



**How Sleep Medicine Can Significantly
Lower the Cost of an ACO's High-Risk Patients**



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- Baylor College of Medicine
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- Practicing Sleep Medicine for 30+ Years

Clinical Team



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Medical Director – Dental Sleep Medicine

- Columbia University School of Dental and Oral Surgery
- M.D. SUNY Upstate Medical Center
- Board Certified in Sleep Medicine



John Cronin M.D.
Chief Medical Officer

- Medical Director – Scripps Sleep Clinic
- Board certified in sleep medicine, pulmonary medicine, and critical care
- Vanderbilt School of Medicine
- Harvard Medical School Fellowship



Sam Clark M.D.
Medical Director

- 20+ years diagnosing and treating sleep disorders
- Board certified in sleep medicine, pulmonary medicine, and critical care
- M.D. Vanderbilt U. School of Medicine



Derek Loewy Ph.D., D.AGSM, CBSM
Director of Behavioral Health

- Co-founder Stanford Insomnia Program
- Director of Behavioral Sleep at Scripps Clinic
- Ph.D. U. of Ottawa

“Insufficient sleep is a
public health epidemic.”

– Centers for Disease Control and Prevention

Highly Prevalent, Severely Under-Diagnosed and Very Costly

Sleep Disorder	U.S. Population Affected	Annual Costs	Sleep Apnea Co-Morbidities
Apnea	18%	\$162 Billion¹ in total costs \$87 Billion in lost productivity	46-53% Prevalence of HTN 77% Prevalence of Obesity 5-63% Prevalence of Depression 25% Prevalence of CAD
Insomnia	20%	\$84 Billion in healthcare costs \$411 Billion² in lost productivity	83% of DR-HTN have OSA 71% of DM II have OSA 76% of CHF have OSA 44-72% of CVA have OSA 49% of AF have OSA

The Effects of Poor Sleep on Health

What would you say if:

I told you I could take a previously healthy millennial and without changing their diet or medications make them pre-diabetic in one week?



Decreased glucose tolerance



Decreased insulin secretion



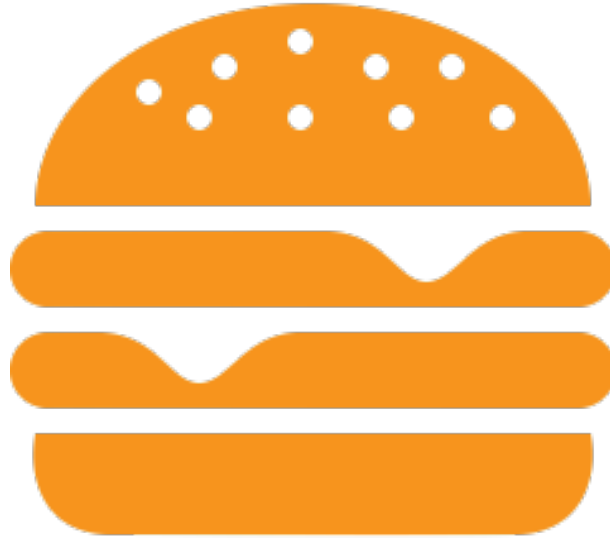
Increased evening cortisol concentrations



