

American Osteopathic College of Occupational and Preventive Medicine  
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## Work Hour Limitations in Disaster Workers

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## Objectives

- Be able to list occupational health considerations that might impact the health and well-being of public health workers during responses to natural and human-caused disasters.
- Be able to list problems associated with sleep deprivation.
- Be able to discuss how working long hours may pose health and/or safety concerns for the public health disaster workers themselves, as well as those in the communities they serve.

## Acknowledgements

This presentation is based on:

Berkowitz, M. R.; "Occupational and public health considerations for work-hour limitations policy regarding public health workers during response to natural and human-caused disasters";

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## Overview

- Introduction
- Current House Staff Work Hour Policies and Legislation
- Economic Considerations
- Legal and Liability Considerations
- Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation
- Duty Hour Restriction Policies
- First Responders in Disaster Scenarios
- Policy Implications
- Conclusions

## Introduction

- Professionals and volunteers resoundingly respond to the crisis
- Willingly work hard
- Shifts of long-duration and over many days (or even weeks)
- Tend to not take "time off" and get away from being actively "on duty"

## Introduction (cont.)

- Challenges of planning and responding to disasters will be further increased as the number of public health workers declines<sup>1</sup>
- Association of State and Territorial Health Officials (ASTHO) reported that the public health workforce shortage jeopardizes terrorism and emergency preparedness<sup>2</sup>

<sup>1</sup>Mahan CS and Malecki JM; "Confronting the Impending Public Health Workforce Crisis in America: Perspectives from Academia and Public Health Practice"; *Florida Public Health Review*; 2004; 1:4-7.

<sup>2</sup>State Public Health Employee Worker Shortage Report: A Civil Service Recruitment and Retention Crisis; Association of State and Territorial Health Officials, Washington, DC: 2004.

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### Introduction (cont.)

- US National Response Team
  - "disaster workers represent a unique population...on whom relatively little attention has been focused."<sup>1</sup>
  - Studies examining any cohort of disaster workers virtually impossible as pre-disaster assessment difficult as disasters strike suddenly.

<sup>1</sup>US National Response Team: Guidance for managing worker fatigue during disaster operations: Technical assistance document. Available at [www.nrt.org](http://www.nrt.org). April 30, 2009. Accessed May 16, 2012.

### Current House Staff Work Hour Policies and Legislation

- ACGME policy of house staff work limitations, interns, residents, and fellows:
  - Max 80 hours per week (averaged over 4 wks)
  - +10% (8 hours) for "emergency" situations
  - Max 24 hrs continuous duty (except that an additional 6 continuous hours are allowed for patient transfer, administration, and didactic lectures)

### Current House Staff Work Hour Policies and Legislation (cont.)

- Min 8 hours of rest between duty periods or work shifts
- Min one 24-hour period per week free from medically related duties (averaged over 4 weeks)
- No overnight in-house call more frequently than every third night (averaged over 4 weeks)
- Surgery training programs are exempted from the ACGME policies

### Current House Staff Work Hour Policies and Legislation (cont.)

- NYS "Libby (Zion) Law":
  - Same as the ACGME policy, except that the
  - Averaging period for the 24-hour period free from medically related duties is 2 wks vs. 4 wks
  - No provision for an additional 10% for emergency situations
  - 4 weeks of vacation time per year
- MANDATORY
- NO exemption for surgery training programs
- Numerous violations of this law (Max fine \$2K)

### Economic Considerations

- Based on 2000 data<sup>1</sup>, costs to replace one resident ranges between \$70K - \$300K.
- Average house staff physician \$38,500
  - \$70K Medicare direct GME reimbursement
  - Nets hospital \$31,500
- Resident works 80 hours per week
- 2 NPs/PAs work same as 1 resident

<sup>1</sup>Greene J. "GME helps community - and bottom line". *American Medical News*. April 24, 2000

### Economic Considerations (cont.)

- Average NP/PA \$55K - \$70K (+ benefits) for 40-hr work week (+ night differential)
- Cost of NPs/PAs to replace 1 Resident is \$110,000 - \$140,000 (+ \$31,500 net from Medicare for the Resident)
  - 5-6 times the cost per resident
- Resident potentially "fully licensed" after 1 yr
  - NPs/PAs more limited scope of practice (by law)
  - And cost more!!

