Incentive Systems for Academic Productivity in a Department of Surgery

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Academic departments of surgery have supported the traditional three areas of faculty endeavors: clinical care, research, and teaching. Economic changes in the healthcare environment have created new challenges to the academic missions of university-based departments of surgery. In the past, excess revenue from clinical services was used to support the research and teaching missions of clinical departments. Over the last decade, the economic trends have been characterized by a decrease in reimbursement for most clinical services, an increase in physician time related to documentation, and an increase in fixed costs associated with malpractice insurance and support services. Within university practices, enforcement of an 80-hour work week for residents and fellows is likely to shift further responsibility of patient care to the faculty. These developments have compromised the resources of revenue and faculty time that had previously been available for academic productivity.

University-based departments of surgery have been forced to compete with for-profit and private practice institutions. To meet this challenge, there has been a greater focus on clinical services and fiscal management within academic surgery departments. Hospitals control a greater percentage of total reimbursement for clinical services and have become an important source of support for clinical faculty. But hospital administrators are often resistant to supporting academic pursuits not directly related to patient care activities. These additional considerations have contributed to a situation that has resulted in support for clinical faculty involved in services that are profitable, with less support for programs related to research and teaching. The increasing role of hospital administration controlling support for clinical services can influence the effort and productivity of clinical faculty. For example, it has been suggested that operating room time be allocated to surgeons based on how individual physician practices contribute to the hospital margin.[1] The overall outcome of these changes has been to place a greater emphasis on clinical care and in some cases has created a disincentive for faculty members to pursue academic endeavors.

One system for measuring clinical productivity is the relative value units (RVUs).[2] This system has been used to measure three categories of practice management: productivity;[3] cost,[4,5] and benchmarking.[6] The RVU system is based on physician activity, which is in contrast to productivity measures based on clinical billings or revenue collection. The Resource-Based Relative Value Scale RVU work component is designed to measure physician effort and the amount of independent decision-making skill required for performing a procedure.[3] The RVU system allows productivity to be directly linked to provider coding. Although the RVU is a useful means to measure clinical productivity, faculty and department administrators can erroneously focus on this single parameter as a measure of faculty productivity. Ideally, one would like to develop a system that creates an incentive for a balanced measure of clinical and academic productivity.

In light of these changes in university-based clinical departments, we sought to develop a system to encourage academic productivity while maintaining an incentive for clinical volume. Such a system should be objective and flexible to achieve the necessary balance of clinical and academic effort. Faculty members should be able to understand the system and how it encourages the goals of the department, and they should understand how their efforts in clinical and academic pursuits would be rewarded. The system should also recognize the diversity of faculty, some of whom devote the majority of time to clinical care and some of whom are more involved in research and teaching. The Department of Surgery at Jefferson Medical College is composed of full-

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time faculty members and volunteer clinical faculty. The volunteer clinical faculty members have an important role in residency training and research projects, but their clinical services are provided through private practice physician offices and are financially separate from the Department of Surgery. Systems that encourage academic productivity must take into account fundamental differences in various practice patterns.

METHODS

Questionnaire

A questionnaire survey was developed to determine the percent effort and current activities of faculty in the Department of Surgery (see Appendix). Questions related to interest in research, teaching, and motivation toward academic pursuits were included. The questionnaire was sent to 42 faculty members, including 24 full-time faculty members and 18 volunteer clinical faculty members. We focused our analysis on the 33 faculty members who deliver the majority of care at Thomas Jefferson University Hospital. Within this group, responses were received from 16 of 23 (70%) full-time faculty members and 7 of 10 (70%) volunteer clinical faculty members. A Web site was developed to allow responses online and can be seen at http://home.ix.netcom.com/≈rrtemp/. Responses to the survey could also be submitted by fax, email, or hard copy. The department annual report was used to gather current data related to faculty publications, research grants, and other scholarly activity. Data from the survey were collated and transferred to a Microsoft Excel spreadsheet.

Interviews

Interviews were performed with a spectrum of personnel, and this information was used to gain a better understanding of the barriers and financial constraints that may limit academic productivity. These interviews included full-time university faculty members, volunteer clinical faculty, key departmental administrators, and chairmen of key committees related to reimbursement and faculty promotion.