Increased sympathetic nervous system activity

Spiegel K. Lancet 1999; 354:1435-9

The Effects of Poor Sleep on **Health**

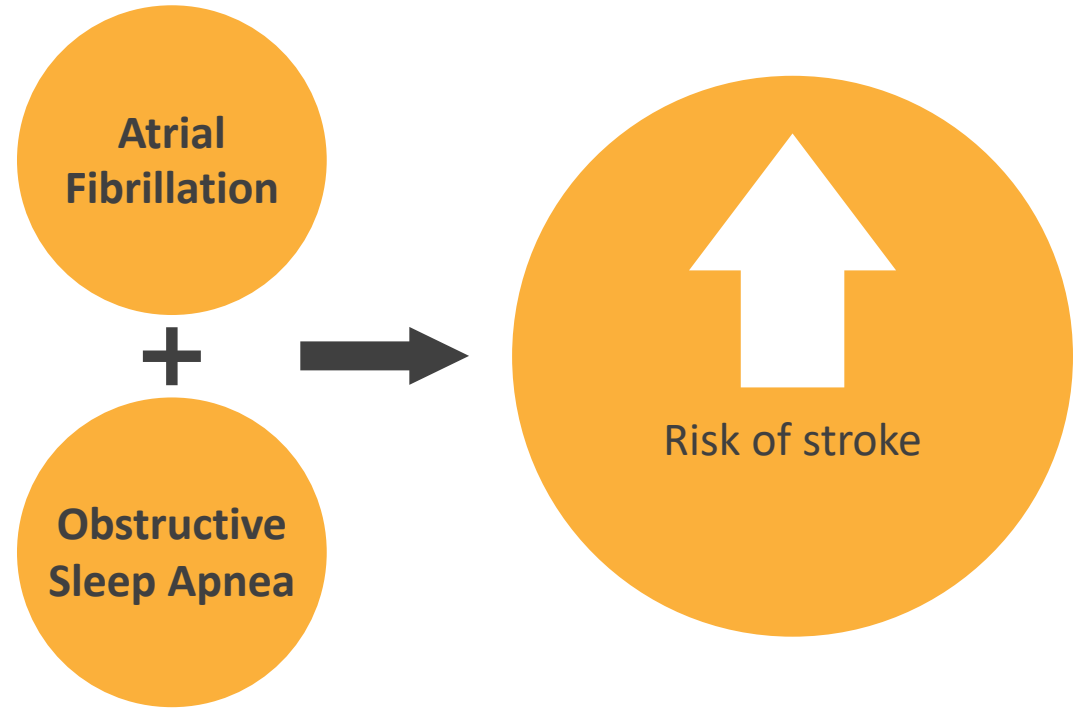


559 additional calories consumed

Calvin A. Chest 2013;144(1):79-86

Atrial Fibrillation & Sleep Apnea

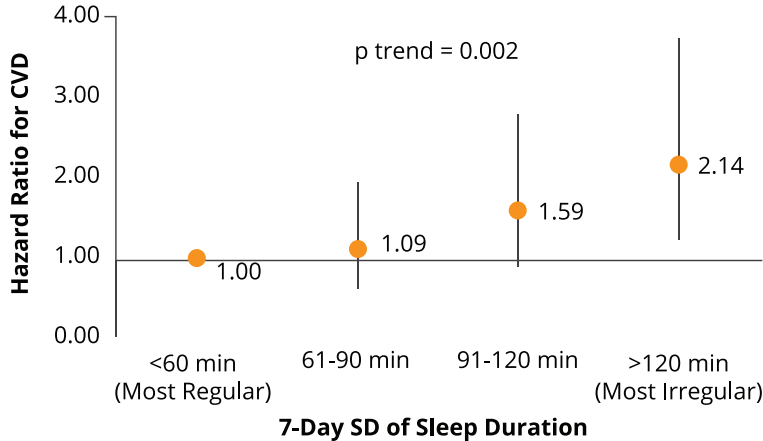
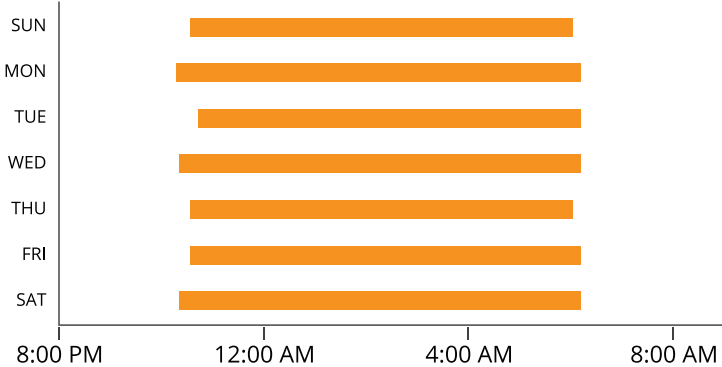
- 22,760 patients with atrial fibrillation
- obstructive sleep apnea was an **independent** risk factor for stroke & systemic embolism



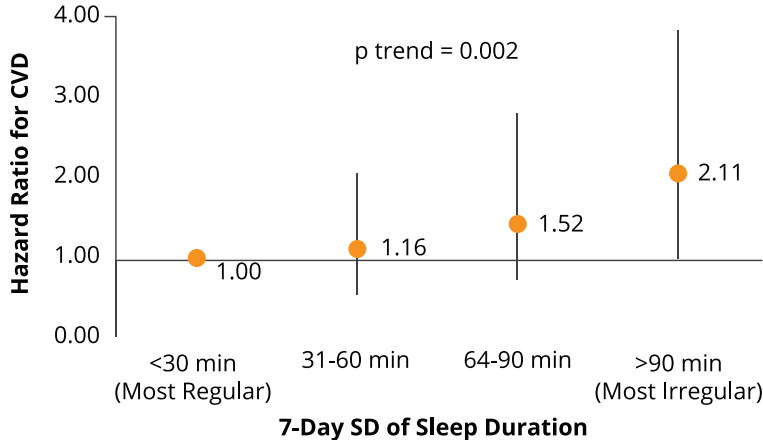
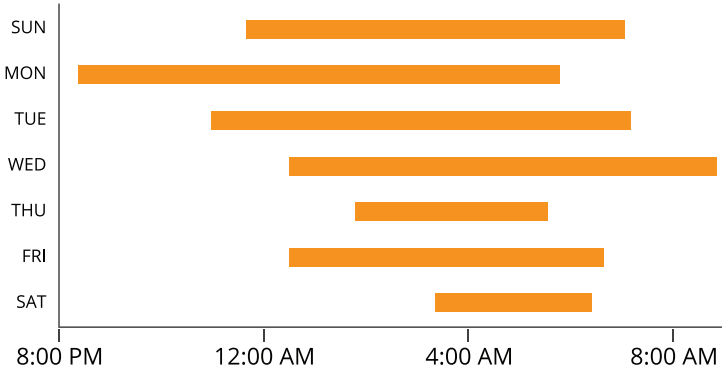
American Heart Journal Vol 223 May 2020, Pages 65-71

Sleep Patterns & CVD Risk

A regular sleeper: Sleep duration SD = 10.1 min
Sleep onset timing SD = 9.2 min



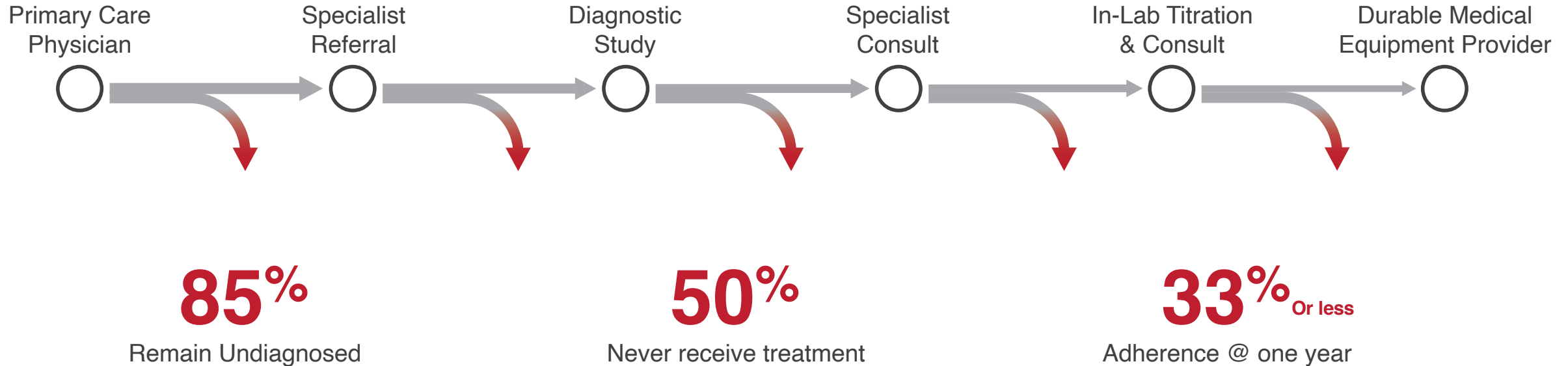
A irregular sleeper: Sleep duration SD = 144.5 min
Sleep onset timing SD = 121.4 min