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### Economic Considerations (cont.)

- Medicare and Medicaid billed for NPs/PAs
  - hospital does not receive a reimbursement for having them “on staff”
  - house staff physicians’ salaries often part of amount Medicare/Medicaid allows hospital.
- Hospital with GME training program gets a (junior) physician for 1/5 the “cost” of NP/PA
  - in terms of the house officer physician salary, but it actually earns a profit.

### Economic Considerations (cont.)

- Economic reasons for NOT reforming current practice for Resident working conditions are a major determinant for maintaining the status quo.
- As has been just demonstrated with analyses based upon notional salary costs, the hospitals and health care institutions benefit from the status quo

### Legal & Liability Considerations

- Who is accountable or liable when sleep-deprived personnel make errors and/or cause injury to their patients or others?
- The answer is not straightforward.
- Involved in the answer are issues pertaining to the status of the personnel and the question of supervision.

### Legal & Liability Considerations (cont.)

- What is the ability of governments to regulate work hours?
- Lochner decision provided precedent for the state being able to regulate the maximum hours that a person may be on duty at work.
- Lochner overturned and reversed in the 1930s.

### Legal & Liability Considerations (cont.)

- Professions whose job performance may impact the public safety (e.g., pilots, maritime crews, commercial drivers, etc.) are regulated by Federal laws.
- In Europe, there are limitations on the hours that physicians may be on duty.
- When there is a compelling public safety issue at risk, the government has the ability to regulate and legislate maximum duty hour limitations.

### Legal & Liability Considerations (cont.)

- GME community and attending physicians have held that house officers are “students” engaged in GME for purposes of receiving an education.
- NLRB (1999) ruled that house staff are “also ‘employees’ within the meaning of Section 2(3) of the Act [NLRA]”<sup>1</sup>

<sup>1</sup> Reference to this case (Boston Medical Center and House Officers’ Association/Committee of Interns and Residents, 330 NLRB 152) was addressed by the law review published in the DePaul Journal of Health Care Law (Fall 2002) by Monique A. Anawis, [6 DePaul J. Health Care L. 83]

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Legal & Liability Considerations  
(cont.)

- This decision is important in the issue of potential liability for the actions of one's employees or for considerations of negligence of the employer regarding potential tort risk.

Legal & Liability Considerations  
(cont.)

- Several cases are relevant to the issue of liability of the employer for the actions of employees:

Legal & Liability Considerations  
(cont.)

- *Robertson v. Lemaster*, Supreme Court of West Virginia found railroad company liable for damages from an accident caused by an employee who fell asleep while driving home from work.<sup>1</sup>
- Central to this issue is "the [railroad's] conduct prior to the accident created a foreseeable risk of harm"<sup>2</sup>

<sup>1</sup>Reference to this case was addressed in a comprehensive law review published in the *Journal of Law and Policy* (2003) by Andrew W. Gefell, [11 J. L. & Pol'y 659]

<sup>2</sup>Gefell, 660

Legal & Liability Considerations  
(cont.)

- *Otis Engineering Corp. v. Clark*, an appeals court in Texas ruled that "an employer has a duty to prevent employees under its control from causing a foreseeable risk of harm to others"<sup>1</sup>

<sup>1</sup>Gefell, 670.

Legal & Liability Considerations  
(cont.)

- *Faverty v. McDonald's*, the court awarded the plaintiff damages for injuries sustained in an accident caused by a McDonald's employee who had also fallen asleep while driving home and caused the accident.<sup>1</sup>
- The employee died and McDonald's – the employer – was held liable.<sup>1</sup>

<sup>1</sup>Gefell, 666.

