nately, the cogency of this conclusion is considerably vitiated by the fact that the selection criteria utilized to categorize patients as either OSA or CSA precluded the inclusion of a group of patients with "pure" CSA (defined as individuals with a simultaneous cessation of both airflow and inspiratory effort). Thus, since these two groups are essentially similar with varying degrees of upper airway obstruction, a similar pathogenesis is not particularly startling or remarkable.

In conclusion, Mendelson has provided an extraordinary set of data from the clinical experience of a single laboratory. The strength of these data lies in the consistency of data acquisition in terms of both clinical and polysomnographic variables. Similarities and discrepancies with existing literature will hopefully serve as a stimulus for further investigation.

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The Measurement of Daytime Wakefulness

Excessive daytime sleepiness (EDS) is a troubling symptom for patients who must function effectively; for society, which depends on alert members; and for physicians who must make medicolegal decisions regarding patients' alertness. Over the past two decades, sleep disorders clinicians and researchers have sought to develop effective measures to quantify EDS and wakefulness/alertness. Subjective measures and performance tests have been utilized.1,2 Physiologically based tests have been studied,3-5 with varied success.

The most widely accepted laboratory measure of sleepiness is the multiple sleep latency test (MSLT). This test provides objective, electrophysiologic quantification of daytime sleep propensity and differentiation of the abnormal tendency to achieve-REM. The diagnostic utility of the MSLT has been well documented.6 Standards and guidelines of pathology are well established.7 However, the MSLT tells us less regarding the patient's ability to remain awake.

In this issue of Chest, two important articles, by Sangal et al (see page 898) and by Poceta et al (see page 893), document the utility of another objective, physiologically based measure, the maintenance of wakefulness test (MWT). While strikingly similar to the MSLT, this test addresses an important difference. It tests the patient's ability to remain awake. These articles represent the first large-scale, standardized MWT study to be published and offer important contrasts and comparisons between it and the MSLT. Using large subject pools in two separate laboratories, the authors demonstrate the utility of the MWT among different diagnostic groups and its sensitivity to treatment effect. This is good news for the clinician/researcher interested in alertness!

Sangal et al isolate a remarkable group of patients whose test results are discordant; they fall asleep quickly yet can maintain wakefulness when asked to do so. The clinical ramification is that the MSLT, while diagnostically useful, may not be the sole test upon which life decisions, such as ability to drive or operate machinery, should be based.

For the researcher interested in alertness and/or the impact of respiratory disease on wakefulness, the MWT provides an important physiologic base of comparison to other noninvasive measures, such as pupillography and evoked potentials, and provides a foundation upon which certain assumptions of normalcy can be made. Continued work should be directed toward establishing adult norms and standards for testing. Additional research questions emerge: Poceta et al address the impact of sleep fragmentation and hypoxemia on EDS. Will the discordant groups resolve questions regarding the interaction of these mechanisms on the severity of EDS? Sangal et al speculate that brain mechanisms for sleep and wakefulness may be differentially affected in some disorders. Perhaps the discordant group suggests that sleepiness is a trait rather than a state marker.

One caveat should be addressed: Sangal et al have chosen the label of "alertness" to describe one of the
factors that emerge in their analysis. Polysomnographic wakefulness may not equate to “alertness.” Rather, broad-based, nonspecific, behavioral tests to document levels of alertness and vigilance need to be evaluated.

These articles, which describe another objective “tool” for evaluating sleep/wakefulness propensity, are a meaningful and overdue beginning toward assessing the quality of wakefulness.

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Spontaneous Pneumothorax

The presence of air in the intrapleural cavity resulting from the rupture of the pulmonary parenchyma and visceral pleura by unknown cause has been called idiopathic or primary spontaneous pneumothorax (SP). When the cause of air collection in the intrapleural cavity is known, the term pneumothorax is preceded by an adjective such as iatrogenic, secondary, or smoking-induced. The partial or total pressure equilibration between the intrapleural cavity and the ambient air results in partial or total collapse of the lung. The rupture in the lung tissue is often so small that the point of elastic contraction of the lung tissue can stop further air leakage at the point of partial collapse.

For many years it was erroneously considered that physical effort could promote the development of SP, despite observations pointing to the contrary. The onset of symptoms was found in a circadian fashion and was related to physical inactivity. The relation of SP to weather conditions had been considered but denied until a significantly increased number of admissions for SP after falls in the atmospheric pressure of at least 10 millibars/24 h was observed and confirmed. It has been observed that divers contract SP at ascension or at rapid decompression. It has also been found that pulmonary cavities of previous SP patients increased corresponding to the nominal altitude in a hypobaric chamber. Furthermore, it has been documented that pilots suffer SP in flight. The expected relation between flying (decreasing ambient pressure) and SP (ie, significantly more pneumothoraces in flying personnel than in ground personnel), might have been revealed if the time of exposure had been equal with the time of observation not only for ground personnel, but also for flying personnel.

Rupture of the pulmonary tissue is due to higher intrapulmonary pressure in at least one region of the lung than in other lung regions and the intrapleural space. This is possible only if the intrapulmonary gas cannot find an outlet via either the airways or the circulation. Thus, pressure in the closed intrapulmonary region cannot decrease, especially when the ambient atmospheric pressure falls. This results in an increased pressure difference between the intrapulmonary and ambient spaces, leading to barotrauma.

Smoking was found in a survey study to increase the relative risk of contracting SP 29 fold in men and 9 fold in women, which implies that quitting smoking is an effective preventive measure. It was found that changes in cigarette sales were followed by similar changes in SP incidence within one to two years, indicating that smoking already has an effect after a short exposure time and that this effect is reversible. The rather quick, reversible effect of smoking also confirms the theory of obstruction as the pathogenetic mechanism of SP, which may prompt study of this disease as a model for obstruction.

The obstruction-check valve mechanism may be caused or enhanced by several factors in secondary SP: (1) intraluminal factors, such as inflammation, granulation, blood clot, tumor, and accumulation of exudate, mucus, or meconium; (2) parietal factors, such as thickening of the bronchial wall due to smoking, inflammation, low atmospheric humidity, inhaled intravenously administered drug particles, gas, and tumor and (3) peripheral bronchial factors, such as interstitial pneumonia; fibrosis, which may be caused by radiologic or medical treatments, drug abuse, and Pneumocystis carinii pneumonia.

The above pathophysiologic description links the recently arisen pneumothorax epidemic in drug addicts and AIDS patients to one or more of the following causes. They are often (1) smokers in whom (2) the intrapleural space is invaded by injection of drugs into the neck vein and have, due to drug abuse, both (3) obstructive (cocaine inhalation even without the Val-