Huang, T. et al. Am Coll Cardiol. 2020;75(9):991-9

Sleep Care Management is **Broken**

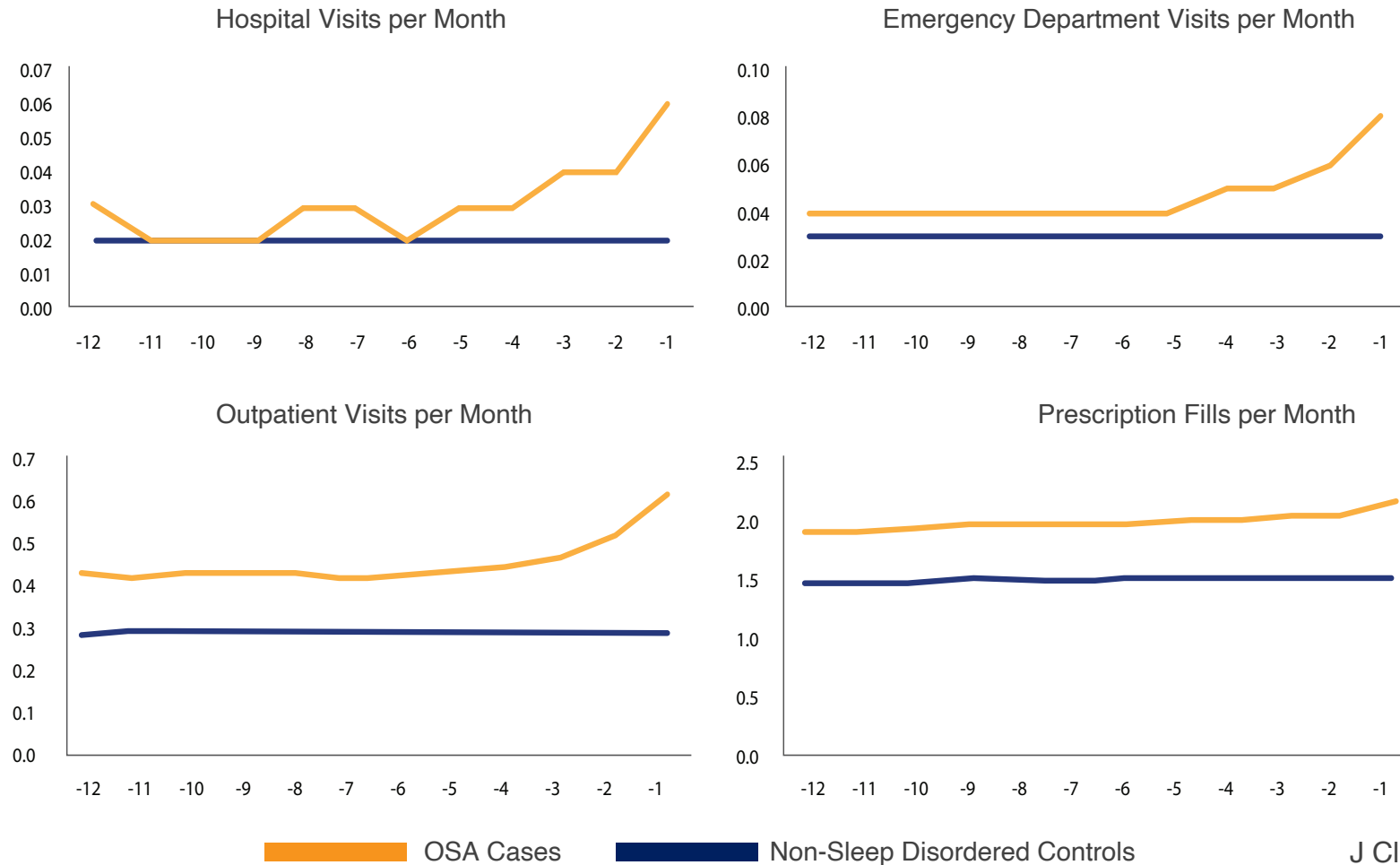
Silos of Costly & Fragmented Care Delivered over Multiple Months



Average time to complete: **4 months** | Average cost: **\$3,500 - \$8,700**

Untreated Sleep Apnea Costs

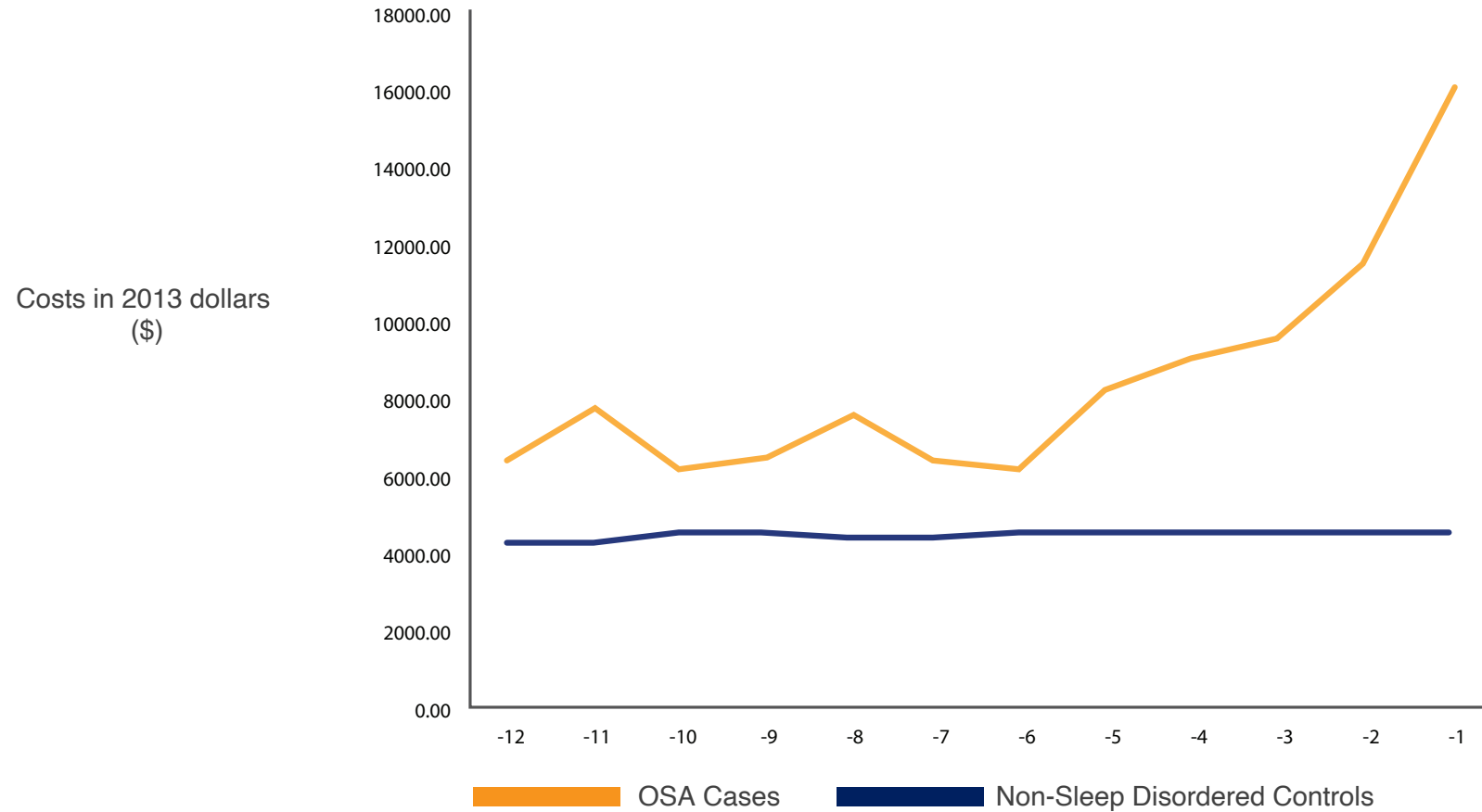
Health care utilization during the year prior to OSA diagnosis



J Clin Sleep Med. 2020;16(1):81–89

Untreated Sleep Apnea Costs

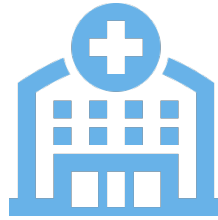
Total mean monthly costs during year prior to OSA diagnosis



