istent asthma. Each patient received four sessions of individualized acupuncture or sham acupuncture. In this carefully controlled and executed RCT, personalized short-term acupuncture therapy showed no benefit. Peak flow, bronchial reactivity as determined by methacholine challenge, asthma symptoms, and medication usage were unaffected by acupuncture. The study population was well characterized and represented a homogeneous group of patients.

Previous studies8–12 of acupuncture have been published with conflicting results. In general, these studies are limited by the lack of a control group, inclusion of heterogeneous patients, nonindividualized treatment, lack of blinding, and the combination of acupuncture with other techniques. Tandon and Soh13 and Tashkin and coworkers14 performed double-blind, sham-controlled, crossover RCTs of acupuncture in patients with moderately severe asthma. In keeping with the findings of Shapira et al, both of these studies failed to demonstrate any benefit from acupuncture therapy. The article by Shapira et al is important because it provides the rigor of Western scientific method to an alternative medical therapy. The lack of efficacy places the benefit of acupuncture in patients with moderate asthma in serious doubt. Although previous data suggest an immediate effect in asthma, no long-term benefit has been demonstrated, and these studies are plagued by methodologic problems.8,11,12

Does this mean that we should discourage our asthmatic patients from being treated by acupuncture? Clearly, thousands of patients seek the care of acupuncturists for a variety of illnesses, including asthma. The population studied by Shapira et al is quite specific, and it is possible a real benefit exists in the treatment of acute asthma exacerbations. Further well-done trials are needed. Until then, we remain skeptical and cannot recommend acupuncture for the treatment of asthma.

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Lung Cancer Screening
Who Will Pick Up the Tab?

The recent Enron scandal illustrates how creative accounting practices can be used by self-interested parties to make ledger columns dance to favored music. One fact that all medical accountants can agree on is that mass screening for lung cancer (LC) using low-dose, noncontrast, spiral, CT scanning (LDCT) will be very, very expensive. Precisely how expensive, whether it will be worthwhile, and who will pay are matters of bitter contention. Widely variant estimates of cost and cost-effectiveness will be published in this and future issues of CHEST.

In essence, the math is simple. One must determine who to screen, what percentage will consent to be screened, and what the initial CT scan and any further
diagnostic tests will cost. Extrapolation provides the national cost. The calculation of cost and survival before and after the implementation of mass screening will provide figures for relative cost- effectiveness.

The problem is that although we know some of the numbers to plug into these equations, others must be estimated or predicted. Hence, the opportunity for creative accounting; hence, the marked disparity of results in different publications.

Zero dollars are currently spent on LC screening. What is the cost of this policy? The current direct medical costs incurred in the treatment of tobacco-related disease in the United States total at least $50 billion, increasing to $123 billion when indirect costs are included. Since 37% of deaths caused by tobacco smoking (160,000 of 430,000 deaths) are due to LC, I will assume $18.5 billion in direct costs and $45.5 billion in total costs attributable to LC. As a return on this expenditure, 23,660 individuals (i.e., 14% of LC patients) survive at least 5 years at a direct cost of $781,910 and a total cost of $1,923,076 per survivor. The remaining 160,000 patients suffer and die.

The calculations for screening are more complex. There are currently an estimated 93 million smokers and ex-smokers in the United States. Should they all be screened? Less than 1,000 LC cases are seen in patients who are < 40 years of age in the United States annually. I have chosen age 45 years as a lower limit because of the way that the National Institutes of Health calculates the percentage of the population by age. Survival and cost-effectiveness data indicate that screening above age 75 years provides limited benefit, and so I have assumed that screening will not be performed in patients who are older than that age. There are 79,391,757 men and women in the United States between 45 and 74 years of age.

Since 75% of men and 50% of women are ever-smokers, the number of screening candidates is reduced to no more than 50,000,000. There is then the question of what constitutes a high-risk group from the standpoint of tobacco carcinogen exposure. Not all candidates will have had exposure to the minimal exposure (i.e., 10 pack-years). Further reductions are required to reflect those persons who will not present for screening or will not be compliant in subsequent years. The prevalence of screening is approximately 65% for mammography and 85% for Pap smears.

Since tobacco smoking causes not only LC, but also coronary artery disease, cerebrovascular disease and peripheral vascular disease, chronic bronchitis and emphysema, cancers in other organs, and many other serious illnesses, many candidates have too much comorbidity to benefit from the treatment of LC. Accordingly, I assume that the maximum number for persons screened would not surpass 25,000,000.

