AGENDA

TASK FORCE ON THE COST OF GRADUATE MEDICAL EDUCATION AND FACULTY PRACTICE PLANS

July 19, 1972
12 - 5 p.m.
AAMC Conference Room
One Dupont Circle
Washington, D.C. 20036

I. Approval of Minutes, Meeting of June 12, 1972 — TAB A

II. Remarks by Dr. Cooper — TAB B

III. Discussion of Draft Paper entitled, "Medical Education --The Patient Care Cost Component" — TAB C

A) Review of Background Material — TAB D, E, F, G, H

B) Conceptual basis of the Problem

C) Quantification of the Conceptual Framework

D) Implications of Such an Approach On Current Program Financing: Short Term and Long Term Effects

IV. Discussion of Further Action by the Task Force

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

SUITE 200, ONE DUPONT CIRCLE, N.W., WASHINGTON, D.C. 20036

June 21, 1972

TO: TASK FORCE ON COST OF GRADUATE MEDICAL EDUCATION AND FACULTY PRACTICE PLANS

FROM: Robert H. Kalinowski, M.D. and Richard M. Knapp, Ph.D.

SUBJECT: Minutes of June 12, 1972 Meeting

Present: TF GME & FPP	TF Cost of Med. Ed.	AAMC Staff
Dr. William Anlyan	Dr. Charles Sprague	Dr. Cooper
Dr. William Grove	Dr. John Gronvall	Dr. Swanson
Dr. Robert Heyssel	Dr. John Bartlett	Dr. Knapp
Dr. Arnold Relman	Dr. Donald Boulton	Dr. Kalinowski
Dr. Charles Womer	Dr. John Chapman	Miss Beirne
Guest: Mr. Ronald Lochbaum	Dr. Christopher Fordham	Miss Burt
	Dr. Edgar Lee, Jr.	Mr. Campbell
	Dr. William Mayer	Mr. Checker
	Mr. Henry Meadow	Mr. Hilles
		Mr. Rosenthal

The full-day meeting was divided between a morning session held jointly with the Task Force on Cost of Medical Education and the newly organized Task Force on Cost of Graduate Medical Education and Faculty Practice Plans, followed by separate meetings of the two Task Force groups.

JOINT SESSION

1. The Task Force on Cost of Graduate Medical Education and Faculty Practice Plans is chaired by Dr. Anlyan. Dr. Anlyan has also joined the parent Committee on Financing of Medical Education. The purpose of this joint session was to provide the members of the new group with the necessary background information on the objectives and activities of the parent committee and the three Task Force groups that have been in existence since the Committee was formed, and to delineate the objectives and priorities for the new task force.

2. Dr. Sprague outlined the Committee's immediate goal of providing the Executive Council and the Assembly with a preliminary set of findings on the cost of undergraduate medical education. This set of estimates will be based on: (a) an intensive review of the cost allocation data

for a selected group of 8-10 medical centers. This will provide a range of the cost of the instruction component of undergraduate medical education, where the range of costs reflect the differing instructional programs of the selected schools. This aspect of the Committee's program is the responsibility of the Task Force on Cost of Medical Education; (b) recommendations of the Task Force on Biomedical Research on the cost of the research component of undergraduate medical education; and, finally, (c) the estimates of the costs of patient care requisite to the undergraduate medical education process. The Task Force on Cost of Graduate Medical Education and Faculty Practice Plans has been asked as a first priority, to focus upon this requirement; the interrelationships of undergraduate and graduate medical education in the patient care setting makes this Task Force the logical group for a consideration of this aspect of the undergraduate medical education process. The Task Force will also be concerned with determining the impact on academic center finances of faculty practice plans, their magnitude, and how these plans impinge on the estimates of costs. Investigation of the broader aspects of graduate medical education programs and costs is the main objective of this Task Force, but the urgent needs of the Committee for data relating to undergraduate medical education will govern the order of its activity.

3. Dr. Cooper discussed the functional/activity matrix of academic center programs. He emphasized the importance for AAMC and the medical schools that the views of the academic centers on undergraduate medical education be presented in the form of a range of cost estimates, even though these estimates will be preliminary ones, and may be modified by subsequent AAMC analyses. It is urgent that these data be made available for review and discussion within AAMC, and then by all concerned with medical education, and that the AAMC position be on record before other analyses are promulgated.

4. Dr. Gronvall, chairman, reviewed the program of the Task Force on Cost of Medical Education. The Task Force has developed a draft statement on the elements and objectives of undergraduate medical education, and is engaged in developing the costs of instruction at 8-10 centers, together with the input from the Task Force on Biomedical Research and the Task Force on Graduate Medical Education and Faculty Practice Plans, these will be the preliminary estimates of the cost of undergraduate medical education to be reviewed by the full Committee for submission to the Assembly. The Task Force is concerned with: (1) developing a methodology which will also provide cost estimates under changing conditions of numbers and mix of students--to reflect the dynamics and not merely a fixed situation, of the education process; and (2) providing some measures to gauge the quality of the output. Dr. Gronvall explained the basis for the selection of the 8-10 centers to be studied--in terms of paired institutions with similar characteristics of faculty and student size, operating and research budgets, MCAT science scores.

As a result of the morning's discussion, the following points emerged:

1. The primary focus is on the elements of the undergraduate medical education process--instruction, research, patient care, and their costs.

2. Mechanisms for financing these costs will be investigated subsequently, along with further investigation of the cost of undergraduate medical education, and costs of other education programs in academic medical centers.

3. The Task Force on the Cost of Graduate Medical Education and Faculty Practice Plans will consider, as first priority, mechanisms for determining:

   a) How much of house staff costs can be allocated to the function of instructing medical students; Chapel Hill -10%
   Hopkins -20% - Hypothesis

   b) How to estimate the cost for the hospital space allocated to undergraduate students;

   c) How to estimate the cost of the nursing, technician, and other supporting staff time devoted to teaching undergraduate medical students;

   d) How to estimate the effect of teaching undergraduate medical students on such items as length of stay of patients, outpatient clinic costs, specialized service utilization (laboratory tests, radiologic services, etc.); and

   e) How dollars from faculty practice plans impinge upon the undergraduate medical education process, and how to account for them.

AFTERNOON SESSION

The afternoon session of the Task Force on Cost of Graduate Medical Education and Faculty Practice Plans wrestled with the problems of identifying a methodology that would give us information to fill in the grid on patient care. No clear-cut methodology was decided upon, and the staff was asked to evaluate what was presently available from at least three sources, and make an interim recommendation to the Task Force at its next meeting. The three principal sources were the eight center-paired cost allocation study (Duke-Case Western Reserve, Syracuse-Kansas, Georgetown-St. Louis, Ohio State-Iowa), the Connecticut Hospital Association data which might be used to pair a community hospital with graduate education with a university hospital with undergraduate and graduate education (Hartford Hospital vs. Yale-New Haven), and the Duke Endowment data which serve comparative purposes. Additional applicable sources of information would also be developed.

The next meeting of the Task Force is scheduled for Wednesday, July 19, from 12:30 p.m. to 5 p.m. in the AAMC Conference Room. Lunch will be served at noon. Please return the enclosed postcard indicating whether or not you will be able to attend the meeting and if you will need hotel accommodations.

The meeting adjourned at 2 p.m.

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

SUITE 200, ONE DUPONT CIRCLE, N.W., WASHINGTON, D.C. 20036

July 12, 1972

TO: Dr. C. Sprague
Dr. W. Anlyan
Dr. H. Bost
Dr. J. Gronvall
Dr. D. Hanahan

FROM: Joseph Rosenthal

SUBJECT: Minutes - July 11th Meeting, AAMC
Review of Outline of Committee's Report to AAMC Assembly

Present:

Dr. C. Sprague	Dr. J. Cooper	Mr. C. Fentress
Dr. H. Bost	Mr. J. Murtaugh	Ms. R. Wilson
Dr. J. Gronvall	Dr. R. Knapp	Mr. J. Rosenthal
Dr. D. Hanahan	Dr. R. Kalinowski	Mr. A. Checker

This meeting of the Committee and Task Force chairmen was held primarily to review an outline of the report by the Committee on the Cost of Undergraduate Medical Education. This report is to be completed by October, for presentation to the AAMC Assembly.

As a result of the discussion, the group agreed that:

A. The Committee's report to the Assembly will seek to establish the view of the Association concerning (1) the complexity of the medical education process --- the interrelatedness of the elements that are integral to that process (instruction, research, service); (2) the indivisibility of that process, beginning with the curriculum leading to the M.D. degree through the years of internship and residency; (3) that only upon the completion of this continuum can the national objective to increase the number of persons capable of performing the functions of physicians in the delivery of health care be satisfied.

The report will therefore stress the essentially arbitrary nature of efforts to establish estimates of the costs of undergraduate medical education, since this is a discrete concept only in the sense that a degree is awarded upon its completion and not in terms of the preparation of an individual for the independent practice of medicine.

However, because of pressures for such estimates, the Association will present a set of preliminary figures, for consideration as a guide to the probable costs of this segment of the continuum - to be followed by more definitive views of the entire medical education process, its costs, and financing, in the context of the broad range of activities of the contemporary medical center complex.

The Task Force groups will continue, therefore, to develop estimates of the costs of undergraduate medical education, for inclusion in the Committee's report.

