



“Is it Sleep Apnea, or...?”



Remote Attendees,  
Welcome!  
Please leave your phones on  
**MUTE** – Thank You!



# Agenda

**8:00-9:15** – The scope of the problem; Benefits of treatment; Definitions; Identifying patients at risk; Establishing the diagnosis; Treatment options

**9:15-9:30 Break**

**9:30-10:30** – Understanding the Equipment

**10:30-10:45 Break**

**10:45 -11:15** – Tracking compliance

**11:15-11:30** – Deprescribing

**11:30-12:00** – Panel Questions



# Sleep Medicine

## **Bill Bowerfind, M.D.**

The Oregon Clinic, Pulmonary,  
Critical Care and Sleep Division  
Medical Director,  
Providence Portland Medical Center  
Sleep Disorders Center  
and Providence Milwaukie Sleep Lab



# Obstructive Sleep Apnea

- The scope of the problem
- Benefits of treatment
- Definitions
- How to identify patients at risk
- Treatment
- Follow-up



# Wake Up!



# Which has more caffeine?



Monster Energy  
16 oz.

160 mg  
10 mg/oz.



Mt. Dew  
12 oz.

54 mg  
4.5 mg/oz.



Red Bull  
8.46 oz.

80 mg  
9.5 mg/oz.



Starbucks  
Coffee 8 oz.

180 mg  
22.5 mg/oz.



# Caffeine

- Stimulating effect within 15 min of consumption
- Half life of 4-8 hours
  - Can double in later stages of pregnancy
  - Up to 96 hours in acute liver disease
- In some individuals, caffeine can disrupt sleep even 15 hours after ingestion.
- Caffeine withdrawal
  - Occurs within 12-24 hours of discontinuation
  - Peak symptoms at 1-2 days
  - Can last up to nine days.





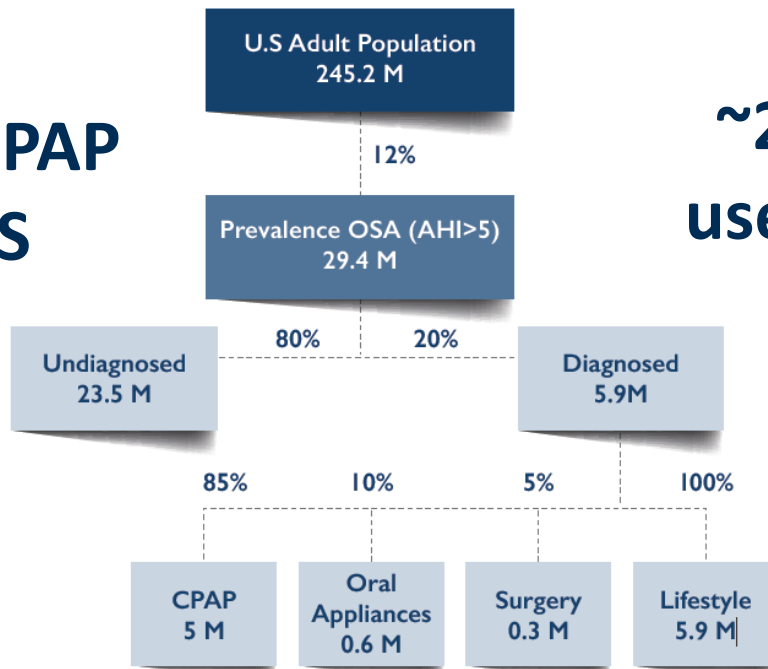
# Obstructive Sleep Apnea

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# OSA Epidemiology

~25 million CPAP users in US

~227,000 CPAP users in Portland Metro Area



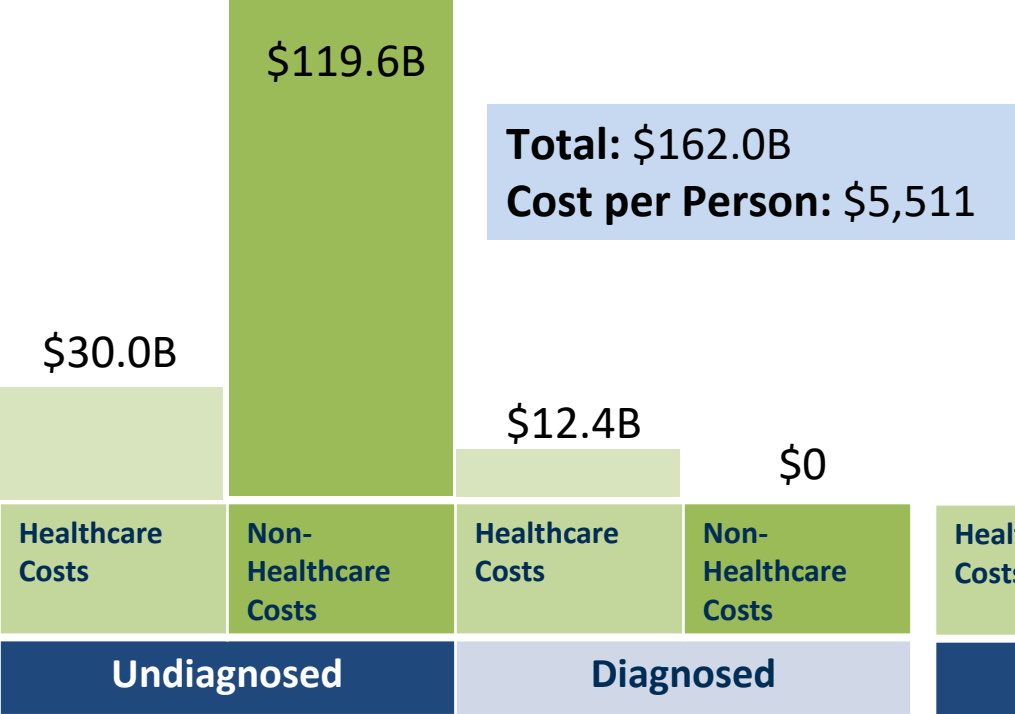
Source: Primary research with experts, U.S. Census (2014), Peppard "Increased Prevalence of Sleep-disordered Breathing in Adults."

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# Diagnosing and Treating All 29.4M Americans with OSA Could Save \$100.1 Billion

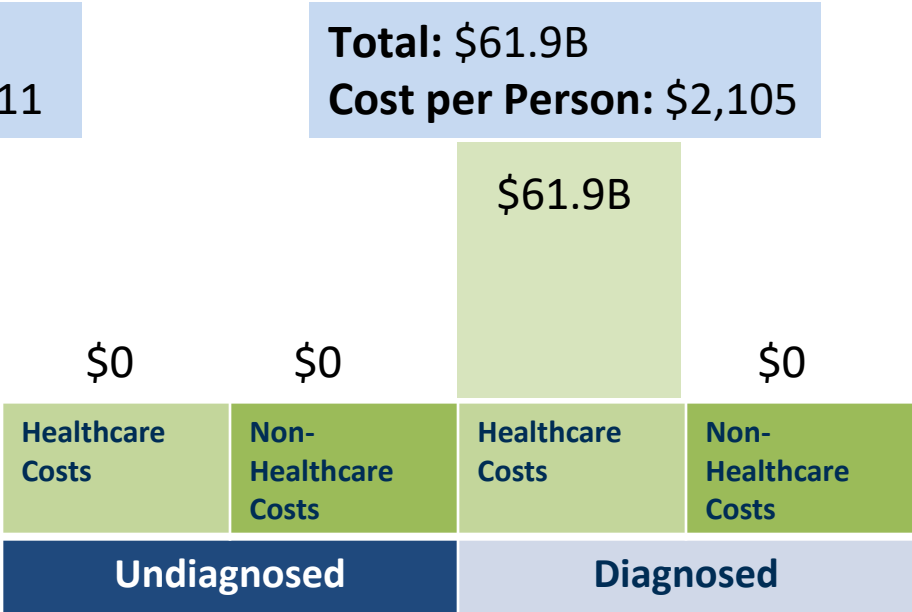
## Today

Where 80% of OSA Patients Are Undiagnosed



## Future

Where No OSA Patients Are Undiagnosed



# Portland, we have a problem...



12% of the CareOregon  
Population

- We need your help
- Your patients need your help



# Obstructive Sleep Apnea

- The scope of the problem
- **Benefits of treatment**
- Definitions
- Identifying patients at risk
- Establishing the diagnosis
- Treatment options
- Tracking compliance

# OSA Treatment has a Major Impact on Comorbidities

After one year, patients surveyed state OSA treatment delivers...



## Hypertension

- 41% report blood pressure improvement
- 17% report decrease in medication usage



## Diabetes

- 31% report improved HbA1c
- 14x increase in “good quality” sleep



## Asthma & Breathing Conditions

- 54% report improved respiratory function
- 70% increase in patients reporting symptoms as mild
- 8x increase in “good quality” sleep

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# OSA Treatment has a Major Impact on Comorbidities

After one year, patients surveyed state OSA treatment delivers...



## Insomnia

- 7x increase in good quality sleep
- Decline from 54% to 1% reporting “very bad” quality sleep



## Depression, Anxiety and Mental Health

- 12x increase in “good quality” sleep
- 4x reduction in reported life threatening mental health condition
- 49% report improved mental health



## Heart Disease

- 56% report reduced heart disease risk
- 5x decrease in self-reported life-threatening heart disease
- Decline from 50% to 3% reporting “very bad” quality sleep
- Increase from 0% to 26% reporting “very good” quality sleep

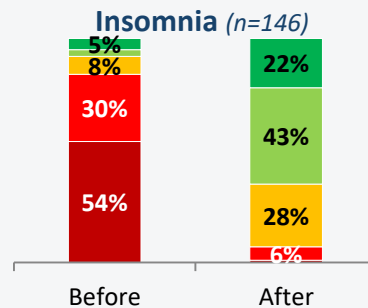
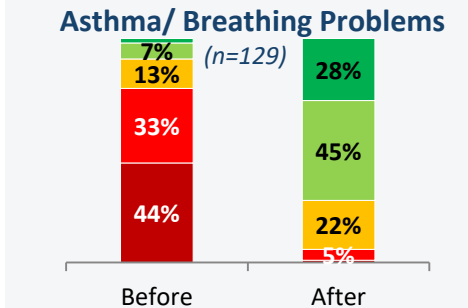
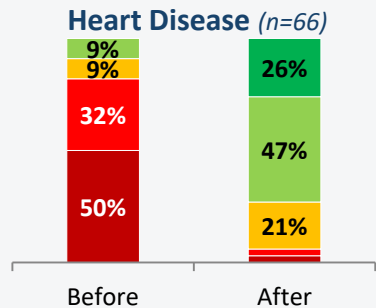
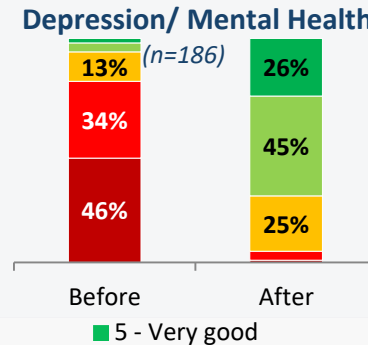
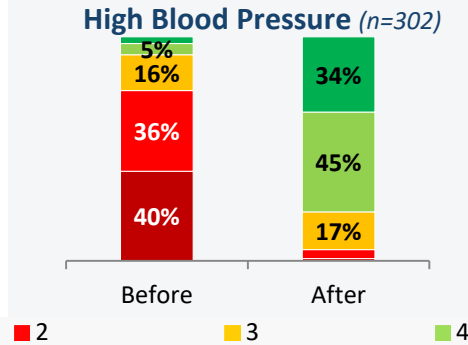
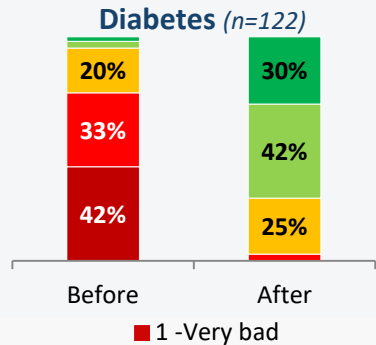
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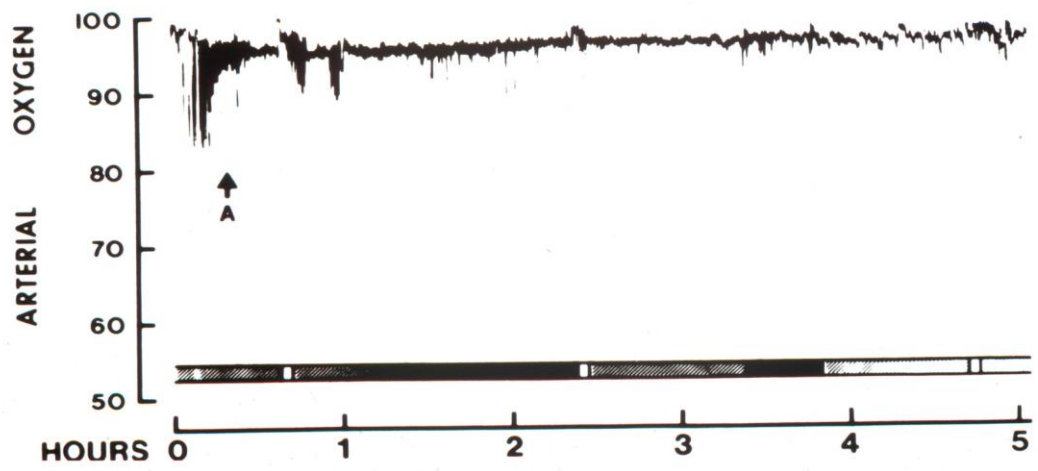
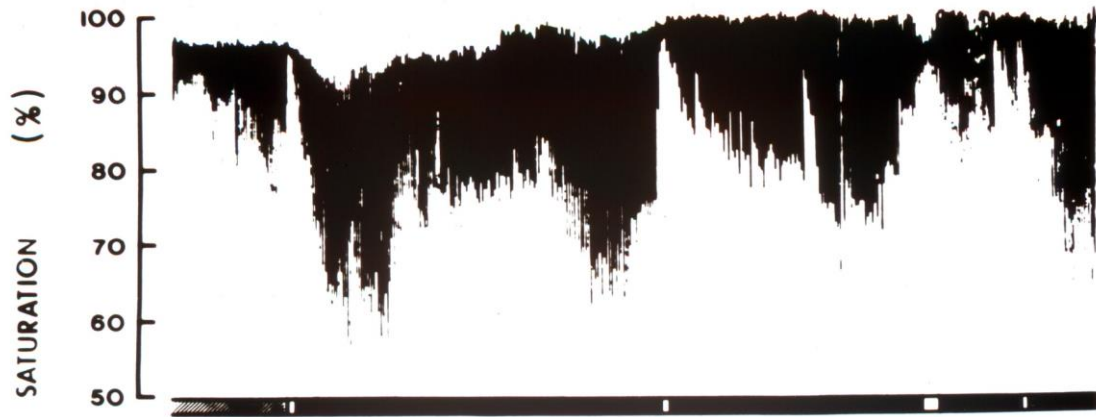
# Quality of Sleep Across Comorbidities

## Before and after sleep apnea treatment

A high proportion of respondents with comorbidities declare their sleep quality as 'good' / 'very good' after treatment. The biggest difference is among High Blood Pressure patients (79% vs 8% before treatment.) and the smallest among Insomnia patients (65% vs. 8% before treatment.)







