


COUNTERPOINT:

Does Laboratory Polysomnography Yield Better Outcomes Than Home Sleep Testing? No

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It has been almost 7 years since the Centers for Medicare and Medicaid Services approved home sleep testing (HST) for the diagnosis of OSA in adults. Since the initial approval of HST, there have been several peer-reviewed studies validating many different portable diagnostic devices as well as numerous randomized controlled trials demonstrating similar outcomes when comparing an ambulatory approach that incorporates HST to a management strategy utilizing polysomnography (PSG) for diagnosis and determination of appropriate CPAP therapy.1-7 Yet, despite advancements in technology and a growing body of outcome data supporting the use of HST in appropriate patient populations, many clinicians have not willingly adopted HST as part of a standard strategy for the diagnosis and management of OSA.

PSG Compared With HST for the Diagnosis of OSA

PSG has been considered the gold standard for the diagnosis of OSA, as for many years there had been few alternatives. While many critics argue that the sensitivity and specificity of HST for assessing OSA are inferior to that of PSG, PSG is far from perfect for diagnosing OSA or defining its severity. Estimates of the sensitivity of one night of PSG to detect an apnea-hypopnea index (AHI) > 5 in patients with OSA range between 75% and 88%.8 The less-than-optimal sensitivity and specificity are due to several factors including disease-related night-to-night variability, the patient population being tested, number and types of parameters being measured, and the differences in disease definition. Specifically, the sensitivity and specificity for both PSG and HST depend on the hypopnea definition used to define sleep-disordered breathing events as well as the threshold AHI used to define OSA.

Proponents of PSG also contend that HST results in higher failure rates and greater need for repeat testing when compared with PSG. While there are no standard definitions for failure vs success with HST, failure rates in the literature range from 1% to as high as 20% depending on the study and type of device. Aside from a minimum of 6 h of recording time that is typically required for reimbursement for PSG, there are no standard definitions for failure vs success for PSG. Thus, it is difficult to accurately determine whether HST actually results in higher failure rates when compared with PSG in clinical practice. Even in cases where an HST is not successful, the cost of repeating an HST is still less than the cost of a single PSG.

When comparing HST devices as a group to PSG for the diagnosis of OSA, several issues need to be acknowledged. First, many of these devices use an array of technologies that incorporate alternative physiologic measurements and proprietary algorithms to define and quantify

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FINANCIAL/NONFINANCIAL DISCLOSURES: ‘The author has reported to CHEST’ that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.
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DOI: 10.1378/chest.15-0479
sleep-disordered breathing. In addition, since many of the HST devices either do not measure sleep or use surrogate measures for assessing sleep time, these devices may have a tendency to underestimate the presence or severity of OSA. With these limitations in mind, most of the commonly used HST devices have been validated against PSG for the diagnosis of OSA. While many of these studies have typically been performed in patients with moderate to severe OSA without comorbid medical disorders, there have been several studies validating these devices against PSG in normal individuals as well as in patients with a lower pretest risk of clinically significant OSA. Thus, used in appropriate patient populations, HST appears to be as accurate as PSG for diagnosing OSA.

Attended PSG for Determining PAP Therapy
The American Academy of Sleep Medicine recommends that CPAP settings be determined during an in-laboratory titration study and have published guidelines on how to manually titrate positive airway pressure (PAP) therapy for OSA. These guidelines outline consensus-based quality definitions for PAP titrations with an optimal titration being defined as that PAP pressure that resolves sleep-disordered breathing (AHI < 5) and oxygen desaturations in supine rapid eye movement sleep for at least 15 min. Despite these recommendations, there are little data documenting how often in-laboratory PAP titrations successfully achieve an optimal titration in research or clinical settings. Based on limited published data, only 50% to 60% of in-laboratory titrations result in optimal PAP settings. Thus, one should not assume that a given patient is on the optimal PAP setting just because he or she underwent an attended PSG-based PAP titration. To my knowledge, there are no published data that have followed patients who have received less-than-optimal titrations to determine their outcomes or describe how these patients were managed. It is likely that many patients who do not achieve an optimal titration are either being treated with suboptimal pressures or are managed with either autotitrating positive airway pressure (APAP) or empirically titrated CPAP based on symptoms.