J Clin Sleep Med. 2020;16(1):81–89

Economics of Sleep Apnea

OSA patients have **higher direct medical costs** for up to **10 years** before diagnosis compared with those who are not diagnosed with OSA and the magnitude of difference in these costs is **directly related to the severity of SDB²**



Untreated OSA patients averaged **32% more hospital admissions** than treated OSA patients²



Prior to diagnosis, OSA patients utilized medical resources **23-50% more** than control group.¹

1. McKinsey-Harvard 'The Economics of Sleep,' 2010

2. Butterfield et al., SLEEP 2011

3. Cai et al. *Am J Man Care*, 2012

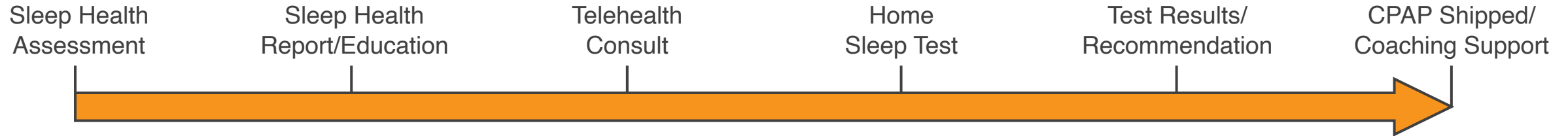
Sleep Care Management – Time for Change



- HST efficiency vs. brick & mortar sleep lab
- AutoPAP technology adoption
- Smart PAP devices allow remote management
- Critical mass of published research on impact of untreated OSA on overall healthcare cost
- Rising consumer awareness
- Mis-alignment of interest

BetterNight **Fixes** Sleep Care Management

Fully integrated Virtual Care



50%

Improvement in Conversion from
Diagnosis to Therapy

99%

Patient Satisfaction

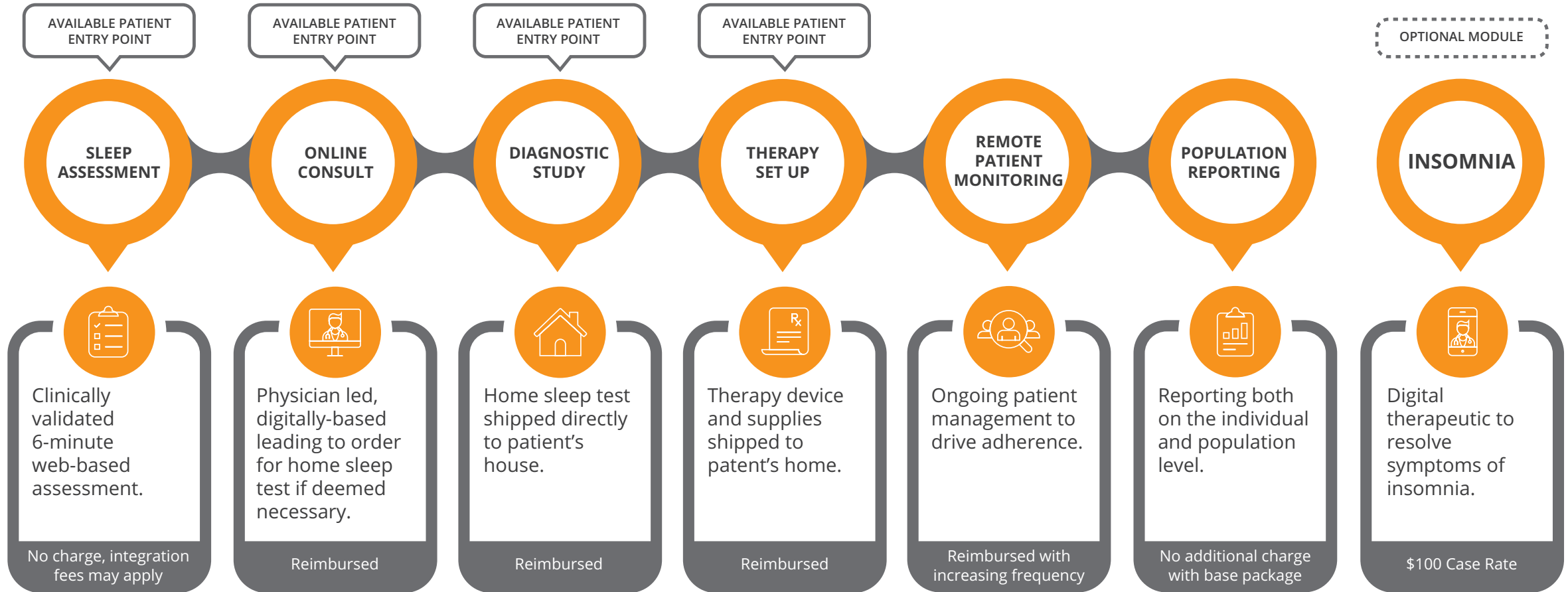
67%

Adherence @ one year

Average time to complete: **2 Weeks** | Average cost: **\$1,300**

The BetterNight Platform

A modular & adaptable platform allowing customers and patients to choose the services appropriate to their specific needs.



BetterNight Overview



24 Years

Unparalleled experience in sleep management with top sleep experts trained at or affiliated with Baylor, Vanderbilt, Duke, Stanford and Harvard



30,000

Patients treated annually



67%

Long-term adherence vs 33% from standard sleep apnea pathway



> 180

Highly trained professionals



99%

Average patient satisfaction score over the past 5 years

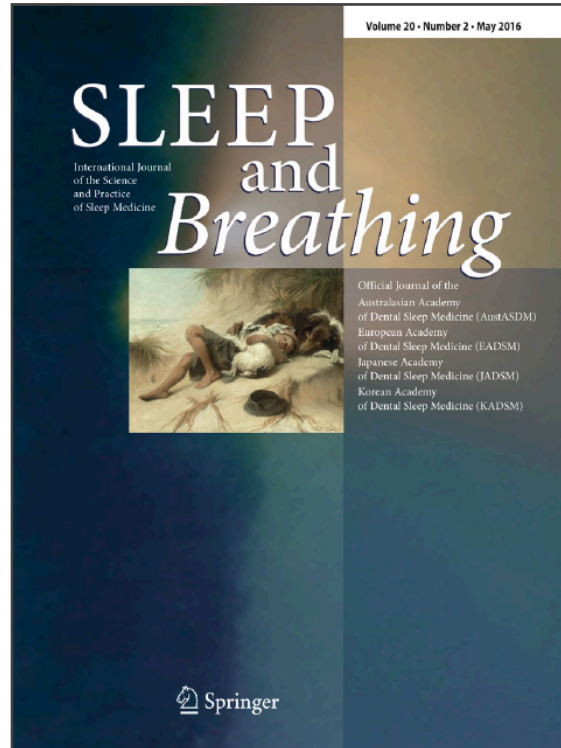


16

Peer reviewed articles authored and published



Telehealth and CPAP Therapy

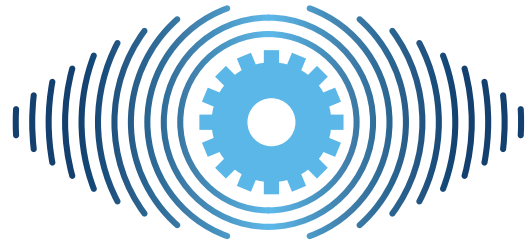


A telehealth program for CPAP adherence reduces labor and yields similar adherence and efficacy when compared to standard of care.