Legal & Liability Considerations  
(cont.)

- In his review, Gefell states, "The court looked at the circumstances of the case to determine that a reasonable jury could find the employer negligent. It is important to note that the fact that the employer in Faverty worked the employee beyond its own rules was crucial to the court's decision. Without such a policy and blatant violation, the court may not have reached the same result." (Gefell, 667)

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## Legal & Liability Considerations (cont.)

- McLean describes *Darling v. Charleston* as “the watershed case that applied corporate liability to hospitals”<sup>1</sup>
- “Since *Darling*, numerous courts have imposed liability of hospitals for injuries resulting from the negligence of the hospital’s medical and nursing staff.”<sup>2</sup>

<sup>1</sup> In a comprehensive law review published in the *Case Western Reserve University Health Matrix: Journal of Law-Medicine* (Summer 2002), Thomas R. McLean, MD, JD, MS, FACS, presented an analysis of Whalen in the context of the state being able to use its police powers through the board of professional practice to regulate the scope of the practice of medicine. [12 Health Matrix 277]

<sup>2</sup> McLean, 278

## Legal & Liability Considerations (cont.)

- There exist precedent cases in tort law:
  - establish the liability of hospitals (and health care corporations, more generally) for the injuries and damages resulting from the actions and accidents of their employees
    - where employee was acting within his/her official capacity or was driving home and an accident ensued.
  - The courts have used external documents such as third-party policies (e.g., ACGME work hour limitation policies, JHCAO, etc.) in their decisions.

## Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation

- Cardiopulmonary<sup>1</sup>
- Mental health<sup>1</sup> and depression<sup>2</sup>
- Alterations and decrease of brain activity and cognitive functions<sup>3-7</sup>

<sup>1</sup>Paul Tam; “Sleepless in Loughborough”; Wellcome News, 1998, at [www.lboro.ac.uk/departments/hu/groups/sleep/wellcome.htm](http://www.lboro.ac.uk/departments/hu/groups/sleep/wellcome.htm)

<sup>2</sup>Brain Basics: Understanding Sleep” at the National Institute for Neurological Diseases and Stroke website: [www.ninds.nih.gov/health\\_and\\_medical/pubs/understanding\\_sleep\\_brain\\_basics\\_.htm](http://www.ninds.nih.gov/health_and_medical/pubs/understanding_sleep_brain_basics_.htm)

<sup>3</sup>Lockley SW, Cronin JW, Evans EE, Cade BE, Lee CJ, Landrigan CP, Rothschild JM, Katz JT, Lilly CM, Stone PH, Aeschbach D, and Czeisler CA; “Effect of Reducing Interns’ Weekly Work Hours on Sleep and Attentional Failures”; *New England Journal of Medicine*; October 28, 2004, 351(18):1829-1837.

<sup>4</sup>Landrigan CP, Rothschild JM, Cronin JW, Khashali R, Burdick E, Katz JT, Lilly CM, Stone PH, Lockley SW, Bates DW, and Czeisler CA; “Effect of Reducing Interns’ Work Hours on Serious Medical Errors in Intensive Care Units”; *New England Journal of Medicine*; October 28, 2004, 351(18):1838-1848.

<sup>5</sup>Drazen JM; “Awake and Informed”; *New England Journal of Medicine*; October 28, 2004, 351(18):1884.

<sup>6</sup>Brain Activity is Visibly Altered Following Sleep Deprivation” (February 9, 2000) at [http://health.ucsf.edu/news/2000\\_02\\_09\\_Sleep.html](http://health.ucsf.edu/news/2000_02_09_Sleep.html)

<sup>7</sup>Marcia Purse; “Mood Disorders and Sleep”; at <http://bjipolar.about.com/libray/weekly/aa000203a.htm>

## Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation (cont.)

