

SECTION III

REGULAR AND SPECIAL FEATURES

Development of a Method to Analyze Orthopaedic Practice Expenses

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The purpose of the current investigation was to present a standard method by which an orthopaedic practice can analyze its practice expenses. To accomplish this, a five-step process was developed to analyze practice expenses using a modified version of activity-based costing. In this

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method, general ledger expenses were assigned to 17 activities that encompass all the tasks and processes typically performed in an orthopaedic practice. These 17 activities were identified in a practice expense study conducted for the American Academy of Orthopaedic Surgeons. To calculate the cost of each activity, financial data were used from a group of 19 orthopaedic surgeons in Houston, Texas. The activities that consumed the largest portion of the employee work force (person hours) were service patients in office (25.0% of all person hours), maintain medical records (13.6% of all person hours), and resolve collection disputes and rebill charges (12.3% of all person hours). The activities that comprised the largest portion of the total expenses were maintain facility (21.4%), service patients in office (16.0%), and sustain business by managing and coordinating practice (13.8%). The five-step process of analyzing practice expenses was relatively easy to perform and it may be used reliably by most orthopaedic practices.

In 1992, The Health Care Financing Administration developed the Resource Based Relative

Value Scale.^{15,16} The Resource Based Relative Value Scale is an index that assigns weights to each medical service; the weights represent the relative amount to be paid for each service. The relative value scale used in the development of the Medicare Fee Schedule consists of three components: physician work; practice expense; and malpractice expense. The purpose of the relative value scale is to rank the relative values for various physician services and to calculate the Medicare reimbursement to physicians for patient care services. Much of the research involved in designing the scale was performed by Hsiao et al.^{15,16}

The physician work component is "a measure of the physician's time, physical effort and skill, mental effort and judgement, and stress from iatrogenic risk associated with providing a medical service".²⁰ The physician work component accounts for approximately 50% of total Medicare reimbursement. The practice expense component is "the cost of non physician resources incurred by the physician to provide services. Examples are salaries and fringe benefits received by the physician's employees, and the expenses associated with the purchase and use of medical equipment and supplies in the physician's office".²⁰ The practice expense component accounts for approximately 40% of total Medicare reimbursement. The malpractice expense component is "the cost of professional liability insurance incurred by physicians".¹⁸ The malpractice expense component accounts for approximately 10% of total Medicare reimbursement.

If the Resource Based Relative Value Scale is to be a precise method of rating the value of various physician services, it is particularly important that the practice expense component data be accurate because this component accounts for approximately 40% of physician reimbursement.

The purpose of this paper is to present a method that an orthopaedic practice can use to analyze its practice expenses using a modified version of activity-based costing. The authors chose to show the method by analyzing the financial data of a group of 19 orthopaedic surgeons; financial data from the general ledger

was input into a database and analyzed using a modified version of activity-based costing to determine the actual expenses associated with each of the 17 major activities. The authors think this method of analysis and its findings may be particularly useful to the orthopaedic community as the Health Care Financing Administration is currently in the process of reviewing the practice expense component of the Resource Based Relative Value Scale.

MATERIALS AND METHODS

A cost analysis was done to determine the practice expenses associated with performing all activities in an orthopaedic practice. Financial data from a practice with 19 orthopaedic surgeons were analyzed using a modified version of activity-based costing.

Activity-based costing, a state of the art cost accounting method, provides more accurate cost information than traditional cost accounting methods because it traces all costs to activities, then traces the activity cost to products and services. In contrast, traditional cost accounting arbitrarily allocates indirect costs to products and services. Activity-based costing increasingly is being adopted by American manufacturers, service companies, and other businesses.^{1-3,11-14,19}

The process of analyzing practice expenses using the modified version of activity-based costing involves five steps.

Step 1: Creating a Model of Activities Associated With Practice Expenses

Rather than identify the full set of activities necessary to run an orthopaedic practice, the authors used those developed by the Gary Siegel Organization (Lincolnwood, IL) for a practice expense study commissioned by the American Academy of Orthopaedic Surgeons.²¹ The activities were identified by interviewing orthopaedic surgeons and their office staff and observing the work that people do in orthopaedic practices. The Siegel research team comprised 13 doctoral level professors of accounting. The research team collected information from 18 orthopaedic practices in five cities in the United States. They identified 17 activities that are performed in a typical orthopaedic practice. These activities encompass all of those associated with expenses in an orthopaedic practice and are shown in Table 1.

