

Sanjay R. Patel, MD MS

Assistant Professor of Medicine

Division of Pulmonary, Critical Care and Sleep Medicine

Center of Clinical Investigation

Education:

Undergraduate: Princeton University, A.B. in Mathematics 1991

Medical School: Health Sciences & Technology Program, Harvard Medical School and Massachusetts Institute of Technology, M.D. 1996

Graduate: Harvard School of Public Health, M.S. in Epidemiology 1999

Training:

Internship and Residency:

Internal Medicine, Hospital of the University of Pennsylvania, 1996-1999

Fellowships:

Pulmonary and Critical Care Medicine, Harvard University Combined Program, 1999-2003

Sleep Medicine, Brigham and Women's Hospital, 2001-2003

Membership in organizations:

American Academy of Sleep Medicine (AASM)

American Thoracic Society (ATS)

American College of Chest Physicians (ACCP)

Society of Critical Care Medicine (SCCM)

Massachusetts Medical Society (MMS)

Board Certifications:

Internal Medicine, Pulmonary Medicine, Critical Care Medicine, Sleep Medicine

Publications:

Original Research:

1. Kanter DS, Mikkola KM, **Patel SR**, Parker JA, Goldhaber SZ. Thrombolytic Therapy for Pulmonary Embolism: Frequency of Intracranial Hemorrhage and Associated Risk Factors. *Chest* 1997; 111:1241-45.
2. Daniels LB, Parker JA, **Patel SR**, Grodstein F, Goldhaber SZ. Relation of Duration of Symptoms with Response to Thrombolytic Therapy in Pulmonary Embolism. *Am J Cardiol* 1997; 80:184-8.
3. Mikkola KM, **Patel SR**, Parker JA, Grodstein F, Goldhaber SZ. Increasing Age is a Major Risk Factor for Hemorrhagic Complications After Pulmonary Embolism Thrombolysis. *Am Heart J* 1997; 134:69-72.
4. Mikkola KM, **Patel SR**, Parker JA, Grodstein F, Goldhaber SZ. Attenuation over 24 Hours of the Efficacy of Thrombolysis of Pulmonary Embolism Among Patients with Cancer. *Am Heart J* 1997; 134:603-7.
5. **Patel SR**, Parker JA, Grodstein F, Goldhaber SZ. Similarity in Presentation and Response to Thrombolysis Among Women and Men with Pulmonary Embolism. *J Thromb Thrombolysis* 1998; 5:95-100.
6. Palmer LJ, Buxbaum SG, Larkin E, **Patel SR**, Elston RC, Tishler PV, Redline S. A Whole-Genome Scan for Obstructive Sleep Apnea and Obesity. *Am J Hum Genet* 2003; 72:340-50.
7. Ayas NT, White DP, Al-Delaimy WK, Manson JE, Stampfer MJ, Speizer FE, **Patel S**, Hu