B. Additional members of the Task Force on Biomedical Research will be selected. Dr. Petersdorf has resigned from the Committee, and as chairman of the Task Force.

C. The Task Force on Facilities has been organized. Dr. Bost is chairman, and the following persons have been appointed:

Dr. Manson Meads - Bowman Gray School of Medicine
Vice President for Medical Affairs

Dr. Baldwin Lamson - UCLA Hospitals & Clinics
Director

Dr. Charles Gregory - University of Texas
Division of Orthopedics

Mr. Robert Lindee - Stanford University
Associate Dean for Administration

Mr. Gerlandino Agro - New York Medical College
Director
Planning & Construction

D. Mr. Cartmill and Dr. Cronkhite will be asked to serve as ex officio members of the Committee, as COTH representatives.

E. Dr. Hogness (Institute of Medicine) has asked AAMC to suggest candidates to serve on the Institute's Advisory Committee for Medical Education. This group is to guide the development of the Institute's cost study on undergraduate medical education.

The group recommended that Dr. Cooper send the following names to Dr. Hogness: Dr. Sprague, Dr. Anlyan, Dr. Gronvall, Dr. Hanahan, Dr. Lee and Mr. Hurtaugh.

F. The agenda for the July 24th meeting of the parent Committee will focus upon the outline of the Committee's report to the Assembly, and the scheduling for the completion of the report.

Dr. Rashi Fein (Professor of Economics of Medicine, Harvard Medical School), will be invited to this meeting. Dr. Fein has studied the medical education process from an economist's viewpoint and has expressed some cogent views concerning the "costing" problem.

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

SUITE 200, ONE DUPONT CIRCLE, N.W., WASHINGTON, D.C. 20036

D R A F T -- For Discussion Purpose
JSM-- July 12, 1972

MEDICAL EDUCATION -- THE PATIENT CARE COST COMPONENT

The Committee on the Financing of Medical Education has proceeded with the view that the undergraduate educational program requisite to the qualification of an individual for the M. D. degree is comprised of an integral mix of teaching, research and patient care activity--all three of which are essential to the process. Given this view then, the measurement of the costs of undergraduate medical education requires some method of deriving from the overall teaching, research and patient care expenditures of an academic medical center the proportion and amounts of such expenditures which can appropriately be attributed to undergraduate education.

The Association of American Medical Colleges cost allocation process does provide for distributing instructional costs among the various educational programs, but no firm conceptual approach or methodology has yet been devised for separating research and patient care costs on a program basis. The Research Task Force is engaged in assessing the utility of alternative approaches to the program distribution of

research costs. Similar effort must be directed to the problem of determining what part, if any, of the patient services expenditures of an academic medical center should be considered as applicable to education, specifically undergraduate medical education, and thus be included in the measurement of the costs of such programs.

The approach to the resolution of this problem would appear to involve submitting the total expenditures for hospital and clinic services of an academic medical center to a sequence of three reductions:

1. Teaching Function Costs

The first reduction is relatively straightforward and is already provided for in the AAMC cost allocation methodology. Included here are the costs of those activities financed under the teaching hospital budget of an academic medical center which can be appropriately considered as teaching in nature. This would include, for example, the teaching activities of the nursing and other hospital staff and associated expenses. As noted, methods for determining and allocating the costs of such hospital teaching functions are already a part of the current cost allocation program. Thus these particular costs are being identified and separated in the current cost allocation studies.

2. Incremental Hospital Costs Due To Teaching

The second reduction is conceptually a relatively

clear matter, but there is at present no agreed upon methodology much less an appropriate body of data to carry out the necessary quantification process. Included here are those increased hospital operating costs resulting from the conduct of teaching functions within the clinical setting. This would include, for example, the costs of increased laboratory testing, added hospital days, greater housekeeping costs, etc. which result from the conduct of teaching activities and specifically undergraduate teaching programs. There have been numerous observations of the substantial differences in operating costs between teaching and non-teaching hospitals. The major part of those differences has been considered to be the combined effects of the added costs of teaching functions, the greater expense involved in treating a more seriously ill patient population and the more extensive services provided. Almost nothing has been done in separately measuring these several factors of difference much less making any attempt to distribute these incremental costs due to teaching programs among the several educational programs involved. Advice on how to proceed in carrying out this second reduction is urgently needed.

3. The Sharing of Joint Costs

The third reduction of the patient care costs of an academic medical center in reaching for the full costs of educational programs is principally a conceptual and policy

problem, rather than a methodological one. Described thus far in the preceding steps one and two are those costs encompassed in the patient care expenditures of an academic medical center which result directly, and to a degree indirectly, from the conduct of teaching activities. Carrying out the reductions of these costs, as proposed in steps one and two, would leave as a remainder, those expenditures for what might be termed regular patient care activity shorn of teaching costs.

The question that remains is whether any part of this body of patient care costs should be allocated to the cost of medical education. The reason this question arises is the simple fact that the conduct of an undergraduate medical education program requires access to a particular volume of patient care activity. Without it there can be no medical education program. At the same time that patient care activity is being carried out to provide needed hospital care for sick people and thus serves another objective; namely, providing health care.

Thus, some part or all of the patient care activity of an academic medical center serves more than one objective and therefore constitutes a joint endeavor serving dual purposes. Since this patient care activity is essential to each such purpose, there is reason to argue that its costs ought to be shared to the extent that they are truly joint. (In many instances, the patient care program of an

academic medical center may be of a substantially greater magnitude than that required to provide an adequate teaching program. Such additional patient care activity would be above and beyond that which could be considered as jointly serving educational programs, and its cost would have to be assigned to other program objectives.)

The fact that this regular patient care activity is reimbursable by its recipients or their agents does not change the theoretical problem of how its costs should be assigned. If, indeed, the costs of this regular patient care activity are fully reimbursed that would appear to have the practical effect of eliminating the problem. But, if they are not fully reimbursed, as could be the case if any number of indigent patients, not eligible for public support, are treated, the basic issue remains except that is presented in a somewhat more acute form; namely, who shall bear the burden of the deficit?

The inclusion of this third element of patient care costs related to medical education represents a substantial departure from existing cost measurement approaches. While it may be conceptually valid, it presents major policy considerations, but it does offer the possibility of clarifying and placing on a truly comparable basis, the cost measurement of medical education programs. The methodological process of obtaining this third level of cost involves an agreement on the volume of patient care activity requisite

to the teaching of a specific number of students, i.e. the number of patients or patient admissions per student.

In summary, advice is required on the elements of patient care expenditures in an academic medical center that should be assigned to medical educational and specifically undergraduate education programs and the appropriate methodology for deriving such data.

Unidentified Educational Costs in a University Teaching Hospital: An Initial Study

Daniel D. Busby, James C. Leming, and Merlin I. Olson

Despite the fact that many of the acute financial problems faced by teaching hospitals are related to their association with medical schools, traditional accounting reports do not reveal the teaching hospitals' investments in medical education (1–3). However, there have been studies that have probed this area. For example, a Columbia University study of New York Blue Cross plans revealed that hospitals with an approved internship and residency program had higher patient care costs than those without such programs and that those with medical school affiliation had still higher costs (4). In a discussion of graduate medical education finances, Dr. Stanley W. Olson, former director of the Division of Regional Medical Programs, U.S. Department of Health, Education, and Welfare, expressed concerns which can be extended to undergraduate medical education (5). He indicated that a teaching hospital (or medical center) should:

1. Keep its charges in line with those of other similar institutions by relieving itself of the costs associated with research, education, and other nonpatient care activities while requiring that payment be made for nonmedical services rendered by physicians and house staff.

2. Not subsidize patient care services in order to carry out educational functions.

3. Not act as a quasi-taxing agency which charges paying patients more than the true value of the services received in order that indigent patients may receive care at reduced charges.

4. Bill third parties for full charges of all special services involved in patient care but not for any costs not related to patient care.

Dr. Olson also recommended adoption by medical centers of sophisticated management tools which would make available full information not only about costs but also about sources of income.

Because the authors felt that the University of Kansas Medical Center needed a more sophisticated method of identifying and quantifying program costs and support, they participated in program cost allocation (PCA) studies sponsored by the Association of American Medical Colleges. The emphasis of the PCA studies was assessment of faculty activity in various programs and allocation of expenses along program rather than departmental lines (4).

The University of Kansas Medical Center PCA study was based on expenditure data from the fiscal year that ended June 30, 1969, and the results in summary were that patient care services accounted for $14,374,313 and education, research and other programs for $14,757,981. These results correspond closely with the average percent distributions reported in the AAMC PCA studies.

Mr. Leming and Mr. Olson are associate directors and Mr. Busby is a financial analyst at the University of Kansas Medical Center.

Upon completion of the Kansas PCA study in September 1970, the acting vice chancellor for health affairs asked for a reexamination of allocations to patient care services and the underlying data for the purpose of identifying and measuring factors that cause patient care costs in a major teaching hospital to be greater than patient care costs in hospitals of comparable size which do not have significant teaching programs. This report is a description of the initial phase of that reexamination, which is based on the PCA examination supplemented by fiscal 1970 data where 1969 data were unavailable. The costs identified in this study are additional to those allocated to educational programs in the PCA study and can, therefore, be considered as reallocations from patient care to education. For purposes of this investigation, a teaching hospital was defined as one which is involved in the clinical education of undergraduate medical students. The University of Kansas Medical Center's hospital and clinics (herein called the medical center) were considered to be representative of teaching hospitals, and three community hospitals which cooperated in this analysis were considered to be representative of nonteaching hospitals. Two of these participating community hospitals have nursing programs, and one has approved house staff training programs.