TABLE 1. Description of the 17 Activities and Allocation of the Nonemployee Related Expenses (From the General Ledger) to the 17 Activities

Activity	Description
Service patients in office	This is the activity of treating and managing patients during initial and postoperative office visits. This includes all processes necessary to service the patients including greeting the patient, taking the patient history, scheduling appointments, preparing examination rooms, preparing prescriptions, ordering tests, answering patient questions (in person and on the phone), routing patients, referring patients to other specialists or to occupational therapists. This activity also includes providing information and reports to the referring and primary care physicians but does not include maintaining medical records, obtaining insurance authorization, or in-office surgeries.
Schedule and perform in-office surgeries	This activity applies only to practices that have their own operating room. Activities include scheduling and performing surgeries in the practice's operating room, preparing the operating room for surgery, assisting the doctor during surgery, and caring for patients after surgery. This activity does not include any processes related to surgeries performed in hospitals or other facilities.
Schedule and coordinate surgery patients in hospital or external facility	This is the activity of keeping track of patients in the hospital or other facilities. It includes scheduling surgeries and physician rounds, keeping track of every patient in the hospital, delivering and picking up medical records, recording all daily physician services, and scheduling physician meetings. This work is done for inpatient and outpatient surgeries.
Service patients in hospital or external facility	This is the activity of treating patients in the hospital or other facilities. It includes making rounds, examining patients, and working in the operating room. All of this work is done outside the office.
Obtain insurance authorization	This activity is the process of contacting the insurance company, healthcare maintenance organization, or Workers' Compensation to verify insurance coverage and to obtain authorization for services to a patient.
Maintain medical records	This is the activity of collecting, entering, and copying information for patients' medical charts. It includes transcription of notes, photography, pulling charts, and refiling charts.
Billing	This is the activity of recording patient charges for services rendered and submitting claims to insurance companies, Medicare, and healthcare maintenance organizations.
Collect payments	This activity includes collecting funds from individuals, insurance companies, healthcare maintenance organizations, maintaining accounts receivables records, and making bank deposits.
Resolve collection disputes and rebill charges	This is the activity of evaluating explanation of benefits and working with insurance companies, healthcare maintenance organizations, to resolve payment/billing disputes, submitting additional information to payors, and rebilling.
Provide information to third parties	This activity involves providing information to third parties, such as attorneys and insurance companies. It does not include providing information to the referring physician (see service patients in office).
Patient radiographs*	This is the activity of taking radiographs in the office. It includes all costs of maintaining equipment, authorizing release, and sending and receiving x-rays.

(continues)

TABLE 1. Description of the 17 Activities and Allocation of the Nonemployee Related Expenses (From the General Ledger) to the 17 Activities (Continued)

Activity	Description
Casting** Providing occupational therapy or physical therapy	This is the activity of applying and removing casts (and dressings) in the office. This applies only to practices that have their own occupational therapy or physical therapy facility. This is the activity of preparing the therapy room for patients, working with patients in therapy, billing for therapy, and managing the therapy department.
Maintain professional education†	This is the activity of the physicians and office staff in maintaining their respective intellectual capital.
Sustain business by managing and coordinating practice††	This is the activity of running the business side of a medical practice. Activities include general office management, accounting, marketing, purchasing office and medical supplies, postage and delivery, negotiating contracts, complying with regulatory requirements, managing human resources, and taxes.
Maintain facility‡	This is the activity of maintaining an environment in which to practice medicine and run the business. It includes rent, negotiating leases, telephone service, nonemployee related insurances, supplies, acquiring medical and office equipment (allocating expenses by depreciating the asset over its useful life), and installing communications systems.
Teaching and research	This is the activity of teaching residents, medical students, and interns, and involvement in research projects.

*The corresponding general ledger account is film expense.

**The corresponding general ledger account is supplies—medical.

†The corresponding general ledger account is continuing education.

