Goals Session
Putting it all Together

Adherence to therapy

Case presentations

Treatment issues

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Disclosures

- No Conflicts

Goals for this presentation

- Discuss adherence monitoring and technology
- Show examples of OSA cases illustrating common problems and solutions
- Insomnia case
- Plenty of time for your questions

Isn't it obvious that CPAP adherence data is helpful?

- Many "obvious" things in medicine turn out to be wrong after they are tested
  - Estrogen supplementation in menopause
  - Anti-oxidants supplementation for cancer and heart disease just about everything else
- It is possible that CPAP adherence monitoring is a nice "supplement" to clinical decision making but does not fundamentally change results

Tracking systems

- Data collected
- Data transmitted
- Impact on outcomes
- Conclusions

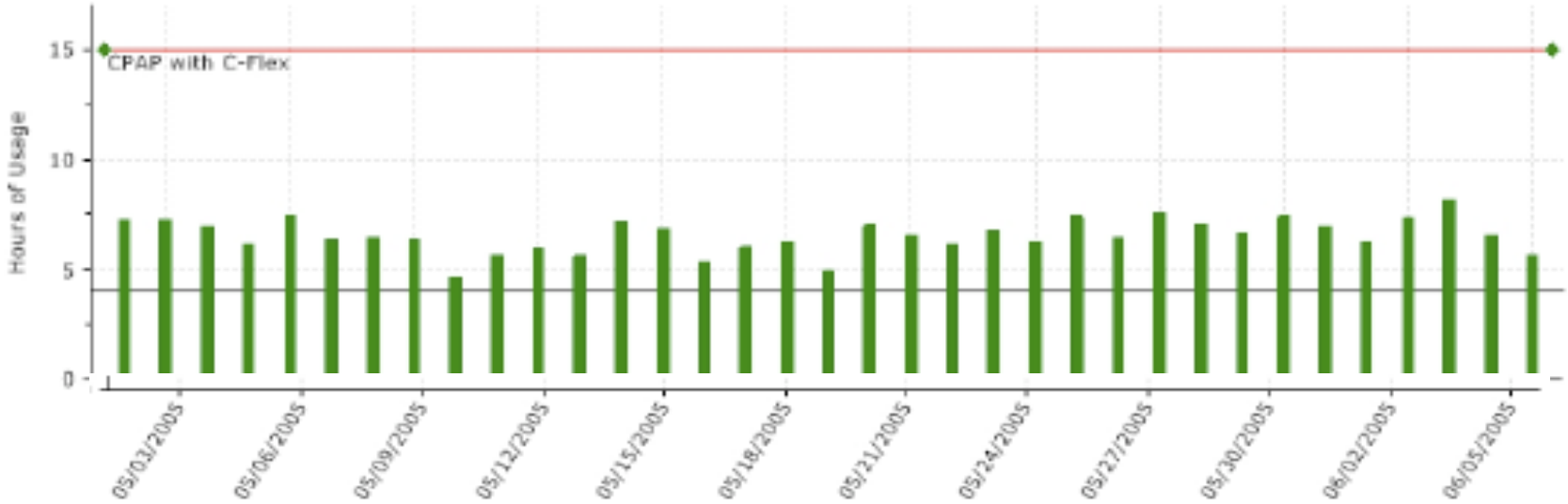
Evolution of CPAP Adherence Tracking Systems

- Card systems
- Internet telephony
- Newer systems – Bluetooth to cell phone

Data collected

- Conventional profile
  - Hours
  - Hours per night
  - Time at Pressure
- Enhanced profile
  - Pressure prescription
    - Fixed mode
    - Auto mode
  - Events
    - Apneas
    - Hypopneas
    - Snoring
  - Leak