RESULTS

Effort reporting was characterized as relating to teaching, research, administration, or clinical care. There are obvious difficulties delineating effort among these categories. For example, delivering patient care with residents and medical students could be categorized as either clinical or teaching effort. There is an understanding that providing patient care is clinical effort and that teaching effort should be reported as additional time spent related specifically to teaching. Clear trends were noted in the analysis of percent effort. As seen in Figure 1, the average time spent in research was 11% and in clinical care was 63%. The majority of faculty members with significant clinical responsibilities (16 of 21 or 76%) indicated a desire to increase their effort in research by an average of 12%. Similarly, the majority of faculty members (17 of 21 or 81%) indicated a desire to decrease clinical effort by an average of 14%. When considering only respondents who indicated a desire to decrease clinical effort, the average change in clinical effort was noted to be 20% (a decrease from 68% to 48%).

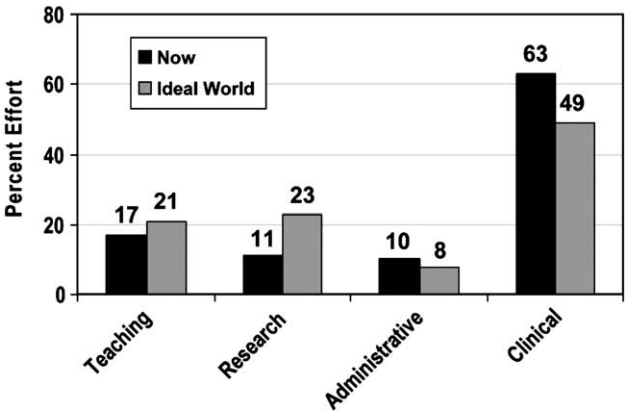

Figure 1. Faculty effort. Faculty effort is shown as a percentage of total time for current effort (Now) and according to faculty preference if possible (Ideal World).

There was unanimous response that it was important for faculty members to be affiliated with Thomas Jefferson University or a comparable academic institution, and 90% indicated that their association with the university was "very important." Ninety percent of respondents believed that research should be a major focus of the department. Although 14% of respondents believed that insufficient training or background limited academic productivity, 62% indicated that both time and financial constraints were major obstacles to academic productivity.

Teaching was an important part of the academic activity for the faculty, and all respondents indicated a desire to continue teaching. The activities thought to be most important for effective teaching were rounding with residents and students and providing intraoperative

technical instruction. Formal lectures and conferences were cited as least important activities relating to teaching by the faculty. Seeing patients in clinic with the residents was also believed to be of less importance to surgical education. Overall, the percent effort devoted to teaching was approximately 20% on average, and most respondents did not indicate a change in this effort.

Several questions dealing with financial incentives indicated that most faculty members believed that devoting more time to academic pursuits would decrease clinical volume, which would result in a loss of income. These findings indicate that a system to encourage academic productivity must avoid creating a disincentive for research and teaching. On the other hand, the incentive to be clinically productive must be maintained. Interestingly, approximately half the respondents were willing to risk up to 10% of their salary in order to spend 10% of their time on academic pursuits. The faculty indicated that incentives and rewards for academic productivity should be equally divided between recognition, financial incentives, and promotion.

There was significant diversity related to longterm career goals. Less than 15% of respondents indicated the desire to become a departmental chairman. The most common response to longterm career goals was to develop a national reputation for clinical expertise.

The survey and interviews highlighted a number of issues that could increase academic productivity. One item discussed at several levels was a need for a clinical database and data manager or nurse coordinator. Such a database could be used to collect and analyze clinical data as a way to improve patient care and design controlled trials to address specific research questions. One other suggestion was to develop a core curriculum for surgery residents that would be specific to each of the surgery services. The survey confirmed a strong commitment to medical education among both full-time and volunteer clinical faculty.

DISCUSSION

As economic pressures continue to focus attention on clinical volume and productivity, there are fewer resources and less time to devote to the academic mission. Given the changing health-care environment, incentive systems within academic departments of surgery need to adapt in order to continue to encourage academic productivity. On the other hand, any incentive system within a department of surgery must encourage and reward clinical productivity. There are several methods for measuring clinical productivity, and compensation methodologies must be adjusted based on the payer mix of fee-for-service versus capitated managed care patients.[7] The RVU system has been introduced as a means to objectively measure clinical productivity and cost-effective care.[5,6] Although the RVU system may be appropriate for measuring clinical productivity and benchmarking, this system may actually create a disincentive to academic productivity, which is not readily measured in monetary gains.