††The corresponding general ledger accounts are administrative, advertising, bank charges, contract labor, contract services, contributions, dues and subscriptions, entertainment, insurance—miscellaneous, interest expense, laundry and linen, legal and accounting, licenses and registrations, maintenance and repairs, minor equipment miscellaneous expense, paging and answering, parking, placement fee, public relations, postage and delivery, supplies—office, supplies—printing, travel.

‡The corresponding general ledger accounts are depreciation, offsite storage, rent, rental of equipment, telephone.

Nonvalue added activities are those that incur cost, but do not add any value to the products or services being delivered. For example, in a manufacturing facility, the activity of transporting a product from one work station to another (during the manufacturing process) incurs expenses but adds no value to the final product. Nonvalue added activities in the model include: obtain insurance authorization, resolve collection disputes and rebill charges, and provide information to third parties.

Step 2: Selection and Description of the Orthopaedic Practice(s)

For this study, the authors analyzed the financial data of 19 orthopaedic surgeons of the largest division of an orthopaedic group. The group was formed in 1973 and currently is a partnership of 42 orthopaedic surgeons in 14 locations in Texas. The largest division has 128 employees (125 full time equivalent employees) for an average of 6.6 full time equivalent employees per physician. The largest division contains 19 orthopaedic surgeons, all in one office in an orthopaedic hospital.

Step 3: Determination of the Percentage of Person Hours Devoted to Each Activity

To determine the percentage of person hours devoted to each activity, the authors asked each of the group's 128 employees to estimate the percentage of their time devoted to each of the 17 activities in a typical month. Employees were asked to round to the nearest 5% and were asked to ignore activities that they perform infrequently (accounting for less than 5% of their work time). Employees were given the activity definitions and a worksheet to record their time estimates (Appendix A). Completed data worksheets were returned by all 128 employees. The data were tabulated and the estimated percentage of person hours devoted to each activity was calculated (Table 2).

To verify these estimates, the authors performed a time and motion study for November, 1997. A stratified random sample (grab bag draw) of 40 employees (from the 10 departments within the authors' practice [Accounting, Administration, Support Services, Medical Records, Transcription, Insurance, Collections, Front Desk, Cast Room, Radiography]) recorded the actual number of minutes devoted to each activity on an hourly basis for 2 weeks. From the time and motion study data, the actual percentage of person hours devoted to each activity was calculated. On comparing the em-

ployee estimates and actual percentage of person hours from the time and motion study, the employee estimates generally were accurate; these results are in agreement with those of Siegel.²¹ Of the 680 observations in the time and motion study (40 employees each reporting on the percentage of their time devoted to each of the 17 activities), 558 (82%) showed time and motion results within 5% of the employee estimates, 82 (12%) were within 6% to 10%, 34 (5%) were within 11% to 15%, and only six (1%) showed time and motion results that differed from employee estimates by 16% or more.

Step 4: Conversion From Percentage of Person Hours to Percentage of Expenses (For Employee Wages and Related Employment Expenses)

To convert from percentage of person hours to percentage of expenses, the reported percentage of person hours for each of the 128 employees was multiplied by their annual wages and related employment expenses. Information regarding annual wages was gathered from each employee's 1997 form W-2 Wage and Tax Statement. Information regarding annual employee related employment expenses was gathered from the general ledger.

Step 5: Application of the General Ledger Data to Activity-Based Costing

Data from the 1997 (January 1 through December 31) general ledger were abstracted to determine total annual practice expenses. The general ledger for the group's financial accounting system includes 39 expense categories. Of these 39 expense categories, five are for employee wages and related employment expenses (employee relations, employee insurances [including medical, dental, and workers' compensation], employee pension and 401 (k) employer contribution, salaries, and payroll taxes [Social Security, Medicare, State Unemployment, and Federal Unemployment]), and 34 are for nonemployee related expenses (administrative, advertising, bank charges, continuing education, contract labor, contract services, contributions, depreciation, dues and subscriptions, entertainment, film expenses, miscellaneous insurances, interest expense, laundry and linen, legal and accounting, licenses and registrations, maintenance contracts, maintenance and repairs, minor equipment, miscellaneous expense, offsite storage, paging and answering service, parking, placement fees, public relations,

postage and delivery, rent, rental equipment, office supplies, printing supplies, medical supplies, telephone, and travel). For the employee wages and related employment expenses, the results of the employee survey (Step 3) and the conversion from percentage of person hours to percentage of expenses (Step 4) were used to apportion employee expenses across the 17 activities (based on the percentage of expenses devoted to each activity). The nonemployee related expenses were allocated to the appropriate activity (Table 1).