The price of an LDCT in Southern California at present is $300 (a bilateral mammogram costs $106). Since this price depends on the cost of the equipment and the time required for an individual examination, it can reasonably be expected to come down in price with wider application in response to competitive market forces.

Assuming that, in the first year, all 25 million persons are screened (a highly unlikely scenario) at $300 each, the maximal cost of the initial screening examination would be $7.5 billion. Because many of those screened will have nodules detected, there will be further expense for tests to confirm or exclude LC. The Early Lung Cancer Action Project study found 23% of persons had nodules that required further workup (i.e., 5,750,000 study subjects nationally). Such persons require follow-up with high-resolution contrast CT scans (approximate cost, $500 per scan) on two to four occasions. A small percentage of persons will require transbronchial needle biopsies or surgical resection for diagnosis. Assuming that the average cost of this workup will be $2,000, the total cost of a subsequent workup would be $11.5 billion. The maximum total cost for the first year thus would be $19 billion. In subsequent years, fewer new nodules would be discovered, and old nodules would have been demonstrated to be benign. Thus, the downstream reduction in cost would be considerable. Treatment dollars would be spent on an intervention (i.e., surgical resection) that can reasonably be expected to result in an increase in survival rate and a reduction in mortality rate in stage IA patients.

One major economic benefit that can be anticipated is a reduction in multimodality treatment costs in screened patients. Patients with stage IA LC require treatment only with surgical resection at a cost of $20,000 to $30,000 per case. Among cases of LC, 75 to 80% are now discovered in stages III and IV, for which different guidelines recommend radiation therapy and/or chemotherapy for curative or palliative treatment. Oncologist Paul Bunn, MD, during a lecture at a City of Hope symposium (Las Vegas, NV; April 2001), stated that the cost of the best available regimen of chemotherapy is $43,000. It is known that approximately 30% of LC patients in the United States receive chemotherapy. Therefore, we can estimate a cost of approximately $2.3 billion, with few patients attaining long-term survival.

In this issue of CHEST (see page 1507), Robert A. Clark, MD, and his colleagues at the H. Lee Moffitt Cancer Center have presented a well-conceived and innovative model of data analysis that has very important implications for public health policy in the
United States. Their approach is interesting. Rather than guesstimate numbers to plug into their equations, they calculate a broad range of figures over a wide spectrum of possible results. They show considerable restraint by adopting only the most conservative “worst-case” estimates of potential costs and benefits. They appear to have bent over backward to anticipate and forestall potential criticism from opponents of LC screening. Their estimates are so pessimistic, in fact, that a separate economic analysis based on more optimistic cost and cost-effectiveness projections will be needed. The take-home point from their analysis, however, is very compelling. Even when one assumes worst-case results, LDCT should prove to be cost-effective. There is a very real possibility that LC screening, despite a high initial cost, can save money as well as lives. This possibility must be investigated immediately in carefully designed trials so that further millions of people need not suffer and die.

Where will the money to pay for screening trials come from? Medicare, Medicaid, managed-care companies, and health insurance companies will certainly not pay until data, public opinion, or both compel them to. Accordingly, only those who can afford to pay out of pocket can participate. One obvious source is funding from the Master Settlement Agreement between state attorneys general and the tobacco industry, but most of the $200 billion-plus is currently spent on pet political projects unrelated to tobacco control. In Los Angeles, the money is spent paving sidewalks. A second potential source is from a Justice Department RICO investigation of the tobacco industry that was initiated during the Clinton years, currently languishing under the Bush administration. Another obvious source of funding for LC screening is from class action lawsuits against the industry that is responsible for causing the disease through its premeditated, deceptive marketing of an addictive, carcinogenic product. Tobacco industry expert witnesses were recently successful in convincing a West Virginia jury in the first such trial that LC screening is not just ineffective, but is also dangerous.

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Ventilator-Associated Pneumonia and Surgical Patients

I suspect that many intensivists caring for patients with ventilator-associated pneumonia (VAP) would assume that patients with polymicrobial infections had worse outcomes, had a greater chance for inadequate empiric coverage, were more likely to have resistant organisms, etc. However, in the study by Combes et al (see page 1618), although almost half of their patients had polymicrobial VAP, no difference in outcomes was observed. The authors