# Cardiovascular/Cerebrovascular Disease and OSAS

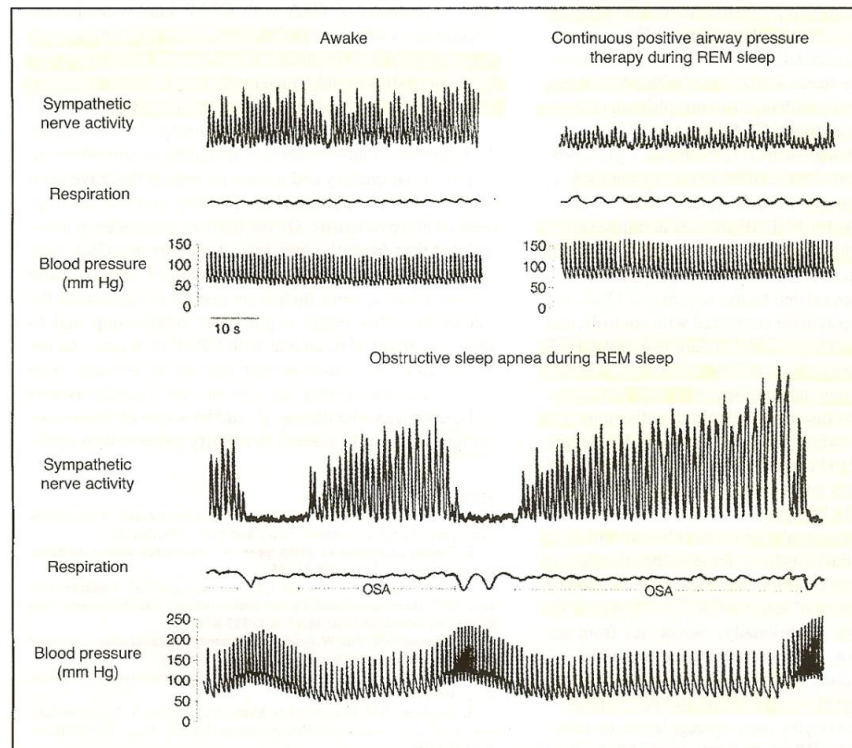


FIGURE 1. Recordings of sympathetic nerve activity, respiration, and intra-arterial blood pressure in an otherwise healthy patient with obstructive sleep apnea (OSA) during wakefulness (top left), during recurrent obstructive apneas (bottom panel), and during treatment with continuous positive airway pressure (CPAP) (top right). Even during wakefulness and normoxia, patients with OSA have high levels of resting sympathetic nerve activity. During obstructive apneas, chemoreflex activation by hypoxemia and hypercapnia causes even further increases in sympathetic activity, with recurrent surges in blood pressure most notable at the end of apneic events. Blood pressure increases up to 250/130 mm Hg even though the patient is normotensive during wakefulness. Treatment with CPAP lowers both sympathetic activation and blood pressure. REM = rapid eye movement. Reprinted from Somers et al,<sup>74</sup> with permission from the American Society for Clinical Investigation.

# OSA Treatment Benefits – The Patient Perspective

- Respondents gained an **additional 1.7 hours** of sleep after treatment
- **11x increase reporting sleep as “good” or “very good”** following treatment with a long-term persistence effect beyond initial adoption
- The percentage of respondents stating their **quality of life was “good/very good” tripled** (26% vs. 76%) following treatment
- Satisfaction with bed partner relationship, mood and patience **doubled**
- Use of alcohol, cigarettes, and sleeping aids **substantially declined** post-treatment
- **Productive work time grew 17%** after treatment
- **Work absences declined 40%** after treatment



# Benefits of Treatment: The “Triple Aim”

Beyond economics and cost savings, imagine what the U.S. would be like if all 29.4 million people with OSA received treatment...

## Payors/ Employers

- Reduces costs long-term
  - Increases productivity
- Lowers accident rates and liability costs



## Patients

- Improves health and life expectancy
  - Increases productivity
- Increases quality of life
  - Improves relationships

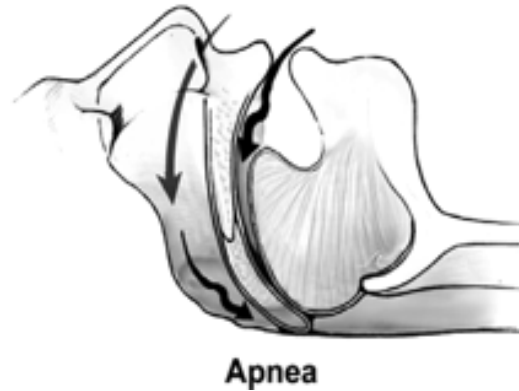
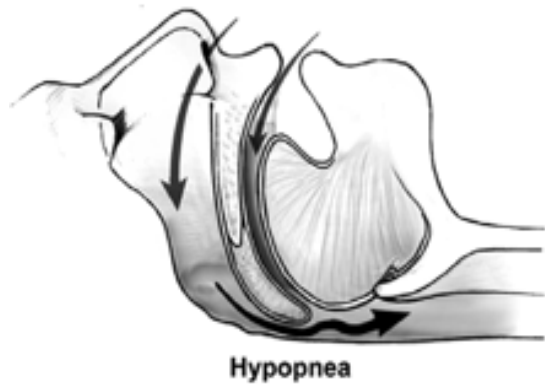
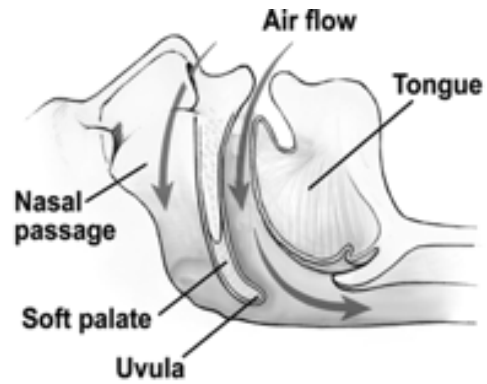
## Providers

- Aligns with population health incentives
- Improved outcomes increases profit in a value-based healthcare system
  - Lowers healthcare utilization and reduces admissions



# Obstructive Sleep Apnea

- The scope of the problem
- Benefits of treatment
- **Definitions**
- Identifying patients at risk
- Establishing the diagnosis
- Treatment options
- Tracking compliance

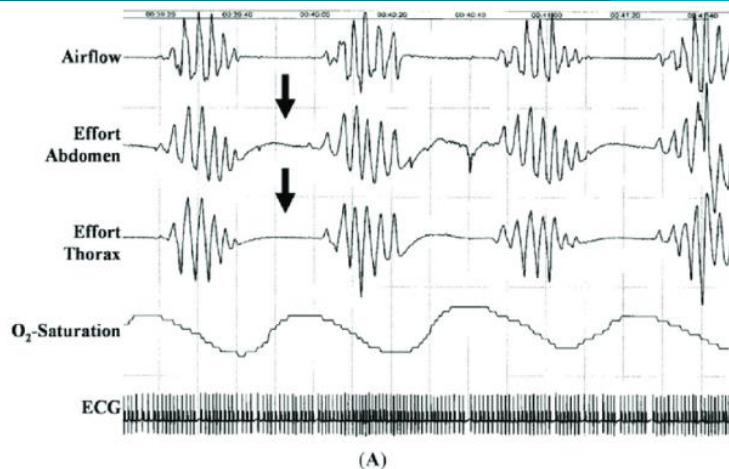


# Definitions: Respiratory Events

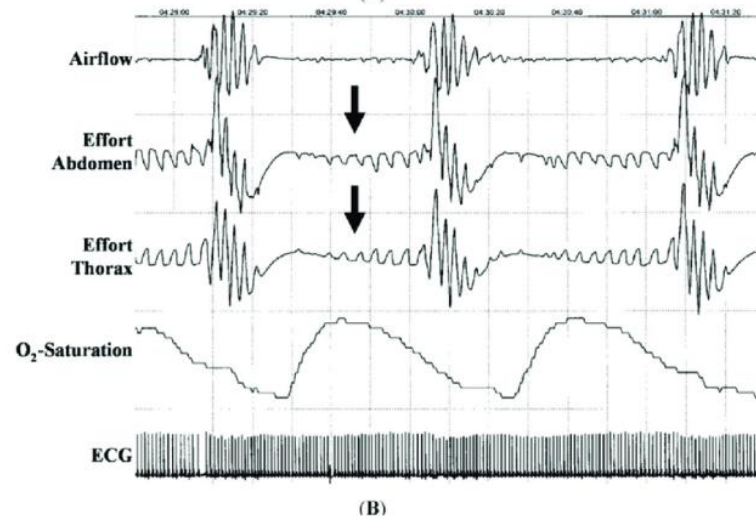
- Obstructive sleep apnea (OSA)
  - Apnea: No airflow >10 sec, but *continued effort*
  - Hypopnea: Shallow breathing with 4% decline in O2 sat
- Central sleep apnea (CSA)
  - No airflow or effort >10 sec
- Complex sleep apnea
  - OSA that becomes predominately CSA during CPAP
- Upper airway resistance syndrome (UARS)
  - Respiratory effort-related arousals (RERAs)



# Central Sleep Apnea



# Obstructive Sleep Apnea





# Obstructive Sleep Apnea

- The scope of the problem
- Benefits of treatment
- Definitions
- **Identifying patients at risk**
- Establishing the diagnosis
- Treatment options
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# Definitions: Sleep Apnea severity

- Apnea hypopnea index (AHI): Respiratory events/hour
  - < 5 Normal
  - 5-15 Mild Treat if symptoms/comorbidities
  - 15-30 Moderate Treat
  - >30 Severe Treat
- Respiratory disturbance index (RDI)
  - Includes RERAs

# Patients at High Risk for OSA

- BMI > 35
- CHF
- Atrial fibrillation
- Refractory hypertension
- Type II DM
- Nocturnal arrhythmias
- CVA
- Pulmonary hypertension
- High risk driving population
- Bariatric surgery candidates

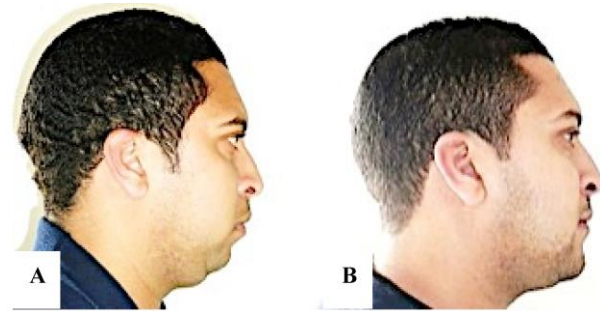
# Clues to Diagnosis

- Snoring
- Witnessed apneas
- Gasping, choking at night
- Non-refreshing sleep
- Sleepiness (Epworth)
- Nocturia
- Morning headaches
- Decreased concentration
- Memory loss
- Decreased libido
- Irritability