There are a number of general concerns that need to be considered when developing a system to measure academic productivity. The first consideration is that no single system can be developed that is appropriate to every institution. Different departments of surgery have disparate goals that reflect the institutional priorities and culture. Institutional priorities can change with time, necessitating a realignment of incentive systems. Accomplishing the various clinical and academic goals within a department requires the concerted effort of a group. To reflect the cooperation required to achieve departmental goals, the appropriate unit of measure might not be the individual, but rather the division, program, or center. For any incentive methodology to be effective, there must be acceptance of the system among the faculty. So the faculty within the division should develop an incentive system with the approval of the department and institution. Such an inclusive process is more likely to result in an effective system that creates an incentive to achieve the goals of the department.

Metrics of academic productivity

The first step in creating an incentive system for academic productivity is to define the metrics that will be used to assess academic accomplishments. Although there are significant differences between institutions, there is a common set of criteria that can be used to develop an objective measure for academic achievement. Table 1 summarizes the various categories of academic productivity that may be used to evaluate academic accomplishments.

Academic rank

One component of academic productivity is academic rank. Promotion in most academic medical centers requires a consistent track record of academic achievement and considers medical education, research, other scholarly activity, and national reputation.

Table 1. Categories of Academic Productivity that Evaluate Academic Achievement

Category	Achievement/effort		Weight	Subtotal
Academic rank	Full professor		X1a	
	Associate professor		X1b	
	Assistant professor		X1c	
	Instructor		X1d	
Administration	Chairman		X2	
	Vice-chairman		X3	
	Division chief		X4	
	Residency director		X5	
	Student clerkship director		X6	
	Committee chairman (h/y)		X7	
	Committee membership (h/y)		X8	
Research	Publications (impact factor)(number)(authorship, 1 or 0.5)		X9	
	Total costs obtained from grants		X10	
	Number of grant submissions		X11	
	Editorial board (h/y)		X12	
	Study section (h/y)		X13	
Teaching	Average resident evaluations		X14	
	Average student evaluations		X15	
	Lectures (h/y)		X16	
	Medical boards (h/y)		X17	
	National lectureships (h/y)		X18	
	Teaching award		X19	
			TOTAL	
Total	<10 percentile	10–50 percentile	51–90 percentile	>90 percentile
RVU multiplier	0.90	0.95	1.05	1.10

RVU, relative value unit.

Administrative duties

Program administration is required to attain the missions of a department of surgery, and time spent performing administrative duties is not normally reimbursed from identifiable income sources. In an optimal situation, funds to support the administrative work of the department are provided through the medical school or hospital and do not add to the economic burden of the department. Administrative work varies with the level of responsibility as it relates to departmental structure. The usual departmental administrative categories include chairman, vice-chairman, and division chief. Other administrative duties relate to departmental and medical school programs and include residency director, clerkship director, and memberships on departmental, hospital, and medical school committees.

Research

Research productivity can be measured by a variety of metrics, including publications, grants, and memberships on editorial boards and study sections. Rather than count publications equally, it seems more appropriate to weight each publication based on an objective measure of quality or significance. One objective measure that can be applied is to weight publications based on the impact factor. The use of the impact factor to measure quality of publications is controversial. The impact factor was developed as a bibliometric indicator and not as a measure of publication quality.[8] On the other hand, use of impact factor as an objective measure of publication quality may be reasonable for general medical journals.[9] Despite the limitations of this system, the impact factor can be used as one objective measure that correlates with the significance of published articles,[10-12] and it should be determined whether the faculty would be willing to use this system to weight publications. In the system we have proposed, the impact factor could be used to weight publications to derive an objective value of publications. For example, if two papers were published in a journal with an impact factor of 7 and three papers were published in a journal with impact factor of

3, then the total publication impact would be (2)(7) + (3)(3) = 23. Publications in which the faculty member is first or corresponding author are fully credited; papers on which the faculty member is coauthor are given half credit. Although book chapters are not peer reviewed, they represent a valuable contribution and could be assigned an impact factor (eg, 2–5).

Grants can be obtained from a wide range of sponsors, including government or other peer-reviewed sources and contracts with companies that support specific clinical trials or product testing. Several metrics can be used to measure the value of grant funding. The obvious measure is total dollar value of the grant including direct and indirect costs. Because direct costs are budgeted for specific purposes, one measure of the off-balance sheet value of research grants is indirect cost recovery, and indirect costs are usually higher for more rigorously peer-reviewed grants and lower for corporate sponsored projects. There is significant effort that is required to submit a grant, and grant submissions should be considered in assessing academic effort even when the grant was not funded.