The major hypotheses were that in contrast to comparable nonteaching hospitals the University of Kansas Medical Center experiences a higher medically indigent patient load, operates outpatient clinics which are larger and more diverse, has a lower occupancy rate, has a greater utilization of diagnostic services, has a higher nursing staffing expense, provides a greater number of specialized medical services, and has a greater investment in clinical facilities and that each of these factors is related to or is influenced by educational programs. The findings and conclusions pertaining to the first five hypotheses constitute the bulk of this paper; findings concerning the last two hypotheses were inconclusive and are still under study.

Indigent Patients

Historically, teaching hospitals have cared for many of the indigent patients in their service areas regardless of the amount or nature of public support received by the hospital. Also, the view that a high indigency load is necessary in a teaching hospital to guarantee the proper flow of "teaching material" through various educational programs has been widely expressed (2, 6–8). In accord with this idea, the authors hypothesized that the University of Kansas Medical Center does have a higher percentage of medically indigent patients than comparable nonteaching hospitals because of its educational programs and its position as a major referral center. It was the authors' opinion that the higher indigency load has a financial impact on the medical center because of the following factors:

1. If the patients of most members of a hospital's medical staff are composed of people in middle or higher income brackets, as is the case at the three community hospitals under investigation, it is reasonable to expect that the majority of the patients admitted to the hospital would not be medically indigent. On the other hand, the medical center provides service to all economic classes; therefore it is exposed to a broader range of credit risks than are the community hospitals.

2. Because the medical center treats more acutely ill patients than do the community hospitals, the relative cost of hospitalization per admission is higher at

the medical center. This is in agreement with opinions expressed by prominent medical administrators (4, 8–11).

3. Because the medical center is the major referral center for the state, it serves more patients who have been hospitalized elsewhere for the same illness just prior to admission than do the community hospitals. Previous hospitalizations for the same illness would decrease insurance coverage and therefore increase the possibilities of medical indigency.

4. Because patient admission and credit policies (for example, on installment payments and account deferral) at the medical center are more liberal than those of the community hospitals, it is reasonable to expect that the medical center would have a higher percentage of patient accounts that were uncollectable.

5. Because the medical center is considered the "general" hospital for the state, physicians frequently refer patients to the medical center primarily because the medical center will recognize medical indigency and, therefore, discount services more readily than community hospitals. Medical center staff members accept indigent patient referrals and discount charges for service to them in order to be certain that the proper disease patterns are available for educational programs.

To study credit policies and test these five factors, the community hospitals were surveyed by questionnaire and subsequent personal interviews with business office personnel. Topics discussed were gross charges per patient day; collection percentages of gross charges; credit policies, including admission deposits, third parties honored, and account deferral; accounts receivable write-off policy; patient discount and allowance policies; and special policies for admission of psychiatric, tubercular, and addiction patients.

Original questionnaire and interview techniques were inadequate to substantiate fully the authors' opinions about factors one, two, and five. The opinion they expressed in factor four, regarding admission policies, was unsupported because admission policies of the medical center were not found to be more liberal than those of the community hospitals.

Although additional investigation is required, it is apparent from the preliminary findings that the medical center's indigency load is higher than that at the community hospitals. The hospitals reported collections of 98.6 percent, 97 percent, and 94.4 percent of gross patient charges, which is significantly higher than the 87.7 percent collected by the medical center. Assuming comparable collection policies, the difference in collection percentages can be used as a gross indication of difference in indigency load; and it is possible to estimate additional revenue which would have been available to the medical center if it had collections comparable with that of the community hospitals. The actual gross patient charges at the medical center in fiscal year 1970 were $15,610,371 and its hospital collections were $13,689,472. If 95 percent of the charges had been collected, the revenue would have been $14,759,852, and at 97.5 percent it would have been $15,140,112. This would have made increases of $1,070,380 and $1,450,640, respectively.

As Dr. John Knowles pointed out (11):

> If our charges were paid equally by all the patients or their third party representative, then our charges would be reduced for all and our cost would equal our charges for all involved. One segment of the hospital's population would then be relieved of paying for another segment, an obligation which would be met ultimately by the use of tax dollars.

Given the assumption that the in-

creased volume of medically indigent patients is the result of the medical center's educational activities, then the difference between the 87.7 percent collection rate and a rate that is normally collected by a nonteaching hospital should be recognized as an educational expense. Also, if the difference is partially due to the medical center's operating as the *de facto* publicly supported referral center of the state, this added cost should be recognized as a public expense and not as a patient expense (2, 4).

Ambulatory Patient Care

The results of several studies have indicated that teaching hospitals generally operate larger and more diverse ambulatory patient care facilities than do nonteaching hospitals (2, 12–13). It was the authors' opinion that the operation of the medical center outpatient clinics represents a significant educational cost that is not generally recognized and so may be borne by the inpatient or a third party rather than by the sources of support for educational programs. To test this opinion, the following information concerning fiscal year 1970 operation of the clinics was collected: the average number of patients per clinic session for each clinic; the average length of each clinic session; the faculty, house staff, and student participation in each clinic; and the degree of interaction with patients of each of these three groups. In addition, operational costs and a patient-hour unit cost for each clinic were ascertained so that cost allocations could be made. Subsequently, the community hospitals were studied by personal interview with the nursing service administrators. It was concluded that their ambulatory patient care activities were so limited as to be noncomparable in size and scope with the medical center's clinics.

Once it was established that the medical center clinics did indeed far surpass those in the community hospitals, an unsuccessful attempt was made to measure the educational content and the relationship of education to patient service in each medical center clinic. The clinics staffed by faculty with no student or house staff involvement could be considered to have little educational content. Other clinics appear to have a high degree of educational content because students and house staff have a major responsibility for patient care and faculty members only supervise. If the degree of education and the degree of patient service in each clinic could be successfully measured, it would be possible to allocate the operating costs to educational programs or patient service activities or both. A more detailed study of each clinic is necessary before such a measuring technique can be developed. In its absence, three methods of determining the educational costs of clinic operations are proposed.

1. The total unreimbursed costs of operating each of the outpatient clinics are considered to be educational whether there is or is not any student or house staff involvement in an individual clinic.

2. The unreimbursed costs of clinics with no student or house staff involvement are considered to be entirely patient service and, therefore, having no educational content. The unreimbursed costs of all other clinics are considered to be entirely educational.

3. This item is similar to item 2 with the addition that those clinics which have combined faculty and house staff involvement only (no medical student participation) are assumed to be one-half service and one-half education.

Unreimbursed (by patients, third-party insurers, or the state) costs of medical center clinics were approximately $850,000

TABLE 1
ALTERNATE METHODS OF ALLOCATING UNREIMBURSED COSTS OF AMBULATORY CARE METHODS (IN DOLLARS)

	1	2	3
Patient service			
Faculty solo clinics		225,591	225,591
One-half of nonmedical student clinics			36,176
Total		225,591	261,767
Education			
Other than faculty solo clinics		621,968	
Medical student clinics			549,616
One-half of nonmedical student clinics			36,176
All clinics	847,559		
Total	847,559	621,968	585,792
Total	847,559	847,559	847,559

in fiscal year 1969. Using the three allocation methods listed above, the calculations in Table I can be made.

Occupancy Rate

For purposes of this study, the authors isolated the following factors that might serve to reduce occupancy rates in the Kansas University Medical Center; since most of them are unique to a teaching hospital, they would tend to keep occupancy there lower than in community hospitals.

1. Clinical faculty involvement in postgraduate medicine seminars, courses, and symposia.
2. Clinical faculty involvement in Regional Medical Program activities.
3. Remodeling and construction in inpatient care areas.
4. Clinical faculty vacation scheduling.
5. Clinical faculty travel and attendance at professional meetings.
6. Weekend and holiday occupancy fluctuations.
7. Referral patterns, including the fluctuation in admission backlog.
8. Student and house staff vacations and holidays and year-end house staff changes.
9. Bed assignment by service and subspecialty which would include whether or not beds were shared among services and the number of empty beds for emergency admissions maintained by each service or subspecialty.
10. Regulation of patient flow by number and admitting diagnosis in order to conform to educational requirements.

Daily occupancy statistics by service for the fiscal year that ended June 30, 1970, were gathered and studied to determine their relationship with these factors. Nationwide occupancy data for nonteaching hospitals participating in the Hospital Administrative Services and for eight major teaching hospitals also in the HAS for the last 18 months were also analyzed. In addition, the community hospitals were asked to furnish daily obstetric, pediatric, and medical-surgical bed occupancy for August and October 1969 and May 1970.

The medical center averaged 76 percent occupancy during the 18 months that ended June 30, 1970, while nonteaching hospitals reported average occupancies of more than 88 percent during the same period (14). The other major teaching hospitals averaged between 75 and 80

percent occupancy, indicating that their rates were similar to that of the medical center. The two community hospitals that responded to the daily occupancy sample had occupancy rates of 80 percent and 91.9 percent during the selected three months compared with the 76 percent rate of the medical center.