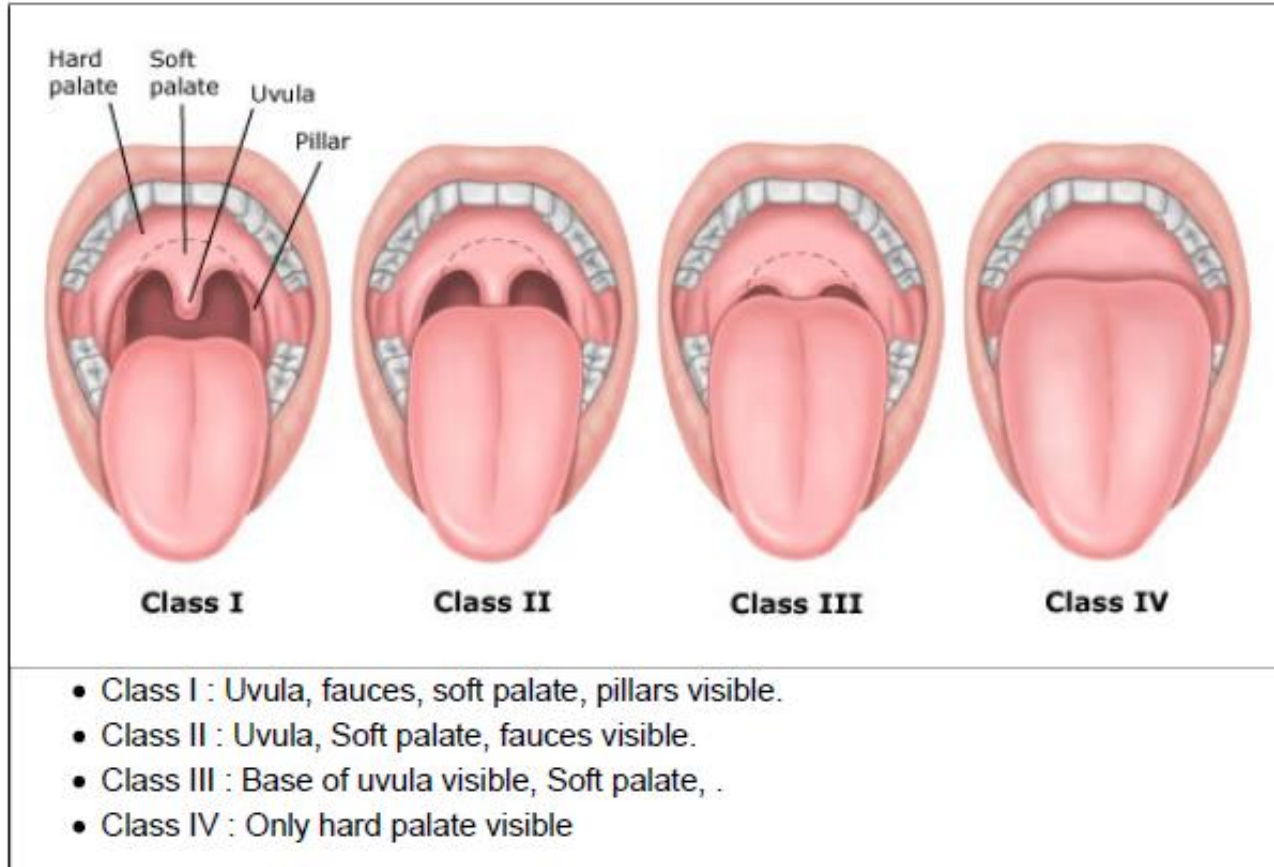


# Exam Clues

- Increased BMI
- Retrognathia
- Nasal obstruction
- Narrow oropharynx
- High Mallampati score
- Increased neck circumference
- Cor pulmonale



# Mallampati Score



# Tongue Scalloping



## STOP BANG Questionnaire

1. **Snoring** Yes No

Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?

2. **Tired** Yes No

Do you often feel tired, fatigued, or sleepy during daytime?

3. **Observed** Yes No

Has anyone observed you stop breathing during your sleep?

4. **Blood Pressure** Yes No

Do you have or are you being treated for high blood pressure?

5. **BMI** Yes No

BMI more than 35 kg/m<sup>2</sup>?

6. **Age** Yes No

Age over 50 yr old?

7. **Neck circumference** Yes No

Neck circumference greater than 40 cm?

8. **Gender** Yes No

Gender male?

**High risk of OSA:  $\geq 3$**

**Low risk of OSA:  $< 3$**

## The Epworth Sleepiness Scale (ESS)

How likely are you to doze off or fall asleep in the following situations:

0 = would never doze

1 = slight chance of dozing

2 = moderate chance of dozing

3 = high chance of dozing

### • **SITUATION CHANCE OF DOZING (0–3)**

- Sitting and reading
- Watching television
- Sitting inactive in a public place (e.g. a theater or meeting)
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon when circumstances permit
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in the traffic

**$\geq 10$  = significant sleepiness**



# STOP BANG and Epworth

## STOP BANG Questionnaire

1. *Snoring* Yes No  
Do you *snore loudly (louder than talking or loud enough to be heard through closed doors)*?
2. *Tired* Yes No  
Do you often feel *tired, fatigued, or sleepy during daytime*?
3. *Observed* Yes No  
Has anyone *observed you stop breathing during your sleep*?
4. *Blood pressure* Yes No  
Do you have or are you being treated for high blood *pressure*?
5. *BMI* Yes No  
*BMI more than 35 kg/m<sup>2</sup>*?
6. *Age* Yes No  
*Age over 50 yr old*?
7. *Neck circumference* Yes No  
*Neck circumference greater than 40 cm*?
8. *Gender* Yes No  
*Gender male*?

**High risk of OSA: answering yes to three or more items**  
**Low risk of OSA: answering yes to less than three items**

## The Epworth Sleepiness Scale (ESS)

How likely are you to doze off or fall asleep  
in the following situations:

- 0 = would never doze
- 1 = slight chance of dozing
- 2 = moderate chance of dozing
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### SITUATION CHANCE OF DOZING (0–3)

- Sitting and reading
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- Sitting inactive in a public place (e.g. a theater or meeting)
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon when circumstances permit
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in the traffic

**10 or greater is significant sleepiness**

# STOP BANG

- STOP-BANG

- All items: yes or no
  - High risk of OSAS if yes to 3+ questions
  - Low risk if yes to < 3 questions
- Sensitivity
  - AHI  $\geq$  5: 84%
  - AHI  $\geq$  15: 93%
  - AHI  $\geq$  30: 100%
- Specificity
  - AHI  $\geq$  5: 56%
  - AHI  $\geq$  15: 43%
  - AHI  $\geq$  30: 37%

# Obstructive Sleep Apnea

- The scope of the problem
- Benefits of treatment
- Definitions
- Identifying patients at risk
- **Establishing the diagnosis**
- Treatment options
- Tracking compliance

# Types of Studies

- Split Night Polysomnogram
- Home Sleep Test (HST)
  - Type 3
  - WatchPAT
- PAP Titration
- Auto-Titrating PAP

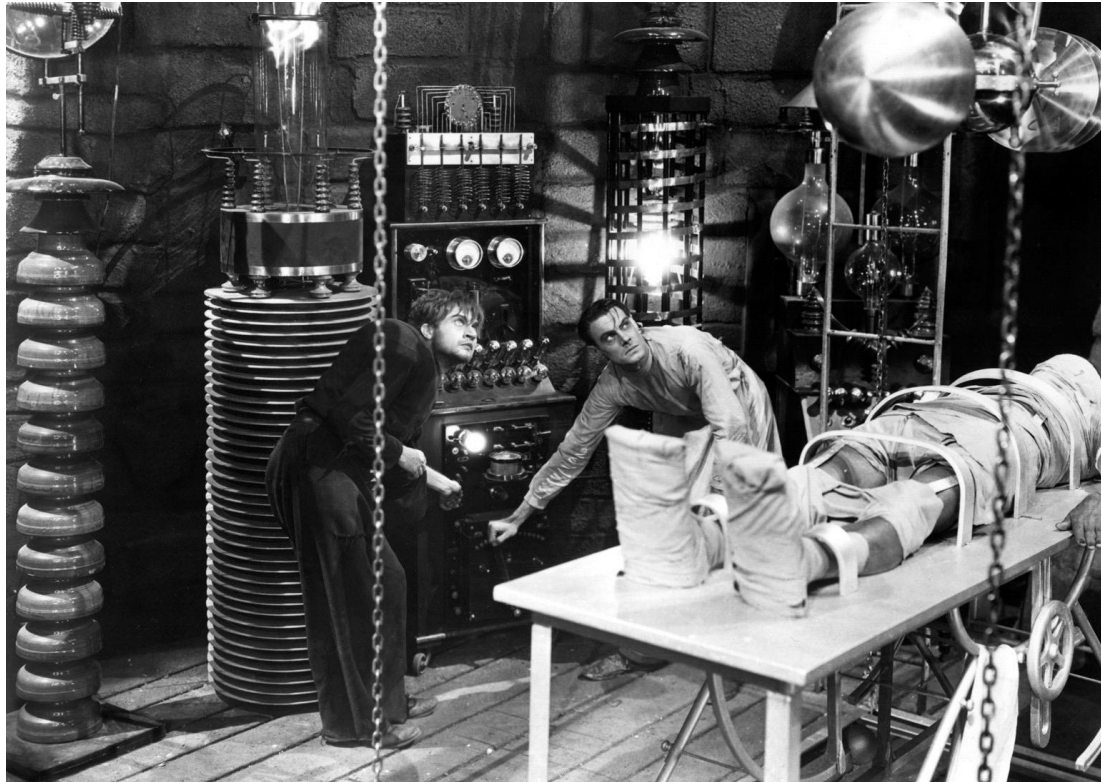
# Pre-study Considerations

- Discourage napping, sleeping in on day of study
- Discourage caffeine
- What about alcohol?

# The Sleep “Lab”



# The Sleep “Lab”



# Split-night Polysomnogram

## Advantages:

- Gold standard test
- Direct referral option
- Diagnostic followed by CPAP titration *if criteria met*
- 16 channel *attended* study
- Activity noted and recorded
- Sleep is scored

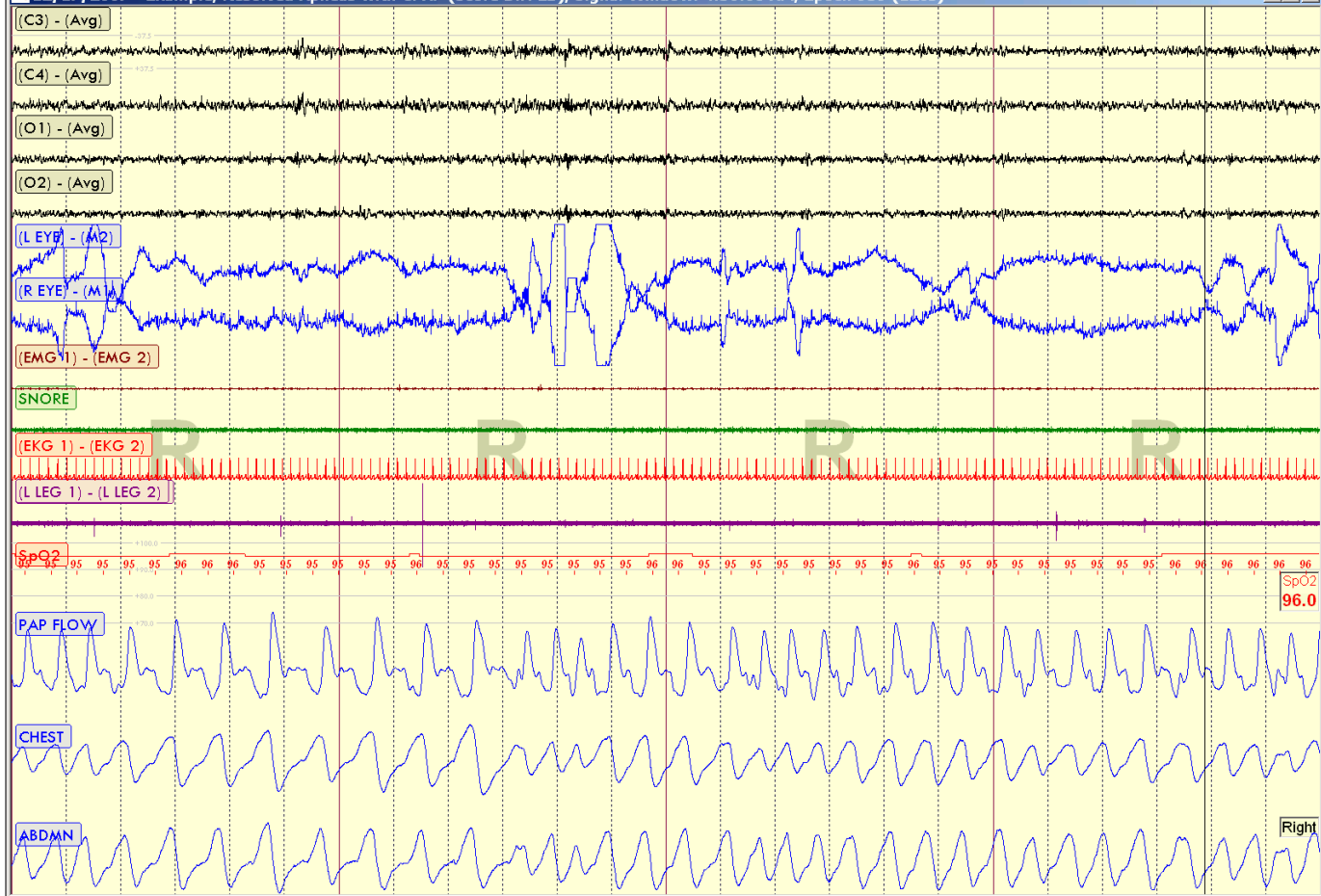
## Disadvantages:

- In-lab, may inhibit sleep
- Cost









# Home Sleep Apnea Test (HST)

- Application of sensors by sleep tech or patient
- Sole indication is diagnosis of OSAS

Attended/full PSG is *mandatory* if HSAT is non-diagnostic

- False negative rate up to 17%
  - Not a screening tool; not able to “rule out” OSAS
- Other uses
    - PSG not practical due to immobility, safety
    - Monitor response to non-CPAP treatments



