Improving Clinical Productivity in an Academic Surgical Practice Through Transparency

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BACKGROUND: Patient care revenue is becoming an increasingly important source of funding to support the academic surgery department missions of research and education. Transparency regarding productivity metrics will improve clinical productivity among members of an academic surgical practice.

STUDY DESIGN: Clinical productivity-related data were collected and compared between 2 time periods. Data were stratified by pretransparency and post-transparency time periods. Comparisons were made using the Wilcoxon-Mann-Whitney test, and p values ≤ 0.05 were considered significant.

RESULTS: The faculty compensation plan remained the same across both time periods; faculty members were paid a base salary plus practice plan income based on individual collections minus practice overhead and academic program support taxes. Before 2006, clinical productivity data were not made public among faculty members. In 2006, the departmental leadership developed a physician scorecard that led to transparency with regard to productivity. After publication of the scorecard, clinical productivity increased, as did the number of partners producing a threshold number of work relative value units (RVU) (6,415 wRVU = 1.0 full time equivalent [FTE]). This occurred during a time of reduced collections per RVU. There was no change in the work assignments (percent effort for clinical service, research, and teaching) for the physicians between the 2 time periods, or the overall effort assigned to the Veterans Affairs hospital.

CONCLUSIONS: Clinical productivity can be improved by making productivity metrics transparent among faculty members. Additional measures must be taken to ensure that research and teaching activities are appropriately incentivized. (J Am Coll Surg 2013;217:46–55. © 2013 by the American College of Surgeons)

The practice of modern medicine is complex. There are many challenges, including an ever-expanding body of knowledge, issues with jurisprudence, and the evolving health care financial landscape.[1,2] While costs soar, physician reimbursements frequently decline. Given this, developing compensation plans that are fair and equitable is highly desirable. There are multiple compensation models available to physicians. Some involve straight salary, while others have compensation tied to productivity. Having a portion of one's compensation tied to clinical productivity helps to incentivize clinical practice. Indeed, one of the most common methods for incentivizing clinical productivity is to tie compensation to amount of work performed, as opposed to having a straight salary that has no "at-risk" money. In order to effectively administer an incentive-based compensation plan, one must engage in benchmarking productivity data.

Business executives have long known that benchmarking provides the foundation for measuring performance. Indeed, the ability to quantify an activity or event then allows one to develop strategies to "improve" that activity. Whether alteration of human work product by instituting a "variable" reflects the Hawthorne effect or real change is often explained by statistical methodology, but the adage remains that "if you can measure it you can improve it." Kaplan and Norton took the concept of measurement and helped to develop a novel business tool entitled, "The Balanced Scorecard."[3] This tool involves taking

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complex data germane to the business and condensing it into workable information for managers. This concept can provide a framework for the development of a "physician scorecard," a tool that allows managers (and individual clinicians) to see large amounts of data that together work to drive a business function, such as affecting clinical productivity.

Many physicians are competitive, especially surgeons. They want to excel at being a doctor and also to be busy. When data are presented to physicians regarding their clinical productivity, improvements can be realized.[4] This is especially important during a time of diminishing reimbursement and increased budgetary pressure from academic medical centers. Based on these issues, we hypothesized that clinical productivity could be improved simply by making departmental productivity data transparent among faculty members within the surgical practice group.

METHODS

Financial and productivity records between the years 2000 and 2011 from the clinical practice group (University Surgical Associates, PSC) of the Department of Surgery at the University of Louisville were retrospectively reviewed. This practice group includes the following specialties: general and minimally invasive surgery, trauma/critical care, vascular surgery, surgical oncology, transplantation, colorectal surgery, plastic and reconstructive surgery, and otolaryngology/head and neck surgery (ENT). Before 2006, data regarding individual clinical productivity, charges, collections, and costs were made available to each individual physician; however, individuals were not allowed access to these data for other physicians. In 2006, departmental leadership made the decision to share productivity data among the faculty and rank faculty members based on readily available business metrics, reasoning that all surgeons within the same clinical practice were entitled to know the clinical productivity of their partners. A clinical productivity scorecard was developed and distributed monthly to all surgeons within the group; metrics reported included monthly and year-to-date work relative value units (wRVUs), charges, collections, and lag time between the date of service and charge submission. In this way, each surgeon could evaluate his or her clinical productivity compared with all of the other surgeons in the group. Two time periods were compared: Time period A (2000 to 2005) and period B (2006 to 2011).