Data were analyzed by expenses per number of patients seen and expenses per number of office visits.

RESULTS

From January 1, 1997 to December 31, 1997, 19 orthopaedic surgeons at one institution saw and treated 32,426 patients for a new or established musculoskeletal condition. These patients had 66,131 office visits. The total expenses in connection with these visits was \$6,652,306; the average expense per visit therefore was \$99.09 (Table 2).

Table 2 shows the distribution of expenses across the 17 activities. The largest expense was the maintain facility expense which accounted for 21.4% of costs or \$21.20 per office visit. Service patients in office accounted for 16.0% of expenses and sustain business by managing and coordinating practice accounted for 13.8%. Together, these three activities accounted for 51.2% of all expenses (Table 2). Nonvalue added activities accounted for 25.6% of all person hours and 16.5% of all expenses.

Annual employee wages and related employment expenses totaled \$4,275,290 (64.3% of all practice expenses) and annual nonemployee related expenses totaled \$2,377,016 (35.7% of all practice expenses). The expenses were attributable to employee wages and related employment expenses in 10 of the 17 activities and made up a portion of the expenses for an additional three activities (Table 2).

DISCUSSION

The recent trends toward managed healthcare systems have led to a growing interest in the

costs associated with delivering musculoskeletal care. Recent work has focused on the costs associated with specific orthopaedic conditions and procedures.^{4-8,10,17,22} A more global issue, which has remained somewhat obscure, is an evaluation of total orthopaedic practice expenses.

The purpose of the current investigation was to present a standard method by which an orthopaedic practice may analyze its practice expenses. A five-step process of analyzing practice expenses was developed using a modified version of activity-based costing. The method described involves relatively simple accounting techniques and can be used by individuals familiar with bookkeeping and accounting. The technique may be used by a solo practice or large groups, including private practice and university practice. The technique is applicable to group practices regardless of the manner in which individual physicians expenses are calculated (divided equally among all physicians or divided based on income or divided based on actual resource utilization).

The model of 17 activities accounts for all of the expenses incurred by an orthopaedic practice.

For an orthopaedic practice to use the method of calculating practice expenses the model of activities must be understood (Step 1, Table 1) and the orthopaedic practice must be defined (Step 2). All of the practice's employees must estimate the percentage of their time devoted to each of the 17 activities (Step 3). A reprint of the employee worksheet is shown in Appendix A. In this investigation, the employee survey estimates were verified via a time and motion study. The results suggest that employee estimates are relatively accurate. Individual practices therefore may wish to skip the labor intensive process of verifying estimates via a time-and-motion study.

Next, the percentage of person hours (results obtained from Step 3) are converted to percentage of expenses using the methods described in Step 4.

Finally, employee wages and related em-

TABLE 2. Data From the Practices of 19 Orthopaedic Surgeons

Activity	Percentage of Person Hours	Annual Employee Wages and Related Employment Expenses (\$)	Annual Nonemployee Related Expenses (\$)	Total Annual Expenses* (\$)	Percentage of Expenses	Expense Per Patient** (\$)	Expense Per Office Visit† (\$)
Service patients in office	25.0	1,067,341	0	1,067,341	16.0	32.92	15.90
Schedule and perform in office surgeries	0.5	20,149	0	20,149	0.3	0.62	0.30
Schedule and coordinate surgery patients in hospital or external facility	7.3	312,316	0	312,316	4.7	9.63	4.65
Service patients in hospital or external facility	1.9	80,598	0	80,598	1.2	2.49	1.20
Obtain insurance authorization	8.2	352,615	0	352,615	5.3	10.87	5.25
Maintain medical records	13.6	612,048	0	612,048	9.2	18.88	9.12
Billing	2.3	99,483	0	99,483	1.5	3.07	1.48
Collect payments	4.6	198,334	0	198,334	3.0	6.12	2.95
Resolve collection disputes and rebill charges	12.3	527,492	0	527,492	7.9	16.27	7.86
Provide information to third parties	5.1	219,748	0	219,748	3.3	6.78	3.27
Patient radiographs	8.1	346,933	113,501	460,435	6.9	14.20	6.86
Casting	4.2	175,858	173,880	349,738	5.3	10.79	5.21
Provide occupational therapy or physical therapy	0.0	0	0	0	0.0	0	0
Maintain professional education	0.0	0	13,748	13,748	0.2	0.42	0.20
Sustain business by managing and coordinating practice	6.8	262,374	652,794	915,168	13.8	28.22	13.63
Maintain facility	0.0	0	1,423,093	1,423,093	21.4	43.89	21.20
Teaching and research	0.0	0	0	0	0.0	0	0
Total	100.0	4,275,290	2,377,016	6,652,306	100	205.15	99.09