# HST Exclusion Criteria

- EPWORTH < 10, STOP BANG < 3
- Heart Disease
  - Congestive Heart Failure
    - Acute or chronic
    - Diastolic and/or systolic
  - MI (myocardial infarction)
  - Coronary Artery Disease
  - Heart Arrhythmia
  - Atrial Fibrillation
  - Congestive Heart Failure (CHF)
  - Pacemaker
  - Right heart failure
- Stroke
- Lung Disease
  - COPD
  - Pulmonary fibrosis
  - Restrictive lung disease
- Oxygen Dependence
- BMI > 50
- Cognitive Impairment
- Neuromuscular disease
  - ALS
  - Post polio
  - Kyphoscoliosis
  - Muscular dystrophy
  - Parkinson's
  - MS
  - Myasthenia Gravis
  - Guillain Barre
- Insomnia
- Parasomnia- known or suspected
- Circadian rhythm disorders
- Pulmonary hypertension
- Vascular Disease
- Pain Medications- Morphine/MS Contin; Oxycodone/Oxycontin; Dilaudid, and/or Methadone
- Stimulant medications- Adderall/methamphetamine; Ritalin/methylphenidate

# HST



- Advantages:
  - Available for home dx
  - Less interference with sleep (?)
  - Less costly
- Disadvantages
  - Diagnostic only, No split study
  - Not attended, not monitored
  - No documentation of sleep/EEG
  - Can not detect UARS
  - Significant failure rate (10-20%)
- Pro/Con: Requires Sleep Consult

# Limitations of HST

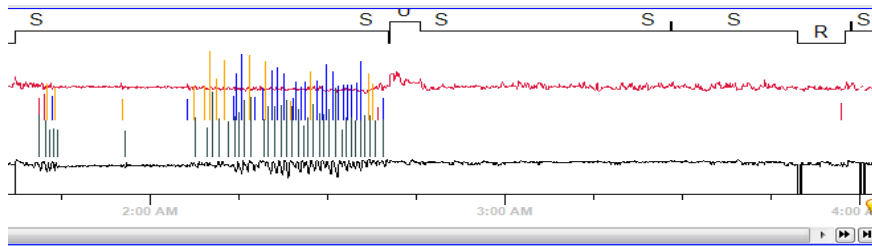
- Recoding time  $\neq$  sleep time

PSG

$$\text{AHI} = \frac{\text{Respiratory Events}}{\text{Total Sleep Time}}$$

HST

$$\text{AHI} = \frac{\text{Respiratory Events}}{\text{Total Recording Time}}$$



\*Poor choice in patients with insomnia

# WatchPAT

- Wrist-mounted home sleep test
- Measures:
  - PAT (peripheral arterial tone)
  - Oximetry
  - Actigraphy
  - Heart Rate
  - Body Position
  - Snoring
- **Measures sleep and respiratory events**



# WatchPAT: Advantages

- Easy instructions for patient
- Less interruption of sleep (not proven)
- Option of “chain of custody”





# WatchPAT NOT for Everyone

- Consider if: High likelihood of moderate-severe OSA
- Inappropriate for:
  - Suspected central sleep apnea
  - Significant CHF
  - Moderate to severe lung disease
  - Neuromuscular disease
  - Insomnia
- **In addition, avoid use if:**
  - Medications: alpha blockers (doxazosin/Cardura) and nitrates
  - Permanent pacemaker
  - Sustained non-sinus rhythm (ex.:**A.Fib**)
  - Peripheral Vascular Disease
  - PLMS/RLS



# Pearls of HST

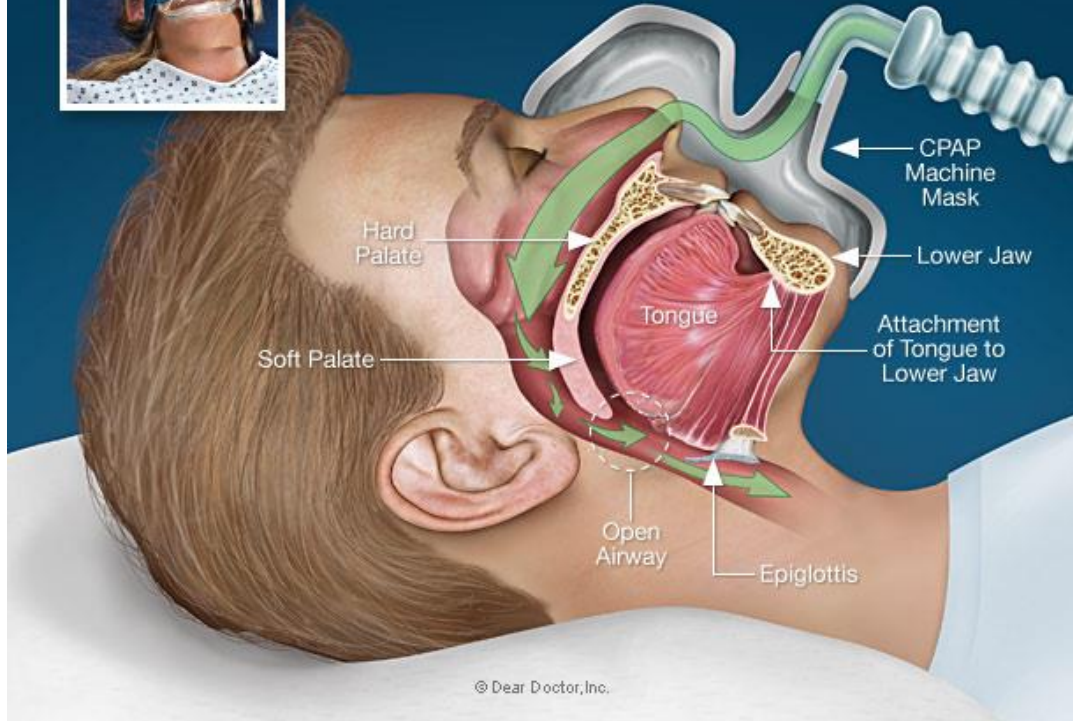
- ONLY for patients with:
  - HIGH pretest likelihood of OSA
  - No contraindications
- **Good for RULING OSA IN**
- **Does NOT rule out OSA**
- **A negative HST should be followed by an in-lab PSG**

# Obstructive Sleep Apnea

- The scope of the problem
- Benefits of treatment
- Definitions
- Identifying patients at risk
- Establishing the diagnosis
- **Treatment options**
- Tracking compliance

# CPAP Therapy

A potential life saving and changing option for the treatment of sleep apnea.



© Dear Doctor, Inc.



# OSAS - Treatment

- Weight loss
- Oral appliances
  - Mandibular repositioning
  - Continuous Open Airway Therapy (COAT)
  - Mild to moderate OSAS
    - Patient preference over CPAP
    - Do not respond to or fail CPAP
    - Not appropriate candidates for CPAP
  - American Academy of Dental Sleep Medicine (AADSM)

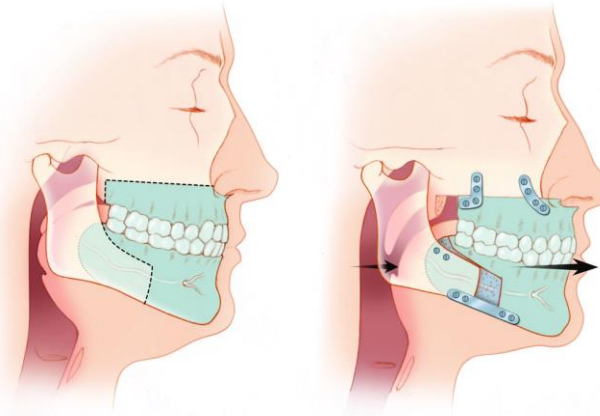


# Oral Appliances: Side Effects

- Jaw pain, TMJ
- Malocclusion
- Excessive salivation
- Tooth migration
- Inadequate treatment

# Treatment

- Surgery
  - Often first line therapy in children
    - Tonsils/adenoids
  - Mixed (but generally disappointing) results in adults
    - Uvulopalatopharyngoplasty (UPPP)
    - Maxillomandibular advancement (MMA)
- Positional Therapy
  - SlumberBump



# Types of Positive Airway Pressure

- CPAP: Continuous, single pressure
- BPAP: Bilevel. Higher inspiratory pressure, lower pressure during exhalation.
- BPAP ASV: Adaptive servo ventilation
  - For central and complex sleep apnea
- BPAP AVAPS: Average volume assured pressure support
  - For neuromuscular disease
  - Targets a predetermined tidal volume.
  
- Auto titrating CPAP/BiPAP





# CPAP Titration Options

## In-lab titration

- Identical set up to diagnostic study
- Single night
- Technician present
  - Reassurance
  - Trouble shooting
- Ability to try different masks
- Expensive

## Auto-CPAP titration

- Done at home
- Worn for ~30 days
- Patient responsible for identifying/reporting issues
- Difficult to trial masks
- Less expensive

# In-Lab CPAP Titration

- Patients with significant desaturations
- Positional or sleep stage dependent sleep apnea
- Narcotics
- Concern for complex sleep apnea
- Failed auto-CPAP
- Reluctant patient
- To assess response of other issues to therapy



# Auto-Titrating CPAP (APAP)

- Can be used at home to determine
  - Optimal fixed level of CPAP, in patients without significant comorbidities/hypoxemia
  - Follow-up CPAP pressure adjustment (weight change, sx/s)
  - As final treatment mode
- Provider sets CPAP range (5-20 cmH<sub>2</sub>O)
- Monitors snoring, airflow and flow vs time.
- Proprietary algorithm varies pressure as needed.
- “Optimal” CPAP pressure is 90%



# Auto-Titrating CPAP

## **Patient requirements:**

- Reliable, competent
- Accepting of CPAP
- Well educated on using CPAP
- Have a good mask fit
- Able to reliably apply the mask properly

## **Physician requirements:**

- Timely follow-up of results
- Responsive to CPAP related issues
- Know how to review results.

# Initiating Therapy

- Review study results, severity.
- Emphasize benefits to symptoms and comorbidities
- May take time to get this right
  - Mask size, type
  - Pressure setting
  - Leaks
- Wear it every night
- Try wearing while watching TV or otherwise distracted
- Call DME with issues
- Consider sleep tech visit, sleep consult

# 35 Break



# What Happens Next?

## Understanding the Equipment

Heather Stoecklin, RRT

Population Health Respiratory Therapist

CareOregon

Shannon Kaski, RPSGT

Sleep Center Manager, The Oregon Clinic

[careoregon.org](http://careoregon.org)





# Where Does the Equipment Come From ?

- Several DME companies provide the equipment prescribed after a sleep study.
- You can choose any company that you feel gives the best service to your patient.
- These companies also provide oxygen, nebulizers and other respiratory equipment.
- Consider keeping all equipment with the same company whenever possible.
- Consider narrowing down the companies that you use to promote a relationship between your staff and the DME company.



***It can be very difficult for patients to adjust to using sleep equipment. It doesn't mean that they are doing something wrong.***

***They often need a lot of support in the beginning.***



# Clinic Champions

- Clinic Champions Pilot
- Shadow OC providers & DME staff
- Exciting model for primary care

**Why become a  
Champion?**



# MA PAP Issue Reference Sheet

**(see your handout)**

Please let the patients know that you will need to gather the necessary information to pass on to the patient's provider and/or the sleep center for recommendations.

If at any point you feel it would be best for patient to speak with a sleep technologist, please direct them to the sleep lab that performed the test or to the DME provider.



# Common Problems When Adjusting to Sleep Equipment

## Mask Discomfort

- Which style mask do they use? (nasal pillow, nasal, full face)
- Where is the discomfort?
- When did the discomfort start?
- Have they tried adjusting the mask/headgear?
- How is it affecting their amount of usage?
- How long has it been since they have gotten a new mask?



# Common Problems When Adjusting to Sleep Equipment

## Mask Leak

- Which style mask do they use? (nasal pillow, nasal, full face)
- Where is the mask leaking?
- Have they tried adjusting the mask/headgear?
- How long has it been since they have gotten a new mask?
- How often are they cleaning their current mask?



# Common Problems When Adjusting to Sleep Equipment

## Too Much Pressure

- Are they having difficulties exhaling out against the pressure?
- Is it difficult to get the mask to seal?
- Do they experience any pressure/discomfort in their ears?
- Do they feel like they are swallowing air?
- Do they use the ramp button?



# Common Problems When Adjusting to Sleep Equipment

## Not Enough Pressure

- Is it a comfort issue (like they are “starving for air”)?
- Does bed partner notice snoring or breathing pauses?
- Does patient wake gasping for air?





# Common Problems When Adjusting to Sleep Equipment

## Nasal/Oral Dryness

- Which style mask do they use? (nasal pillow, nasal, full face)
- If nasal pillows or nasal mask, do they use a chin strap?
- Do they use their heated humidity? If so, do they know what it is set at?
- Are they using all of the water in their humidifier each night?



# Common Problems When Adjusting to Sleep Equipment

## Condensation in Tubing/Mask

- What is their humidifier set at?
- Have they tried adjusting the setting?
- Is their tubing insulated?



# Common Problems When Adjusting to Sleep Equipment

## Replacement Equipment

- If patient needs a replacement mask/cushion, tubing, filters, etc., please refer them to their DME company.
- If patient complains of a broken machine, refer them to their DME company.



# PAP Cleaning & Resupply Schedule

It is important to follow the replacement and cleaning recommendations below to ensure effective treatment and avoid damage to equipment.