Other academic activities include memberships on editorial boards and study sections. These efforts represent important academic contributions that require a commitment of time and effort and that are not directly supported by identifiable sources of revenue. Time spent in these activities can be an important part of the academic mission of a department.

Teaching

Medical education is a core mission of an academic department of surgery that needs to be supported. In most cases, there are insufficient funds to support the time and effort of teaching residents and medical students. It is often difficult to clearly categorize effort involving patient care that is provided in association with a resident or medical student as related to teaching or clinical care. For example, seeing patients in the clinic with a medical student can be considered clinical activity, but it also adds additional time and effort and is an important aspect of medical education. By contrast, didactic lectures and national presentations are more obvious examples of teaching. Resident and medical student teaching can be objectively assessed through resident and student evaluations, and a numeric evaluation (eg, 1–10) can be used to obtain an overall score that reflects teaching effort. Teaching awards are additional evidence of a consistent commitment to medical education. Service on medical boards such as the American Board of Surgery is another example of an important academic contribution to medical education.

Creating an incentive system

The parameters in Table 1 can be used to develop an objective measure of academic accomplishment and can be assessed annually to evaluate individual performance. The relative weight (Xi) given to each category is likely to be different for each department and will reflect the goals of the department or division. For example, a department that wanted to emphasize teaching might assign relatively larger values to X14 and X15 (eg, a value of 10) and lower weights to X10, X11, and X12. In the case of X10, the total grant funding might be multiplied by 0.001 so that $100,000 annual grant funding would receive a subtotal value of 100 and would be equivalent to an individual receiving an average score of 10 from resident evaluations (10 from resident evaluations multiplied by X14, where X14 = 10, would give a subtotal of 100 in that teaching category). Alternatively, the faculty might decide that time spent on an editorial board did not fulfill the objectives of the department and could make X12 very low or zero. By assigning weights to each category, one can develop an objective measure of academic accomplishment that reflects the goals of the department or division. But developing an incentive system to reward academic accomplishment can take many forms. Several groups have attempted to develop compensation plans that take into consideration clinical care, research, teaching, academic rank, and administrative duties.[13-15] There are several approaches that can be used to develop incentive systems that encourage academic productivity.

One system to create an incentive for academic effort is based on maintaining a minimal level of academic accomplishment as a requirement for employment. One application of this model is the "up or out" system, which is based on the requirement that faculty members be promoted within a set number of years or face losing their appointment. This system is usually associated with multiple academic tracks (eg, tenure, clinical, or research) that have various criteria for promotion. This system has the advantage that it separates reimbursement from academic achievements yet maintains the requirement for a minimal level of academic effort. The disadvantages are that the junior faculty members are uncertain of their future at the

institution and senior faculty members do not have a continued incentive for academic effort.

Another system is based on using the parameters in Table 1 to develop an objective value of academic accomplishment, which is used to weight RVUs. The first step requires assigning weights (Xi) for each category and will need to be generally agreed on by the faculty. The individual weight is multiplied by the achievement or effort to derive a subtotal for that category. The relative weight given to each category will depend on the goals and culture of the institution. The sum of the subtotals provides a total score that should represent an objective rating of academic effort and achievement. The total rating can be used to assign a factor, which will be used to weight clinically generated RVUs. As an example of determining the factor, the percentile rank within the department can be used to stratify individual faculty members. Faculty members who are very productive academically (top 10 percentile) might have their RVUs weighted by a multiplier (eg, 1.1), and faculty members with the lowest academic effort have a lower multiplier (eg, 0.9). Application of this system requires a consensus as to the relative weight given to each category of academic parameters and the range of factors used to weight RVUs. An advantage of this system is that it provides an incentive to be academically productive while at the same time encouraging clinical volume. But this system redistributes clinical revenue, and the argument could be made that any system that redistributes clinical revenue based on academic effort creates a disincentive to clinical effort. An alternative to this system would be to set aside a percentage of total revenue (derived from various sources including the school, hospital, fund raising, and clinical fees) that will be distributed to the faculty members based on academic effort. Success of these systems requires that the model used is objective and is based on a consensus of the faculty within the department or division.

Appendix

Faculty questionnaire. This is the questionnaire submitted to the faculty. It could be completed by email, hard copy, or online at http://home.ix.netcom.com/~rrtemp/.

