with idiopathic cardiomyopathy, but wondered about the generalizability of their conclusions. It seemed likely that their patients' survival would not be statistically different from the survival of patients in whom the only selection criterion was the presence of an ejection fraction of less than 0.25.

To examine this hypothesis, a 5,000-record adult echocardiography data base was used to retrieve 130 records of patients whose mitral E point septal separation (EPSS) [1] was greater than 20 mm. A cutpoint of 20 was selected because prior work had demonstrated the correlation of an EPSS of greater than 20 mm with an ejection fraction less than 0.25 [1]. EPSS was chosen as the inclusion criterion rather than ejection fraction because of the ease of measurement of the EPSS, even in patients in whom echocardiography is not easy to perform. Time zero was the date of echocardiography. Information regarding survival was available for all Miami patients. Possible prognostic variables that we considered were: age, history of coronary artery disease, history of ventricular tachycardia, EPSS dimension, presence of a low cardiac output on two-dimensional echocardiography [2], and presence of aortic regurgitation by pulsed Doppler echocardiography. Since three of Stevenson et al's patients were withdrawn for emergency transplant surgery but the time of withdrawal was not reported, we ran our statistical tests twice: first, we assigned three nine-month survivors as "withdrawn from the study," then we re-ran the analysis with the three withdrawn patients listed as "deaths." BMDP statistical software was used. Survival curves were calculated for two groups: Stevenson et al's patients, and Miami patients. Cumulative survival was calculated by the life-table method. Breslow's version of the generalized Wilcoxon statistic was computed to test the equality of survival curves of the two groups of patients. The correlates of survival in Miami patients were assessed via Cox survival analysis. A p value <0.05 was defined as statistically significant.

The results showed that survival curves for the two groups of patients were not significantly different from each other, although there was a trend, albeit not statistically significant, for shorter survival in Stevenson et al's patients beyond three months. The results were unchanged whether we coded the three emergency transplant recipients as withdrawn or dead. In Miami patients, the only variable significantly related to survival was the age of the patient, such that the relative risk of death for a 50-year-old patient was 1.8 times that of a 30-year-old patient, and the relative risk of death for a 70-year-old patient was 3.4 times that of a 30-year-old patient. Age was not analyzed by Stevenson et al, but unless there was a very narrow range of age in their patients, age would likely be an important prognostic factor in their patients also.

These data suggest: (1) survival in Stevenson et al's patients was not significantly different from that in Miami patients, (2) Miami patients represented a broad cross-section of patients with very poor left ventricular systolic function, and (3) since relative risk increases sharply with age in such patients, consideration should be given to further relaxing the upper age limit for cardiac transplantation.

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Submitted December 7, 1987, and accepted January 15, 1988

The Reply:

It is interesting that Dr. Kinney has found a survival curve similar to ours in his patients with E-point septal separation (EPSS) of 20 mm or greater. However, his population was slightly different than ours. Although increased E-point septal separation, after exclusion of mitral stenosis and aortic insufficiency, has correlated well with angiographic ejection fraction for a heterogeneous population, only nine patients in that study had EPSS of 20 mm or more, five of whom had ejection fraction of more than 25 percent [1]. Although severity of illness may thus have been lower in Dr. Kinney's group, the comparable mortality may be due to his inclusion of a large number of older patients, as he suggests. At the time of our study, the upper age limit for cardiac transplantation referral ranged from 55 to 60 years. We did include age in our Cox regression and it did not predict survival, hemodynamic failure, or sudden death.

We agree that the upper age limit for cardiac transplantation should be liberalized. The University of Arizona has shown good survival in patients over 50 [2] and we have accepted five patients over 60 years, who have done well. However, some factors that influence mortality of older patients may be noncardiac and must be carefully investigated prior to selection for transplantation.

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FINE NEEDLE ASPIRATION OF THE THYROID

To the Editor:

We fully agree with the conclusions of Asp et al (Am J Med 1987; 83: 489–493) regarding the feasibility of fine needle aspiration of the thyroid (FNA) in an average health care facility. In our own initial experience with 183 patients studied over a period of five years (Liel Y, Zirkin HJ, Sobel RJ: Fine needle aspiration of the thyroid. Five years' experience with 183 patients. Isr J Med Sci 1985; 21: 719) only one false-positive and one false-negative diagnosis was made among 49 of the patients who underwent thyroid surgery. The false-negative was a necrotic anaplastic carcinoma that appeared cytologically as acute thyroiditis. Our ongoing impression is that by limiting the actual performance of the procedure in the hands of one clinician and one cytologist, we were able to reduce the number of unsatisfactory specimens and to increase the proportion of definitive "benign" and "malignant" results.