The effects of referral patterns, remodeling, clinical faculty travel, regulation of patient mix, and student body and house staff changes on occupancy are, as yet, untested. Faculty involvement in Kansas Regional Medical Program activities and postgraduate education programs appear to have minimal impact on inpatient census fluctuations. In all but the smallest clinical sections, patient care duties are shifted or shared among faculty members to compensate for individual absences. Thus, there appear to be many unidentified reasons for periods of low occupancy. The assignment of beds by service appears to be a significant factor. Comprehensive study of this factor is needed, but the data collected indicated that:

1. "Bed-swapping" between services sharing a nursing unit is not always optimal; there were simultaneous declines in bed occupancy on both services sharing a nursing unit on numerous occasions.

2. Most services have substantially lower occupancy during December, June, and July.

3. Surgery services have both lower overall occupancies and wider occupancy fluctuations than do internal medicine specialties.

Although significant educational causal factors for the lower occupancy rates at the medical center have yet to be identified, the lower occupancy is a substantial financial consideration for the institution. It appears that a 5 percent occupancy increase (from 75 percent to 80 percent) would generate hospital revenue of $665,484 less additional expenses of $147,757 for a net increase of $517,727 and that a rise of 10 percent (from 75 percent to 85 percent) would yield $1,330,362 less additional expenses of $295,514 for a net increase of $1,034,848.

In arriving at the above estimates, the following assumptions regarding revenue were made:

1. Daily patient services would be charged at the most prevalent current semiprivate room rate.

2. Ancillary revenue would increase at the same rate as daily service charges.

3. Professional commissions would maintain the present ratio of commissions to total ancillary charges.

4. Uncollectible accounts would be constant at 14 percent of gross charges.

5. Discounts would be considered to be 50 percent variable as related to gross charges.

Diagnostic Services

The authors hypothesized that there is a greater utilization of diagnostic services in a teaching setting than in a nonteaching setting and that this increased utilization and its attendant cost can be associated in some measure with the educational programs in the teaching setting (15). To test this hypothesis, they measured the use of clinical laboratory determinations, X-ray examinations, and electrocardiograms in cases of identical clinical diagnoses in both the teaching and nonteaching settings.

The intent in selecting diagnoses to be studied was to include only those that were as relatively free as possible from secondary diagnoses so as to reduce the likelihood of intervening variables that could distort the findings. After consultation with clinicians in three departments, the following eight diagnoses were selected for testing: Department of Internal Medi-

cine–duodenal ulcer, pyelonephritis, myocardial infarction, and hepatitis; Department of Surgery–cholecystectomy for cholecystitis and colectomy for cancer of the colon; the Department of Pediatrics–pneumonia and meningitis.

Ten cases representative of each diagnosis were then selected at random at the medical center as well as in each of the community hospitals. The only constraint on sample selection was the decision that no case prior to 1965 should be included in order to avoid distortions brought about by significant changes over time in clinical practices and diagnostic procedures. Each chart was surveyed, and the number of laboratory tests, X-ray examinations, and electrocardiograms were tabulated; the patient's length of stay was also noted. The results of combining these data for all diagnoses are shown in Table 2.

A t-distribution was used to determine whether or not the differences shown in the table were statistically significant. The figures for the medical center did differ significantly from those for the community hospitals on three variables; the fourth variable, length of stay, did not yield a statistically significant difference and hence cannot be cited as a determinant in the differences found in the other three variables.

Following are some general observations on this data. Compared with the community hospitals, per case the medical center had 90 percent more laboratory tests, 95 percent more X rays, and 25 percent more electrocardiograms. The authors recognized the widely held assumption that the involvement of students and house staff in patient care results in increased utilization of diagnostic services. It was concluded that these differences are associated with the educational programs at the medical center.

Each of these percentage increases was used to compute the direct expense of the volume of tests above the number of tests that are done in the community hospitals for the applicable service department. In addition, allowance was made for any indirect expenses that could be anticipated in areas such as nursing, the business office, and medical records and as a result of increased institutional overhead. In Table 3 these calculations are summarized for each of the diagnostic services studied.

During the course of this study, data were accumulated which led the authors to speculate that diagnostic procedures at the medical center were considerably more complex than those in the community hospitals. A detailed analysis of this data was not performed; but if this speculation is accurate, the additional costs calculated here can be assumed to be grossly understated.

Nursing Services

As a result of reviewing the findings of other studies and examining the medical

TABLE 2

UTILIZATION OF DIAGNOSTIC SERVICES FOR SELECTED DIAGNOSES IN THREE COMMUNITY HOSPITALS AND IN THE MEDICAL CENTER

	Community Hospitals				Medical Center
	A	B	C	Average	
Length of patient stay (in days)	13.5	11.9	11.9	12.4	13.5
No. per admission of:					
Laboratory tests	40.1	20.7	25.7	28.8	54.8
X-rays	2.3	1.6	2.1	2.0	3.9
Electrocardiograms	1.5	0.8	1.2	1.2	1.5

TABLE 3

COSTS OF GREATER UTILIZATION OF DIAGNOSTIC SERVICES IN THE MEDICAL CENTER

	Clinical Laboratories	X-ray	Electro-Cardiography
Caused by:			
Direct expense	$540,000	$310,000	$32,000
Indirect expense	160,000	55,000	6,000
Total	700,000	365,000	38,000
Less original allocation in PCA study	90,000	3,000	10,000
Additional expense identified in the present study	610,000	362,000	28,000

center's cost finding reports, the authors noticed a marked involvement of nursing employees in educational efforts, and this has led them to hypothesize that significant differences in nursing staffing and activity exist between teaching and nonteaching hospitals and that these differences are related to educational programs (14). To examine this possibility, the following assumptions were investigated in detail:

1. Teaching hospitals employ a greater number of nursing personnel per bed and per patient day than do nonteaching hospitals.

2. Nursing administrative and supervisory personnel comprise a greater proportion of total nursing personnel in teaching hospitals than in nonteaching hospitals.

3. A greater proportion of total nursing personnel is assigned to areas other than inpatient nursing units in a teaching hospital than is true in a nonteaching hospital.

4. There is a higher proportion of R.N.'s to L.P.N.'s in a teaching hospital than in a nonteaching hospital.

5. The use of patient supplies is greater (per patient day) in a teaching hospital than in a nonteaching hospital.

A questionnaire, which was developed in an effort to substantiate these assumptions and to obtain certain related data, was completed at the community hospitals subsequent to interviews with the respective directors of nursing which included discussion of the hypothesis and assumptions involved. A representative of the medical center also filled out the questionnaire.

The findings, which are summarized in Table 4, prompted the following conclusions about each assumption:

1. The data supported the first assumption. It is the authors' opinion that a significant portion of the nursing staffing differences between the medical center and the community hospitals was a result of the role played by the former's nursing personnel in student activity on the floors.

2. The second assumption was supported by the determination that three percentage points more of the total nursing personnel at the medical center served in administrative and supervisory capacities than was the case at the community hospitals.

This comparison was particularly significant because in the authors' opinion the degree of involvement in educational activity was greater among this group than among nursing employees as a whole. It is to be noted further that these administrative and supervisory employees have higher salaries than the other nursing personnel and thus have a greater impact on total costs.

3. The assumption that a greater proportion of nursing employees at the medical center serve in other than inpatient areas was confirmed. This finding

TABLE 4

COMPARISON OF NURSE STAFFING IN THE MEDICAL CENTER AND IN THE COMMUNITY HOSPITAL

	Medical Center	Community Hospital Average
No. of nursing personnel per bed (F.T.E.)*	1.28	1.06
No. of man hours per patient per day	9.2	7.5
Percent of nursing personnel in administrative and supervisory positions	10.3	7.3
Percent of nursing personnel in other than inpatient areas	33.6	27.3
Ratio of R.N.'s to L.P.N.'s	1 to 1	2 to 1

* Full-time equivalents: Derived by dividing total annual nursing hours worked by 2,080 which is defined as annual minimum hours worked for full-time position.

was significant in that these assignments were in areas maintained (in part) for educational purposes (for example, outpatient clinics and emergency room), in inservice educational capacities, or in supportive areas that were perhaps larger because of the increased needs in a teaching setting (for example, central supply and the nursing office).

4. The fourth assumption was not supported; in fact, the opposite relationship was demonstrated. It is the authors' feeling that the presence of a practical nurses training program on the medical center campus and the hiring of a significant proportion of each year's graduates had an effect on the ratio of R.N.'s to L.P.N.'s in the medical center. It does not appear that any portion of the additional nursing costs at the medical center as compared with such costs in the community hospitals can be attributed to the mix of professional versus practical nursing.

5. It was the authors' opinion that the fact that the medical center uses more patient supplies than the community hospitals was due to student involvement (for example, more gloves are used because more than one person takes part in sterile procedures, and catheter sets and syringes are contaminated by students or are used for demonstration purposes). In this regard it should be noted that central supply, the dispensing department, has nearly twice as many employees (proportionate to total nursing employees) at the medical center than at the community hospitals. However, overall preliminary findings on patient supplies were inconclusive and indicated a need for further measurement refinement to adjust for price differences and varying use of disposables.