SUPPLY ITEM	CLEANING SCHEDULE	REPLACEMENT SCHEDULE
Full Face Cushion	Daily	1 per month
Nasal Cushion	Daily	2 per month
Nasal Pillow Cushion	Daily	2 per month
PAP Mask	Weekly or sooner if visibly dirty	1 per 3 months
PAP Headgear	Bi-Weekly or sooner if visibly dirty	1 per 6 months
Chinstrap	Monthly or sooner if visibly dirty	1 per 6 months
PAP Tubing	Weekly	1 per 3 months
Disposable Filter	N/A	2 per 1 month
Non-disposable Filters	Monthly	1 per 6 months
Humidifier Chamber	Weekly	1 per 6 months









# 35 Break





# Tracking Compliance

**Bill Bowerfind, M.D.**

The Oregon Clinic, Pulmonary,  
Critical Care and Sleep Division  
Medical Director,  
Providence Portland Medical Center  
Sleep Disorders Center  
and Providence Milwaukie Sleep Lab



# Follow-up – Compliance

- Ideally, contact patient in first several days after starting CPAP.
- Face to face follow up with prescribing provider 30-90 days after initiating therapy
- Review compliance download.
- **Compliance = Usage for >4 hours/day on 70% of days.**
- Ensure symptom resolution
- Trouble-shoot issues



# PAP Compliance Downloads

- PAP compliance download within 30–90 days of initiating therapy.
- Arrange for download on-line.
- If patients are having any issues with CPAP mask, tubing or machine have them **bring equipment to the appointment.**



# Barney

## Compliance Information

6/14/2019 - 7/13/2019

A-Flex™

### Compliance Summary

Date Range	6/14/2019 - 7/13/2019 (30 days)
Days with Device Usage	30 days
Days without Device Usage	0 days
Percent Days with Device Usage	100.0%
Cumulative Usage	10 days 8 hrs. 40 mins. 51 secs.
Maximum Usage (1 Day)	10 hrs. 13 mins. 45 secs.
Average Usage (All Days)	8 hrs. 17 mins. 21 secs.
Average Usage (Days Used)	8 hrs. 17 mins. 21 secs.
Minimum Usage (1 Day)	6 hrs. 35 mins. 1 secs.
Percent of Days with Usage $\geq$ 4 Hours	100.0%
Percent of Days with Usage $<$ 4 Hours	0.0%
Total Blower Time	10 days 8 hrs. 41 mins. 7 secs.

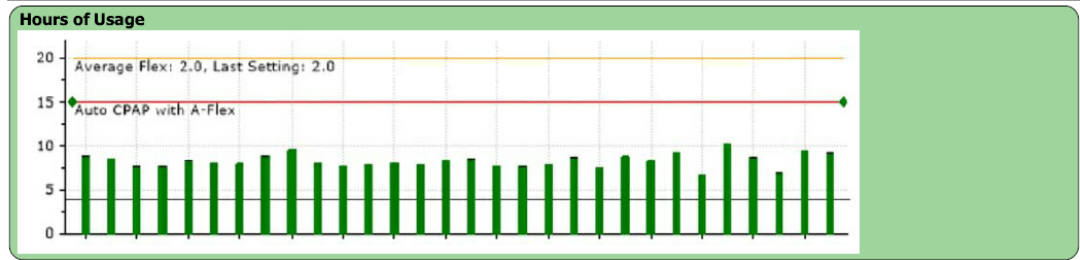
### Auto-CPAP Summary

Auto-CPAP Mean Pressure	7.5 cmH2O
Auto-CPAP Peak Average Pressure	9.1 cmH2O
Average Device Pressure $\leq$ 90% of Time	8.5 cmH2O
Average Time in Large Leak Per Day	7 mins. 34 secs.
Average AHI	5.7



# Barney

Device Settings as of	7/13/2019
<b>Device Mode</b>	AutoCPAP - A-Flex
<b>Device Settings</b>	
<b>Parameter</b>	<b>Value</b>
<b>Min Pressure</b>	7 cmH2O
<b>Max Pressure</b>	20 cmH2O
<b>A-Flex Setting</b>	2
Auto Off	Off
Auto On	Off
View Optional Screens	On
Ramp Type	Linear
Ramp Time	20 minutes
Ramp Start Pressure	5.0 cmH2O
Mask Resistance	Off
Mask Resistance Lock	Off
Tubing Type	15 HT
Tubing Type Lock	Off
Opti-Start	Off
EZ-Start	Disabled
Tube Temperature	3
Humidifier	3
Humidification Mode on Heated Tube Disconnect	Adaptive





Patient is active Modem status: N/A Edit profile  
 Patient reported information Neat scheduled call: N/A Show/hide details

Patient ID Setup date Home phone Address Birth date

DME Sleep Technologies Device REMetar Auto (System One 60 Series)  
 Primary Care Physician N/A Therapy mode AutoCPAP  
 Sleep doctor Sleep doctor Pressure 5.0 - 20.0  
 Clinician Rx status Reference  
 Sleep lab Legacy Sleep Medicine Clinic Mask ResMed P10 FOR HER SMALL  
 Insurance provider Regence Blue Cross (NEED AUTH?)

Patent Summary Prescription Therapy Data Patient Messages Contacts Questionnaires Notes History

**THERAPY EVENT SUMMARY (LAST 14 DAYS)** -- HIDE

**Compliance Summary**  
 Days with Device Usage: 13 days  
 Percentage of Days >=4 Hours: 64.3%  
 Average Usage (Days Used): 5 hrs. 38 mins. 19 secs.  
 Average Usage (All Days): 5 hrs. 14 mins. 9 secs.

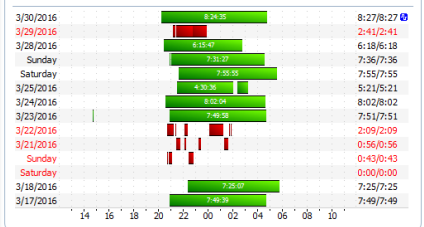
**Apnea Indices**  
 Average AHI: 0.7  
 Average OA Index: 0.4  
 Average CA Index: 0.0

**Ventilator Statistics**  
 Average Breath Rate: N/A  
 Average % Patient Triggered: N/A  
 Breaths:  
 Average Tidal Volume: N/A  
 Average Minute Vent: N/A

**Large Leak**  
 Average Time in Large Leak: 0 secs.  
 Average % of Night in Large Leak: 0.0%

**Periodic Breathing**  
 Average % of Night in PB: 0.1%

**COMPLIANCE (LAST 14 DAYS)**



**MY PRIORITY ITEMS** -- REMOVE SELECTED

No Notification records found.

**AVAILABLE THERAPY DATA** -- HIDE

Device	Therapy mode	Start date	End date
REMStar Auto (System One 60 Series)	AutoCPAP with A-Flex	3/7/2014 1:38 PM	3/31/2016 4:46 AM

**THERAPY EVENT SUMMARY** -- HIDE DATE RANGE: 3/1/2016 - 3/30/2016

**Compliance Summary**  
 29 days  
 Percentage of Days >=4 Hours: 80.0%  
 Average Usage (Days Used): 6 hrs. 14 mins. 33 secs.  
 Average Usage (All Days): 6 hrs. 2 mins. 3 secs.

**Apnea Indices**  
 Average AHI: 0.6  
 Average OA Index: 0.4  
 Average CA Index: 0.0

**Ventilator Statistics**  
 Average Breath Rate: N/A  
 Average % Patient Triggered: N/A  
 Breaths:  
 Average Tidal Volume: N/A  
 Average Minute Vent: N/A

**Large Leak**  
 Average Time in Large Leak: 0 secs.  
 Average % of Night in Large Leak: 0.0%

**Periodic Breathing**  
 Average % of Night in PB: 0.1%

**THERAPY DATA REPORTING**

Select data for report  
 One week  
 One month  
 Two months  
 Three months  
 Six months  
 Custom  
 Best 30 days of compliance

Refresh graph

Select report  
 Details Report

Select number of days for Detail section  
 7

Create report

Include/exclude



# Patient with Poor Compliance

- Significant improvement requires >4 hours/ night
- Encourage PAP use during the day while watching TV, reading or otherwise distracted.
- Consider consultation with sleep tech for desensitization
- Consider alternative masks





# New Sleep Consults

- If the patient has had a sleep study then we need a copy.
- If the patient is currently on PAP therapy then they need to bring their machine

# Appropriate Indications for a Sleep Study

- EXCESSIVE DAYTIME SLEEPINESS
  - Epworth  $\geq 10$
- Snoring, witnessed apneas, gasping/choking
  - STOP BANG  $\geq 3$
- Insomnia *with* symptoms above
- Bariatric surgery candidate
- On narcotics, concern for central apnea – In-lab study only.

# Sleep Study NOT Indicated

- Insomnia alone.
  - Review other causes first.
- Restless legs alone
  - Treat
- Intolerant of CPAP
  - Review download
  - Refer to DME provider
  - Consider acclimation
- CPAP machine not working
  - Refer to DME
- Patient needs new mask or machine
  - Refer to DME
- X years since last sleep study, patient doing fine.
- When in doubt, consider sleep consult.

# Consult Recommended

- Home sleep apnea test
- Parasomnias
  - Sleep walking, night terrors, possible seizure, unusual behavior during sleep
- Persistent insomnia
- Narcolepsy
- Idiopathic hypersomnia
- Circadian rhythm disorders
- Complex sleep apnea
- Central sleep apnea
- Not sure what it is or what to do
- I don't feel comfortable dealing with it

**You're getting  
sleepy.**

**Very sleepy.**

**At the count  
of three,**

**you will not  
wake up.**





# Drowsy Driving

- NSF poll on driving to work drowsy
- 27% drive drowsy at least a few days per month
  - 12% - a few days per week
  - 4% every day
- NHTSA: 20% of all auto accidents in US due to driver fatigue
    - 100,000 MVAs
    - 1,550 deaths
  - National Sleep Foundation: 36% admit to falling asleep behind the wheel of a moving vehicle



# DROWSY IS RED ALERT

- Yawning, rubbing eyes, blinking frequently
- Trouble focusing, keeping eyes open, head up
- Difficulty remembering the last few miles driven
- Drifting from your lane, hitting rumble strips
- Slower reaction time

## PULL OVER IMMEDIATELY





# Is It Time to Think About Deprescribing?

But, how?

And, where do I start?

Mariah Alford, PharmD, BCPS  
Pharmacy Clinical Supervisor  
CareOregon



# Example Medication List:

- Metformin ER 2g once daily
- Glipizide 5mg BID
- ASA 81mg once daily
- Amlodipine 10mg QD
- Lisinopril 20mg QD
- Gabapentin 600mg TID
- Zolpidem 10mg QHS
- Hydrocodone/APAP 5/325 2 tabs QID PRN
- Cyclobenzaprine 10mg TID PRN
- Wixela Inhub (generic Advair) 250/50 1 puff BID
- Incruse Elipta 1 inhalation daily
- Cetirizine 10mg QHS
- Montelukast 10mg QHS
- Clonazepam 0.5mg BID PRN
- Sertraline 100mg once daily



# Risk Factors for Polypharmacy

Polypharmacy defined:  
regular use of five or more medications

## Risk factors:

- Patient
- Age >62
- Cognitive impairment
- Developmental disability
- Frailty
- Lack of PCP
- Mental health conditions
- Multiple Chronic conditions
- Residing in a long-term care facility
- Care from multiple subspecialists

Source: American Family Physician Volume 100, Number 1, July 1, 2019



# Deprescribing Defined:

- The planned process of reducing or stopping medications that may no longer be of benefit or may be causing harm.
- The goal is to reduce medication burden or harm while improving quality of life.

Source: [deprescribing.org](https://deprescribing.org)



# How do I Identify Potentially Inappropriate Medications?

- STOPP (screening tool of older people's prescriptions)
- Beers Criteria

AGS 2019 Beers Criteria Update, J Am Geriatr Soc. 2019 Apr;67(4):674-694

STOPP/START criteria for potentially inappropriate prescribing in older people: version 2, Age Ageing. 2018 May; 47(3): 489.



## Table 9. Medications/Criteria Added Since 2015 American Geriatrics Society Beers Criteria<sup>®</sup>

Medication/Criterion	Reason for Addition
Rivaroxaban	Emerging evidence of increased risk of serious bleeding compared with other anticoagulant options
Tramadol	Risk of SIADH/hyponatremia
Opioids + gabapentin/pregabalin	Increased risk of overdose

# Okay, I'm Ready. How Do I Approach Deprescribing?

- Shared decision making with the patient and/or caregiver
  - **An ongoing process that will take time**
- Focus on optimizing clinical outcomes within the context of the patient's care goals, level of function, life expectancy, values and preferences

Source: American Family Physician Volume 100, Number 1, July 1, 2019





### Why is patient taking a BZRA?

If unsure, find out if history of anxiety, past psychiatrist consult, whether may have been started in hospital for sleep, or for grief reaction.

- Insomnia on its own OR insomnia where underlying comorbidities managed  
For those  $\geq 65$  years of age: taking BZRA regardless of duration (avoid as first line therapy in older people)  
For those 18-64 years of age: taking BZRA  $> 4$  weeks

- Other sleeping disorders (e.g. restless legs)
- Unmanaged anxiety, depression, physical or mental condition that may be causing or aggravating insomnia
- Benzodiazepine effective specifically for anxiety
- Alcohol withdrawal

**Engage patients** (discuss potential risks, benefits, withdrawal plan, symptoms and duration)

### Recommend Deprescribing

#### Taper and then stop BZRA

(taper slowly in collaboration with patient, for example  $\sim 25\%$  every two weeks, and if possible, 12.5% reductions near end and/or planned drug-free days)

- For those  $\geq 65$  years of age (strong recommendation from systematic review and GRADE approach)
- For those 18-64 years of age (weak recommendation from systematic review and GRADE approach)
- Offer behavioural sleeping advice; consider CBT if available (see reverse)

#### Continue BZRA

- Minimize use of drugs that worsen insomnia (e.g. caffeine, alcohol etc.)
- Treat underlying condition
- Consider consulting psychologist or psychiatrist or sleep specialist

#### Monitor every 1-2 weeks for duration of tapering

Expected benefits:

- May improve alertness, cognition, daytime sedation and reduce falls

Withdrawal symptoms:

- Insomnia, anxiety, irritability, sweating, gastrointestinal symptoms (all usually mild and last for days to a few weeks)

Use non-drug approaches to manage insomnia

Use behavioral approaches and/or CBT (see reverse)

If symptoms relapse:

Consider

- Maintaining current BZRA dose for 1-2 weeks, then continue to taper at slow rate

Alternate drugs

- Other medications have been used to manage insomnia. Assessment of their safety and effectiveness is beyond the scope of this algorithm. See BZRA deprescribing guideline for details.