Relative value unit data were collected from the practice management software used for billing and collecting. Surgeons were defined as having worked a full-time equivalent (FTE) if they reached the median number of wRVUs for a full-time private practice general surgeon, as defined by specialty-specific RVU data from the Medical Group Management Association (source: MGMA.com). For example, if a surgeon worked 6,415 wRVUs, then this surgeon would be considered as having done 1.0 FTE clinical work for that year. This metric was applied across the entire faculty, even those whose work assignment (as determined by the department chair) was weighted more toward research or teaching as well as those with Veterans Affairs (VA) hospital commitments. This metric was held constant throughout the study period and regardless of a surgeon's VA or research commitment. This allows for standardization of the metric across the entire department for the purposes of this study. Academic support taxes are defined as those standardized, flat rate taxes that are applied to collections across all surgeons in our department. These monies are used by the medical school to fund programs and are at the discretion of the dean and departmental chairs.

Population statistics for the surrounding census statistical area (source: US Census Bureau) and the number of practicing surgeons in the area were also analyzed. Comparisons were made using Student's *t*-test, chi-square, and Wilcoxon-Mann-Whitney test, and p values of 0.05 or less were considered significant.

RESULTS

During the study period, there was a slight increase in the number of surgeons from time period A (2000 to 2005; $n = 41$) to time period B (2006 to 2011; $n = 45$). The total number of FTE surgeons rose by 50% during this time period ($p = 0.02$; Fig. 1), as did the total number of wRVUs performed (36% increase, $p = 0.031$). Likewise, wRVU productivity per surgeon was higher in the second time period ($p = 0.031$; Table 1). There was no change in the work assignments for the physicians between the 2 time periods (percent effort for clinical service, research, and teaching), or the overall effort assigned to the Veterans Affairs hospital. When stratified by quartiles of wRVU production, there was a shift away from being in the second (2,146 to 4,367 wRVU/surgeon) and third (4,368 to 6,783 wRVU/surgeon) quartiles toward the top producing quartile (≥6,784 wRVU/surgeon; Fig. 2).

The data were stratified by clinical divisions in order to investigate the impact of these changes on the composition and productivity of each division (Table 2). In terms of numbers of faculty members, it is evident that there was not a significant shift in the total composition of the faculty (ie, a shift away from one division to another) between the 2 time periods. There were several interesting changes in the clinical productivity of the individual

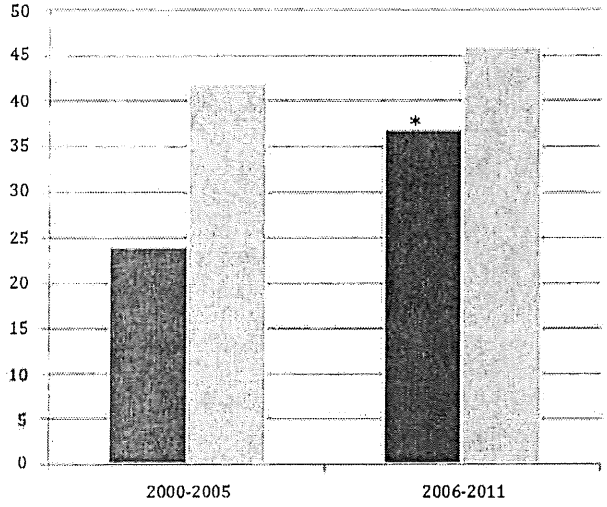

Figure 1. Change in the ratio of full time equivalent (FTE) partners compared with total number of doctors over the reporting period, *p = 0.02. Dark gray bar, full time equivalent surgeons; light gray bar, number of doctors.

