

**Sleep and Hospitalization:  
What Can Be Done?**  
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Sleep, Health, and Metabolism Center  
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**+ Disclosures**

- **Current funding:**
  - NHLBI R25 SIESTA Sleep for Inpatients Empowering Staff to Act
  - NIA T35 START – Scholars in Translational Research in Aging Training Program
- **Past funding:**
  - NIA K23 Environment & Perceived Control: Understanding Sleep in Hospitalized Older Patients
  - American Sleep Medicine Foundation Education Research Grant
- **Other financial relationships:**
  - American Board of Internal Medicine Board Member
- **Conflicts of interest:** none

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**+ Why is Sleep in the Hospital Important?**



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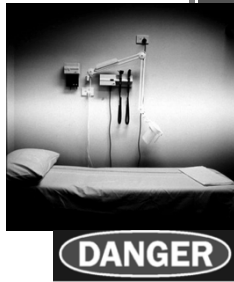
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**+**  
**Significance**

- Sleep critical for recovery from acute illness
- Hospitalization is a time of acute vulnerability
  - "Hazards of hospitalization"
    - Delirium
    - Cardiometabolic derangements, i.e. hyperglycemia
    - Hospital-acquired conditions (HACs)
      - Falls
    - Hospital acquired infections (HAI)
      - CAUTI, CLABSI



**No Sleep in the Hospital**

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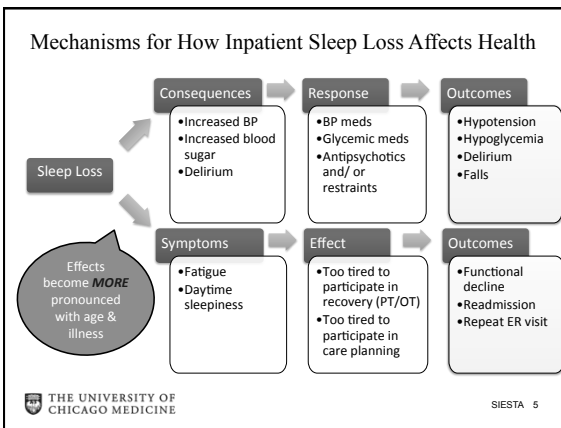
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**The Atlantic**  
SUBSCRIBE SEARCH MENU

**PBS NEWSHOUR**  
TOPICS > HEALTH

**Why won't hospitals let patients sleep?**  
BY SHEFALI LUTHRA, KAISER HEALTH NEWS August 17, 2015 at 12:34 PM EDT

**When Hospitals Don't Let Their Patients Sleep**  
Constant monitoring, noise, and other interruptions can keep people awake through the night—and their health can suffer as a result.

THE UNIVERSITY OF CHICAGO MEDICINE | SHEFALI LUTHRA | AUG 16, 2015

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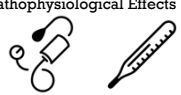
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**+ Why is sleep in the hospital important?**

**CNN** Hospitals work on allowing patients to actually sleep

**Pathophysiological Effects**



**The Patient Experience**

Word cloud: pain management, discharge process, reduce noise, hourly rounding, communication, cleanliness

**HCHAPS & Value Based Purchasing**  
Patients who reported that the area around their room was "Always" quiet at night...

Hospital	Percentage
THE UNIVERSITY OF CHICAGO MEDICAL CE.	54.0%
NORTHWESTERN MEMORIAL HOSPITAL	65.0%
RUSH UNIVERSITY MEDICAL CENTER	69.0%

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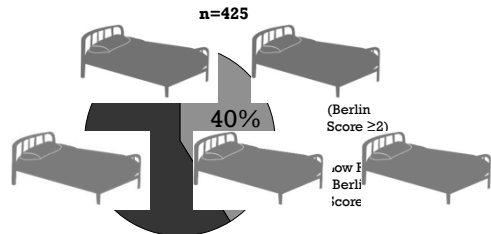
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**+ Inpatients at Risk for Sleep Disorders**