Dominic Munafò & William Hevener & Maureen Crocker & Leslee Willes & Sarah Sridasome & Ma'an Muhsin

Sleep Breath (2016) 20:777–785
DOI 10.1007/s11325-015-1298-4

BetterNight Care Management



C L A R I T Y

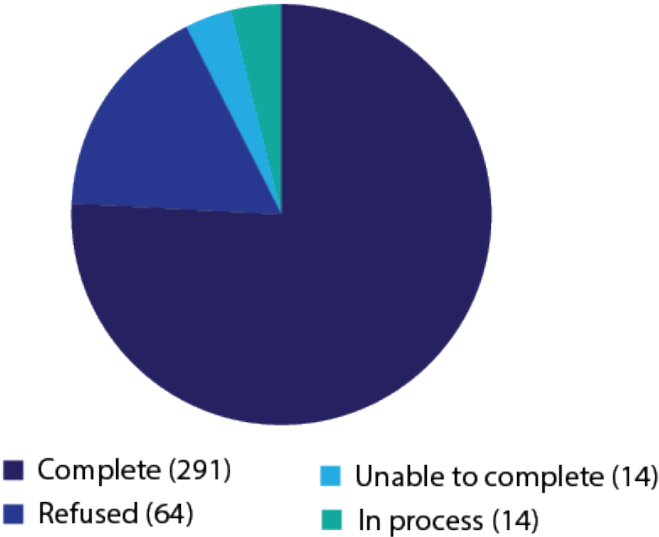
BetterNight's Proprietary Data
Analytic Software

Unprecedented Outcomes & Accountability

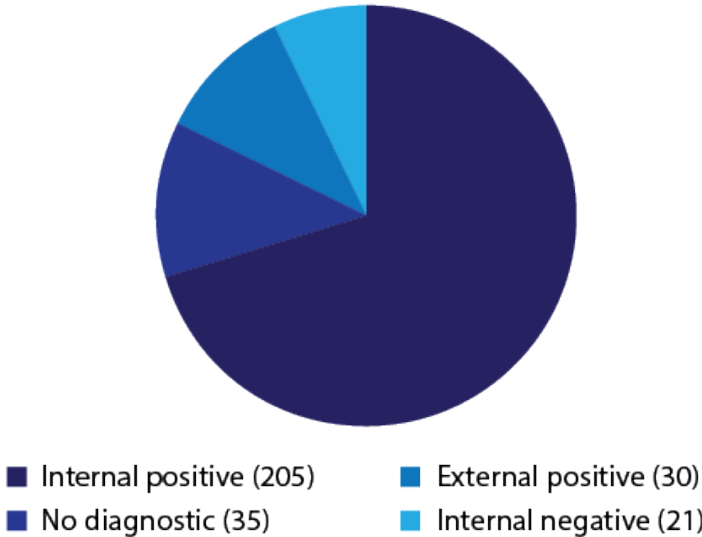
- **Objective** reporting on adherence and therapy efficacy in real-time
- **Exception-based** coaching using proprietary algorithms to drive high compliance and adherence in a cost-effective manner
- **Ongoing** therapy supplies

Clarity Population Management Report

Diagnostic - Status (383)

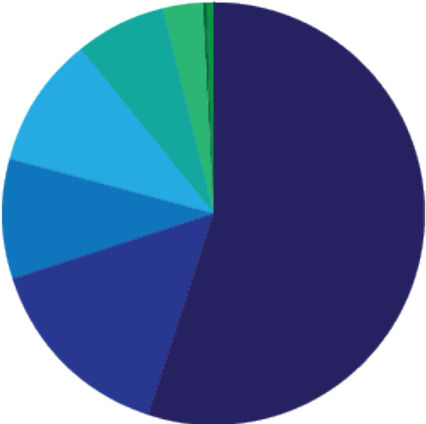


Diagnostic - Test Results (291)



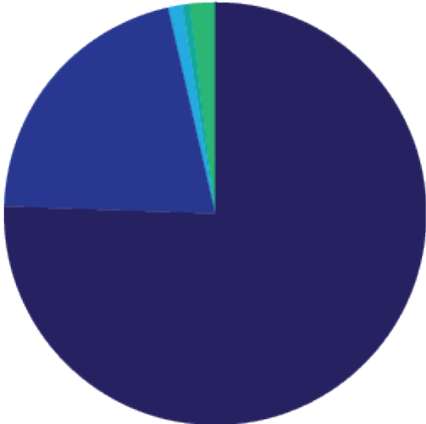
Clarity Population Management Report

Therapy - PAP Status (270)



- Intake complete (149)
- TX not prescribed (40)
- Refused (25)
- In Process (27)
- Supplies Only (19)
- Physician declined (8)
- Unknown (1)
- Unable to complete (1)

Therapy - Has Recent Data (168)



- Internal modem (127)
- No data - active (35)
- No data - inactive (2)
- PAP returned (1)
- External modem (3)

Clarity Population Management Report

Apnea Severities

Mild (5-15): **20% (56)**
Moderate (15-30): **25% (69)**
Severe (30+): **40% (110)**
Unknown: **12% (35)**

Active Modems (127)

Average Nights Used (%): **83.49% (25 nights)**
Median Nights Used (%): **96.67% (29 nights)**
Average Hours Used: **5.32 hours**
Median Hours Used: **5.62 hours**
Average Treated AHI: **3.12 events/hour**