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Pottie K, Thompson W, Davies S, Grenier J, Badowski V, Gwynne V, Kozlowski A, Boyd C, Swenson JR, Ma A, Farrell B. Evidence-based clinical practice guideline for deprescribing benzodiazepine receptor agonists. *Can Fam Physician* 2018;64:339-51 (Eng). e209-24 (Fr)





## BZRA Availability

BZRA	Strength
Alprazolam (Xanax <sup>®</sup> ) <sup>T</sup>	0.25 mg, 0.5 mg, 1 mg, 2 mg
Bromazepam (Lectopam <sup>®</sup> ) <sup>T</sup>	1.5 mg, 3 mg, 6 mg
Chlordiazepoxide <sup>C</sup>	5 mg, 10 mg, 25 mg
Clonazepam (Rivotril <sup>®</sup> ) <sup>T</sup>	0.25 mg, 0.5 mg, 1 mg, 2 mg
Clorazepate (Tranxene <sup>®</sup> ) <sup>C</sup>	3.75 mg, 7.5 mg, 15 mg
Diazepam (Valium <sup>®</sup> ) <sup>T</sup>	2 mg, 5 mg, 10 mg
Flurazepam (Dalmane <sup>®</sup> ) <sup>C</sup>	15 mg, 30 mg
Lorazepam (Ativan <sup>®</sup> ) <sup>T,S</sup>	0.5 mg, 1 mg, 2 mg
Nitrazepam (Mogadon <sup>®</sup> ) <sup>T</sup>	5 mg, 10 mg
Oxazepam (Serax <sup>®</sup> ) <sup>T</sup>	10 mg, 15 mg, 30 mg
Temazepam (Restoril <sup>®</sup> ) <sup>C</sup>	15 mg, 30 mg
Triazolam (Halcion <sup>®</sup> ) <sup>T</sup>	0.125 mg, 0.25 mg
Zopiclone (Imovane <sup>®</sup> , Rhovane <sup>®</sup> ) <sup>T</sup>	5mg, 7.5mg
Zolpidem (Sublinox <sup>®</sup> ) <sup>S</sup>	5mg, 10mg

T = tablet, C = capsule, S = sublingual tablet

## BZRA Side Effects

- BZRAs have been associated with:
  - physical dependence, falls, memory disorder, dementia, functional impairment, daytime sedation and motor vehicle accidents
- Risks increase in older persons

## Engaging patients and caregivers

### Patients should understand:

- The rationale for deprescribing (associated risks of continued BZRA use, reduced long-term efficacy)
- Withdrawal symptoms (insomnia, anxiety) may occur but are usually mild, transient and short-term (days to a few weeks)
- They are part of the tapering plan, and can control tapering rate and duration

## Tapering doses

- No published evidence exists to suggest switching to long-acting BZRAs reduces incidence of withdrawal symptoms or is more effective than tapering shorter-acting BZRAs
- If dosage forms do not allow 25% reduction, consider 50% reduction initially using drug-free days during latter part of tapering, or switch to lorazepam or oxazepam for final taper steps

## Behavioural management

### Primary care:

- Go to bed only when sleepy
- Do not use bed or bedroom for anything but sleep (or intimacy)
- If not asleep within about 20-30 min at the beginning of the night or after an awakening, exit the bedroom
- If not asleep within 20-30 min on returning to bed, repeat #3
- Use alarm to awaken at the same time every morning
- Do not nap
- Avoid caffeine after noon
- Avoid exercise, nicotine, alcohol, and big meals within 2 hrs of bedtime

### Institutional care:

- Pull up curtains during the day to obtain bright light exposure
- Keep alarm noises to a minimum
- Increase daytime activity & discourage daytime sleeping
- Reduce number of naps (no more than 30 mins and no naps after 2 pm)
- Offer warm decaf drink, warm milk at night
- Restrict food, caffeine, smoking before bedtime
- Have the resident toilet before going to bed
- Encourage regular bedtime and rising times
- Avoid waking at night to provide direct care
- Offer backrub, gentle massage

## Using CBT

### What is cognitive behavioural therapy (CBT)?

- CBT includes 5-6 educational sessions about sleep/insomnia, stimulus control, sleep restriction, sleep hygiene, relaxation training and support

### Does it work?

- CBT has been shown in trials to improve sleep outcomes with sustained long-term benefits

### Who can provide it?

- Clinical psychologists usually deliver CBT, however, others can be trained or can provide aspects of CBT education; self-help programs are available

### How can providers and patients find out about it?

- Some resources can be found here: <https://mysleepwell.ca/>

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Pottier K, Thompson W, Davies S, Grenier J, Sadowski C, Welch V, Holbrook A, Boyd C, Swenson JR, Ma A, Farrell B. Evidence-based clinical practice guideline for deprescribing benzodiazepine receptor agonists. Can Fam Physician 2018;64:339-51 (Eng). e209-24 (Fr)

This algorithm and accompanying advice support recommendations in the NICE guidance on the use of zaleplon, zolpidem and zopiclone for the short-term management of insomnia, and medicines optimisation. National Institute for Health and Care Excellence, February 2019



# Wait, How Can I Evaluate If I'm Adding the Right Medications in the Future?

- **START (Screening Tool to Alert to Right Treatment)**

<http://medstopper.com/>

- **START/STOPP & Beers Criteria combined!**

<https://www.healthinaging.org/medications-older-adults>

- **Lowest dose for the shortest time**



# Panel Questions & Answers



CareOregon®

# Join Our Upcoming Sessions!

- *Empowering Patients in Advanced Illness*
- *Trauma-Informed Care and SUD*



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Thank you!



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# Appendix



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# Barney



Date of Birth: Location: The Oregon Clinic Sleep T... Setup Date: 6/5/2019  
 Patient Reference: Address: 1111 NE 98th Ave Date Range: 6/14/2019 - 7/13/2019  
 Patient ID: Portland, OR 97220 Mask:  
 Phone Number: 503-963-3185  
 Device: onramson Auto CPAP V1.1.8.3313 (500X110) 22459247830A

## Summary Report

### Care Team

Olsen, Esther The Oregon Clinic Sleep Therapy Services 1111 NE 98th Ave, Portland, OR 97220 503-963-3185  
 Friberg, PA, Whitney The Oregon Clinic Pulmonary and Sleep Med Division 1111 NE 98th Ave, Portland, OR 97220

### Compliance Information

6/14/2019 - 7/13/2019

A-Flex<sup>®</sup>

### Compliance Summary

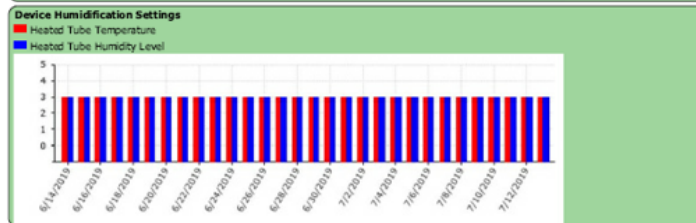
Date Range 6/14/2019 - 7/13/2019 (30 days)  
 Days with Device Usage 30 days  
 Days without Device Usage 0 days  
 Percent Days with Device Usage 100.0%  
 Cumulative Usage 10 days 8 hrs. 40 mins. 51 secs.  
 Maximum Usage (1 Day) 10 hrs. 13 mins. 45 secs.  
 Average Usage (All Days) 8 hrs. 17 mins. 21 secs.  
 Average Usage (Days Used) 8 hrs. 17 mins. 21 secs.  
 Minimum Usage (1 Day) 6 hrs. 35 mins. 1 secs.  
 Percent of Days with Usage >= 4 Hours 100.0%  
 Percent of Days with Usage < 4 Hours 0.0%  
 Total Blower Time 10 days 8 hrs. 41 mins. 7 secs.

### Auto-CPAP Summary

Auto-CPAP Mean Pressure 7.5 cmH2O  
 Auto-CPAP Peak Average Pressure 9.1 cmH2O  
 Average Device Pressure <= 90% of Time 8.5 cmH2O  
 Average Time in Large Leak Per Day 7 mins. 34 secs.  
 Average AHI 5.7

Device Settings as of 7/13/2019

Parameter	Value
Device Mode	AutoCPAP - A-Flex
Device Settings	
Min Pressure	7 cmH2O
Max Pressure	20 cmH2O
A-Flex Setting	7
Auto Off	Off
Auto On	Off
View Optional Screens	On
Ramp Type	Linear
Ramp Time	20 minutes
Ramp Start Pressure	5.0 cmH2O
Mask Resistance	Off
Mask Resistance Lock	Off
Tubing Type	15 HT
Tubing Type Lock	Off
Opt-Start	Off
EZ-Start	Disabled
Tube Temperature	3
Humidifier	3
Humidification Mode on Heated Tube Disconnect	Adaptive



# Barney



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### Compliance Information

6/14/2019 - 7/13/2019

A-Flex<sup>®</sup>

### Compliance Summary

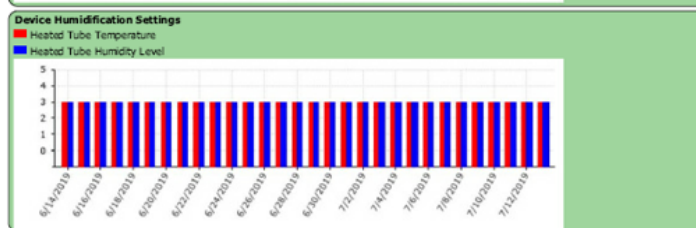
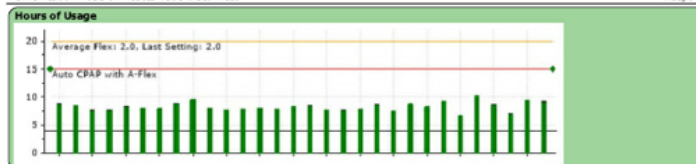
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### Auto-CPAP Summary

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Min Pressure	7 cmH2O
Max Pressure	20 cmH2O
A-Flex Setting	7
Auto Off	Off
Auto On	Off
View Optional Screens	On
Ramp Type	Linear
Ramp Time	20 minutes
Ramp Start Pressure	5.0 cmH2O
Mask Resistance	Off
Mask Resistance Lock	Off
Tubing Type	15 HT
Tubing Type Lock	Off
Opt-Start	Off
EZ-Start	Disabled
Tube Temperature	3
Humidifier	3
Humidification Mode on Heated Tube Disconnect	Adaptive





# Betty

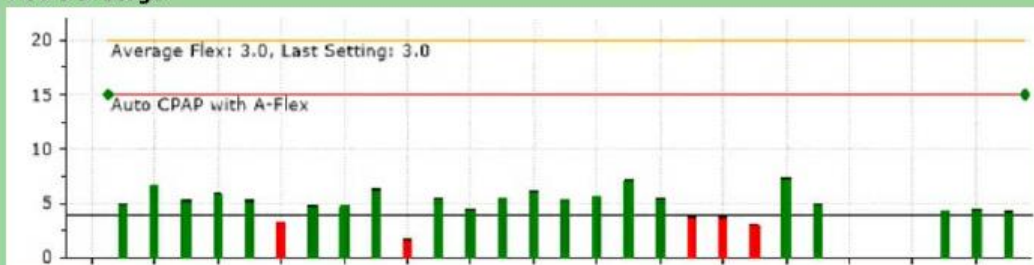
## Compliance Summary

Date Range	6/14/2019 - 7/13/2019 (30 days)
Days with Device Usage	26 days
Days without Device Usage	4 days
Percent Days with Device Usage	86.7%
Cumulative Usage	5 days 9 hrs. 44 mins. 42 secs.
Maximum Usage (1 Day)	7 hrs. 19 mins. 54 secs.
Average Usage (All Days)	4 hrs. 19 mins. 29 secs.
Average Usage (Days Used)	4 hrs. 59 mins. 24 secs.
Minimum Usage (1 Day)	1 hrs. 40 mins. 30 secs.
Percent of Days with Usage >= 4 Hours	70.0%
Percent of Days with Usage < 4 Hours	30.0%
Total Blower Time	5 days 9 hrs. 49 mins. 12 secs.