- Weight gain<sup>1</sup>
- Diabetes<sup>1</sup>
- CHD<sup>2</sup>
  - Sleeping 5 hrs or less per night => 30%
  - Sleeping 6 hrs => 18%
- Immune suppression<sup>3</sup>
  - Cancer (??)

<sup>1</sup>Science News, July 14, 2001.

<sup>2</sup>Researchers find that sleep deprivation or excess in women may be associated with increased risk of coronary artery disease”, reported at [www.brightandwomen.com/publicaffairs/news/sleep\\_deprivation\\_and\\_excess.asp](http://www.brightandwomen.com/publicaffairs/news/sleep_deprivation_and_excess.asp)

<sup>3</sup>Excerpt from Dement, W C; *The Promise of Sleep*; Delacorte Press, 1999 reported at [www.ivillagehealth.com/print/0,,126446,00.html](http://www.ivillagehealth.com/print/0,,126446,00.html)

## Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation (cont.)

- Effects of sleep deprivation:
  - Same as BAC = 0.10<sup>1</sup>
  - Decreased cognitive and motor skills<sup>2,3</sup>
  - Increased errors<sup>4</sup>
  - Surgeons awake all night =>
    - Increase errors 20%<sup>1</sup>
    - Increase length of time to complete tasks 14%<sup>1</sup>
  - Increased MVA => injury & death<sup>5,6</sup>

<sup>1</sup>The Lancet 1998; 352:1191 reported in “Sleep-deprivation Affects Surgical Skill”, on PersonalMD at [www.personalmd.com/news/1998100904.shtml](http://www.personalmd.com/news/1998100904.shtml)

<sup>2</sup>Matthew B. Weinger and Sonia Ancoli-Israel; “Sleep Deprivation and Clinical Performance”; *JAMA*, Feb. 27, 2002, p 955-957.

<sup>3</sup>Sigrid Veasey, et al; “Sleep Loss and Fatigue in Residency Training: A Reappraisal”; *JAMA*, Sep. 4, 2002, pp 116-1124.

<sup>4</sup>Stein R; “Doctors Who Sleep More Err Less”; *The Washington Post*, October 28, 2004.

<sup>5</sup>Lynne Lamberg; “Long Hours, Little Sleep: Bad Medicine for Physicians-in-Training”; *JAMA*, Jan 16, 2002, p304-305.

<sup>6</sup>Barger LK, Cade BE, Aytas NT, Cronin JW, Rosner B, Speizer FE, and Czeisler CA; “Extended Work Shifts and the Risk of Motor Vehicle Crashes among Interns”; *New England Journal of Medicine*, January 13, 2005, 352(2):125-134.

## Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation (cont.)

- Cannot be “trained” to function better sleep deprived<sup>1</sup>
- The more subject to sleep deprivation, the greater that individual’s total “sleep debt”
  - Condition only gets worse
  - As sleep debt increases, the longer to fully recover & return to nl

<sup>1</sup>Dement, W C; *The Promise of Sleep*; Delacorte Press, 1999, p 304.

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## Health Risks Posed by Long-Duration Duty Hours and Sleep Deprivation (cont.)

- ◆ Increasing duration of work shifts significantly increased the chances of injuries or accidents in workers<sup>1</sup>
  - circadian rhythm influence
    - ◆ exacerbation of problems during night shifts
- ◆ Comparing EU max weekly work limits of 48 hours to standard US 40-hour work week
  - increased chances of injury or accident by only 3% when adding a sixth workday
  - when same 48 hours took place in 12-hour work shifts over four successive days, the chances of accident or injury increased by 25%.
  - For night shifts, found increases of 25% and 40%, respectively.

<sup>1</sup>Folkard S and Lombardi DA; "Modeling the Impact of the Components of Long Work Hours on Injuries and 'Accidents'"; presented at the National Conference on Long Working Hours, Safety and Health: "Toward a National Research Agenda", University of Maryland School of Nursing, Baltimore, Maryland; April 29-30, 2004.