% of Hospitalized Patients Screened at High Risk for OSA

n=425



**2 out of every 5 inpatients** screened as high risk for OSA

Shear et al. J Clin Sleep Med. 2014

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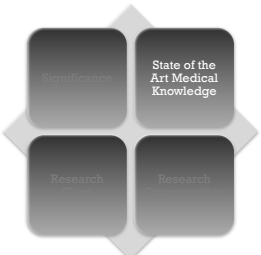
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**+ What do we know about inpatient sleep duration & quality?**




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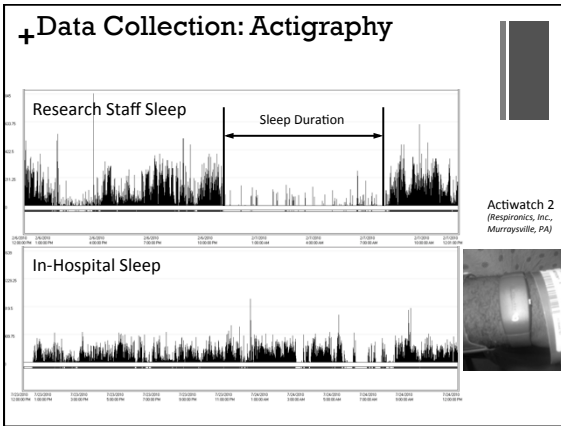
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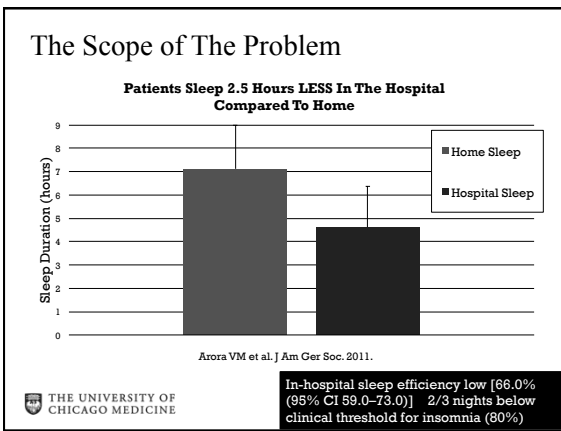
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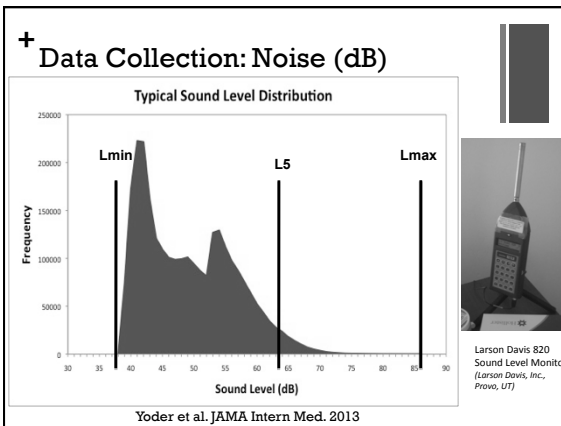
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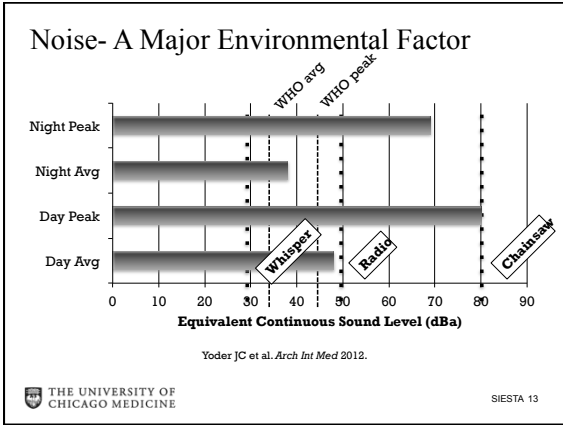
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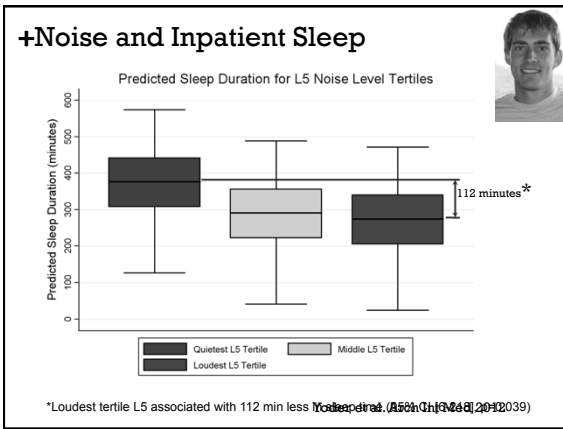
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**Annals of Internal Medicine**  
ESTABLISHED IN 1973 BY THE AMERICAN COLLEGE OF PHYSICIANS

