Varmus, MD, director of the NIH. The following are key recommendations of that plan:

**Basic Science Research:** (1) Increase efforts to understand the basic mechanisms of sleep by applying molecular biologic approaches in concert with techniques of cellular and systems neurobiology; (2) Conduct basic studies to understand the brain mechanisms responsible for sleepiness; (3) Study the basic mechanisms underlying the interaction between circadian and neurophysiologic mechanisms responsible for sleepiness; (4) Increase attention to genetic factors controlling the basic mechanisms of sleep; and (5) Increase research efforts to elucidate the fundamental functions of sleep.

**Patient-Oriented Research:** (1) Identify the genetic basis of sleep disorders that have a genetic or familial component; (2) Conduct epidemiologic research to assess prevalence, risk factors, and long-term consequences of common sleep disorders, and determine the role of ethnicity, age, and gender in their causation; (3) Conduct outcomes research and clinical trials on the management of common sleep disorders; (4) Develop new technological approaches for diagnosis of sleep disorders, screening for sleep disorders among high-risk populations in whom sleepiness presents a particular danger (eg, transportation workers), monitoring the effectiveness of therapy, and detecting abnormalities of sleep as early biological markers of psychiatric illness; (5) Elucidate the pathogenesis/pathophysiology of sleep disorders and their consequences; and (6) Provide the research infrastructure needed to carry out patient-oriented research.

**Applied Research:** (1) Conduct epidemiologic research to define the prevalence, etiology, risk factors, morbidity, and costs of sleepiness in the general population; (2) Define the decrement and recovery processes associated with chronic partial sleep deprivation; (3) Develop efficient, objective measures of daytime sleepiness; and (4) Evaluate the utility of interventions to prevent and manage sleepiness, with the goal of improving productivity and safety.

**Research Training:** Enhance the number of trained investigators and trainees in biologic and behavioral research related to basic sleep mechanisms and patient-oriented research.

This document should be read carefully by chest physicians involved in sleep medicine and research. By several measures there are many of us: over 40% of the members of the American Sleep Disorders Association are pulmonologists, representing the largest specialty in that society. The single best-attended symposium at Chest ’95 in New York City concerned diagnostic methods in sleep apnea. More sleep centers in this country are now directed by pulmonologists than by members of any other subspecialty.

Because of the prevalence and medical importance of sleep apnea, pulmonologists have assumed an increasingly important role in sleep medicine and research. However, chest physicians must realize that the science and practice of sleep medicine encompass far more than sleep apnea. Those who wish to participate in the care of patients with sleep-disordered breathing must also acquire at least a basic knowledge of narcolepsy, periodic limb movements of sleep, and insomnia.

We need to work closely with our colleagues in the neurosciences and behavioral sciences to begin to understand more about daytime somnolence and its effects. There is an urgent need to apply the advanced tools of cellular biology, molecular genetics, clinical outcomes research, and behavioral science to all of these sleep disorders. Considerable expertise in these areas has been successfully applied to other major clinical problems in chest medicine. It is time for the field of sleep medicine to catch up!

**REFERENCES**


**Tracheobronchial Stents, Stunts, and Medical Ethics Revisited**

Almost 100 years ago, in 1898, Gustav Killian1 published his first report of successful bronchoscopy. This new technique, as well as a similar technique of esophagoscopy, were rapidly adopted by many clinicians. The pioneering work of Chevalier Jackson2 in the United States promoted development of a new breed of clinicians specializing in bronchoesophagology. For a prolonged period of time, the domain of bronchoesophagology remained in the hands of otorhinolaryngologists.
Progressively, however, with technologic advances, endoscopy was incorporated into the practice of thoracic surgeons, gastroenterologists, and pulmonary specialists. The advent of fiberoptic instruments permitted introduction of endoscopy far beyond a few specialized clinical centers. Eventually, a dichotomy developed, separating the digestive tract from the respiratory system. Gastroesophagoscopy became the domain of gastroenterologists, and exploration of the tracheobronchial tree became an integral part of the pulmonologist’s practice. Unfortunately, however, this development also resulted in inadequate training of both gastroenterologists and pulmonologists in use of the rigid scopes. A small number of otolaryngologists remained skilled in original bronchososophagologic procedures, using mainly rigid scopes.

Resurgence of rigid bronchoscopy occurred when bronchoscopy evolved from a purely diagnostic exploration to a more interventional, therapeutic procedure. New techniques included laser therapy, cryotherapy, and subsequently, endoscopic stent placements.

Two articles published in this issue of CHEST, “Management of Malignant Esophagotracheal Fistulas With Airway Stenting and Double Stenting” (see page 1155) and “The Use of the Covered Wallstent for the Palliative Treatment of Inoperable Tracheobronchial Cancers: A Prospective, Multicenter Study” (see page 1161), report on various aspects of interventional bronchoscopy and placement of tracheobronchial prostheses.

The article by Freitag and colleagues (page 1155) raises several interesting points and shows once more the dichotomy between gastroenterologists and pulmonologists. It is very likely that certain decisions regarding therapy in the patients presented in this article would have been different had the patients been initially evaluated and treated in a specialized center by trained bronchosopagologists. On the other hand, it is evident that placement of the Dynamic stent, which is performed without direct visual-endoscopic guidance, requires extensive training. The successive accumulation of a substantial number of cases provides the experience essential to achieve the proficiency necessary to assure both maximum patient safety and the best clinical results. These types of procedures should be attempted only in dedicated institutions with a well-trained staff of physicians and nursing personnel as well as with adequate equipment to deal with potentially lethal complications.