*Annual employee wages and related employment expenses + annual nonemployee related expenses.

**The total number of patients seen in 1997 was 32,426.

†The total number of office visits in 1997 was 66,131.

ployment expenses are apportioned based on the percentage of expenses that were calculated in Step 4. Nonemployee related expenses are apportioned by distributing the general ledger expense categories across the 17 activities based on the detailed descriptions (Table 1). To facilitate this process (Step 5), a worksheet to calculate expenses is shown in Appendix B.

The technique is useful because it allows for distribution of a practices financial data across the 17 activities so long as the expense categories are distributed based on the detailed descriptions (Table 1).

Results of this study showed an average expense per office visit of \$99.09. These findings are based on the 66,131 office visits of the 19 physicians practices studied. Orthopaedic practice expenses undoubtedly will vary to some degree based on geographic location, practice type, group size, penetration of managed care in the local market, and various other factors. The importance of the current data, however, should not be diminished by the fact that it represents one orthopaedic groups' experience. Healy and Finn⁹ have reported on important economic findings from one center. One particular practice's expense data were presented to show more clearly the method of analysis that has been developed.

In the practice studied, employee wages and related employment expenses comprised 64.3% of all practice expenses. The activity of maintaining the facility (rent, negotiating leases, telephone service, nonemployee related insurances, supplies, acquiring medical and office equipment and installing communication systems) accounted for 21.4% of all expenses. Servicing patients in the office and sustaining business by managing and coordinating practice accounted for an additional 16.0% and 13.8%, respectively. By identifying those activities that account for the largest

proportion of expenses, physicians and practice administrators can focus their attention on the expense areas offering the greatest opportunity for cost reduction.

Nonvalue added activities are those activities that have expenses associated with them, but do not add any value to the products or services being delivered. In the simplest terms, these activities may be thought of as wasted manpower and dollars. In this study, nonvalue added activities accounted for 25.6% of all employee person hours and 16.5% of all expenses. In a more efficient healthcare environment, these nonvalue added activities could be eliminated and resources could be used to make healthcare available to more patients. Eliminating these nonvalue added activities would decrease cost without impacting the quality of medical care. A glaring example of wasted resources is the activity of resolving collection disputes and rebilling charges. In this study, this activity accounted for 12.3% of person hours and 7.9% of all expenses; surely these resources could be spent better elsewhere.

The method described to calculate orthopaedic practice expenses is a modified version of activity-based costing. The method traces employee related expenses to activities. All other expenses are assigned to physicians (office visits) based on use. The method requires no special computer software or training. The authors think this method will allow orthopaedic practices to analyze practice expenses carefully. By carefully analyzing practice expenses, orthopaedic practices may focus their attention on the expense areas offering the greatest opportunity for cost reduction.

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Appendix A. EMPLOYEE WORKSHEET

Employee Name: _____ Average Hours Worked Per Week: _____

Instructions:

A business process is a collection of tasks and activities necessary to run a medical practice. Business activities include servicing patients in the office, maintaining medical records, billing, and others. Seventeen activities have been identified in a typical orthopaedic surgery practice. Please see the list of activities (and their description) below.

To determine the cost of providing medical services, the activities which consume your time must be determined. Please review the activity list. Think about the work you have done over the past few months and indicate the approximate percentage of your time typically spent on each activity. If all your time is spent on one activity, simply enter 100% in the appropriate box. If your time is divided between three or four activities, the approximate percentages should be entered in the appropriate boxes. The smallest block of time should be 5%; that is, ignore those things that you do infrequently. Time should sum to 100%.