Example of a basic adherence report, 2005



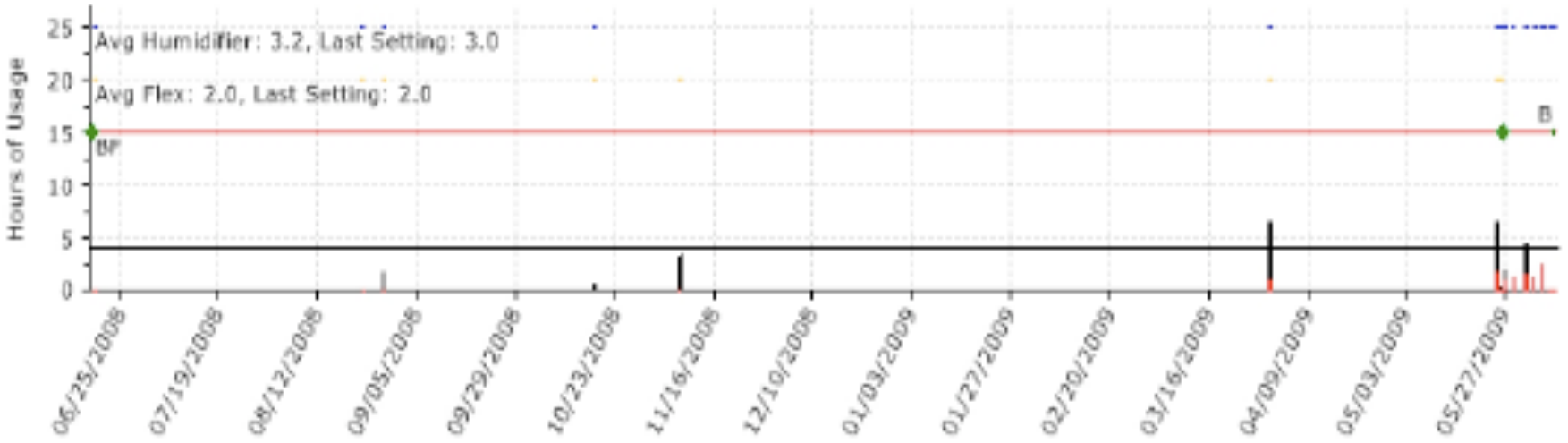
50 YO female, AHI 12, Epworth 14

Same patient, same report

Compliance Summary

Date Range	05/02/2005 - 06/05/2005 (35 days)
Days with Device Usage	35 days
Days without Device Usage	0 days
Percent Days with Device Usage	100.0%
Cumulative Usage	9 days 12 hrs. 34 mins.
Maximum Usage (1 Day)	8 hrs. 8 mins.
Average Usage (All Days)	6 hrs. 31 mins. 49 secs.
Average Usage (Days Used)	6 hrs. 31 mins. 49 secs.
Minimum Usage (1 Day)	4 hrs. 39 mins.
Percent of Days with Usage >= 4 Hours	100.0%
Percent of Days with Usage < 4 Hours	0.0%
Total Blower Time	9 days 12 hrs. 34 mins.

Adherence report, 2008



35 YO male, AHI 25, Epworth 7

Same patient, same report

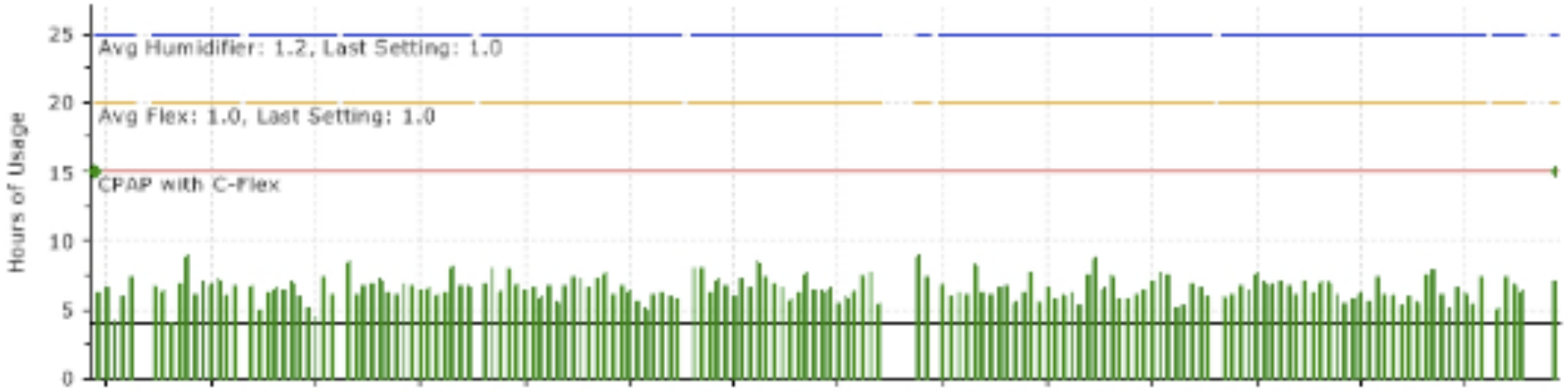
Compliance Summary

Date Range	06/19/2008 - 06/08/2009 (355 days)
Days with Device Usage	15 days
Days without Device Usage	340 days
Percent Days with Device Usage	4.2%
Cumulative Usage	11 hrs. 18 mins. 26 secs.
Maximum Usage (1 Day)	2 hrs. 20 mins.
Average Usage (All Days)	1 mins. 54 secs.
Average Usage (Days Used)	45 mins. 13 secs.
Minimum Usage (1 Day)	1 mins. 21 secs.
Percent of Days with Usage >= 4 Hours	0.0%
Percent of Days with Usage < 4 Hours	100.0%
Total Blower Time	1 day 6 hrs. 2 mins. 52 secs.