## Duty Hour Restriction Policies

- ◆ US Federal laws exist to limit the duty hours that may be performed by pilots, maritime crews, and commercial drivers
  - FAA restricts pilots to no more than 8 hours per day and 30 hours in any week
  - Minimum crew rest is 10 hours between duty periods
  - Maximum pilot duty hours are:
    - ◆ 500 hours per calendar quarter
    - ◆ 800 hours in any two consecutive calendar quarters
    - ◆ 1400 hours in any calendar year
  - Civil monetary penalties may be assessed against any air carrier whose pilots violate these regulations
  - Pilots may have their pilot certifications (licenses) suspended or revoked
    - ◆ losing their ability to earn a living

## Duty Hour Restriction Policies (cont.)

- ◆ US Maritime Administration imposes specific work limits on maritime crews, which vary depending upon the type of vessel.
- ◆ Civil penalties up to \$10,000 per violation may be assessed against the shipping company whose crew member(s) violate the laws

## Duty Hour Restriction Policies (cont.)

- ◆ US DOT imposes duty/work hour limitations on railroad operators and commercial drivers:
  - Railroad operators are restricted to a maximum of 8 hours per day, 40 hours per week
  - Minimum 10-hour rest period between duty periods and a minimum of 24 hours per week free from duty is mandated
  - Violations subject the company, the management, and the employee to civil and criminal penalties

## Duty Hour Restriction Policies (cont.)

- Commercial drivers incur duty/work hour limitations depending upon whether they are driving property-carrying vehicles or passenger-carrying vehicles
- Limitations are:
  - ◆ 11 hours "on duty" followed by a minimum of 10 hours "off duty" for property-carrying vehicle drivers
  - ◆ 10 hours "on" followed by a minimum of 8 hours "off" for passenger-carrying vehicle drivers.
- All drivers are required to maintain six-month logbooks documenting these duty and rest period
- Required to be able to present these logs for inspection at any time and must have them with them
- Violations subject the motor carrier and the driver to civil and criminal penalties

## Duty Hour Restriction Policies (cont.)

- ◆ Duty hour restrictions and limitations on the length of time physicians can work were enacted in Europe.
- ◆ The Netherlands restricted physician work hours to no more than 48 hours per week.

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## Duty Hour Restriction Policies (cont.)

- EU Directive on resident work hours limits:
  - Maximum of 60 hours per week in 2003
  - 56 hours per week in 2006
  - 52 hours per week in 2009
  - 48 hours per week in 2012
  - Unanimously approved by all nations in EU
  - Denmark has had resident work hour limits since 1937

## First Responders in Disaster Scenarios

- Systematic review of the literature regarding the effects of sleep deprivation on the performance of fire fighters and emergency medical services first responders:<sup>1</sup>
  - Increased prevalence of chronic diseases, MI, CA<sup>2</sup>
  - Demonstrated loss of attention to detail and other vigilance deficits<sup>3,4</sup>
  - Negative psychological impacts due to family-related problems among first responders<sup>1</sup>

<sup>1</sup>Elliot DL and Kuehl KS: Effects of Sleep Deprivation on Fire Fighters and EMS Responders; Final Report. Division of Health Promotion & Sports Medicine, Oregon Health & Science University, Portland, Oregon, June 2007.  
<sup>2</sup>Boudreaux E, Mandy C, Brantley PJ, and Jeffries S: "From 24 to 12. Benefits of Shift Modification"; *J Emergency Med*. 1997; 22(3):86-87.

<sup>3</sup>Brody S, Wagner D, Heinrichs M, et al: "Social desirability scores are associated with high cortisol levels in firefighters"; *J Psychosomatic Res*; 2000; 49:227-228.

