Residents' Reports on the Impact of Fatigue in the Past Decade: Impact of Duty Hour Changes

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Disclosure

We have documented that we have no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.

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Background

- In the past decade, 2 changes to duty hours for all specialties occurred: 2003 and 2011

- Duty hours purportedly prevent fatigue that places patient safety and resident education at risk

- Studies demonstrate mixed results for achieving these goals
Research Questions

1. Are there any changes in the past decade in pediatrics’ resident reports of outcomes related to fatigue?

2. Are there any changes in the past decade in the frequency that moonlighting occurs within the final 12 months of residency?
Methods

• AAP Annual Survey of Graduating Residents
• Random sample of 1,000 graduating pediatric residents in 2004 and 2013
  • 500 in 2002
• Cross sectional survey: May to August
  • Mailed survey (2002 and 2004)
  • Mailed and emailed survey (2013)
• Response rate: 62%-65%
Methods

• Descriptive

• Bivariate
  • Linear by linear chi-square to examine for trends across survey years

• Logistic regression
Dependent Variables

• Fatigue questions
  • Has fatigue from work caused you to do any of the following in the past year?
    • Fall asleep during an educational conference
    • Fall asleep while driving home from work
    • Make an error in patient care resulting in additional tests or procedures, prolonged hospitalization, or injury to the patient

• Moonlighting question
  • During your last 12 months of residency, how many months did you moonlight at least once?
Variables

- Survey year
- Gender
- Age
- Race
- Marital status
- Medical school location
- Educational debt level
- Residency program size
Graduating Pediatric Residents Reported Impact of Fatigue

*Linear decrease, p<0.001
Moonlighting Results

- Moonlighting decreased across survey years, p<0.01
  - 41% in 2002
  - 38% in 2004
  - 30% in 2013

- Mean number of months moonlighted decreased across years, p<0.001
  - 2.3 months in 2002
  - 1.5 months in 2004
  - 1.1 months in 2013
Multivariable Results

• Compared to 2002 residents, controlling for resident characteristics, 2004 and 2013 residents are less likely to report:

  • Falling asleep during educational conference
    • 2004: adjusted Odds Ratio (aOR): 0.61 (95% CI: 0.41-0.91)
    • 2013: aOR: 0.32 (95% CI: 0.22-0.45)

  • Falling asleep driving home from work
    • 2004: aOR: 0.55 (95% CI: 0.37-0.81)
    • 2013: aOR: 0.43 (95% CI: 0.31-0.60)
Multivariable Results

• Compared to 2002 residents, controlling for resident characteristics:

• 2004 residents are less likely to report making error in patient care
  • 2004: aOR: 0.46 (95% CI: 0.27-0.76)
  • 2013: aOR: 0.80 (0.54-1.19); not significant

• 2013 residents are less likely to report moonlighting at least once
  • 2004: aOR: 0.94; 0.66-1.34; not significant
  • 2013: adjusted OR: 0.57 (95% CI: 0.41-0.78)
Limitations

• Cross-sectional survey data
• Data based on graduating pediatric resident self-report
• Single specialty
• No independent measures of fatigue, sleep and patient care errors
Summary

- Over the past decade, with 2 major duty hour limitations, we found decreased resident reports of
  - Falling asleep during conference
  - Falling asleep while driving from work

- Reports about making patient care errors improved but then worsened
  - Decrease in errors reported from 2002 to 2004
  - Increase in errors reported from 2004 to 2013

- Reports of moonlighting declined

- Further exploration is needed on impact of fatigue
Acknowledgements

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Thanks to the Graduating Resident Survey respondents!
But, you don’t have to take my word for it....

Which team are you rooting for to win the men’s college basketball national title?

- Connecticut: 17%
- Florida: 27%
- Kentucky: 19%
- Wisconsin: 37%

(Total votes: 140,448)
Falling Asleep: Consistent Downward Trend

- This suggests duty hour limitations are accomplishing some of the goals they set out to achieve.
- Potentially anticipated trend, but no evidence prior to duty hour restrictions that limiting hours would directly change fatigue.
  - Indeed, residents still report notably less sleep than young physicians in practice and the general public (Acad Peds 2014).
- Reassuring not to see work compression and increased workload that has been described with duty hour limitations increasing fatigue in this study.
Patient Care Errors: Variable Trend

- Decrease in 2004 but then increase in 2013 (not to 2002 levels, though)

**Why?**

- 80 hour work week limits in 2003 led to decrease but these effects are being diminished for senior residents (those in our study) assume more workload after 2011 standards limited interns to 16 consecutive hours?

- Duty hour limits have led to decrease in this area with concomitant increased focus on quality and safety over the past decade that has made residents more aware of these factors and thus more likely to report on variables related to them?

- Increasing complexity of medicine leading to growing sources for error?

- Residents better rested but less prepared?
Additional Results

- **Response rate**
  - Overall: 1251/2000 (62.6%)
  - 2002: 323/500 (64.6%)
  - 2004: 303/500 (60.6%)
  - 2013: 625/1000 (62.5%)

- **Non-response Bias**
  - Gender
    - Respondents (71.8% female) vs non-respondents (67.5% female), p=0.05
  - Average Age
    - Respondents (31.4 years) vs non-respondents (31.5 years), p=0.32

- **Demographics across survey years**
  - No significant difference: gender, age, marriage
  - Significant difference: race, educational debt, program size, med school location (p<0.001)
The Pediatrician’s Final Four Bracket

Florida Gators vs. UConn Huskies

Wisconsin Badgers vs. Kentucky Wildcats
The Pediatrician’s Final Four Bracket

- Florida Gators
- Wisconsin Badgers
- Kentucky Wildcats

Florida Gators vs. Wisconsin Badgers
Kentucky Wildcats vs. Eliminated
I BLEED BLUE

1960
1988
1977
1989

College Vault
The Pediatrician’s Final Four Bracket
The Pediatrician’s Final Four Bracket

[Diagram showing Florida Gators vs. Wisconsin Badgers, with 'X' marks indicating the winning team in each match]
The Pediatrician’s Final Four Bracket
The Pediatrician’s Final Four Bracket

Florida Gators vs. Florida Gators
Wisconsin Badgers vs. Wisconsin Badgers

Florida Gators vs. Wisconsin Badgers

Flintstones vs. Wisconsin Badgers
The Pediatrician’s Final Four Bracket

- Florida Gators
- Wisconsin Badgers
- Villanova Wildcats
- Wisconsin Badgers
Previous Studies Related to Fatigue

- Cognition impaired by fatigue (Arch Surg 2003)
- Residents across many specialties with reduced hours less likely to report fatigue affected care or patient safety (Arch Int Med 2008)
- Residents working more consecutive hours (usually >24 vs 16 hours) are more likely to:
  - Sustain sharps injury at work (Jt Comm J Qual Patient Safety 2007; JAMA 2006)
  - Suffer MVC driving from work (Jt Comm J Qual Patient Safety 2007; NEJM 2005)
Previous Studies Related to Fatigue

• Demonstrated mixed results for achieving these goals
• No change in outcomes for lap appy, lap chole, or operative trauma between residents working less than or greater than 16 hours (J Surg Res 2010; J Surg Ed 2010)
• Equal daytime sleepiness when residents work 12-16 hours vs 24 hours (Can J Anaesth 2009)