Activity	Description	% of Time
Service patients in office	This is the activity of treating and managing patients during initial and postoperative office visits. This includes all processes necessary to service the patients including greeting the patient, taking the patient history, scheduling appointments, preparing examination rooms, preparing prescriptions, ordering tests, answering patient questions (in person and on the phone), routing patients, referring patients to other specialists or to occupational therapists. This activity also includes providing information and reports to the referring and primary care physicians but does not include maintaining medical records, obtaining insurance authorization, or in office surgeries.	
Schedule and perform in office surgeries	This activity applies only to practices that have their own operating room. Activities include scheduling and performing surgeries in the practice's operating room, preparing the operating room for surgery, assisting the doctor during surgery, and caring for patients after surgery. This activity does not include any processes related to surgeries performed in hospitals or other facilities.	
Schedule and coordinate surgery patients in hospital or external facility	This is the activity of keeping track of patients in the hospital or other facilities. It includes scheduling surgeries and physician rounds, keeping track of every patient in the hospital, delivering and picking up medical records, recording all daily physician services, and scheduling physician meetings. This work is done for inpatient and outpatient surgeries.	
Service patients in hospital or external facility	This is the activity of treating patients in the hospital or other facilities. It includes making rounds, examining patients, and working in the operating room. All of this work is done outside the office.	
Obtain insurance authorization	This activity is the process of contacting the insurance company, healthcare maintenance organization, or workers' compensation to verify insurance coverage and to obtain authorization for services to a patient.	

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Maintain medical records	This is the activity of collecting, entering, and copying information for patients' medical charts. It includes transcription of notes, photography, pulling charts, and refiling charts.
Billing	This is the activity of recording patient charges for services rendered and submitting claims to insurance companies, Medicare and healthcare maintenance organizations.
Collect payments	This activity includes collecting funds from individuals, insurance companies, healthcare maintenance organizations, maintaining accounts receivables records, and making bank deposits.
Resolve collection disputes and rebill charges	This is the activity of evaluating explanation of benefits and working with insurance companies, and healthcare maintenance organizations, to resolve payment/billing disputes, submitting additional information to payers, and rebilling.
Provide information to third parties	This activity involves providing information to third parties, such as attorneys and insurance companies. It does not include providing information to the referring physician (see Service patients in office).
Patient radiographs	This is the activity of taking radiographs in the office. It includes all costs of maintaining xray equipment, authorizing xray release, and sending and receiving xrays.
Casting	This is the activity of applying and removing casting (and dressings) in the office.
Providing occupational therapy or physical therapy	This applies only to practices that have their own occupational therapy or physical therapy facility. This is the activity of preparing the therapy room for patients, working with patients in therapy, billing for therapy, and managing the therapy department.
Maintain professional education	This is the activity of the physicians and office staff in maintaining their respective intellectual capital.
Sustain business by managing and coordinating practice	This is the activity of running the business side of a medical practice. Activities include general office management, accounting, marketing, purchasing office and medical supplies, postage and delivery, negotiating contracts, complying with regulatory requirements, managing human resources, and taxes.
Maintain facility	This is the activity of maintaining an environment in which to practice medicine and run the business. It includes rent, negotiating leases, telephone service, nonemployee related insurances, supplies, acquiring medical and office equipment (allocating expenses by depreciating the asset over its useful life), and installing communications systems.
Teaching and research	This is the activity of teaching residents, medical students, and interns, and involvement in research projects.
Total	

Appendix B. Worksheet For Calculating Orthopaedic Practice Expenses

Activity	Percentage of Person Hours	Annual Employee Wages and Related Employment Expenses	Annual Nonemployee Related Expenses	Total Annual Expenses	Percentage of Expenses	Expense Per Patient	Expense Per Office Visit
Service patients in office							
Schedule and perform in office surgeries							
Schedule and coordinate surgery patients in hospital or external facility							
Service patients in hospital or external facility							
Obtain insurance authorization							
Maintain medical records							
Billing							
Collect payments							
Resolve collection disputes and rebill charges							
Provide information to third parties							
Patient radiographs							
Casting							
Provide occupational therapy or physical therapy							
Maintain professional education							
Sustain business by managing and coordinating practice							
Maintain facility							
Teaching and research							
Totals							

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