The following figures on the additional costs of nursing staffing and supply use in the medical center that can be attributed to educational programs must be viewed as only estimates until further studies are undertaken to analyze these apparent differences with greater precision. One-half the difference in man hours per patient per day between the medical center and the mean of the community hospitals (Table 4), or .85 (9.2 minus 7.5 divided by 2) hours per patient per day, has been assumed to be associated with educational activity. This makes 125,008 (.85 times 147,068 patient days per year) man hours per year requiring an increase in the equivalent of full-time employees of 60.1 (125,088 divided by 2,080—the average number of working hours per employee per year, i.e., a full-time equivalent). This would cost $438,730 (60.1 times an average annual nursing

salary of $7,300); and of this amount, $288,000 was allocated to this area in the PCA study, leaving as additional expenses identified in the present investigation $150,730 for nursing salaries and $85,000 for supplies for a total of $235,730.

Discussion

It is apparent that all elements that cause patient care costs in a major teaching hospital to be higher than in community hospitals have not been identified, measured, and articulated in the present investigation, nor have the educational components of those costs which have been isolated been conclusively determined in all cases. With this understanding and using those increased costs that have been assumed to be related to educational programs which are in excess of the figures arrived at in the PCA study, the following "moderate" estimates have been made: hypothesis 1 on indigency, $1,070,000; 2 on ambulatory care, $622,000; 3 on occupancy, $1,035,000; 4 on diagnostic services, $1,000,000; and 5 on nursing services, $236,000 for a total of $3,963,000. The authors adjusted their PCA results by this figure so that whereas the PCA figures were $14,374,313 (49.4 percent) for patient care services and $14,757,981 for education, research, and other programs, the revised totals were $10,411,313 (35.8 percent) for patient care services and $18,720,981 for education, research, and other programs; the totals in both cases were $29,132,294.

It should be emphasized that these figures are based on data for fiscal years 1969 and 1970. If they were based on current dollars, it is doubtful whether relative program differences would be significantly altered, but the total dollar magnitude would be increased by an estimated 15 percent. Further, the authors feel that the additions to the PCA results are conservatively stated, and they anticipate the identification of other education costs in extensions of the investigation that has been reported here. In addition, they intend to attempt to measure the benefits of student services and other aspects of educational programs to patient care.

Despite these problems and apparent deficiencies, the investigation results to date have been valuable to the medical center administration as a supplement to the PCA study and as a means of understanding the interrelationships of various programs and activities of the medical center. Further, they have been a useful operational tool; for example, they led directly to the development of new systems for admission coordination and bed control.

This study will be continued and similar simultaneous studies in other medical centers will be encouraged for the following reasons:

1. The governmental concern for patient care costs will continue to escalate, and unfortunate comparisons of teaching hospitals costs with community hospital costs will be made unless teaching hospitals can demonstrate acceptable reasons for the differences.

2. Negotiation with supporting entities for full support for educational costs will be enhanced as a result of any increase in our knowledge of total program costs.

3. More definitive program understanding will enhance future physical and operational program planning.

4. Future relations with the medical center's public, patients, faculty members, and governing board will be influenced by the ability to define, explain, and justify its programs.

References

1. LINSWOOD, S., Who Should Pay for Medical Education in the Hospital? *Can. Hosp.*, 45:49–52, 1968.

2. SNOKE, A. W. Teaching Hospital: Its Responsibilities and Conflicts. *J. Med. Educ.*, 35:207–213, 1960.
3. CARROLL, A. J., and DARLEY, W. Medical College Costs. *J. Med. Educ.*, 42:1–16, 1967.
4. POLLACK, J. Teaching and Research Costs in the Teaching Hospital's Economy: A Consumer View. *J. Med. Educ.*, 36:805–812, 1961.
5. OLSON, S. W. Financing Graduate Medical Education. *J. Med. Educ.*, 44:745–754, 1969.
6. CAMPBELL, T. J. *Program Cost Allocation in Seven Medical Centers: A Pilot Study.* Evanston, Illinois: Association of American Medical Colleges, 1969.
7. EBERT, R. H. The Dilemma of Medical Teaching in an Affluent Society. In *The Teaching Hospital.* Knowles, J. H. (Ed.). Cambridge, Massachusetts: Harvard University Press, 1966.
8. WITTRUP, R. D. University Hospital: Teaching Hospital or Referral Center? *J. Med. Educ.*, 41:451–456, 1966.
9. GLASER, R. J. The Teaching Hospital and the Medical School, In *The Teaching Hospital.* Knowles, J. H. (Ed.). Cambridge, Massachusetts; Harvard University Press, 1966.
10. RUSSELL, P. S. Surgery in a Time of Change, In *The Teaching Hospital,* Knowles, J. H. (Ed.). Cambridge, Massachusetts: Harvard University Press, 1966.
11. KNOWLES, J. H. Medical School, The Teaching Hospital and Social Responsibility. In *The Teaching Hospital,* Knowles, J. H. (Ed.). Cambridge, Massachusetts: Harvard University Press, 1966.
12. BELL, L. G. The Importance of an Outpatient Department in a Teaching Hospital. *Can. Med. Ass. J.* 78:477–489, 1958.
13. MACFARLANE, J. A. Medical School and Teaching Hospital: Problems of Present and Future Relationships. *Can. Med. Ass. J.*, 84:683–686, 1961.
14. Hospital Administrative Services Monthly Reports. American Hospital Association, Chicago, Illinois, January 1, 1969 to June, 1970.
15. VORAN, O. L. The Effect of Intern-Resident Involvement in the Care of Patients Upon the Quantity of Diagnostic Work-Up in a Private, Non-Profit Teaching Hospital. In *Comprehensive Medical Care for the Medically Indigent.* Miller, W. R. and Wallace, W. N. (Eds.). Saint Paul, Minnesota: Saint Paul Medical Center, 1966.

PROFESSIONAL ACTIVITY STUDY MEDICAL AUDIT PROGRAM

Commission on Professional and Hospital Activities

William H. Kincaid, editor Vol. 9, No. 11 4 October 1971

CHOLECYSTECTOMIES IN UNIVERSITY AND NONUNIVERSITY HOSPITALS

Margaret A. Child, MD, MPH

This **PAS Reporter** *issue is an adaptation of an exhibit first shown at the 57th Annual Clinical Congress of the American College of Surgeons held in October 1971.*

Does university hospital care differ from that in nonuniversity hospitals?

In an effort to examine this question we looked at the abstracts of 6,208 patients with cholecystectomy as the most important operation during their hospitalization in 1970. Of these, 3,583 were treated in 26 university hospitals participating in PAS and 2,625 were treated in nonuniversity hospitals. The latter group was selected from a systematic sample of all patients in all 1,340 PAS hospitals.

We compared the two groups with respect to their:

Demographic and physical characteristics
Investigation
Management
Length of stay
Complications
Deaths

Dr. Child is a biostatistician with the Commission on Professional and Hospital Activities and lecturer in Biostatistics in the School of Public Health of the University of Michigan.

PUBLISHED BY CPHA, 1968 GREEN ROAD, ANN ARBOR, MICHIGAN 48105 PRINTED IN USA

Surprisingly, the two groups of patients were almost exactly the same in their demographic and physical characteristics:

CHOLECYSTECTOMY PATIENTS
PAS Hospitals, 1970
CHARACTERISTICS OF THE PATIENTS

	University Hospitals	Nonuniversity Hospitals
Average age	51 years	51 years
Percent over 65	34%	33%
Percent female	76%	74%
Average admission systolic blood pressure	136 mm Hg	138 mm Hg
Average admission diastolic blood pressure	85 mm Hg	86 mm Hg
Obesity (average % of median weight for age and height)	104%	104%
Average admission temperature	99°	99°
Average admission WBC	8900	8600
Average number of secondary diagnoses recorded	1.1	0.9
Percent with gallstones	90%	91%
Percent with obstructive biliary disease	0.5%	0.9%
Percent with diabetes mellitus	5.6%	4.7%

Since the patients themselves were so similar, the differences found in investigation and management are probably real and not due to differences in patient characteristics. These differences are significant by Chi-square test beyond the 0.005 level:

CHOLECYSTECTOMY PATIENTS
PAS Hospitals, 1970
INVESTIGATION
Percent of Patients with Test

	University Hospitals	Nonuniversity Hospitals
Chest x-rays	58%	45%
ECGs	63	55
Bacteriology	50	27
Liver function tests	75	65
Nitrogen derivatives	80	70
Blood sugar tests	73	68
Cholangiograms	35	30

These aspects of management varied significantly beyond the 0.001 level with the exception of incision of bile ducts. This difference was not significant.

CHOLECYSTECTOMY PATIENTS
PAS Hospitals, 1970
MANAGEMENT

	University Hospitals	Nonuniversity Hospitals
Incision of bile ducts	12.9%	11.8%
Transfusions	8%	5%
Use of antibiotics	40%	44%
Patients given antibiotics without culture	32%	62%

Except for the "average stay excluding deaths," which was significantly longer at the 0.01 level for university hospitals, length of stay was the same for both groups.