Sleep Therapy Statistics

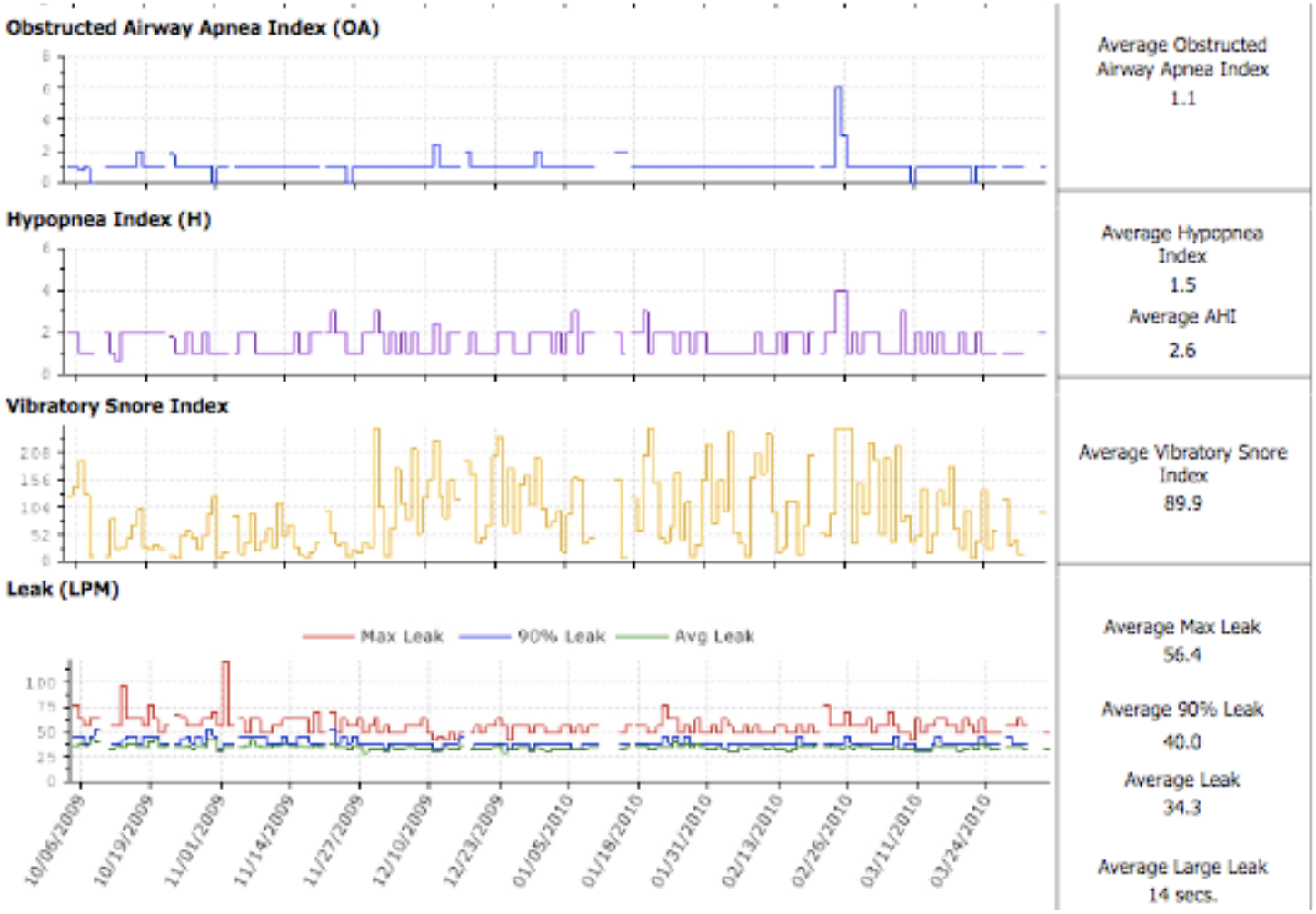
Average Time in Large Leak Per Day	52 secs.
Average AHI	7.4
EPAP Pressure	8.0 cmH2O
IPAP Pressure	12.0 cmH2O