Background Information

Q1. What is your academic rank?

a. Instructor
b. Assistant Professor
c. Associate Professor
d. Full Professor

Q2. What is your affiliation to Thomas Jefferson University?

a. Full-time faculty
b. Volunteer clinical faculty

Q3. How many years has it been since completing your surgery training?

a. 0 - 5
b. 6 - 10
c. 11 -15
d. 16 - 20
e. >21

Allocation of Time

Q4. What percentage of your work time do you spend on each of these activities?

a. Teaching ___%
b. Research ___%
c. Administrative ___%
d. Clinical ___%

Q5. In an ideal world, what percentage of your work time would you spend on each of these activities?

a. Teaching ___%
b. Research ___%
c. Administrative ___%
d. Clinical ___%

Q6. What do you regard as teaching? Place in order of importance with percentages according to practice.

ACTIVITY	Importance (1-highest)	% teaching time
a. Rounds with residents		
b. Formal lectures		
c. Talking about case at scrub sink and during case		
d. Intraoperative technical pointers		
e. Small group sessions about specific topics		
f. Participation in conferences		
g. Seeing outpatients in clinic with residents		

Ways to Improve Academic Involvement

Q7. How important is it for you to be affiliated with TJU or a comparable academic institution?

a. Very important
b. Somewhat important
c. Not important

Q8. In your opinion, what are the obstacles to increasing academic productivity (research, teaching & publications)? (Please use 1-5 scale to indicate degree of impact)

	No obstacle 1	2	3	4	Major obstacle 5
a. Time constraints					
b. Financial constraints					
c. Insufficient background					
d. Lack of general interest					
e. Other: please state _____ _____ _____					

Q9. Please indicate if you agree or disagree with these statements:
1. Strongly Disagree 2. Disagree 3. Don't Know 4. Agree 5. Strongly Agree

a. ___ I would like to be involved in research projects but I do not know where to start.
b. ___ I am highly motivated to pursue research projects.
c. ___ I enjoy teaching the students and would like to spend more time teaching.
d. ___ I am overwhelmed by my clinical duties.
e. ___ I am worried that if I devote more time to research and teaching that my clinical revenue and income will be decreased.
f. ___ I would welcome a system that rewards academic productivity rather than emphasizing clinical volume.
g. ___ It would be a relief if I didn't have to worry about teaching.
h. ___ It would be a relief if I didn't have to worry about publishing papers.
i. ___ As a surgeon, I do not feel promotion should depend upon publications.
j. ___ The department does a good job recognizing my contributions.
k. ___ Research needs to be an important part of the Department of Surgery.
l. ___ I would be in favor of a bonus system that placed a high weight on academic (i.e., research and teaching) productivity.

Q10. In 10 years, I would feel relatively content with my surgical career if (please choose one):

a. I became a chairman.
b. I had a national reputation for clinical care (e.g., present a plenary session at ACS or national specialty meeting).
c. I had a national reputation for research (e.g., present a plenary session at ACS or national specialty meeting).
d. I had a national reputation for teaching (e.g., present a plenary session at ACS or national specialty meeting).
e. I made a major contribution to the field of surgery so that my name was synonymous with a new procedure or concept.
f. I published 3-5 papers per year in peer-reviewed journals.
g. I can provide for my family.
h. I can take care of patients.
i. The residents, students and fellows like me for my teaching.
j. Other_____

Relative Value of Academic Activities.

Q11. What incentives could the department provide to compensate you for your academic activities? (Please allocate 100 points between these 5 options):

	Points Allocated
a. Recognition by department and among peers	___
b. Opportunities to participate in conferences & external training	___
c. Financial incentives	___
d. Promotion (independent of salary increase)	___
e. Other: (Please state)_____	___
	Total = 100

Q12. Assume you spent 100% of your time providing clinical care and had the opportunity to spend 10% of your time pursuing academic activities that were not reimbursed. What percent of your salary would you be willing to put at risk to spend the 10% effort on academic activities?

a. 0.0% - 2.5%
b. 2.6% - 5.0%
c. 5.1% - 7.5%
d. 7.6% - 10%

Additional Comments.

Q13. What would make you more productive academically?

_____
_____
_____
_____
_____

Comments: Please include any additional comments

_____
_____
_____
_____

Author Contributions

Study conception and design: Weigel, Dafoe
Acquisition of data: Weigel, Dracon, Radhakrishnan, Rho, Sevgen
Analysis and interpretation of data: Weigel, Dracon, Radhakrishnan, Rho, Sevgen
Drafting of manuscript: Weigel
Critical revision: Dracon, Radhakrishnan, Rho, Sevgen, Dafoe
Supervision: Weigel, Dafoe

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