

Screening for Obstructive Sleep Apnea in the Primary Care Setting

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Sleep Medicine Northwest

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Northwest Hospital Continuing Education

Diagnosis of OSA Lags Behind Other Vascular Risk Factors

- Primary care providers routinely
 - Check blood pressure
 - Check lipids
 - Assess family history for heart disease and stroke
 - Counsel patients to stop smoking and moderate alcohol intake and lose weight
- However risk for OSA is often inadequately assessed.
- Pick-up rates estimated at 10 – 20% of true prevalence

OSA is Well-Suited to Screening by Clinical Questionnaire

- Symptoms are uniform enough
- High prevalence of OSA in the community
 - High positive predictive values
- Questionnaires provide useful structure and uniformity to the screening process

Berlin Questionnaire

- 10 item screening questionnaire for OSA validated in Cleveland in late 1990's
 - 9 self-rated questions + calculation of BMI by treater
 - Stratified pts into risk brackets for OSA
 - High risk: positive predictive value of 90%
 - Low risk: negative predictive value of 71%
 - Prevalence of OSA in the primary care setting estimated at about 38%
- Somewhat cumbersome to administer and score
 - Slow acceptance among the primary care community

Netzer et al, Ann Int Med, 5 Oct 1999

Sleep Medicine Northwest Clinical Research Focus

- Sought to develop a **more** clinically useful screening tool for OSA
- Sought to determine the approximate prevalence of OSA in our community and to compare with results of Berlin Questionnaire study

The G.A.S.P. questionnaire

- **G**raduated
 - Allows a range of decision thresholds
- **A**pnea
 - Limited to obstructive sleep apnea
- **S**creening
 - Not intended to be a surrogate for overnight sleep studies
- **P**rotocol

Evolution of the G.A.S.P. Questionnaire

- Initially had 7 questions
 - 4 completed by patient
 - 3 completed by primary care provider
 - Poor acceptance in early trials
- Simplified to 5 questions
 - All completed by patient

G A S P
 Graduated Apnea Screening Protocol

Pt's name _____

Home phone _____ Work phone _____

Referred by _____

Date _____

Your height _____ Your weight _____

Yes	No	Not Sure	
()	()	()	Have you ever been diagnosed with obstructive sleep apnea?
()	()	()	Are you currently being treated for obstructive sleep apnea?

	Yes	No	Not Sure	
1.	()	()	()	Have you been told (or noticed on your own) that you snore on most nights?
2.	()	()	()	Have you been told (or noticed on your own) that you stop breathing or struggle to breathe in your sleep?
3.	()	()	()	Are you tired, fatigued or sleepy on most days?
4.	()	()	()	Do you have acid indigestion or high blood pressure (OR use medication to control either of these conditions)?
5.	()	()	()	Are you overweight?

