-172.3)</td>
<td>29.9 (29.8-29.9)</td>
</tr>
<tr>
<td>4</td>
<td>163.5 (161.6-165.5)</td>
<td>30.1 (30.0-30.1)</td>
</tr>
<tr>
<td>5</td>
<td>156.3 (154.3-158.2)</td>
<td>30.3 (30.2-30.3)</td>
</tr>
</tbody>
</table>

*Results are from fixed effects multivariate regression models, controlling for intern subject, month of the year, day of the week, and number of calls taken during current rotation*
Resident Perceptions of Duty Hours

§ 90% (114) incoming UCMC interns in 10 specialties from 54 medical schools
  • Survey of 29 “unprofessional behaviors”

§ Staying past shift limit to complete work was the only behavior viewed as “professional”
  • 69% reported doing so
    • Same result at 2 other Chicago IM residencies (1 community-based)
Duty Hours 2.0

- Preservation of overnight call experiences
  - Currently threatened
- Incorporation of fatigue countermeasures like naps for extended shifts
- Need for standard handoff education and evaluation
- Parameters for ideal workload for given amount of duty hours
Acknowledgements

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