**From: Sleep Disruption due to Hospital Noises: A Prospective Evaluation**  
Ann Intern Med 2012;157(3):170-178. doi:10.7326/0003-4819-156-12-20120870-00472

- **Changes in the median HR during noise-induced arousals aligned with time of peak HR response**
- **Expressed relative to average HR in 10 sec preceding arousals in sleep stages N2, N3, and REM**
- **Vertical lines represent the median times of arousal onset (with CIs) before that peak.**

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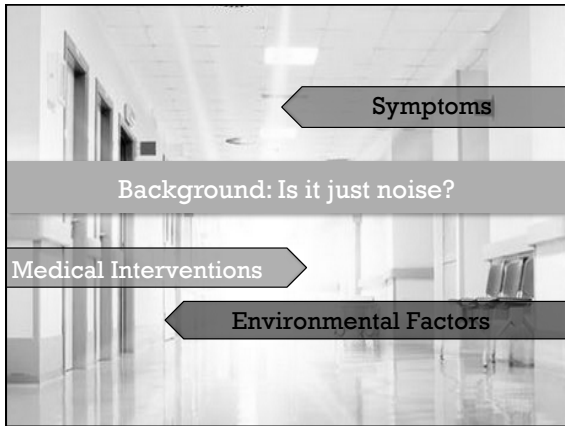
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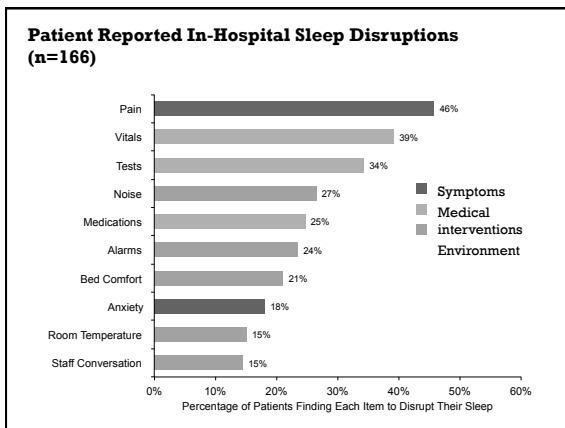
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**Results: Disruptions and Objective Sleep**  
 Output of Five Individual Regression Models  
 (n=645 nights from 379 patients)

Variable	Minutes [95% CI]	P-value
1. Tests	-19.9 [-41.6, 1.9]	0.07
2. Vitals	-1.8 [-23.1, 19.6]	0.9
<b>3. Pain</b>	<b>-43.4 [-66.7, -20.1]</b>	<b>0.001*</b>
<b>4. Medications</b>	<b>-23.1 [-45.9, -0.34]</b>	<b>0.047*</b>
<b>5. Noise</b>	<b>-33.7 [-58.1, -9.3]</b>	<b>0.007*</b>