In view of the low diagnostic specificity of history, physical examination, and thyroid scan, patients with thyroid nodules should be given every opportunity to profit from the accuracy provided by FNA, prior to any decision concerning thyroid surgery. The report by Asp and his colleagues and our personal experience indicate that following a modest adaptation period, FNA becomes a worthwhile diagnostic procedure in the evaluation of thyroid nodules, even in a low-volume health facility.

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Submitted January 4, 1988, and accepted January 15, 1988

CHANGING PATTERNS OF DISEASE ON AN INPATIENT MEDICAL SERVICE

To the Editor:

I read with interest the study by Steiner et al (Am J Med 1987; 83: 331–335) analyzing variations with time in diseases seen on an internal medicine teaching service. I agree that the study of "educational case-mix" at teaching hospitals is imperative, and I offer my own findings to demonstrate that changes occur not only with time but also between institutions at any given time.

I trained in internal medicine at the University of Texas Medical Branch (UTMB) in Galveston from 1977 to 1980. I saved index cards, listing age, sex, hospital mortality, and primary and secondary diagnoses, which I had made on every patient seen by me on the medical wards, intensive and coronary care units, and in medical clinic. **Table I** indicates the most common primary diagnoses seen by me and compared with the 1981–1982 Denver data from Steiner et al. For comparison purposes, diagnoses from outpatient clinic patients are excluded in this analysis. The total number of inpatients seen in the three years was 861, with 837 (97.2 percent) having complete data available and therefore constituting the group reported here. A total of 193 different diagnoses were recorded. The mean patient age was 51.8 years, 51.2 percent were male, 26.1 percent were over age 65, and 4.2 percent died during the admission; all these figures were similar to the 1981 Denver data.

As can be seen, the UTMB case-mix differs markedly from the Denver data from approximately the same time. These changes in case-mix between teaching institutions have also been previously noted in the ambulatory setting. An evaluation of 15 university hospital ambulatory medical services found the prevalence of diabetes to range from 9 to 33 percent, and of hypertension to range from 43 to 80 percent [1]. Thus, the issue of varying patterns of case-mix may be one of location as well as time.

TABLE I Most Common Primary Diagnoses on a Teaching Medical Service

Diagnosis	Total Cases (percent of all cases) UTMB 1977–1980	Denver 1981–1982*
Carcinoma of lung	45 (5.2)	6 (4.1)
Alcohol-related disease	43 (5.2)	5 (3.4)
Renal failure	43 (5.2)	—
Chest pain/ischemia	42 (5.1)	13 (8.9)
Leukemia	31 (3.6)	—
Acute myocardial infarct	28 (3.2)	—
Drug overdose/toxicity	28 (3.2)	7 (4.8)
Rectal/colon carcinoma	26 (3.0)	—
Diabetes and complications	25 (2.9)	4 (2.7)
Hodgkin's disease/ lymphoma	24 (2.8)	—
Congestive heart failure	22 (2.5)	7 (4.8)
Chronic obstructive pulmonary disease	16 (1.9)	9 (6.2)
Rheumatic heart disease	17 (2.0)	1 (0.7)
Pneumococcal pneumonia	17 (2.0)	1 (0.7)
Atrial fibrillation/flutter	13 (1.5)	6 (4.1)

* Steiner et al (Am J Med 1987; 83: 331–335).

A larger issue, however, is whether these changes significantly affect knowledge base, clinical skills, or humane practice. A comparison of results on the American Board of Internal Medicine recertification examination with initial certification scores revealed that internists completing a residency in 1970 to 1978 scored a mean of 501, whereas certification candidates from 1979 scored a mean of 500 [2]. This suggests that any case-mix changes with time did not affect the acquisition of knowledge of internal medicine. Otherwise, little data exist for further analysis of this issue.

Studies need to be undertaken comparing post-residency performance of internists who trained in different programs with widely varying case-mix. These would need to focus both on diseases commonly seen and on the range of all diseases seen, as the 193 different conditions, from asbestosis to Wegener's granulomatosis, that I saw may be more important than which one was seen 45 times. Only when such studies are completed will program directors have the information necessary to make programmatic changes with full confidence in their design.

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