Adherence report, 2012



52 YO male, AHI 32, Epworth 12

Same patient- more detailed report



Leak measures

Respironics

- Average Max leak
- Average 90% leak
- Average leak
- Average large leak

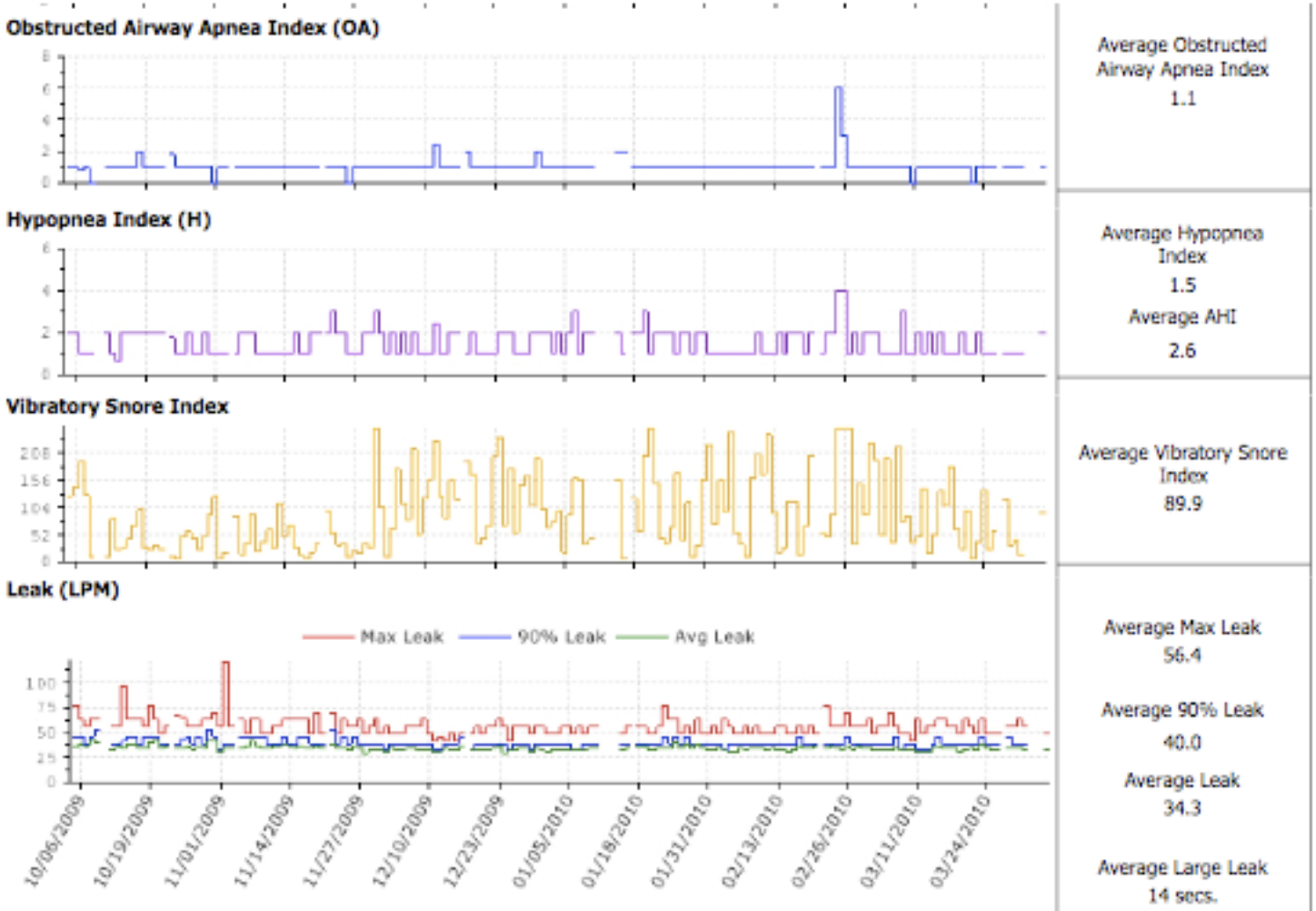
ResMed

- Median leak
- 95% percentile
- Maximum leak
- Unintentional leak

Mask leak Confusion

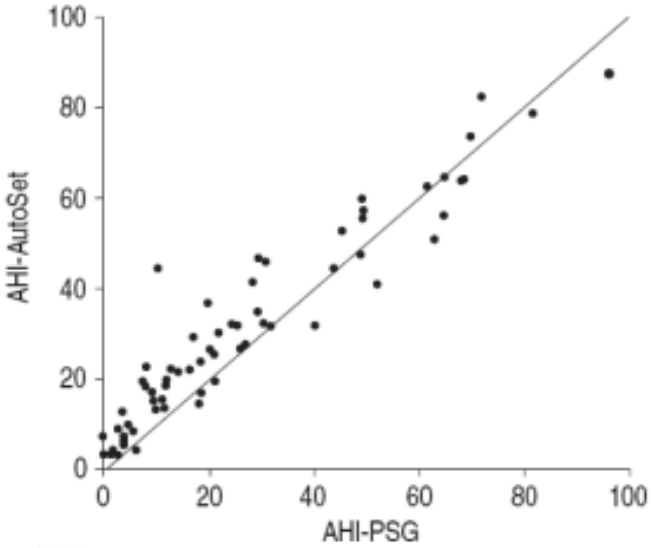
- Data Management software displays *Total Leak* (either l/min or l / sec)
- Total Leak = Intentional Leak plus unintentional leak
- Unintentional leak = Total leak minus Intentional leak
- Intentional Leak can be estimated from the pressure / flow related to a given exhalation valve for fixed CPAP levels