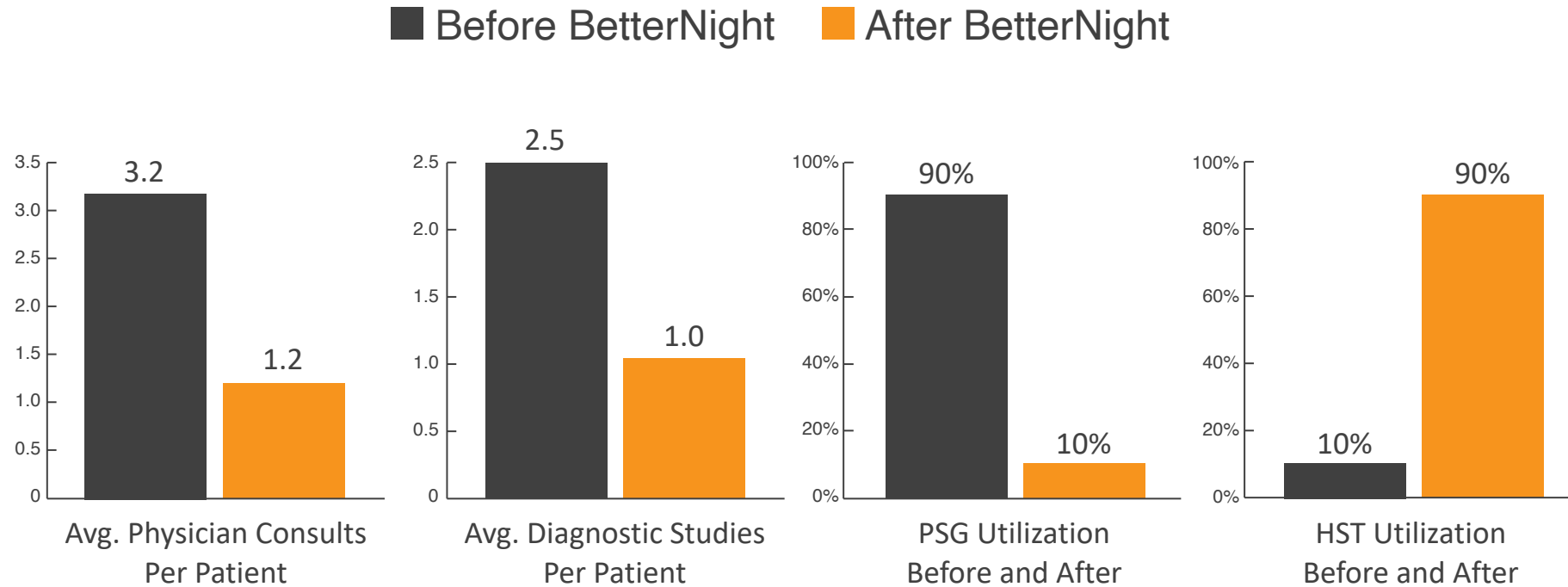
PAP Set Up Complete (149)
Medicare Compliance:
79%

Commercial At Risk Population

	Actual Results ¹	BetterNight Simulation
Employees Diagnosed	122	122
Converted to Therapy	63 (51%)	92 (75%)
Total Cost of Care (apnea related only)	\$546,804	\$173,228
Average cost per patient on therapy	\$8,679	\$1,785
# Adherence @ 14 th month	0	63 (68%)
Direct cost reductions	-	\$373,576
Additional cost savings opportunity	-	\$230,400 ²

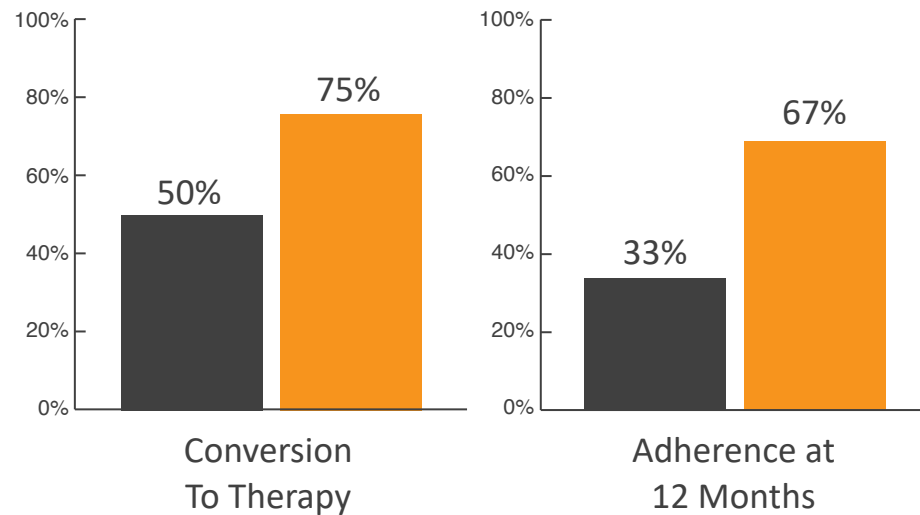
1. From 2015 claims data, 27,500 benefit plan members from large, national employer
2. Based on average annual savings of \$3,600 per compliant apnea patient on CPAP from multiple studies including World J Otorhinolaryngology - Head Neck Surg. 2015 Sep; 1(1): 17–27. Clinical consequences and economic costs of untreated obstructive sleep apnea syndrome.

Case Study - Southern CA based Health Plan



Case Study - Southern CA based Health Plan

■ Before BetterNight ■ After BetterNight



3x

Increase in # of adherent patients at 1 year

BetterNight Case Study

For every 10,000 member lives:

Direct cost savings

\$640,000 annually (\$64 per member per year)⁽¹⁾
result of decreased consultation and diagnosis costs

Additional Return on Investment

\$237,600 annually (\$24 per member per year)⁽²⁾
Increasing long term adherence from 33% to 66%

Lower hospital admissions⁽³⁾

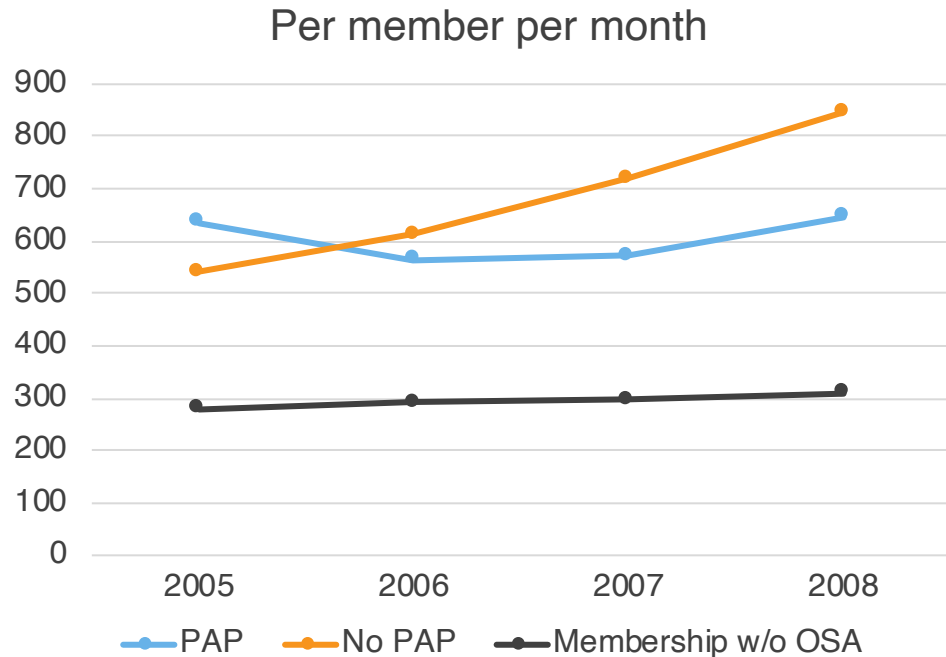
99% patient satisfaction

Population Management through Clarity

- (1) Assumes 2% diagnosed annually. Ave cost for consults, diagnosis and first year therapy of \$5,000 versus \$1,800
- (2) Assumes midpoint savings of \$3,600 per compliant patient. Numerous published studies have validated significant healthcare cost savings related to CPAP adherence. A Harvard McKinsey meta analysis in 2010 estimated annual savings of \$3,200-\$4,000
- (3) Untreated sleep apnea patients averaged 32% more hospital admissions than treated apnea patients. Butterfield et al, Sleep 2011