## Auto-CPAP Summary

Auto-CPAP Mean Pressure	11.6 cmH2O
Auto-CPAP Peak Average Pressure	14.1 cmH2O
Average Device Pressure <= 90% of Time	12.7 cmH2O
Average Time in Large Leak Per Day	5 mins. 42 secs.
Average AHI	3.0

### Hours of Usage



# Auto-CPAP Download

## Summary of Daily Events Per Hour

2/5/2014 - 3/6/2014

Total AHI: 4.0

P	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MaP	0.2	3,440.5	1,794.0	795.3	773.7	661.3	350.8	229.1	219.4	79.4	48.6	21.5	0.0	0.0	0.0	0.0	0.0
%	0.0	40.9	21.3	9.5	9.2	7.9	4.2	2.7	2.6	0.9	0.6	0.3	0.0	0.0	0.0	0.0	0.0
FL	0.0	0.7	0.5	0.9	0.8	0.3	0.7	1.0	0.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VS	0.0	3.3	4.8	9.6	8.7	7.6	8.4	13.1	8.8	15.1	11.1	41.8	0.0	0.0	0.0	0.0	0.0
OA	0.0	1.3	1.5	1.7	2.2	2.2	1.4	2.9	2.2	3.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
CA	0.0	0.1	0.1	0.5	0.2	0.4	0.5	0.8	1.6	0.8	1.2	2.8	0.0	0.0	0.0	0.0	0.0
H	0.0	1.1	2.0	4.3	4.6	4.5	1.0	0.5	0.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
RE	0.0	0.2	0.6	1.3	0.9	0.8	0.5	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AHI	0.0	2.5	3.6	6.5	7.0	7.1	2.9	4.2	4.3	3.8	4.9	2.8	0.0	0.0	0.0	0.0	0.0

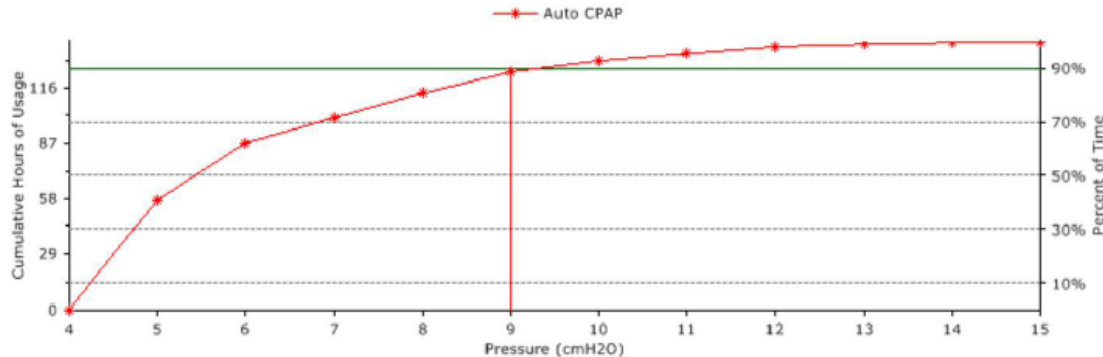
90%

### Legend

P - Pressure, MaP - Minutes at Pressure, % - Percent of Night, FL - Flow Limitation, VS - Vibratory Snore, H - Hypopnea, OA - Obstructed Airway Apnea, CA - Clear Airway Apnea, RE - RERA, AHI - Apnea/Hypopnea Index

## Auto CPAP Time at Pressure

2/5/2014 - 3/6/2014





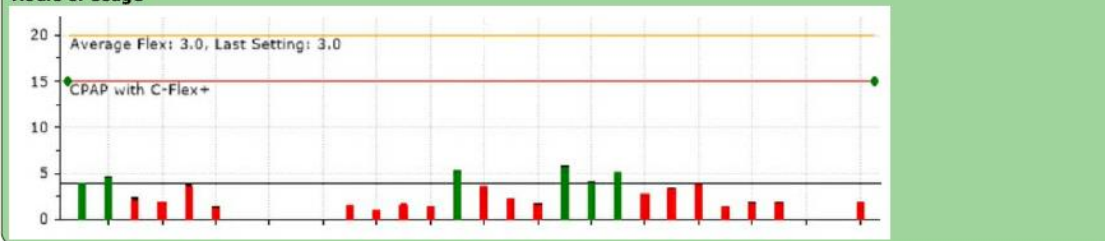
### Compliance Summary

Date Range	6/15/2019 - 7/14/2019 (30 days)
Days with Device Usage	24 days
Days without Device Usage	6 days
Percent Days with Device Usage	80.0%
Cumulative Usage	2 days 20 hrs. 8 mins. 46 secs.
Maximum Usage (1 Day)	5 hrs. 43 mins. 6 secs.
Average Usage (All Days)	2 hrs. 16 mins. 17 secs.
Average Usage (Days Used)	2 hrs. 50 mins. 21 secs.
Minimum Usage (1 Day)	1 hrs. 3 mins. 20 secs.
Percent of Days with Usage >= 4 Hours	20.0%
Percent of Days with Usage < 4 Hours	80.0%
Total Blower Time	2 days 20 hrs. 19 mins. 54 secs.

### CPAP Summary

Average Time in Large Leak Per Day	35 mins. 12 secs.
Average AHI	7.3
CPAP	18.0 cmH2O

### Hours of Usage



# Borat

## Compliance Summary

Date Range	3/1/2016 - 3/30/2016 (30 days)
Days with Device Usage	29 days
Days without Device Usage	1 day
Percent Days with Device Usage	96.7%
Cumulative Usage	7 days 13 hrs. 1 mins. 59 secs.
Maximum Usage (1 Day)	8 hrs. 27 mins.
Average Usage (All Days)	6 hrs. 2 mins. 3 secs.
Average Usage (Days Used)	6 hrs. 14 mins. 33 secs.
Minimum Usage (1 Day)	43 mins. 31 secs.
Percent of Days with Usage >= 4 Hours	80.0%
Percent of Days with Usage < 4 Hours	20.0%
Total Blower Time	7 days 13 hrs. 1 mins. 59 secs.

## Auto CPAP Summary (Philips Respironics)

Auto CPAP Mean Pressure	6.9 cmH2O
Auto CPAP Peak Average Pressure	8.9 cmH2O
Average Device Pressure <= 90% of Time	8.7 cmH2O
Average Time in Large Leak Per Day	0 secs.
Average AHI	0.6

Device Settings as of 3/30/2016

Device Mode AutoCPAP - A-Flex  
Device Settings

Parameter	Value
Min Pressure	5 cmH2O
Max Pressure	20 cmH2O
A-Flex Setting	3
Auto Off	Off
Auto On	On
View Optional Screens	Off
Ramp	Off
Mask Alert	Off
Mask Resistance	Off
Mask Resistance Lock	Off
Tubing Type	22
Tubing Type Lock	Off
Opti-Start	Off
Mask Reminder Period	Off
Change Humidifier Settings	Yes
Humidification Mode	System One
Humidifier Setting	Off
Instant Message Text	

# Bertha



PROVIDENCE HEALTH AND SERVICES  
6410 NE HALSBY, STE 500  
PORTLAND  
Oregon, 97213

Phone: 5032154663  
Fac: 5032154129  
Email: [barbara.ferguson@providence.org](mailto:barbara.ferguson@providence.org)



## Compliance Report

Usage 03/15/2016 - 04/13/2016

Usage days 30/30 days (100%)

>= 4 hours 30 days (100%)

< 4 hours 0 days (0%)

Usage hours 222 hours 9 minutes

Average usage (total days) 7 hours 24 minutes

Average usage (days used) 7 hours 24 minutes

Median usage (days used) 7 hours 26 minutes

### AirSense 10 AutoSet

Serial number 23151234801

Mode CPAP

Set pressure 12 cmH2O

EPR Fulltime

EPR level 2

### Therapy

Leak - L/min Median: 0.9 95th percentile: 17.8 Maximum: 39.7

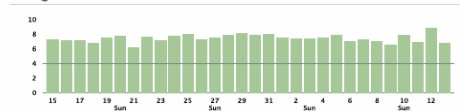
Events per hour AI: 37.8 HI: 1.1 AHI: 38.9

Apnea Index Central: 0.1 Obstructive: 35.5 Unknown: 2.1

RERA Index 0.8

Cheyne-Stokes respiration (average duration per night) 5 hours 5 minutes (69%)

### Usage - hours



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## Therapy Report

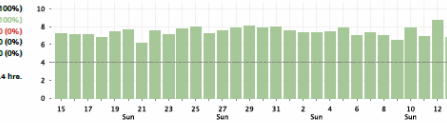
AirSense 10 AutoSet

SN: 23151234801

### Usage (hours)

Usage days 30/30 (100%)  
>= 4 hour days 30 (100%)  
< 4 hour days 0 (0%)  
Days not used 0 (0%)  
Days no data 0 (0%)

Used/Day (avg) 7.4 hrs.



### Leak (L/min)

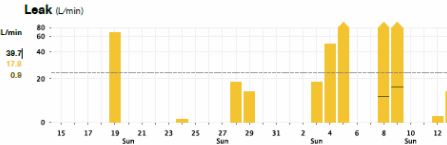
Set threshold 24.0 L/min

Maximum (avg) 38.7

95th % (avg) 17.8

Median (avg) 0.8

LG FITLFE

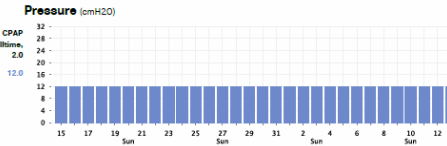


### Pressure (cmH2O)

Set mode CPAP

Set EPR Fulltime

Set pressure 12.0



### AHI (events/hour)

AHI 38.9

HI 1.1

AI 37.8

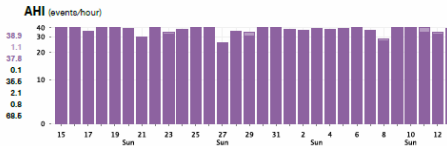
CAI 0.1

OAI 36.6

UAI 2.1

RERA 0.8

CSRS (avg) 68.6



# Balthazar

## Compliance Report

Usage	07/17/2016 - 08/15/2016
<b>Usage days</b>	<b>26/30 days (87%)</b>
<b>&gt;= 4 hours</b>	<b>9 days (30%)</b>
<b>&lt; 4 hours</b>	<b>17 days (57%)</b>
<b>Usage hours</b>	<b>68 hours 26 minutes</b>
<b>Average usage (total days)</b>	<b>2 hours 17 minutes</b>
<b>Average usage (days used)</b>	<b>2 hours 38 minutes</b>
<b>Median usage (days used)</b>	<b>2 hours 35 minutes</b>

AirSense 10 AutoSet	
Serial number	23161233830
Mode	AutoSet
Min Pressure	5 cmH2O
Max Pressure	20 cmH2O
EPR	Fulltime
EPR level	3

Therapy				
Pressure - cmH2O	Median: 5.4	95th percentile: 7.0	Maximum: 7.7	
Leaks - L/min	Median: 31.3	95th percentile: 71.6	Maximum: 88.8	
Events per hour	AI: 1.0	HI: 0.7	AHI: 1.7	
Apnea Index	Central: 0.3	Obstructive: 0.4	Unknown: 0.3	
RERA Index				0.2
Cheyne-Stokes respiration (average duration per night)				0 minutes (0%)

## Usage - hours



PREVIDENCE HEALTH AND SERVICES  
6415 NE HALSLEY, #7E 600  
PORTLAND  
Oregon, 97213

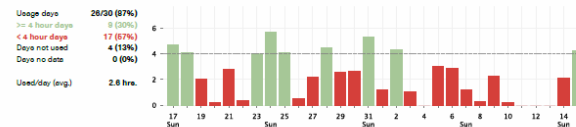
Phone: 5032154663  
Fax: 5032154129  
Email: balthazar.balgaon@providence.org



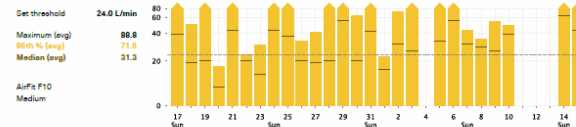
## Therapy Report

AirSense 10 AutoSet SN: 23161233830

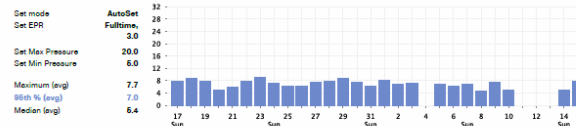
### Usage (hours)



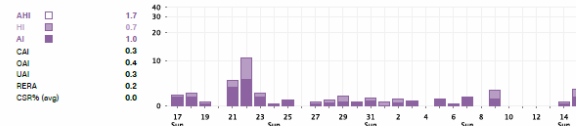
### Leak (L/min)



### Pressure (cmH2O)



### AHI (events/hour)



# CPAP Compliance Report

Providence Health and Services  
6410 NE Halsey  
Suite500  
Portland, OR 97213

Device: REMstar Auto (System One 60 Series) (560P) (P102913701A13 V3.04)

## Therapy Data Summary

### Patient:

Patient ID:  
Home Phone:  
Date of Birth:  
Age:  
Mask: QUATTRO FF

### Sleep Doctor:

Group/Practice:  
Phone:  
Fax:  
E-Mail Address:

### PCP:

Phone:

### Clinician:

### Compliance Information

3/18/2014 - 4/16/2014



### Compliance Summary

Date Range	3/18/2014 - 4/16/2014 (30 days)
Days with Device Usage	27 days
Days without Device Usage	3 days
Percent Days with Device Usage	90.0%
Cumulative Usage	7 days 17 hrs. 37 mins. 41 secs.
Maximum Usage (1 Day)	8 hrs. 35 mins. 54 secs.
Average Usage (All Days)	6 hrs. 11 mins. 15 secs.
Average Usage (Days Used)	6 hrs. 52 mins. 30 secs.
Minimum Usage (1 Day)	2 hrs. 23 mins. 51 secs.
Percent of Days with Usage $\geq$ 4 Hours	86.7%
Percent of Days with Usage $<$ 4 Hours	13.3%
Total Blower Time	7 days 17 hrs. 37 mins. 41 secs.

### Sleep Therapy Statistics (Philips Respironics)

Average Time in Large Leak Per Day	3 mins. 2 secs.
Average AHI	1.6
CPAP Pressure	10.0 cmH2O

# Bart

## Compliance Information

3/18/2014 - 4/16/2014



### Compliance Summary

Date Range	3/18/2014 - 4/16/2014 (30 days)
Days with Device Usage	27 days
Days without Device Usage	3 days
Percent Days with Device Usage	90.0%
Cumulative Usage	7 days 17 hrs. 37 mins. 41 secs.
Maximum Usage (1 Day)	8 hrs. 35 mins. 54 secs.
Average Usage (All Days)	6 hrs. 11 mins. 15 secs.
Average Usage (Days Used)	6 hrs. 52 mins. 30 secs.
Minimum Usage (1 Day)	2 hrs. 23 mins. 51 secs.
Percent of Days with Usage $\geq$ 4 Hours	86.7%
Percent of Days with Usage $<$ 4 Hours	13.3%
Total Blower Time	7 days 17 hrs. 37 mins. 41 secs.

