Nurse Practitioner-Led Obstructive Sleep Apnea Care

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Introduction
Sleep apnea affects more than 40 million people in the United States. Yet, more than 80% of the affected individuals are undiagnosed and untreated due to a number of factors including polysomnography cost, inconvenience of testing, and fear of being watched in the sleep lab. As such, Home Sleep Testing (HST) may be a preferred diagnostic option, especially for Obstructive Sleep Apnea (OSA), which requires a minimal number of physiological parameters for diagnosis. HST can generate high quality recordings, is roughly one fourth the cost of a lab test and is done in the comfort of the patient’s home. HST can be initiated from settings other than a sleep lab including family practices; thus, offering more convenient options to the patient which may speed up the diagnosis and treatment process. In addition, the significant cost savings between in-lab and at home testing, which is estimated at $750 per test, is quickly driving adoption of this new procedure by many healthcare providers and insurance carriers.

Prior to this study, the success of HST in family practices has not been evaluated. The purpose of this research is to identify the feasibility of conducting HST by NPs in a primary care setting.

Methods
A HST program was developed and tested in two (2) NP-owned practices, both in New Hampshire. The program screened patients using Epworth Sleepiness Screening (ESS) and STOP/BANG questionnaires (STOP/BANG evaluates Snoring, Predness, Observed apnea, high Blood Pressure, BMI, Age, Neck size, & Gender). Patients suspected of OSA were trained on sensor hookup during the office visit and dispensed a monitor (SleepView) for self-administration in the home. The monitor channel set was consistent with the American Academy of Sleep Medicine (AASM) guidelines 1.

Once received by the practice, data from the monitor was uploaded to a webportal (CleveMedSleepView.com) where studies were scored by a registered polysomnographic technologist (RPSGT) and interpreted by a sleep physician licensed in NH. Results were then communicated to the Nurse Practitioner in a secure, password protected webportal.

With a formal diagnosis in hand, the NP reviewed results with the patient and referred him/her to a specialist, either NP or MD trained in sleep medicine, to initiate more extensive workup or implement treatment planning as outlined in the sleep diagnostic report.

Results
Analysis from 49 patients showed OSA positive results in 43 patients (88%): 23 mild, 12 moderate, 8 severe. Average Apnea-Hypopnea Index across all patients showed moderate disease severity (AHI = 18.5). As expected, our research showed a significant percentage of patients had other coexisting conditions. For example, the vast majority of patients were overweight (78% had BMI ≥ 25) and nearly half were obese (45% had BMI ≥ 30). Table 1 shows a complete list of comorbidities.

Patent intake process and diagnosis was convenient and very efficient. Average turnaround time for patient diagnosis, which is the time from the office visit to the diagnostic report signed by a sleep specialist, was 5.8 days. This is significantly faster than traditional in-lab method that takes many weeks due to multiple referrals between family practice, sleep physician, a sleep lab, and back to the family practice often resulting in loss of patient interest and high rate of study cancellations. In contrast, 92% of the patients in this research performed their test the night of the office visit. STOP/BANG questionnaire was a markedly more sensitive tool to screen for OSA when compared to ESS (89% vs. 37%, AHI cutoff = 5).

There were three additional patients with incomplete studies yielding a low failure rate of 5.8% (3/52), which is similar to literature 

Conclusions
Our experience shows that sleep testing by NPs is convenient to patients, and improves access to sleep apnea diagnosis and treatment. This research found that patients can effectively self-administer the monitor at home and NPs were able to quickly incorporate the diagnostic process within their normal workflow. While sleep specialists supported the practice staff, we believe the success of this program is mostly attributed to the clinical knowledge of NPs and their face-to-face interaction with the patient during the office visit.

We believe that sleep apnea diagnosis and treatment can be a natural extension to other disease management programs like diabetes, hypertension, obesity and heart disease; thus, allowing family practices to play a bigger role in improving the delivery of care. Barriers that limit access to sleep apnea diagnosis and treatment may be reduced with the initiation of a HST program within primary care settings.

Literature Cited
1) US Sleep Apnea Diagnostic and Therapeutic Devices Markets, N66F-56, Frost and Sullivan report, 2010

<table>
<thead>
<tr>
<th>Table 1 – Sample Characteristics</th>
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<tbody>
<tr>
<td>Subjects (N)</td>
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<tr>
<td>Age (yr) (mean ±sd)</td>
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<tr>
<td>BMI (mean ±sd)</td>
</tr>
<tr>
<td>% of patients who were overweight (BMI ≥ 25)</td>
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<td>% of patients who were obese</td>
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<tr>
<td>% of patients with Hypertension (BMI ≥ 25)</td>
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<tr>
<td>% of patients with High Cholesterol</td>
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<td>% of patients with Depression</td>
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<td>% of patients with Asthma</td>
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% of patients with Hypertension  | 37% |
% of patients with High Cholesterol | 41% |
% of patients with Depression | 37% |
% of patients with Asthma | 6% |