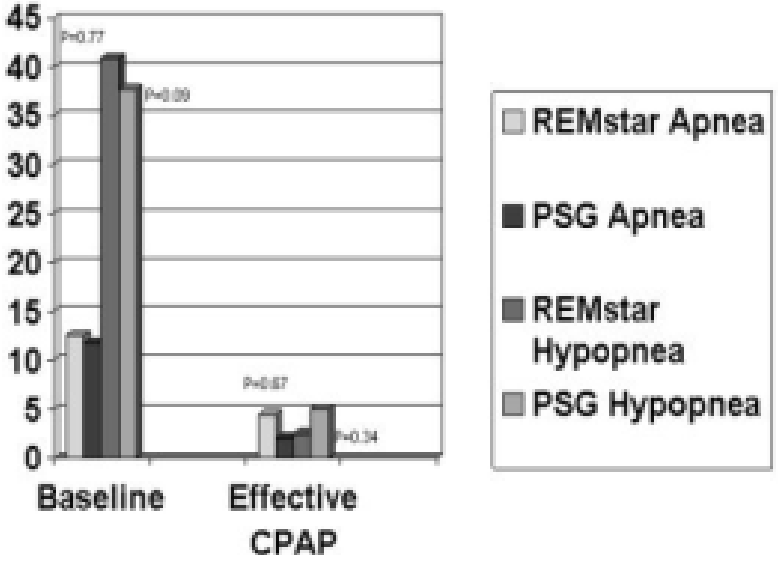
Leak measures on adherence reports



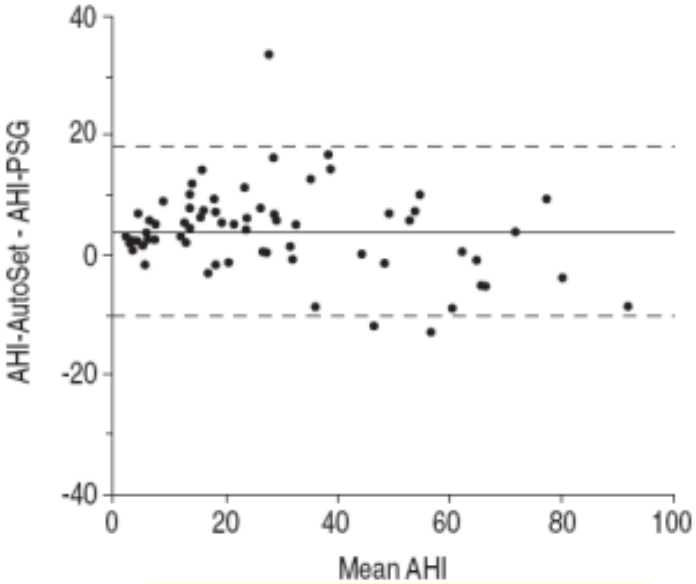
Event Detection Device vs. PSG

AutoSet





AutoSet



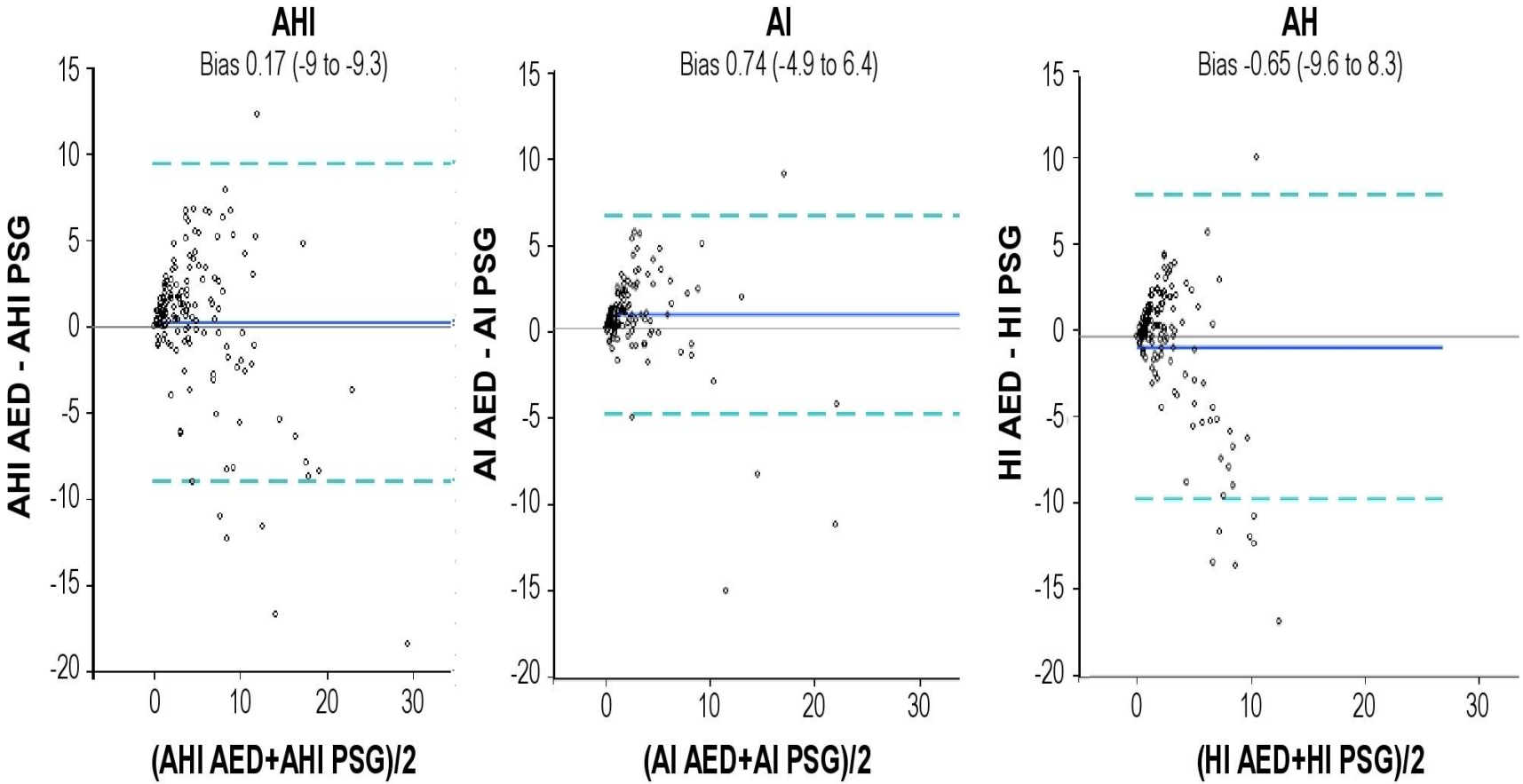
Eur Respir J 1997; 10: 587–591.