<sup>4</sup>Caruso CC, Hitchcock EM, Dick RB, et al: Overtime and extended Work Shifts: Recent Findings on Illnesses, Injuries and Health Behaviors. NIOSH Publication No 2004-143. Available at <http://www.cdc.gov/niosh/docs/2004-143>. Accessed on May 15, 2012.

## First Responders in Disaster Scenarios (cont.)

- Increase in on the job injuries<sup>1</sup>
- Increase in motor vehicles accidents among first-responders that occurred while commuting home after the end of the work shift<sup>2</sup>
- Lack of vigilance and ability to remain on task due to either physiological or psychological factors

<sup>1</sup>Karter MJ Jr.: *Patterns of firefighter fireground injuries*; Quincy, MA: National Fire Protective Agency, 2003.

<sup>2</sup>Bailey MT. *Common denominators of serious wildland fire related vehicle accidents*. Available at [http://www.nifc.gov/wfstar/hottopics/common\\_denominators.html](http://www.nifc.gov/wfstar/hottopics/common_denominators.html). Accessed on May 15, 2012.

## Policy Implications

- No data upon which to evaluate or analyze the policy's possible efficacy, effectiveness, efficiency, or equity
- Policy implementation via institutional administrative means through existing bodies has failed
- The Philippines found a positive impact by instituting work-hour limitations and reforms for public health workers<sup>1,2</sup>
- American Red Cross has specific policies to encourage rest and respite among relief workers<sup>3</sup>

<sup>1</sup>Magna Carta of Public Health Workers (Republic Act No. 7305); Dept. of Health, Manila, Philippines; November 1999.

<sup>2</sup>Sis IC, del Prado G, Diwa B, Estabillo VB, Israel L, Lorenzo FM, and Santos B: "Public service reforms and their impact on health sector personnel in the Philippines"; International Labour Office, World Health Organization; September 1999.

<sup>3</sup>"Self Care on a Disaster Relief Operation"; New Century; American Red Cross; Summer 2000. Accessed at [http://www.redcrossdallas.org/services/disaster/newcentury/hc\\_00summer.pdf](http://www.redcrossdallas.org/services/disaster/newcentury/hc_00summer.pdf)

## Policy Implications (cont.)

The Secretary of Labor is authorized by law (29 CFR 5.15 – Limitation, variations, tolerances, and exemptions under the Contract Work Hours and Safety Standards Act) to specify work-hour limitations and restrictions for workers of government contractors<sup>1</sup>

<sup>1</sup>29 CFR 5.15

## Conclusions

- There are no specific OSHA standards regarding "extended or unusual work shifts"<sup>1</sup>
- Emergency and disaster relief workers and volunteers typically fall under state or federal tort claims acts, thus immunizing them from lawsuits as a result of any actions during their relief work efforts.
- Duty work-hour limitation policies and legislation (New York State) are often violated

<sup>1</sup>"Extended/Unusual Work Shifts"; Occupational Safety and Health Administration, U.S. Dept. of Labor; September 4, 2002. Accessed at <http://www.osha.gov/SLTC/emergencypreparedness/guides/extended.html> on April 11, 2005.

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### Conclusions (cont.)

- The duty work hours of other professions involving public safety (e.g., pilots, maritime crews, and commercial drivers) are federally regulated; the duty work hours are much less frequently violated.
- Why?
- The Federal regulations regarding these professions provide for significant monetary penalties per occurrence and/or criminal prosecution for violations of these laws.

### Conclusions (cont.)

- The impact of recent legislations regarding duty/work hour limitations for physicians in The Netherlands and by the European Union, remain to be determined.
- Duty/work hour limitation laws for public health workers or volunteers must include ALL hours worked
  - Hours performed as a public health worker
  - Hours performed in their normal workday in the case of volunteer relief personnel
- Additional research is needed to study whether the physiological and psychological impacts of sleep deprivation on professional and first-responder personnel is also more likely result in these individuals developing post-traumatic stress disorder (PTSD).

Questions?