CHOLECYSTECTOMY PATIENTS
PAS Hospitals, 1970
LENGTH OF STAY

	University Hospitals	Nonuniversity Hospitals
Average preoperative stay	2.2 days	2.2 days
Median stay	11	11
Average stay excluding deaths	14.3	13.7
Average stay excluding stays $>$ 30 days	12.5	12.2

Most recorded complications, including deaths, were slightly higher for the university hospital group, but only postoperative wound infection was significantly higher at the 0.05 level.

CHOLECYSTECTOMY PATIENTS
PAS Hospitals, 1970

COMPLICATIONS
Percent of Total Patients

	University Hospitals	Nonuniversity Hospitals
Postoperative hemorrhage	0.4%	0.3%
Postoperative fistula	0.1	0.2
Postoperative wound infection	2.5	1.5
Postoperative myocardial infarction	0.6	0.6
Postoperative pulmonary embolus	1.3	0.8
Pancreatitis	2.4	2.2
Peritonitis	0.5	0.5
Deaths	1.6	1.5

NOTES

A university hospital is defined as one owned by or under the same ownership as a medical school where the school has the exclusive right to appoint or nominate all members of the hospital staff assigned to services used by the school for teaching.

The following H-ICDA codes identify these diagnoses or procedures:

Diagnosis or procedure	H-ICDA Code
Cholecystectomy	53.5
Cholelithiasis	574.0–.9
Obstructive biliary disease	576.0–.1
Diabetes mellitus	250.0–.9
Cholangiograms	93.4
Incision of bile ducts	53.0
Postoperative hemorrhage	998.1
Postoperative fistula	998.6
Postoperative wound infection	998.5
Acute myocardial infarction	410.0–.9
Pancreatitis	577.0–.1
Peritonitis	567.0–.9

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Commission on Professional and Hospital Activities

Vol. 7, No. 2 24 February 1969

HOW MUCH LONGER DO PATIENTS STAY IN MAJOR TEACHING HOSPITALS ?

This *PAS Reporter* issue is an adaptation of an exhibit first shown at the 1968 convention of the Association of American Medical Colleges and subsequently shown at the 65th Annual Congress on Medical Education.

Volume 6, No. 7 (issued 10 June 1968) of the *PAS Reporter* showed that patients did stay an average of 1 day longer in teaching hospitals than in nonteaching hospitals. This longer stay was caused by:

1. "teaching effect" which shows delivery of care (0.7 days), and
2. patient mix: teaching hospitals treat more complicated cases (0.3 days)

This study of United States short-term general hospitals participating in the Professional Activity Study (PAS) in the first half of 1966 examined the stay in teaching and nonteaching hospitals. Teaching hospitals were defined as those with internship or residency training programs.

BASE DATA

January-June 1966

	Teaching	Nonteaching	Total
Hospitals	209	326	535
Patients Studied*	1,282,967	814,022	2,096,989
Percent of Patients	61 %	39 %	100 %

*Excludes deaths and patients with stays in excess of 100 days (64,474 patients)

PUBLISHED BY CPHA, FIRST NATIONAL BUILDING, ANN ARBOR, MICHIGAN 48108 PRINTED IN USA

BUT WHAT ABOUT "MAJOR" TEACHING HOSPITALS ?

The data were further analyzed considering only hospitals discharging 5,000 or more patients per year, and teaching hospitals were separated into "major" and "other." For this study hospitals offering any four of the five residencies, medicine, obstetrics-gynecology, pathology, pediatrics, and surgery, were defined as "major" teaching hospitals.

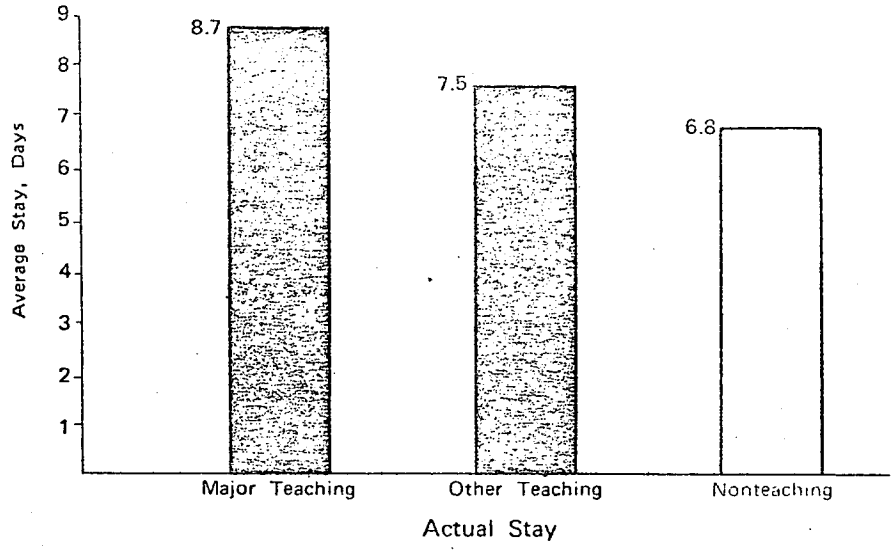
NEW BASE DATA

January-June 1966

	Major Teaching	Other Teaching	Nonteaching	Total
Hospitals	71	130	156	357
Patients Studied*	548,766	724,588	629,339	1,902,753
Percent of Patients	29 %	38 %	33 %	100 %

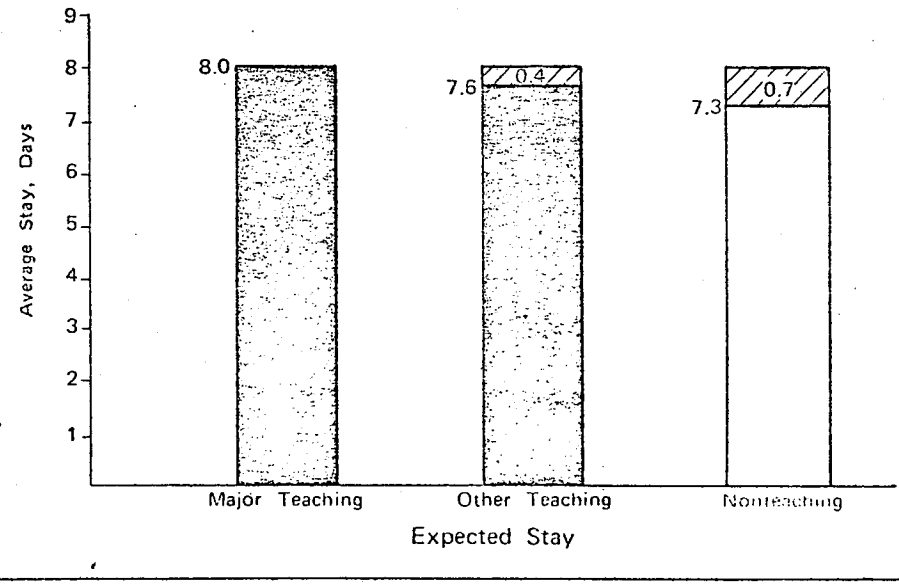
*Excludes deaths and patients with stay in excess of 100 days (48,178 patients)

MAJOR TEACHING HOSPITALS HAD A LONGER ACTUAL AVERAGE STAY



These new data may now be compared with "expected" average stays based on the patient mix for these hospitals. Longer "expected stay" equals more complicated cases.*