**Pain, medications and noise** were associated with significantly less in-hospital objective sleep time.

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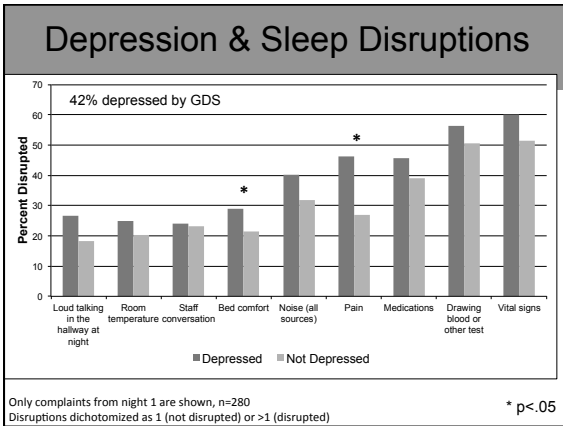
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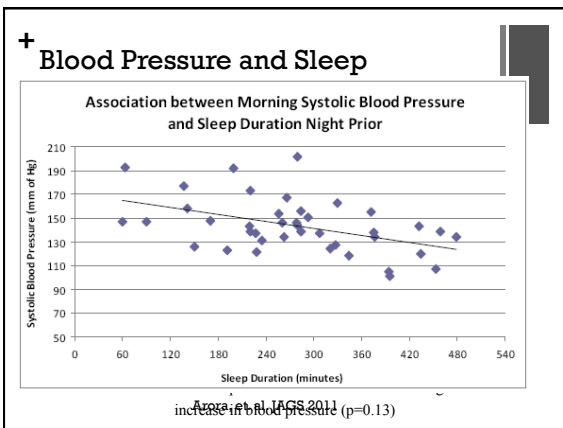
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### +Light in Patient Rooms

133 patients, 206 nights


	Median (IQR)	Recommended
Daytime light*	18.5 (8.9 - 32.9) lux	100 lux
Nighttime light*	1.1 (.3 - 3.8) lux	5 lux

**Recommended Light Levels for Medical Care**  
(European Standards EN12464-1)

Reading, Simple Examination	300 lux
Examination and Treatment	1000 lux

Light levels not associated with inpatient sleep quality

\*No seasonal variation




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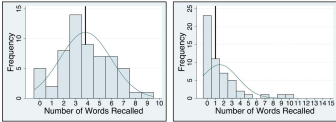
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### + Inpatient Sleep Loss & Delirium/ Memory

- HELP Trial for delirium
  - Only 10% adherence to sleep protocol (Inouye et al Arch Int Med 2003)
  - Can adherence to better sleep reduce delirium?
- 50% have poor memory!
  - No relationship between sleep and memory all patients were likely sleep deprived

Calev et al. JHM 2015

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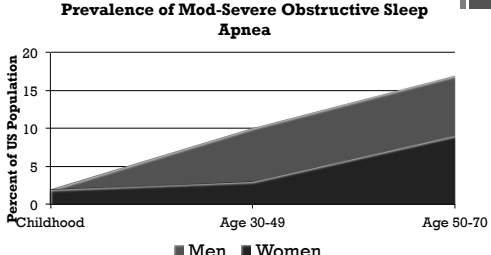
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### + OSA Is More Prevalent As We Age

**Prevalence of Mod-Severe Obstructive Sleep Apnea**



Peppard PE et al. Am J Epidemiol 2013.