PAP Reduces Total Medical Expense for OSA Patients

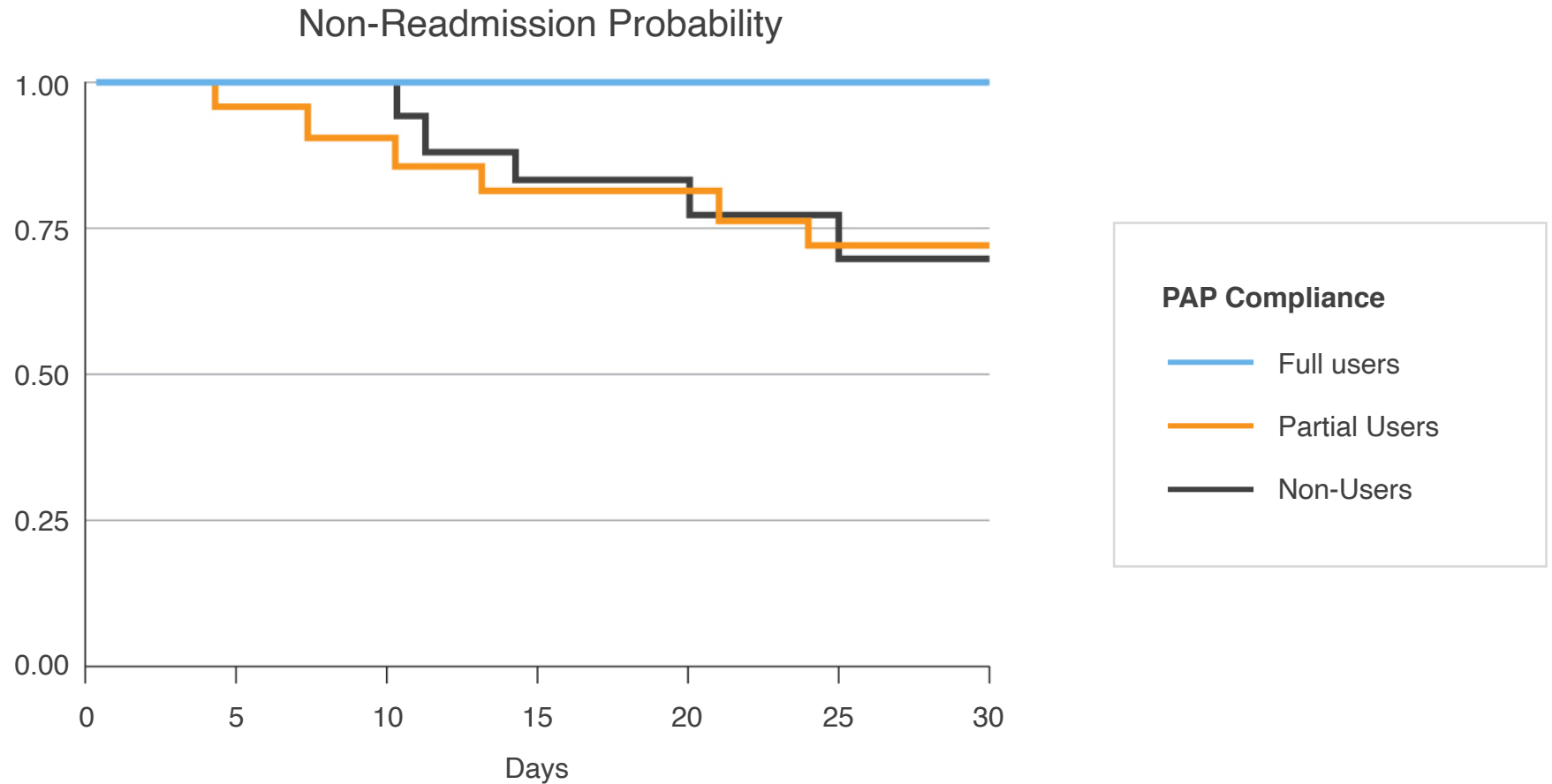
- Union Pacific sleep campaign (2007-2008)
- No PAP participants had **total medical costs 29% more** than PAP participants.
- In 2008 that difference was **31%**.



Year	No SDB	PAP	No PAP
2006	\$3,487	\$6,761	\$7,339
2007	\$3,561	\$6,865	\$8,643
2008	\$3,706	\$7,748	\$10,159

Source: Union Pacific Employees Health Plan; Sleep June 2011

Treatment of OSA Reduces Cardiovascular Disease Readmission



Upenn Schwab, et al Journal of Clinical Sleep Medicine, Oct.2014

Highly **Prevalent**, Severely **Under-Diagnosed** and Very **Costly**

Untreated OSA patients cost **\$1950 - \$3889 per year**
more than those treated.

Patients with untreated OSA had **inpatient costs 82% higher**
than treated patients.

World J Otorhinolaryngol Head Neck Surg 2015 Sep; 1(1): 17–27.

Untreated sleep apnea patients cost **\$2700 - \$5200 per year**
more than those treated.

Sleep 2019 Oct 24

J Occup Environ Med. 2010 May;52(5):473-7

Berger M, et al. Schneider National, Inc., and Definity Health Corp.

COVID-19 Sleep Medicine Update

Concerns

1. Difficulty in adequately sanitizing sleep lab and equipment
2. Home Sleep Studies (HST)
 - Need to sanitize
 - Patient classes impossible
3. Positive Airway Pressure (PAP) set up requires person to person interaction
4. Risk of aerosolization from PAP device

COVID-19 Sleep Medicine Update

Short-Term Consequences

1. Dramatic decrease in assessing and diagnosing
2. Sleep clinics closing – temporary
3. HIPAA non-compliant telemedicine
4. More reliance on HSTs
5. Demand for disposable HSTs
6. Remote PAP set ups

COVID-19 Sleep Medicine Update

Emerging Long-Term Trends

Sleep Medicine

1. HIPAA compliant Telemedicine
2. Reduced dependence on Sleep Labs
 - Mainly complex patients
3. More reliance on HSTs
 - Disposable HSTs
4. Remote PAP Set ups