The article by Monnier and coworkers (page 1161) presents the first reported experience from a multicenter study in which procedures were performed by otolaryngologists and pulmonologists who were well trained in use of rigid bronchoscope. This study focuses on a total of 40 patients who presented to 7 different specialized centers. Fifty stents were inserted, of which 44 were judged to be adequately placed. Once more, the experience of the medical team was evident. According to the authors, improper placement of the stent occurred in 45% of cases in 1 center vs none in another institution. The presumption in the study was that the rate of complications increased with use of the Telestep device. The basis for this presumption is that with the Telestep device, in distinction to the Rigidstep device, no direct endoscopic visualization is available for guidance during the insertion and positioning of the stent. The same criticism has also been levied against introduction of the Dumon stents.3

Opinions still differ as to whether self-expanding stents can be placed under direct visual guidance of a flexible bronchoscope with the use of topical anesthesia alone. It would appear that this technique results in well-controlled placement of the stent at much lower cost and risk to the patient.4,5

Monnier and colleagues suggest superiority of the Wallstent (Schneider, [Europe] AG: Bülach, Switzerland) for the management of esophageotraheal fistulae. However, there is no comparative study with the Dynamic or the Dumon stent to substantiate this conclusion. The rate of complications in all stent insertion is relatively high. The Swiss and German authors, therefore, appropriately introduce a note of caution regarding the use of the Wallstent in benign lesions.

In both studies, the aim of stent placement is palliation of respiratory symptoms and is not a cure. Freitag and coworkers showed that introduction of a tracheal prosthesis is futile in patients who are dependent on mechanical ventilation. Monnier and coworkers suggest that because of its cost, the Wallstent should not be introduced in patients with chances of survival of less than 3 months. Both articles raise ethical questions:

1. Where should these procedures be performed and by whom?

Both studies undeniably prove the superior role of regional, specialized centers of excellence, equipped with adequate instrumentation to work with various bronchoscopic emergencies. Teams should be led by experienced endoscopists, able to use both the rigid and flexible bronchoscopes for diagnostic and therapeutic goals. These endoscopists should be familiar with various types of stents and on occasion be able to perform interventional, imaginative endoscopic stunts.

2. Which type of stent should be used? When and why should stenting be performed?

The cost of stent placement and of each separate stent is undeniably high. Considering the palliative nature of the procedures, the cheaper prosthesis should be used if the efficacy, safety, and rate of complications are comparable. At the present time, it ap-
ears that the Dumon stent is the first choice based on these criteria.\textsuperscript{6}

Indications for proper stent placement in cases of malignant obstruction may be easier to delineate than the appropriate timing of the procedure. Nevertheless, we should not forget our primary obligation, as dictated by our pledge to uphold the principles of the oath of Hippocrates, “to relieve suffering.” We know that we may not cure the patient. This knowledge, however, does not dispense us from delivering the most appropriate relief from suffering; and the oath makes no mention of cost—only moral obligation should prevail.

It is logical to accept the conclusion of Freitag and colleagues that patients who are already dependent on mechanical ventilation do not benefit from further introduction of a palliative prosthesis. Where suffocation is distressing both to patients and their entourage, should we allow death by suffocation in patients who are breathing spontaneously, when the available stent (albeit too expensive) is capable of providing relief? Should we then, in the name of patient comfort, resort to intravenous morphine and indirect euthanasia?

Physicians attempting to use the stents should be mentally prepared to deal with serious ethical problems. These “medical care providers” should determine their responsibility \textit{vis-a-vis} society (or the insurance companies who play an increasingly significant role in medical decision making and with the rapidly growing influence of for-profit managed care organizations) and, on the other hand, their primary responsibility to the individual patient, who has entrusted his or her care in the physician’s hands. The introduction of an appropriate bronchial stent becomes not only a technical stunt, but a serious reevaluation of our ethical, and possibly legal, or economic principles. Moral corruption is in the air which we are breathing.

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\textbf{COPD, Pulmonary Embolism, and Death}

In this issue of \textit{CHEST} (see page 1212), Carson and associates show that patients with COPD and acute pulmonary embolism (PE) have a higher 1-year mortality (53.3\%) than patients with COPD in whom PE was suspected but excluded (1-year mortality 29.1\%). Among patients with COPD and pulmonary hypertension as well as PE, the 1-year mortality was 64.7\%. Even in the absence of PE, the 1-year mortality in patients with COPD and pulmonary hypertension was 50.0\%. This mortality far exceeds the 1-year mortality reported by others in patients with COPD, which, as Carson and associates indicate, is less than 15\%.\textsuperscript{1-3} Patients reported by Carson and colleagues who had COPD, no pulmonary hypertension, and no PE had a 1-year mortality of 27.0\% which also exceeded the mortality reported by others. The most common causes of death in these patients over the period of 1 year were neoplasm, infection, and cardiac disease (usually coronary disease). Pulmonary disease, including COPD, was not a common cause of death. When death occurred from PE, it was usually within 1 week. Recurrent PE was rare. These data indicate that the patients reported by Carson and associates comprised a complex and seriously ill group with compound disease.

The death rates in 1 year, whether PE was present or absent, were over 30\% in patients with neoplasms, heart failure, or interstitial lung disease. Did the pulmonary embolism contribute to death from other disease, such as heart failure? Was the pulmonary embolism a marker of advanced disease?

I calculate from the data of Carson and colleagues that among patients with COPD and neoplasm, 6 of 6 (100\%) with PE died compared to 12 of 20 (60\%) with no PE. In patients with COPD and left-sided heart failure, 3 of 20 (15\%) with PE died compared with 4 of 63 (6\%) who did not have PE. Among patients with COPD and ischemic heart disease, 4 of 16 (25\%) with PE died compared with 4 of 53 (8\%) who did not have PE. Clearly, patients with COPD and associated neo-