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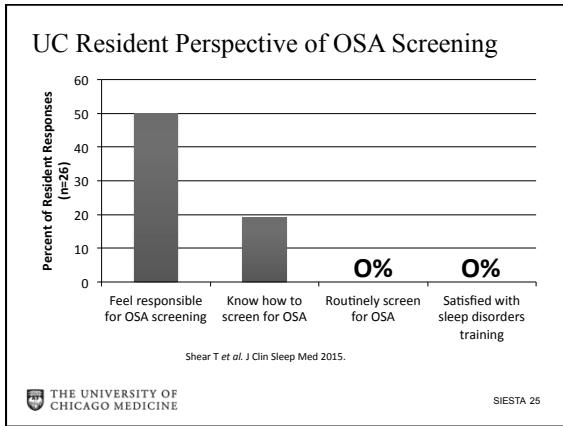
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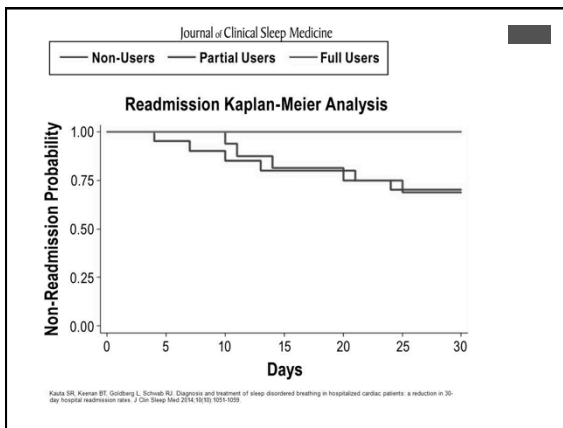
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**Risk of Sleep Apnea in Hospitalized Older Patients**

Tate C, Shear T, Jay S, Saperstein M, D'Onofrio M, Keenan B, et al. J Clin Sleep Med 2014;10(10):1051-1059.

**Background/Objectives:** To investigate the prevalence of sleep-disordered breathing in hospitalized cardiac patients and to evaluate the impact of CPAP on readmission rates.

**Design:** Prospective cohort study.

**Setting:** General medicine ward.

**Participants:** 124 hospitalized cardiac patients who were screened for sleep-disordered breathing.

**Measurements and Main Results:** The prevalence of sleep-disordered breathing was 31%. CPAP use was associated with a 50% reduction in 30-day readmission rates.

**Hospital Sleep Medicine: The Elephant in the Room?**

Commentary on Kaiza et al. Diagnosis and treatment of sleep-disordered breathing in hospitalized cardiac patients: a reduction in 30-day hospital readmission rates. J Clin Sleep Med 2014;10:1051-1059 and Shear et al. Risk of sleep apnea in hospitalized older patients. J Clin Sleep Med 2014;10:1051-1059.

David Shapiro, M.D., F.A.C.S.M.

Allegheny Sleep Disorders Center, Thomas Jefferson University and Hospital, Philadelphia, PA

Confirmation of short and long term benefits of hospital sleep medicine in conjunction to a cost effective screening strategy could lead to a paradigm change on how we practice and view sleep medicine in hospitalized patients. ...With such potentially profound implications we cannot continue to ignore the elephant in the room...can we?

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**+ SIESTA**

- Empower staff to
  - Screen for sleep disorders
  - Optimize the environment
- Need to address EHR "defaults"
  - Vitals q4h throughout night
  - "AM" lab sweep 4a
  - TID heparin for VTE prevention



**A NIGHT IN THE HOSPITAL: MOVING FROM THE REALITY TO THE DREAM**

THE REALITY	THE DREAM
	
	
	

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**+ Acknowledgments**

- U of C Sleep, Metabolism & Health Center
  - Drs. Eve Van Cauter, Kristen Knutson, Babak Mokhlesi, Jay Balachandran
- Students – Jordan Yoder, Kevin Chang, Talia Shear, Hila Calev, Claire Beveridge, Marie Adachi, Mila Grossman, Regina DePietro, Rushil Desai
- MERITS – Drs. Jeanne Farnan, Barrett Fromme, Holly Humphrey
- Project Managers – Paul Staisiunas, Lisa Spampinato, Sam Anderson & Sam Ngooi
- Dr. David Meltzer & Hospitalist Study Staff
  - Andrea Flores, Ainoa Mayo



**Funding**

- NIA 2T35AG029795-06, Short-Term Aging-Related Research Program
- NIA K23AG033763 Career Development Award
- NIH UL1 RR024999 Clinical Translational Sciences Award
- American Sleep Medicine Foundation
- NHLBI R25HL116372-01A1

National Institute on Aging 

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