### Sleep Therapy Statistics (Philips Respironics)

Average Time in Large Leak Per Day	3 mins. 2 secs.
Average AHI	1.6
CPAP Pressure	10.0 cmH2O





Device Settings as of

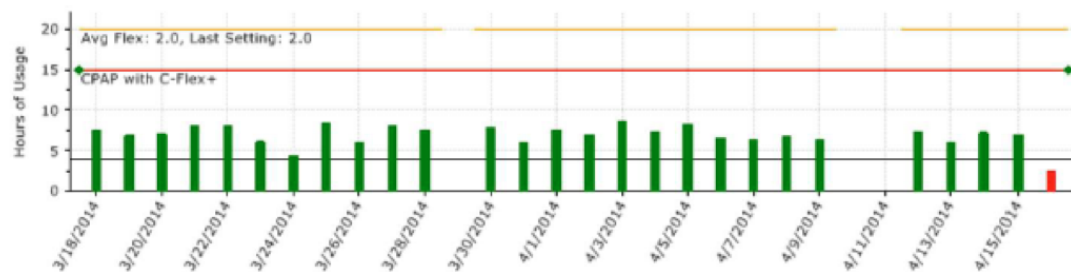
4/16/2014

Device Mode CPAP - C-Flex+  
Device Settings

## CPAP Compliance Report

Parameter	Value
CPAP Pressure	10 cmH2O
C-Flex+ Setting	2
C-Flex+ Lock	Off
Auto Off	Off
Auto On	On
View Optional Screens	On
Ramp	On
Ramp Time	20 minutes
Ramp Start Pressure	4 cmH2O
Mask Alert	Off
Mask Resistance	Off
Mask Resistance Lock	On
Tubing Type	22
Tubing Type Lock	On
Mask Reminder Period	Off
Change Humidifier Settings	No
Instant Message Text	

### Hours of Usage



# Bethany

## Compliance Information

3/19/2013 - 4/30/2013



### Compliance Summary

Date Range	3/19/2013 - 4/30/2013 (43 days)
Days with Device Usage	16 days
Days without Device Usage	27 days
Percent Days with Device Usage	37.2%
Cumulative Usage	1 day 7 hrs. 56 mins. 26 secs.
Maximum Usage (1 Day)	4 hrs. 7 mins. 2 secs.
Average Usage (All Days)	44 mins. 34 secs.
Average Usage (Days Used)	1 hrs. 59 mins. 46 secs.
Minimum Usage (1 Day)	2 mins. 24 secs.
Percent of Days with Usage $\geq$ 4 Hours	2.3%
Percent of Days with Usage $<$ 4 Hours	97.7%
Total Blower Time	1 day 14 hrs. 6 mins. 38 secs.

### Sleep Therapy Statistics (Philips Respironics)

Average Time in Large Leak Per Day	5 mins.
Average AHI	3.2
CPAP Pressure	9.0 cmH2O

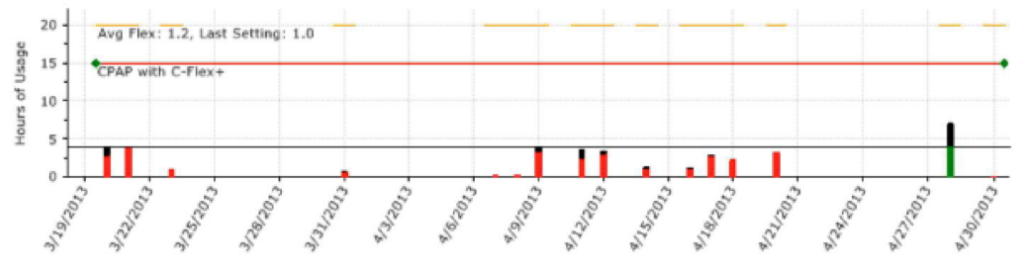


# Bethany

Device Settings as of 4/30/2013

Device Mode	CPAP - C-Flex+
Device Settings	
<b>Parameter</b>	<b>Value</b>
CPAP Pressure	9 cmH2O
C-Flex+ Setting	1
C-Flex+ Lock	Off
Auto Off	Off
Auto On	On
View Optional Screens	On
Ramp	On
Ramp Time	20 minutes
Ramp Start Pressure	4 cmH2O
Mask Alert	Off
Mask Resistance	Off
Mask Resistance Lock	On
Tubing Type	22
Tubing Type Lock	On
Mask Reminder Period	Off
Change Humidifier Settings	No
Instant Message Text	

## Hours of Usage



# Bernie

## Compliance Information

10/26/2013 - 11/24/2013

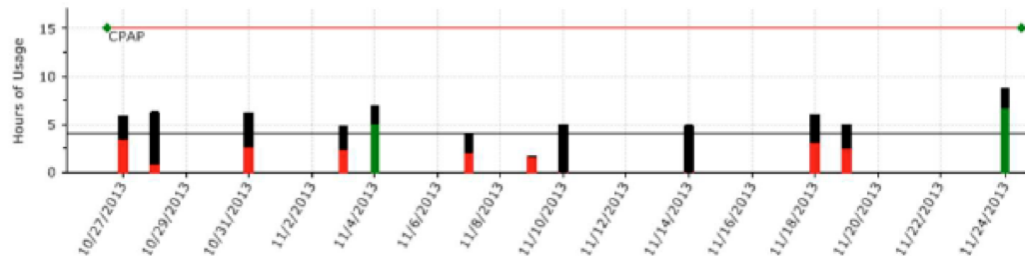
### Compliance Summary

Date Range	10/26/2013 - 11/24/2013 (30 days)
Days with Device Usage	12 days
Days without Device Usage	18 days
Percent Days with Device Usage	40.0%
Cumulative Usage	1 day 6 hrs. 52 mins. 55 secs.
Maximum Usage (1 Day)	6 hrs. 48 mins. 49 secs.
Average Usage (All Days)	1 hrs. 1 mins. 45 secs.
Average Usage (Days Used)	2 hrs. 34 mins. 24 secs.
Minimum Usage (1 Day)	2 mins. 50 secs.
Percent of Days with Usage >= 4 Hours	6.7%
Percent of Days with Usage < 4 Hours	93.3%
Total Blower Time	2 days 17 hrs. 43 mins. 5 secs.

### Sleep Therapy Statistics (Philips Respironics)

Average Time in Large Leak Per Day	25 mins.
Average AHI	2.1
CPAP Pressure	8.0 cmH2O

### Hours of Usage



# Brittney

## Auto-CPAP

## Download

### Therapy Data Summary - All Data

#### Compliance Summary

Date Range	2/5/2014 - 3/6/2014 (30 days)	
Days with Device Usage	28 days	
Days without Device Usage	2 days	
Percent Days with Device Usage	93.3%	
Cumulative Usage	5 days 20 hrs. 13 mins. 46 secs.	
Maximum Usage (1 Day)	7 hrs. 11 mins. 53 secs.	
Average Usage (All Days)	4 hrs. 40 mins. 27 secs.	
Average Usage (Days Used)	5 hrs. 29 secs.	
Minimum Usage (1 Day)	2 hrs. 37 mins. 35 secs.	
Percent of Days with Usage >= 4 Hours	80.0%	
Percent of Days with Usage < 4 Hours	20.0%	
Total Blower Time	5 days 20 hrs. 56 mins. 46 secs.	

#### Auto CPAP Summary (Philips Respironics)

Auto CPAP Mean Pressure	6.6 cmH2O
Auto CPAP Peak Average Pressure	9.2 cmH2O
Average Device Pressure <= 90% of Time	8.6 cmH2O
Average Time in Large Leak Per Day	9 secs.
Average AHI	4.1

Device Settings as of 3/6/2014

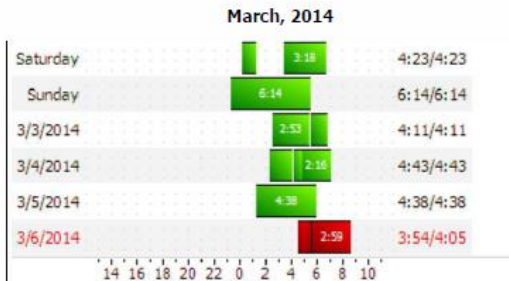
Device Mode AutoCPAP - A-Flex  
Device Settings

Parameter	Value
<b>Min Pressure</b>	5 cmH2O
<b>Max Pressure</b>	15 cmH2O
<b>A-Flex Setting</b>	3
A-Flex Lock	Off
Auto Off	Off
Auto On	On
View Optional Screens	On
Ramp	On
Ramp Time	10 minutes
Ramp Start Pressure	4 cmH2O
Mask Alert	Off
Mask Resistance	1
Mask Resistance Lock	Off
Tubing Type	22
Tubing Type Lock	Off
Mask Reminder Period	Off
Change Humidifier Settings	Yes
<b>Humidification Mode</b>	System One
<b>Humidifier Setting</b>	5
Instant Message Text	

# Brittney

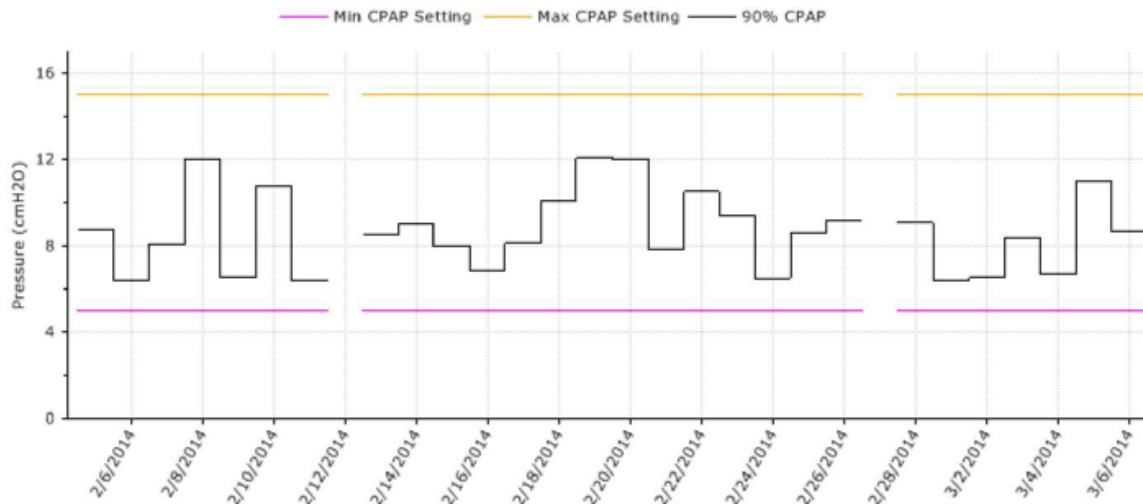
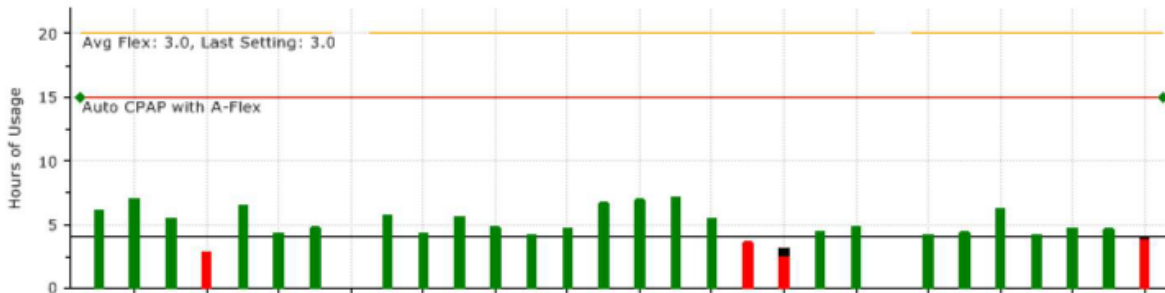
## Auto-CPAP Download

### Patterns of Use



# Brittney

## Auto-CPAP Download



# Brittney Auto-CPAP Download

## Summary of Daily Events Per Hour

Total AHI: 4.0

2/5/2014 - 3/6/2014

P	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MaP	0.2	3,440.5	1,794.0	795.3	773.7	661.3	350.8	229.1	219.4	79.4	48.6	21.5	0.0	0.0	0.0	0.0	0.0
%	0.0	40.9	21.3	9.5	9.2	7.9	4.2	2.7	2.6	0.9	0.6	0.3	0.0	0.0	0.0	0.0	0.0
FL	0.0	0.7	0.5	0.9	0.8	0.3	0.7	1.0	0.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VS	0.0	3.3	4.8	9.6	8.7	7.6	8.4	13.1	8.8	15.1	11.1	41.8	0.0	0.0	0.0	0.0	0.0
OA	0.0	1.3	1.5	1.7	2.2	2.2	1.4	2.9	2.2	3.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
CA	0.0	0.1	0.1	0.5	0.2	0.4	0.5	0.8	1.6	0.8	1.2	2.8	0.0	0.0	0.0	0.0	0.0
H	0.0	1.1	2.0	4.3	4.6	4.5	1.0	0.5	0.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
RE	0.0	0.2	0.6	1.3	0.9	0.8	0.5	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AHI	0.0	2.5	3.6	6.5	7.0	7.1	2.9	4.2	4.3	3.8	4.9	2.8	0.0	0.0	0.0	0.0	0.0

90%

### Legend

P - Pressure, MaP - Minutes at Pressure, % - Percent of Night, FL - Flow Limitation, VS - Vibratory Snore, H - Hypopnea, OA - Obstructed Airway Apnea, CA - Clear Airway Apnea, RE - RERA, AHI - Apnea/Hypopnea Index

## Auto CPAP Time at Pressure

2/5/2014 - 3/6/2014