The REMstar Pro detects sleep-disordered breathing events similar to that of manually scored PSG. The use of an event detection machine may help assess therapy effectiveness and determine the need for additional diagnostic testing.

AJRCCM 2008 177:A940

Comparing PSG vs. AED

Berry et al, Sleep, 2012



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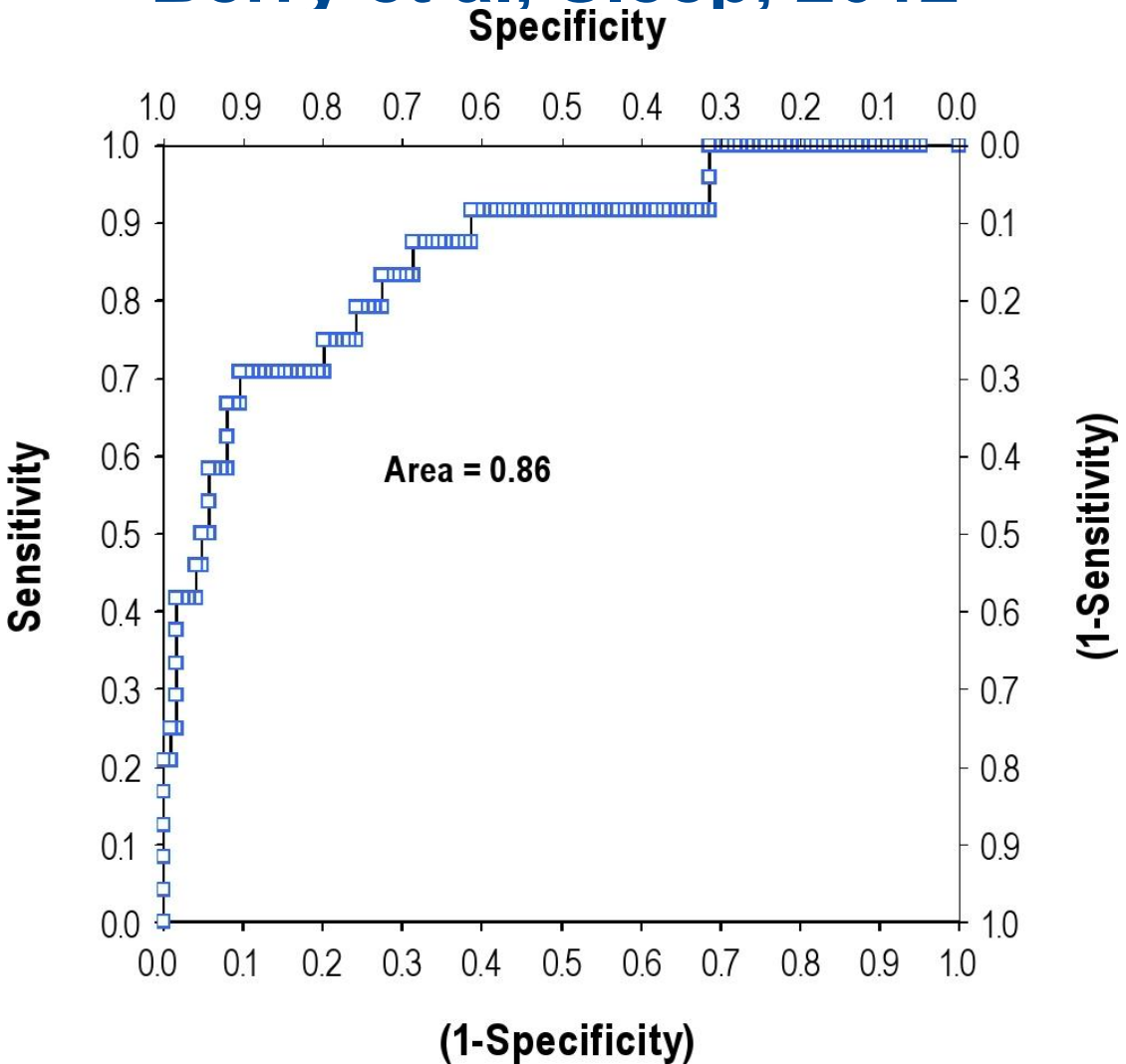