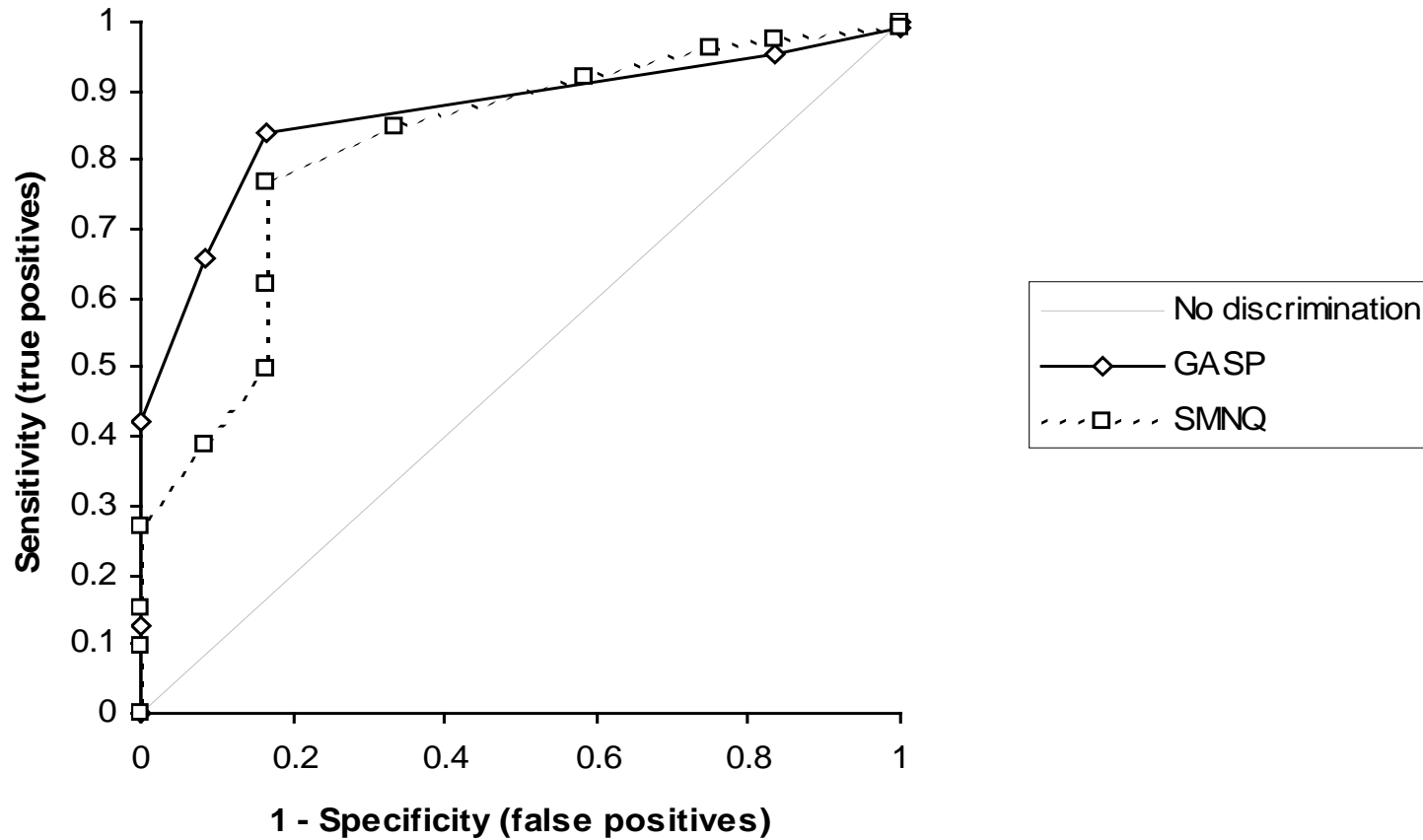
	+		=	0	1	2	3	4	5
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Not sure = Yes

- Several strategies for assignment of numerical scores to Yes, Not Sure and No answers were tried
 - 2/1/0, 1/1/0, 1/0/0
- Giving Yes and Not sure answers equal weight yielded the best performance

G.A.S.P. ROC Curve



G.A.S.P. – Experience in the Primary Care Community

- Administered to patients seen in succession at 3 North Seattle primary care clinics.
- All adults, no other exclusions.
- Data pooled to yield 301 responses.
 - Individual clinics didn't differ significantly from each other

Raw responses to individual questions (Yes + Not Sure)

- Snoring: 55%
- Observed apnea: 25%
- Fatigue/sleepiness: 51%
- HTN/GERD: 49%
- Overweight : 58%
- Prior dx of OSA: 5%

Pilot validation

- Validated in mixed cohort (n = 138)
 - Pts referred to Sleep Medicine Northwest
 - Pts recruited from participating primary care clinics
- All participants had overnight sleep studies
 - 125 persons with obstructive sleep apnea
 - 13 persons without obstructive sleep apnea

Pilot Validation

- Inclusion criteria
 - Ages 18 – 75
 - Not pregnant
 - Not hospitalized within the past month
- Modified Medicare definition of OSA
 - AHI (apneas + hypopneas per hour) of 15 or higher OR
 - AHI of 5 or higher PLUS daytime fatigue/sleepiness