Outcomes
There have been several randomized controlled studies that have compared an ambulatory approach incorporating HST followed by APAP therapy to a strategy using PSG for the diagnosis and determination of PAP treatment of OSA. It should be noted up front that these studies have typically been limited to symptomatic patients with moderate to severe OSA without comorbid medical conditions. These studies have used several different types of HST technologies for diagnosis including pulse oximetry, typical type 3 devices, and devices that incorporate peripheral arterial tonometry. When compared with PSG for diagnosis and treatment, a strategy using HST for diagnosis followed by unattended APAP therapy invariably results in similar improvements in important outcomes including subjective sleepiness, objective alertness, vigilance, PAP adherence, and several measures of quality of life. Some of these studies have demonstrated better PAP adherence with the ambulatory approach. These observations have not been limited to care provided by sleep specialists as these outcomes have also been observed when patients have been managed by appropriately trained nurses, primary care physicians, or both. Additionally, in settings where OSA has been diagnosed by PSG, several randomized controlled studies using unattended APAP as a stand-alone therapy or as a modality used to determine a fixed CPAP setting have also demonstrated similar outcomes compared with CPAP therapy determined by a PSG-based titration.

Cost
There is little data in the peer-reviewed medical literature supporting the use of PSG as the primary method for diagnosing OSA when costs are considered. The commercial payers know the outcome data related to HST and have incorporated HST into a strategy to reduce costs related to the management of OSA. The actual cost savings on a per-patient basis is dependent on several factors including the type of HST device that is used, the number of tests necessary to diagnose and determine appropriate PAP therapy, the population being studied, and the type of insurance. Medicare global reimbursement for a baseline PSG (95810) and PAP titration PSG (95811) is approximately $650 and $675, respectively, compared with $185 for a type 3 HST (95806). Thus, the diagnostic cost savings using an ambulatory approach (HST followed by APAP) compared with standard testing with PSG would be approximately $1,140 per Medicare patient. The cost savings for commercial payors would be projected to be greater on a per-patient basis. Given the outcome data related to HST and APAP in appropriate populations, it is not difficult to understand the economic forces driving commercial payors to expand the use of HST.

Summary
The data support the use of an ambulatory management strategy in patients with a high clinical suspicion of moderate to severe OSA in the absence of comorbid
medical conditions. This approach results in similar outcomes and reduced costs for testing and treatment compared with a management strategy primarily based on PSG. Thus, an out-of-center approach utilizing HST as the first line of testing should be considered for most patients with a high clinical suspicion of OSA as long as the managing clinicians are adequately trained in how to interpret and manage the data from these technologies.

References


Rebuttal From Dr Pack

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Dr Freedman has accurately and effectively described the basis of the switch to use of home testing in the United States. I agree that for subjects with high pretest probabilities of OSA without other major issues, home testing is appropriate provided that subsequent management of therapy is by trained providers.

A test, however, does not by itself lead to “better outcomes.” What matters is management of the problem once the diagnosis is made. Moreover, what are the outcomes we seek to influence? Is it improved quality of life? Is it reduced long-term health-care costs? Studies have shown that effective treatment of OSA can influence all of these outcomes.

Thus, currently we need to move away from the stale debate of home vs in-laboratory testing and address the major questions that matter, that is,

1. What is the most cost-effective way to screen for OSA? Can we use data in the electronic medical record to facilitate this?

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FINANCIAL/NONFINANCIAL DISCLOSURES: The author has reported to CHEST the following conflicts of interest: Dr Pack holds an endowed chair, the Miclot Chair, that was funded by a donation from the Respirations Foundation.

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DOI: 10.1378/chest.15-0478