Adherence to CPAP

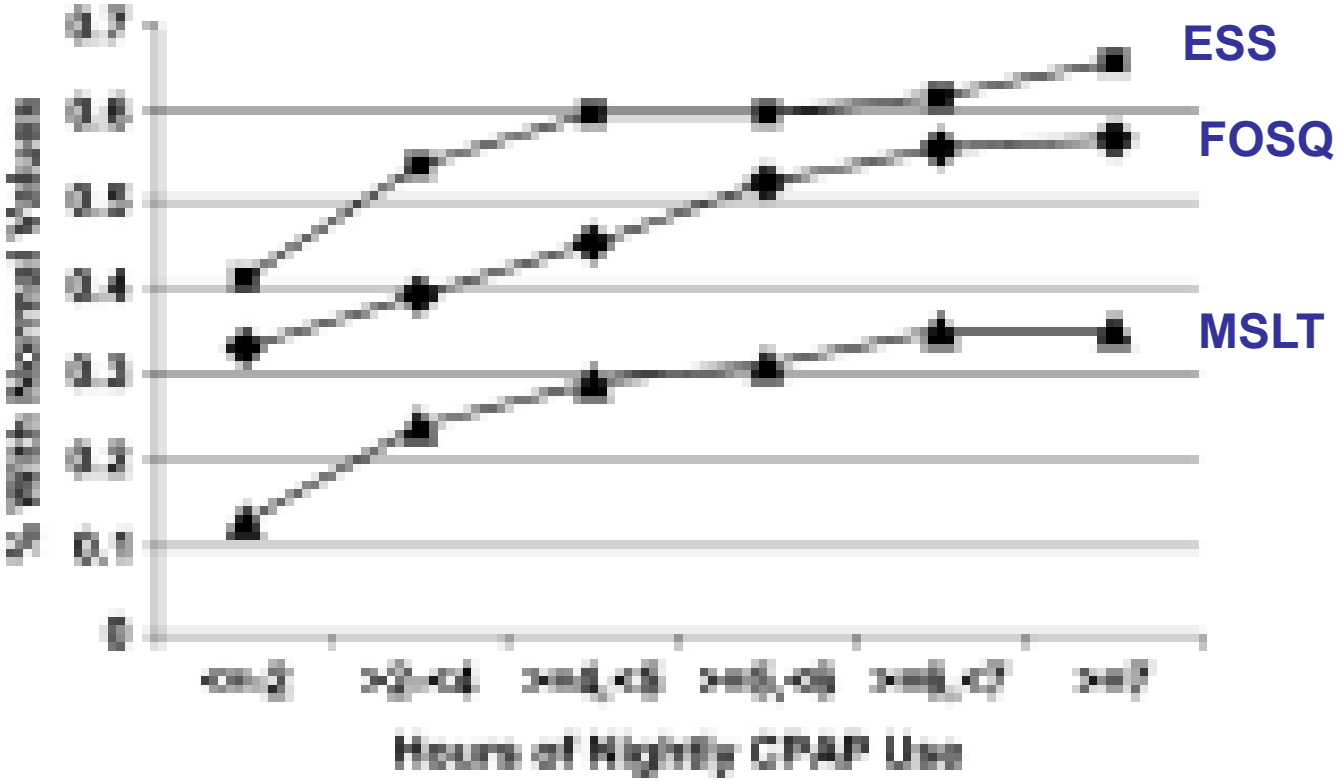
What drives adherence

- Symptoms
- OSA severity
- Socioeconomic status?
- Humidification?

What does NOT drive adherence

- Age
- Side-effects
- Wife nagging
- Guilt
- Threats
- Cajoling
- Employment risk
- A lot of other things

More CPAP usage = Better outcomes



Sleep 2007;30:711–719.