GASP Questionnaire Characteristics

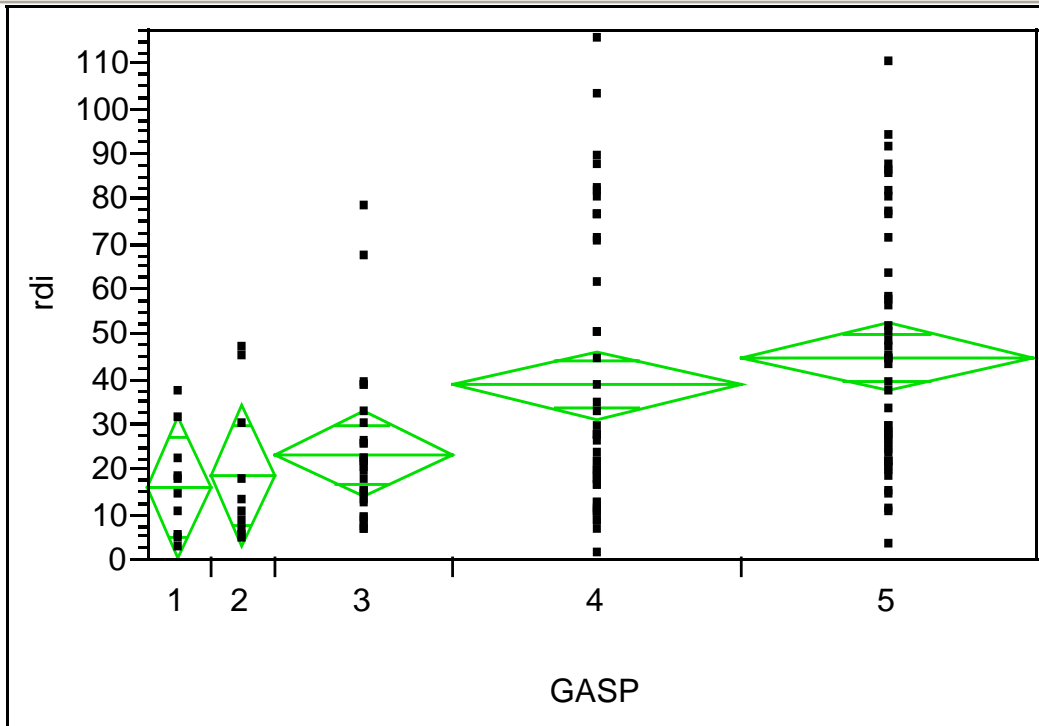
GASP abnormal threshold	Sensitivity	Specificity	TP	TN	FP	FN
0	100.0%	0.0%	126	0	13	0
1	99.2%	0.0%	125	0	13	1
2	88.9%	53.8%	112	7	6	14
3	77.8%	92.3%	98	12	1	28
4	54.0%	100.0%	68	13	0	58
5	19.0%	100.0%	24	13	0	102

GASP: Decision Thresholds

- Score of 4 or higher: **ALMOST CERTAIN** to have OSA
 - Are symptomatic
 - Tend to have a higher RDI (respiratory disturbance index)
- Score of 3 or higher: **HIGH RISK**
 - Positive predictive value greater than 75%
- Score of 2 or less: **LOW RISK**
 - Negative predictive value is greater than 90%
 - Severity of apnea tends to be milder