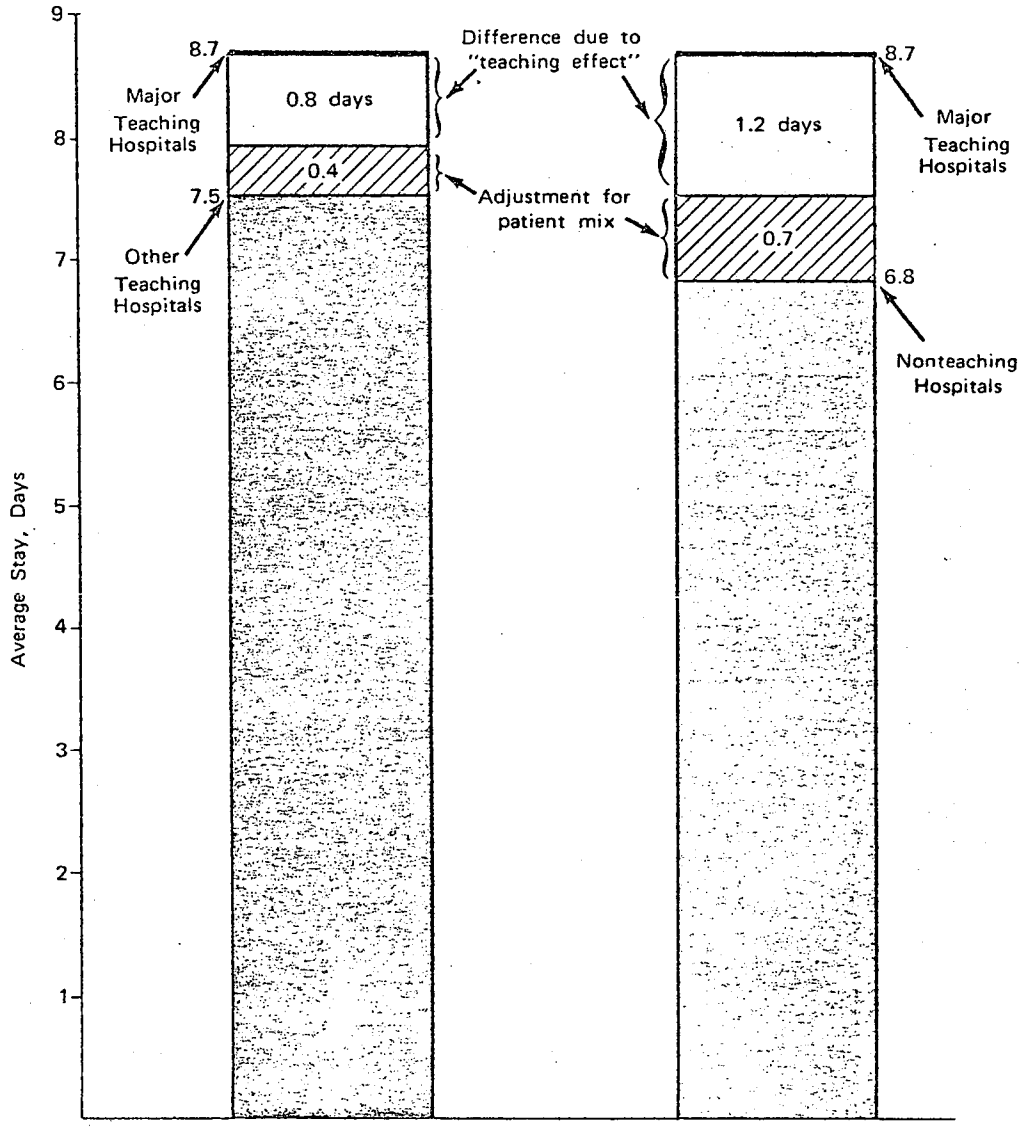
MAJOR TEACHING HOSPITALS HAD SLIGHTLY MORE COMPLICATED CASES



*The method is described in Volume 6, Number 7, of the *PAS Reporter*.

SIMILAR PATIENTS STAYED 11% LONGER IN MAJOR TEACHING HOSPITALS THAN IN OTHER TEACHING HOSPITALS;

18% longer than in nonteaching hospitals



Appendix

Actual average stay has been adjusted by the following technique: For each of the 3 ways used to group hospitals for comparison in this study, fair comparisons among the weighted averages shown were ensured by using a constant set of weights in getting those averages. The weights were chosen to minimize random-sampling errors in the comparisons. Given 32 raw averages a_{ijk} for length of stay, one for each subclass (i = 1,2 for teaching, nonteaching; j = 1,2,3,4 for area; k = 1,2,3,4 for size of hospital), these weights, calculated from the number of hospitals h_{ijk} in each subclass, were

$$w_{jk} = 1/\sum_{i} (1/h_{ijk}) \qquad \text{(16 weights)}$$

for the overall comparison between teaching and nonteaching;

$$w_{k} = 1/\sum_{ij} (1/h_{ijk}) \qquad \text{(4 weights)}$$

for comparisons among the 8 area-teaching program categories; and

$$w_{j} = 1/\sum_{ik} (1/h_{ijk}) \qquad \text{(4 weights)}$$

for comparisons among the 8 hospital size-teaching program categories.

Vergil N. Slee, MD
Richard P. Ament
John P. Mull

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202/466-5127

June 28, 1972

Ronald A. Lochbaum
Assistant Controller For
The Medical Center
Duke University Medical Center
BOX 2901
Durham, North Carolina 27706

Dear Ron:

In follow-up to our conversation on Tuesday, I have reviewed with Bill Hilles the statistical report prepared by the Duke Endowment. The indices marked in yellow on the enclosed copy are the ones I believe we should pursue further.

Also attached is a listing of all the short-term non-federal hospitals in North and South Carolina divided into five groups. Group one includes only the four major teaching hospitals, while group two is comprised of six hospitals which have at least two or three graduate medical education programs (I'm not sure whether Spartansburg should be in or not). Groups three, four and five are those with minimal or no educational programs broken into three bed-size groups.

It is my understanding that ideally we could use the specific data for each hospital in groups one and two as well as medians. For the other three groups, I think the medians (and perhaps a high and low) would be all we'd need.

If there is anything we need to discuss, or if you think something needs modification, please call me at 202/466-5126.

Sincerely,

RICHARD M. KNAPP, Ph.D.
Director
Division of Teaching Hospitals

cc: Thomas Campbell
Bill Hilles

JUL 5 1972

THE DUKE ENDOWMENT
1971 MISCELLANEOUS HOSPITAL STATISTICS
OCTOBER 1, 1970 - SEPTEMBER 30, 1971

FOUR HOSPITALS AFFILIATED WITH SCHOOLS OF MEDICINE

	Group Average	Duke No. 1	North Carolina Baptist No. 2	N Ur
Average Beds in Use	530	791H	463	
Days of Care	161,556	251,772H	141,289	
Nursery Days of Care	8,708	6,952L	8,785	
Obstetrical Discharges, % of Total	15.1%	11.0L	11.7	
Inpatient Discharges	17,212	25,211H	17,037	
Nursery Discharges	1,704	2,001	1,303	
Discharges 65 Years and Over	2,355	3,552H	2,874	
Percent of Discharges*	13.4%	14.1	16.9H	
Average Stay	9.4	9.7	8.4L	
Under 14 Years*	8.3	7.2	6.7L	
14-64 Years	9.0	9.7	8.0L	
65 and Over	12.2	12.3	11.2L	
Obstetrical	3.6	3.6	4.3H	
Medical and Surgical	10.4	10.4	9.0L	
Newborn	4.0	3.7	5.3H	
Premature	17.1	12.6L	0	
Total Operating Expense PPD	$ 141.05	137.87	125.78L	
Depreciation Expense PPD	$ 5.04	6.89H	4.75	
Net Cost PPD (Nursery Days 1/3)	$ 121.20	116.12	111.16	
Total Hospital Revenue PPD	$ 126.30	123.32	132.39	
Net Patient Revenue PPD	$ 104.81	120.99	123.43H	
Inpatient Receipts PPD	$ 95.36	107.05	117.65H	
Patient Receipts, % of Rev.	75.8%	84.3	87.2H	
Gross A/R, Days of Tot. Pat. Rev.	153	120	85L	
Net A/R, Days of Adj. Pat. Rev.	119	78	45L	
Provisions for Bad Debts, % of Rev.	11.1%	9.6	7.6L	
Contractual Adj-Medicare, % of Rev.	3.0	1.0L	4.9H	
Contractual Adj-Medicaid, % of Rev.	1.6%	.8L	0	
Other Deductions, % of Rev.	11.4%	5.6L	0	
Inventory Per Bed	$ 514	189L	811H	
Gross Capital Inves. Per Occupied Bed	$ 50,724	53,689	39,340	
Operating Cost Per Occupied Bed	$ 49,840	48,594	44,178L	
Depreciation Per Bed	$ 1,542	2,194H	1,449	
Equivalent Full Time Employees	1,810	2,625H	1,382	
Employees Per Patient Per Day	4.1	3.8	3.5L	
Employees Per 100 Patients Per Day				
Administration	42.3	27.7	35.5	
Dietary	30.0	31.2	22.9L	
Housekeeping	24.2	13.5L	23.0	
Laundry and Linen	6.8	10.2H	7.7	
Plant	14.0	10.8L	15.3	
Nursing Service	148.7	148.6	111.7L	
Central Supply	9.9	7.9L	8.6	
Pharmacy	6.0	5.3	2.9L	
Medical Records and Library	11.7	8.5	9.4	
Operating and Recovery Rooms	19.1	24.8H	16.4L	
Delivery Rooms	3.8	3.8	2.9	
Radiology	18.5	21.4	18.6	
Laboratory	19.2	18.3	23.6	