Decentralized Primary Care Medicine

1. On-site & Near-site primary care
2. Virtual primary care
3. On-demand, text-based primary care

COVID-19 Sleep Medicine Update

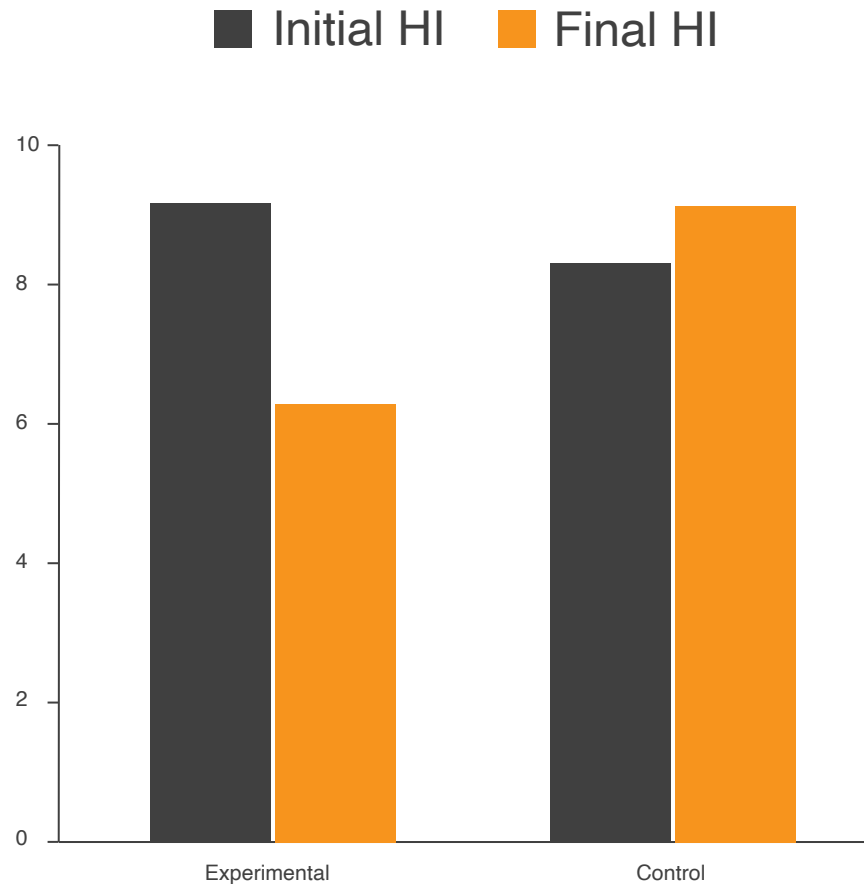
Sleep's Role in Health – Focus on COVID-19

Rejuvenate immune system

Reduce susceptibility to viral infection

Reduce probability of depression / anxiety

And Better Sleep Can Improve Your Golf Game...



Comparison of initial and final handicap indexes among skilled golfers

Bars represent handicap indexes as reported by all golfers with an initial handicap index of 12 or less, both in the OSAS group (n = 5) and in the control group (n = 6). Averages \pm standard error are shown.

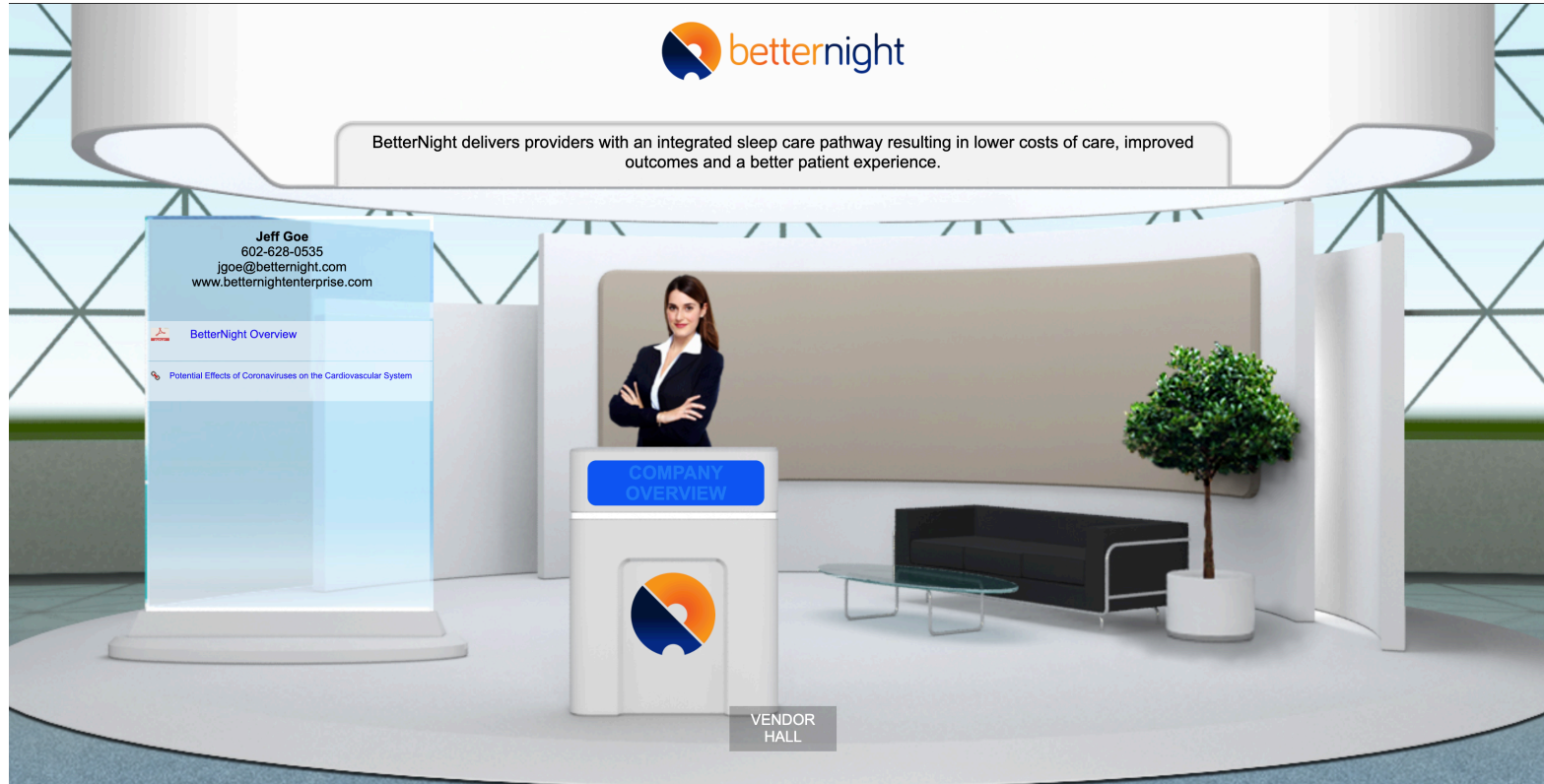


betternight

Questions & Discussion

Stop by our ACO Exhibit Hall Virtual Booth

<https://www.acoexhibithall.com/vendor-booth/betternight/population-health-i-patient-ervices-ancillary-care/123/>



ACOExhibitHall.com 



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