GASP scores of 4 and 5 are associated with higher mean RDI

Oneway Analysis of rdi By GASP



Missing Rows 65396

Oneway Analysis of rdi By GASP

Missing Rows 65396

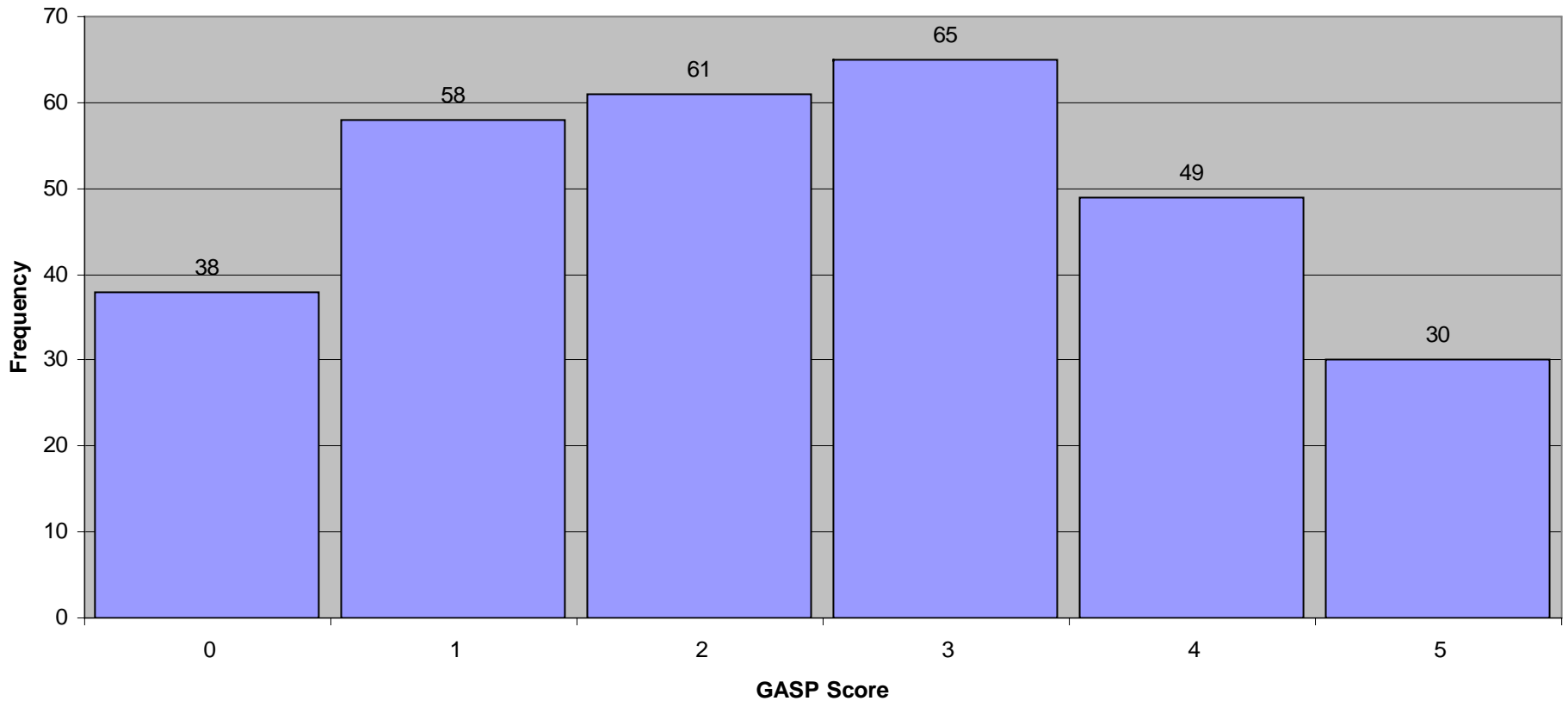