- FB. A Prospective Study of Self-Reported Sleep Duration and Incident Diabetes in Women. *Diabetes Care* 2003; 26:380-4.
8. **Patel SR**, White DP, Malhotra A, Stanchina ML, Ayas NT. CPAP therapy is effective in treating sleepiness in a diverse population with obstructive sleep apnea: Results of a meta-analysis. *Arch Intern Med* 2003;163:565-71.
 9. Palmer LJ, Scurrah KJ, Tobin M, **Patel SR**, Celedon JC, Burton PR, Weiss ST. Genome wide linkage analysis of longitudinal phenotypes using σ^2_A random effects (SSARs) fitted by Gibbs sampling. *BMC Genet* 2003; 4 (Suppl 1): S12.
 10. **Patel SR**, Celedon JC, Weiss ST, Palmer LJ. Lack of reproducibility of linkage results in serially measured blood pressure data. *BMC Genet* 2003; 4 (Suppl 1): S37.
 11. **Patel SR**, Karpaliotis D, Ayas NT, Mark EJ, Wain J, Thompson BT, Malhotra A. The role of open lung biopsy in the acute respiratory distress syndrome. *Chest* 2004; 125:197-202.
 12. Ayas NT, **Patel SR**, Malhotra A, Schulzer M, Malhotra M, Jung D, Fleetham J, White DP. Auto-titrating versus standard continuous positive airway pressure for the treatment of obstructive sleep apnea: Results of a meta-analysis. *Sleep* 2004; 27: 249-53.
 13. **Patel SR**, Palmer LJ, Larkin EK, Jenny NS, White DP, Redline S. Relationship between obstructive sleep apnea and diurnal leptin rhythms. *Sleep* 2004; 27: 235-9.
 14. Palmer LJ, Larkin EK, **Patel SR**, Elston RC, Tishler PV, Redline S. A whole genome scan for obstructive sleep apnea and obesity in African-American families. *Am J Respir Crit Care Med* 2004; 169: 1314-21.
 15. **Patel SR**, Ayas NT, Malhotra MR, White DP, Schernhammer ES, Speizer FE, Stampfer MJ, Hu FB. A prospective study of sleep duration and mortality risk in women. *Sleep* 2004; 27: 440-4.
 16. Malhotra A, Trinder J, Fogel R, Stanchina M, **Patel SR**, Schory K, Kleverlaan D, White DP. Postural effects on pharyngeal protective reflex mechanisms. *Sleep* 2004; 27: 1105-12.
 17. Yang CK, Kim JK, **Patel SR**, Lee JH. Age-related changes in sleep/wake patterns among Korean teenagers. *Pediatrics* 2005; 115: 250-6.
 18. Larkin EK, Elston RC, **Patel SR**, Tishler PV, Palmer LJ, Jenny NS, Redline S. Linkage of serum leptin levels in families with sleep apnea. *Int J Obes Relat Metab Disord* 2005; 29: 260-7.
 19. Heinzer RC, Stanchina ML, Malhotra A, Fogel RB, **Patel SR**, Jordan AS, Schory K, White DP. Lung volume and continuous positive airway pressure requirements in obstructive sleep apnea. *Am J Respir Crit Care Med* 2005; 172: 114-7.
 20. Jordan AS, Wellman A, Edwards JK, Schory K, Dover L, MacDonald M, **Patel SR**, Fogel RB, Malhotra A, White DP. Respiratory control stability and upper airway collapsibility in men and women with obstructive sleep apnea. *J Appl Physiol* 2005; 99: 2020-7.
 21. Larkin EK, **Patel SR**, Redline S, Mignot E, Elston RC, Hallmayer J. Apolipoprotein E and obstructive sleep apnea: Evaluating whether a candidate gene explains a linkage peak. *Genet Epidemiol* 2006; 30: 101-10.
 22. Heinzer RC, Stanchina ML, Malhotra A, Jordan AS, **Patel SR**, Lo YL, Wellman A, Schory K, Dover L, White DP. Effect of increased lung volume on sleep disordered breathing in sleep apnoea patients. *Thorax* 2006; 61: 435-9.
 23. Cho MH, Malhotra A, Donahue DM, Wain JC, Harris RS, Karpaliotis D, **Patel SR**. Air leaks after open lung biopsy for the acute respiratory distress syndrome. *Ann Thorac Surg* 2006; 82: 261-6.
 24. **Patel SR**, Malhotra A, Gottlieb DJ, White DP, Hu FB. Correlates of long sleep duration. *Sleep* 2006; 29: 881-9.
 25. **Patel SR**, Malhotra A, Gottlieb DJ, White DP, Hu FB. Association between reduced

- sleep and weight gain. *Am J Epidemiol* 2006; 164: 947-54.
26. **Patel SR**, Larkin EK, Mignot E, Lin L, Redline S. The association of Angiotensin Converting Enzyme (ACE) polymorphisms with sleep apnea and hypertension. *Sleep* 2007; 30: 531-3.
 27. Williams CJ, Hu FB, **Patel SR**, Mantzoros CS. Sleep duration and snoring in relation to biomarkers of cardiovascular disease risk among women with type 2 diabetes. *Diabetes Care* 2007; 30: 1233-40.
 28. **Patel SR**, Hu FB. Short sleep duration and weight gain: a systematic review. *Obesity* (Silver Spring) 2008; 16: 643-53.
 29. **Patel SR**, Larkin EK, Redline S. Shared genetic basis for obstructive sleep apnea and adiposity measures. *Int J Obes* (Lond) 2008; 32: 795-800.
 30. Ibrahim LH, **Patel SR**, Modarres-Zadeh M, Johnson NL, Mehra R, Kirchner HL, Redline S. A measure of ventilatory variability at wake-sleep transitions predicts sleep apnea severity. *Chest* 2008; 134: 73-8.
 31. Jamasebi R, Loparo K, **Patel SR**, Redline S. Entropy-based measures of EEG arousals as biomarkers for sleep dynamics: Applications to hypertension. *Sleep* 2008; 31:935-43.
 32. **Patel SR**, Frame JM, Larkin EK, Redline S. Heritability of upper airway dimensions derived using acoustic pharyngometry. *Eur Respir J* 2008 [Epub].
 33. Larkin EK, **Patel SR**, Elston RC, Gray-McGuire C, Zhu X, Redline S. Using linkage analysis to identify quantitative trait loci for sleep apnea in relationship to body mass index. *Ann Hum Genet* 2008 [Epub].
 34. Koo BB, **Patel SR**, Strohl K, Hoffstein V. REM-related sleep disordered breathing: influence of age and gender. *Chest* 2008 [in press].
 35. Sammalisto S, Hiekkalinna T, Schwander K, Kardia S, Weder AB, Rodriguez BL, Doria A, Kelly JA, Bruner GR, Harley JB, Redline S, Larkin EK, **Patel SR**, Ewan AJ, Weber JL, Perola M, Peltonen L. Genome-wide linkage screen for stature and body mass index in 3.032 families: evidence for sex- and population-specific genetic effects. *Eur J Hum Genet* 2008 [Epub].