Develop an adherence monitoring plan

- Formal plan not required today but “informal” strategies are important
- Strongly recommend you begin a process of tracking adherence
- Is very likely to be important in the future

Case 1

- 45 yo male presents with loud snoring, daytime sleepiness, choking/ gasping at night
- BMI 34 Kg/m2
- Epworth scale 12
- History of chronic nasal congestion and deviated septum

Case 1

- Dx sleep study shows
  - 366 min total sleep time
  - 70% stage N2, 10% stage N3, 20% stage REM
  - AHI supine = 25
  - AHI lateral = 12
  - LSAT = 82%; CT 90 = 20%
- What is the next step?

Case 1

- In lab CPAP study
  - 70 min at final pressure of 12cm
  - AHI at final pressure is 6
  - Titrated on nasal mask
  - 10 min REM sleep in supine position at 10cm but not at final pressure
- What do you do next?

Question 1

What pressure setting would you choose?

A. 12cm?

B. 14cm?

C. Change to auto titrating CPAP?

D. Repeat the titration in laboratory?

Answer to Question 1

- Correct answer is A
  - The titration was adequate at 12cm.
  - Lack of REM sleep does not make it inadequate
  - Autocpap may work but you don't know that for sure and you have an adequate titration at 12cm

Case 1

1. Need to know acute clinical outcome – did the CPAP titration work for the patient?
   A. Assess by questionnaires, direct questioning
   B. Does he feel better?
   C. Side-effects during the study?
2. Should he be set up on CPAP?
   A. Will he accept it for home use?
   B. 80-90% will say “yes”

Reflection about Case 1

1. What follow-up interval would you recommend?

2. How comfortable are you with making decisions without full data?

Case 2

- 50 yo male with severe OSA
- AHI at diagnosis is 45
- AHI on treatment is 9
- Prescribed CPAP pressure is 10cm
- He uses a full face mask.
- Problem: feels claustrophobic with mask

Case 2

What would you do next?

A. Change mask to nasal mask

B. Desensitization to full face mask

C. Refer to a dentist for an oral appliance

D. Change to autocpap

Case 2

- You change mask to a nasal mask
- Patient likes it better and sleeps better with it for 3 months
- Then develops persistent red marks on the bridge of his nose
- It is unsightly and he is embarrassed by it

Question 2

What is the next best step in his therapy?

A. Silicone pad on bridge of nose to cushion mask

B. Change to nasal pillows

C. Go back to full face mask

D. Loosen straps on the nasal mask and tolerate more leak

Case 2

- Correct answer is B
- Classic indication to change to nasal pillows
- Factors to consider
  - Cost of replacement mask
  - Is the current mask working otherwise
  - Ability to get silicone pads
  - Or ability to use other padding

Claustrophobia

- Psychological feeling of being “closed in”
- Relatively common
- Difficult to address quickly
- Use less encumbering masks – nasal pillows instead of full face
- Desensitization works variably well – few clinical trials

Case 3

- 47 yo female with moderate sleep apnea
- AHI 25
- On CPAP 8cm with nasal mask
- Good CPAP adherence; avg 4.7 hours per night
- She gains 25# over a 6 month period and is now having snoring and feels CPAP not working as well

Question 3

What is the next best step in her therapy?

A. Empirically increase the CPAP by 2-3cm

B. Repeat sleep lab CPAP titration

C. Change to BPAP with new lab titration

D. Refer for an oral appliance

Case 3

- A, B, and C are all plausible
- I would do A, C, then B.
- Routinely adjust pressures up or down 2-3 cm
- Could use APAP to find the “right” pressure for established patients
- Try to keep people out of the sleep lab for retitrations…
- In my experience, the pressure is often not the problem…something else is

Case 4

- 29 yo graduate student
- School fulltime; works part-time
- Mother recently died suddenly
- Gets in bed at 11pm – takes up to 2 hours to fall asleep
- Out of bed at 7am; feels “run down”
- Otherwise healthy; no medications; no prior history of sleep problems

Case 4

What is the most likely diagnosis?

A. Insomnia related to stress
B. Insomnia related to adjustment disorder
C. Insomnia related to major depression
D. Insomnia related to chronic medical illness

Case 4

- Correct answer is B
- She has an adjustment disorder due to her mother's death and her natural bereavement

Case 4

- Treatment?
- Short term use of hypnotics is appropriate
  - Zolpidem, Ezopiclone, Temazepam, etc
- Short term Cognitive Behavioral Therapy is appropriate
  - Focus on sleep restriction and stimulus control and dealing with intrusive thoughts

Case 4

- Behavioral therapy for insomnia
- 4 Principles
  1. Don’t go to be until you are sleepy
  2. Don’t stay in bed if you can’t sleep
  3. Get out of bed at the same time every day
  4. Avoid excessive napping

Summary

- Basic CPAP management principles
- Basic case examples
- Frequently more than 1 right answer for CPAP management

Question 4

The value you see in obtaining a CCSH credential in terms of career development or advancement is

A. High

B. Medium

C. Low

Questions and Answers

Please send me your feedback to atwoodcw@yahoo.com