Means Comparisons

Comparisons for each pair using Student's t

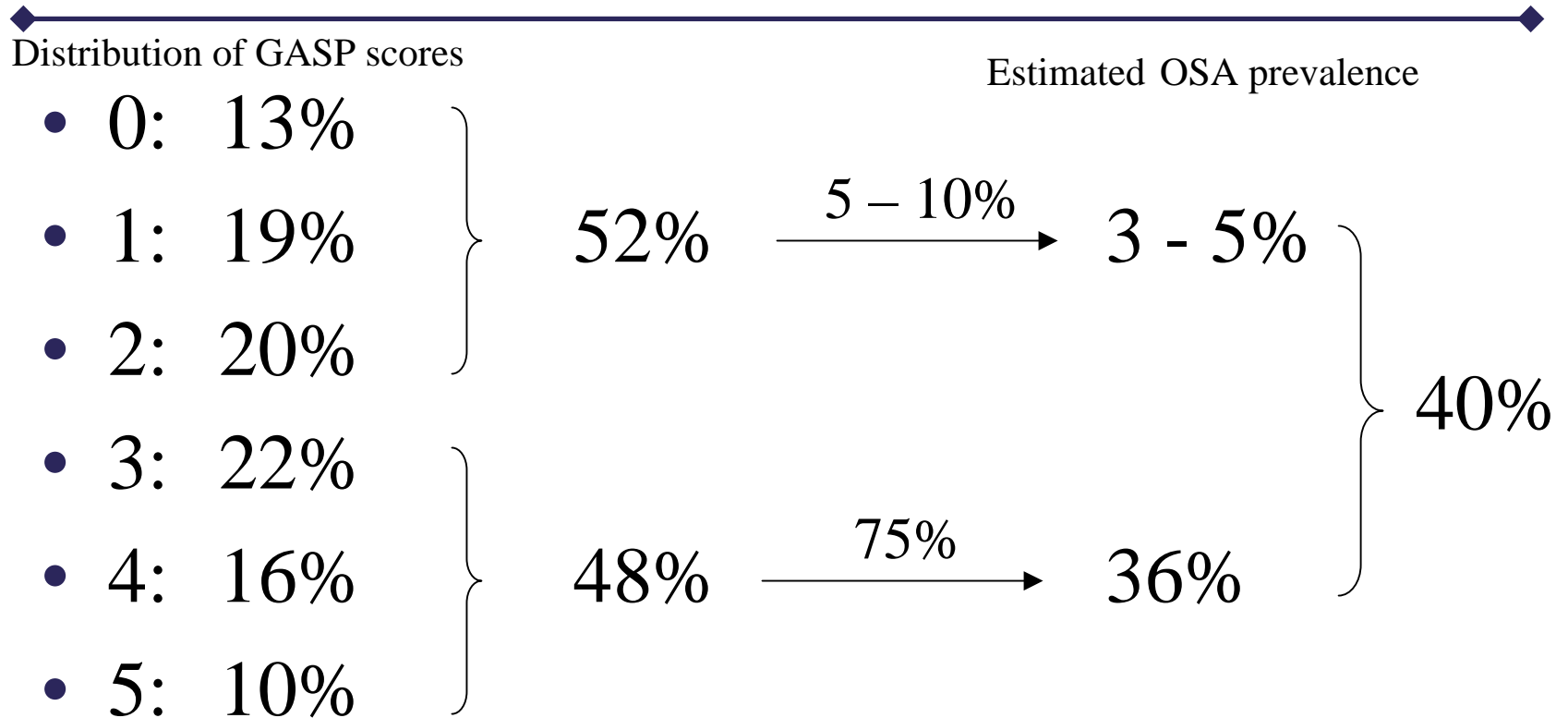
Level	Mean
5 A	44.869565
4 A	38.777778
3 B	23.339286
2 B	18.500000
1 B	16.000000