Reviews, Chapters, and Editorials:

1. **Patel SR**, Redline S. Two epidemics: Are we getting fatter as we sleep less? *Sleep* 2004; 27: 602-3.
2. **Patel SR**, White DP, Collop N. "Sleep". In: Crapo JD (ed.) *Bone's Atlas of Pulmonary Medicine 3rd ed.* Philadelphia: Current Medicine, LLC 2005; 81-93.
3. Erman MK, Young T, **Patel SR**, Neubauer DN. The role of modified-release formulations in hypnotic therapy for insomnia. *CNS Spectr* 2005;10: S1-13.
4. **Patel SR**. Shared genetic risk factors for obstructive sleep apnea and obesity. *J Appl Physiol* 2005; 99: 1600-6.
5. **Patel SR**, Fogel RB. "Obstructive sleep apnea". In: Robinson MK, Thomas A (eds.) *Obesity and Cardiovascular Disease*. New York: Taylor & Francis 2006; 143-76.
6. **Patel SR**, Redline S. "Genetics of sleep apnea". In: Laurent G, Shapiro SD (eds.) *Encyclopedia of Respiratory Medicine*. Boston; Elsevier Press 2006; vol. 4: 63-7.
7. Malhotra A, **Patel S**. Lung Biopsy in ARDS: is it worth the risk? *Critical Care* 2006; 10:160.
8. **Patel SR**, Tishler PV. "Familial and genetic factors". In: Kushida CA (ed.) *Obstructive Sleep Apnea: Pathophysiology, Comorbidities, and Consequences*. New York: Informa Healthcare 2007; 223-43.
9. **Patel SR**. Social and demographic factors related to sleep duration. *Sleep* 2007; 30:1077-8.

10. Redline S, **Patel SR**. "The genetic basis for obstructive sleep apnea: What role for variation in respiratory control?" In: Gaultier C (ed.) *Genetic Basis for Respiratory Control Disorders*. New York: Springer 2007;111-36.
11. **Patel SR**, Hu FB. "Sleep deprivation". In: Hu F (ed.) *Obesity Epidemiology*. New York: Oxford University Press 2008;320-41.
12. Al Lawati NM, **Patel SR**, Ayas NT. Epidemiology, risk factors, and consequences of obstructive sleep apnea and short sleep duration. *Prog Cardiovasc Dis* 2008 [in press].
13. **Patel SR**. Sleep apnea genetics: Its time to wake up to the importance of sleep. *Cardiology* 2009;112: 60-1.

Other Published Material:

1. **Patel SR**, Harris RS, Malhotra A. Pulmonary dead space and survival. *New Engl J Med* 2002;347:851.
2. Palmer LJ, Larkin E, Elston RC, Redline S, **Patel SR**, Tishler PV. Linkage to apnea-hypopnea index across the life-span: Is this a viable strategy? *Am J Respir Crit Care Med* 2004;170:1260-1.
3. **Patel SR**. Is siesta more beneficial than nocturnal sleep? *Arch Int Med* 2007;167:2143-4.

Current Area of Research:

My research interest is in understanding the epidemiology of sleep disorders with particular emphasis on chronic partial sleep deprivation and obstructive sleep apnea and the potential effects of these disorders on metabolism. I have conducted inquiries into the long term health effects of curtailed sleep including defining effects on weight homeostasis, diabetes, heart disease, and mortality. I have also investigated the association between long self-reported sleep durations and health outcomes, attempting to understand, potential mediators of this relationship. I have also been interested in identifying genetic polymorphisms that predispose to the development of sleep apnea and also polymorphisms that influence the risk of developing cardiovascular or metabolic complications from sleep apnea. Additional studies have investigated the relationship between sleep apnea and adipose tissue including levels of circulating adipokines and most recently gene expression in adipose tissue.