* Nursery and Stillborn Excluded

THE DUKE ENDOWMENT
COMPARATIVE OPERATIONAL AND DEPARTMENTAL INDICATORS
OCTOBER 1, 1970 - SEPTEMBER 30, 1971

FOUR HOSPITALS AFFILIATED WITH SCHOOLS OF MEDICINE

	Group Average	Duke No. 1	North Carolina Baptist No. 2	Medical Univers No.
Nursing Administration MH Per Bed	13.18	0	8.21L	10.
% Occupancy - Obstetrical Units	64.67%	49.61L	74.66	80.
- Med. & Surg. Units	83.70%	88.08H	84.54	77.
- Total	82.52%	85.79H	83.61	77.
Nursing MH PPD - Obstetrical	11.23	0	6.58L	11.
- Med. & Surg.	7.46	0	5.94L	8.
- Total	8.28	8.57	6.32L	9.
Manhours Per Delivery	17.90	26.17H	19.10	21.
Direct Cost Per Delivery	$ 84.69	119.22H	90.14	77.
Nursery MH Per Bassinet Per Day	3.94	0	1.30L	7.
Oper. Room Visits Per 100 Admis.	59.01	51.76	49.96	45.
% Registered Nurses	26.95%	0	0	22.
% Licensed Practical Nurses	22.47%	0	0	25.
Obstetrical Unit DC PPD	$ 37.35	0	23.27L	29.
Medical & Surgical Unit DC PPD	$ 25.81	0	20.54L	26.
Nursery DC Per Baby Day	$ 24.55	0	11.63L	31.
Total Nursing Service DC PPD	$ 31.31	33.21	23.17L	31.
Routine Service Revenue PPD	$ 59.45	60.01	59.23	63.
Operating Room DC Per Visit	$ 113.71	176.14H	87.83	111.
Operating Room MH Per Visit	18.78	26.94H	15.86	20.
C. [illegible] Lab Tests/Exams	38.92	54.40H	14.45L	39.
% Outpatient Clinical Lab Tests	25.32%	39.26H	23.25	15.
Total Laboratory Tests Per MH	7.23	8.85	1.74L	14.
Total Laboratory DC Per Test	$ 1.77	1.04L	3.27H	1.
Outpat. Diag. Procedures Per Visit	3.03	2.79	3.00	2.
% Outpat. X-Ray Diag. Procedures	36.54%	49.72H	34.34	17.
Total X-Ray MH Per Procedure	1.67	1.84	1.65	1.
Total X-Ray DC Per Procedure	$ 11.24	13.49H	11.51	8.
Pharmacy DC Per Patient Day	$ 5.86	5.62	5.51L	5.
Physical Therapy DC Per Treatment	$ 4.39	5.34H	4.02	3
Med. Rec. MH Per Discharge	3.42	4.46H	4.24	2
Medical Records DC PPD	$ 1.86	1.33	1.72	
Emer. & Clinic Visits Per Bed	22.82	33.93H	9.63L	18
Emergency MH Per Visit	2.32	3.38H	1.41L	
Emergency DC Per Visit	$ 11.96	17.05H	6.17L	
Meals Prepared Per MH	3.39	2.25L	4.72H	3
Dietary Direct Cost Per Meal	$ 1.55	2.13H	1.15L	1
Food & Supplies DC Per Meal	$ .84	.99H	.68L	
Meals Served Per Patient Day	5.76	4.05L	6.31	6
Cafeteria Revenue Per Meal	$ .82	1.20H	.58L	
Plant DC Per Bed	$ 168.33	186.88	152.81	126
Plant DC Per 1,000 Sq. Ft.	$ 123.80	201.05H	124.24	12
Plant MH Per 1,000 Sq. Ft.	14.10	17.46	18.45	1
Housekeeping DC Per Bed	$ 94.59	55.72L	87.54	109
Housekeeping DC Per 1,000 Sq. Ft.	$ 78.56	70.56	122.48H	14
Housekeeping MH Per 1,000 Sq. Ft.	27.87	25.82	47.71H	6
Laundry DC Per 100 Pounds	$ 8.83	14.27H	7.26	6
Laundry Pounds Per MH	35.64	24.84L	37.23	44
Laundry Pounds Per Patient Day	16.40	14.61	15.55	1
Administrative & Clinical DC Per Bed	$ 351.58	300.31	346.58	212
Admin. & Clerical Medical Records	62.25	41.67	52.64	2
Emp. Health & Wel. - % of Salaries	9.41%	0	6.43L	1
Salaries & Fees - % of Total Exp.	60.35%	61.77	62.45	5

THE DUKE ENDOWMENT
COMPARATIVE STATEMENT OF REVENUES AND EXPENSES
OCTOBER 1, 1970 - SEPTEMBER 30, 1971

FOUR HOSPITALS AFFILIATED WITH SCHOOLS OF MEDICINE

	Group Average	Duke No. 1	North Carolina Baptist No. 2	Medic Univer No.
Revenue				
Routine Services - Inpatient	44.9	41.2L	42.0	5
Delivery and Labor Rooms	.8	.4	.6	
Operating and Recovery Rooms	8.7	9.3	9.3	
Central Services and Supply	2.1	.6L	2.9	
Intravenous Therapy	1.4	1.5	2.2H	
Emergency Service	1.3	1.6H	1.3	
Laboratory	14.6	14.5	13.0	1
Blood Bank	1.6	2.0	.4L	
Radiology	7.1	8.3	8.5H	
Pharmacy	6.1	5.9	7.0H	
Anesthesiology	3.3	3.3	6.5H	
Inhalation Therapy	2.1	1.3L	3.1H	
Clinics	3.4	5.7H	1.0L	
Other Services	3.1	4.5H	2.2L	
Total Patient Revenue	100.0	100.0H	100.0H	10
Deductions from Revenue	21.9	16.9	12.5L	2
Adjusted Patient Revenue	78.1	83.1	87.5H	7
Other Operating Revenue	16.4	1.6L	6.4	
Miscellaneous Non-Operating Revenue	1.8	0	0	
Expense				
Nursing Service	25.5	27.6	20.7L	2
Delivery Rooms and Labor Rooms	.8	.8	.7	
Operating and Recovery Rooms	5.6	7.8H	4.7	
Central Services and Supply	2.1	.5L	2.6	
Intravenous Therapy	1.0	0	1.2H	
Emergency Service	1.3	1.9H	.7L	
Laboratory	6.9	8.0H	7.0	
Blood Bank	1.6	1.6	1.4	
Radiology	5.8	7.5H	6.8	
Pharmacy	4.8	4.7	4.9	
Anesthesiology	2.9	2.7	6.1H	
Inhalation Therapy	1.1	1.2	1.9H	
Medical Records and Library	1.5	1.1	1.6	
Other Professional Services	3.1	2.5	2.3	
Dietary	7.0	7.2	6.5	
Plant Engineering	5.4	6.0H	5.4	
Housekeeping	3.1	1.8L	3.1	
Laundry and Linen	1.5	1.7	1.3	
Administration and Fiscal	11.0	9.6	12.2	
Employee Health and Welfare	6.4	0	4.5L	
Depreciation	4.1	5.7H	4.2	
Miscellaneous Operating	.2	0	.2H	
Base Total Expense	100.0	100.0H	100.0H	1
Nursing Education	1.3	.4	3.2H	
Medical Staff	8.0	10.8H	6.2	
Clinics	4.8	3.5	2.5L	
Personnel Quarters	.4	0	.4H	
Miscellaneous Non-Operating	1.1	0	0	
Professional Fees	2.8	0	2.8H	

Hospitals	Beds	Length of Stay	Occupancy	Personnel Per Occupied Bed	Payroll as % of Total Expense %	Total Expense Per Patient Day $	Outpatient Visits*	Total Expense Per Adjusted Patient Day $	Total Expense Per Admission $
University of Cleveland	968	9.71	72.8	4.62	61	123.93	191,332	109.60	1,203.63
Cleveland Metropolitan	545	11.65	75.7	4.93	63	154.26	215,975	123.39	1,797.80
Duke University	768	10.18	84.9	4.05	--	111.29	---	--	1,132.48
Georgetown University	394	8.49	80.5	3.54	59	132.78	204,499	95.92	1,127.73
St. Louis University	319	10.74	78.7	2.69	50	97.81	130,618	74.67	1,050.53
Albany Medical Center	759	11.63	87.9	3.23	54	95.06	59,424	91.18	1,105.40
Milwaukee County	659	11.81	68.8	3.96	55	109.59	149,330	95.69	1,294.72
Ohio State University	967	11.59	86.7	4.07	54	127.07	112	127.06	1,472.76
University of Iowa	1,068	9.95	79.5	2.38	51	74.79	207,694	66.89	744.11
University of Kansas	530	8.14	75.8	4.43	53	125.65	211,156	100.32	1,023.14
SUNY- Syracuse	338	11.51	81.0	4.45	53	166.27	65,499	144.58	1,913.07
Crouse-Irving Memorial	466	7.39	85.2	3.94	65	109.04	---	--	805.68

*Data were taken from the August 1, 1971 AHA Guide Issue; with the exception of "Outpatient Visits" which were obtained from the 1971-72 Directory of Approved Internships and Residencies, American Medical Association.

Hospitals	Beds	Length of Stay	Occupancy	Personnel Per Occupied Bed	Payroll As % of Total Expense	Total Expense Per Patient Day	Outpatient Visits*	Total Expense Per Adjusted Patient Day	Total Expense Per Admission
					%	$		$	$
Yale-New Haven	762	8.35	85.6	4.15	62	136.41	89,740	127.94	1,138.82
Hartford	919	9.09	90.1	3.44	65	108.73	46,226	105.89	988.84
Peter Bent Brigham	321	10.65	90.7	5.77	50	216.41	73,080	188.25	2,305.05
New England Deaconess	355	11.65	94.1	4.08	62	136.56	9,984	134.16	1,591.22
University of Iowa	1,068	9.95	79.5	2.38	51	74.79	207,694	66.89	744.11
Iowa Methodist	541	9.32	86.3	3.19	61	69.31	19,475	67.95	606.07
University of Michigan	1,027	12.59	72.2	4.83	60	156.39	267,278	133.96	1,969.28
Henry Ford	1,049	11.69	84.1	4.53	--	151.44	349,200	127.23	1,771.00
Memorial Hospital of Long Beach	545	8.32	88.3	2.86	58	98.78	6,117	98.18	821.94
Stanford	612	7.97	85.6	4.47	64	129.56	101,120	118.06	1,032.87
Presbyterian Hospital of the Pacific Medical Center	242	7.50	64.9	4.55	50	199.74	27,607	180.80	1,499.54

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