Levels not connected by same letter are significantly different

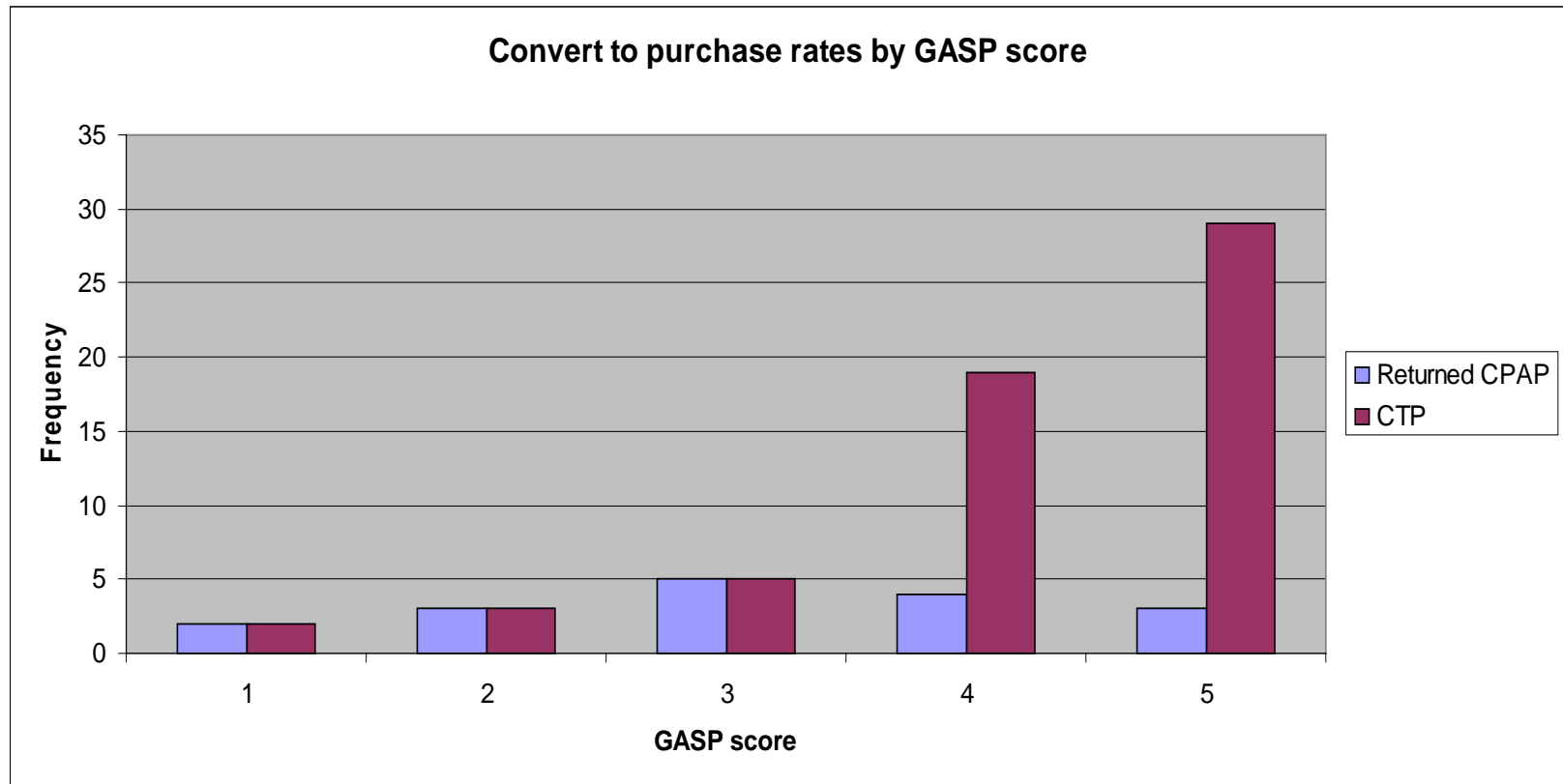
GASP Questionnaire in 301 successive primary care patients



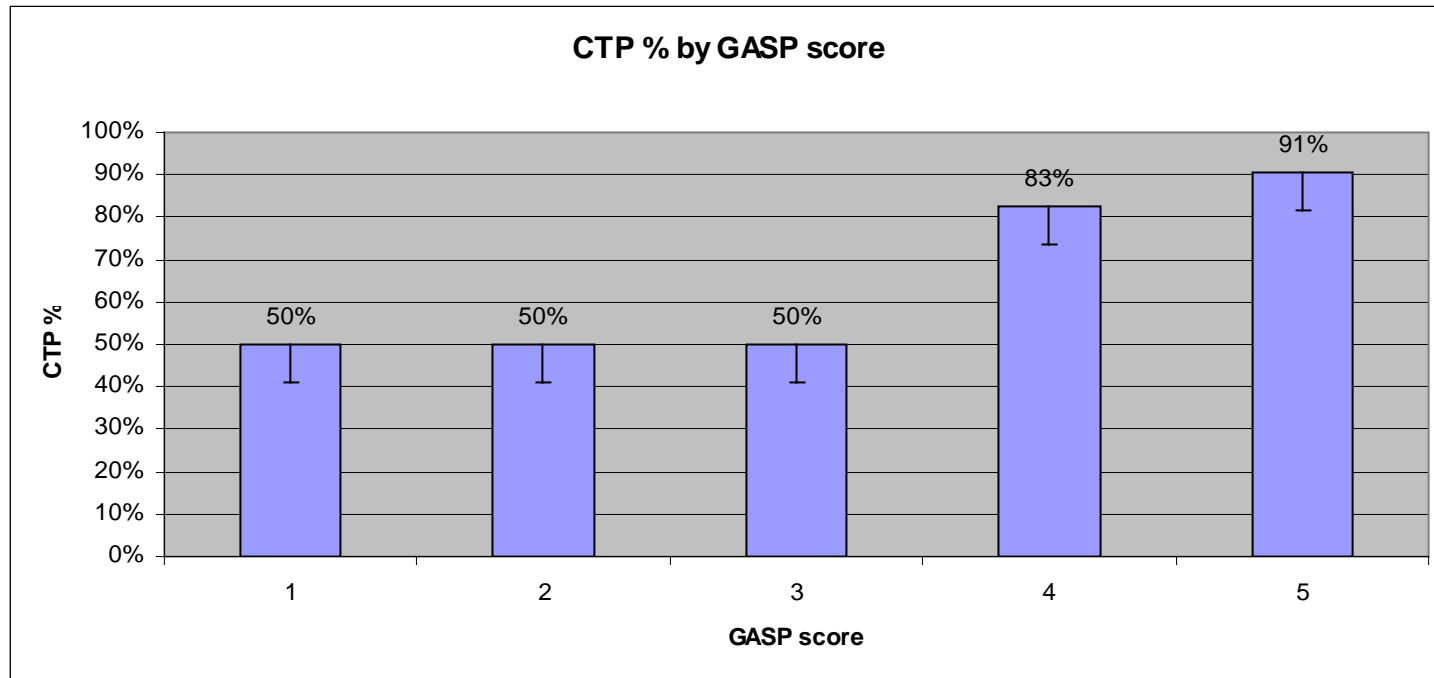
Estimation of OSA prevalence using responses to GASP



High GASP Scores Predict Acceptance of CPAP



Percentage of Patients Purchasing CPAP by GASP Score



Using self-rated weight brackets does not affect GASP results

Agreement for GASP risk bracket

Contingency Table

		3/4/5 (BMI)		
		high	low	
Count				
Total %				
3/4/5 (self rated)	high	74	1	75
		48.37	0.65	49.02
low	low	3	75	78
		1.96	49.02	50.98
		77	76	153
		50.33	49.67	

Tests

Kappa Std Err
0.947719 0.025788

Kappa measures the degree of agreement.

Agreement for scores of 4 or 5

Contingency Table

		4/5 (BMI)		
		high	low	
Count				
Total %				
4/5 (self rated)	high	43	3	46
		28.10	1.96	30.07
low	low	1	106	107
		0.65	69.28	69.93
		44	109	153
		28.76	71.24	

Tests

Kappa Std Err
0.93705 0.031037

Kappa measures the degree of agreement.

In Summary

- Clinical questionnaires have utility in identifying persons at risk for OSA who are likely to benefit from treatment
 - Self administered questionnaires work as well as treater-administered instruments
- In the primary care population in North Seattle:
 - The prevalence of OSA may be as high as 40%
 - The prevalence of **symptomatic** OSA is about 25%
 - OSA prevalence findings are in close agreement with previously reported findings from the Berlin Questionnaire Group