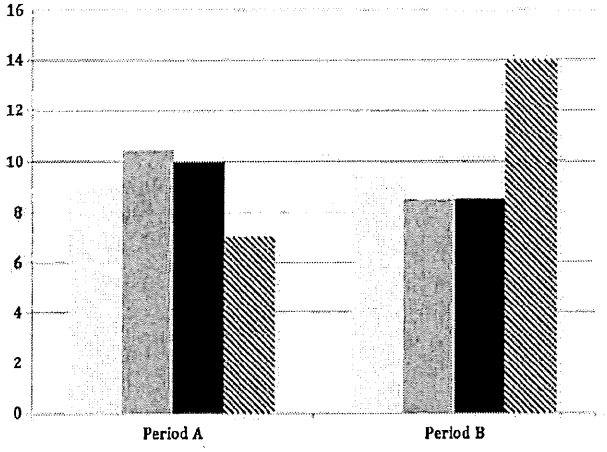

Figure 2. Shift in work relative value units/surgeon by quartiles between the 2 time periods. Light gray bar, 25%: <2,146 work relative value units; dark gray bar, 50%: 2,146 to 4,367 work relative value units; black bar, 75%: 4,368 to 6,783 work relative value units; striped bar, 100%: >6,784 work relative value units.

divisions, however. Several divisions saw a rise in the median wRVU/surgeon after institution of the clinical productivity scorecard, including vascular surgery, transplant, and general surgery. Interestingly, there was a reduction in median wRVU/surgeon in ENT and plastic surgery.

Local population data

During the study period, the population of the Louisville-Elizabethtown-Scottsburg statistical area (source: US Census bureau; www.census.gov) grew from 1.3 million people to 1.45 million (12% growth from time periods A to B), while the total surgeon pool grew from 610 to 638 (5% growth). There was no difference in the population-surgeon ratio ($p = 0.2$) between the 2 time periods. Likewise, there was no statistically significant difference between the total number of surgeons and the number of faculty in our practice ($p = 0.9$).

Impact on practice overhead

Before invoking the clinical productivity scorecard, the practice's overhead rate was 51.1% of collections. During the second time period, the rate decreased to 50.3% ($p = 0.23$). This reduction occurred during a time period that saw a reduction in the amount of collections per wRVU (13% reduction across the 2 time periods, Fig. 3).

Table 1. Impact of Transparency on Clinical Productivity

Variable	Period A, 2000-2005	Period B, 2006-2001	p Value
Surgeons, n	41.5	45.5	0.075
wRVU	188,129	256,076	0.031
wRVU per surgeon	4,556	5,521	0.031
FTE surgeons, n	24.15	36.86	0.02

Data reported as median values.
FTE, full time equivalent; wRVU, work relative value unit.

DISCUSSION

In this study, we demonstrated that transparency of clinical productivity metrics among academic surgical practice group members was associated with increased clinical productivity. The increased clinical productivity seen after introduction of the clinical productivity scorecard occurred despite reduced collections per wRVU. This coincided with improved financial state within the practice (reduced overhead rate), despite a slow change in our overall payor mix toward unfunded or underfunded patients. We work harder and collect more clinical revenue (despite an actual lower collection rate.) In essence, creation of a clinical productivity scorecard and dissemination of productivity data was associated with more clinical work being done by a relatively homogeneous academic surgical faculty.

In 1992, the Centers for Medicare and Medicaid Services began to use a system to reimburse physician work that is based on estimates of work called relative value units (RVU). This system was designed to reflect the difficulty of the service, the risk involved, and the overall care of the patient. Although not a perfect system, bigger, more risky operations are generally associated with more RVUs than more straightforward cases. Because RVUs are standardized nationally, they are probably a valid metric for comparing workloads, and they are

Table 2. Clinical Productivity by Division before and after Introduction of the Clinical Productivity Scorecard

	Period A		Period B		
Division	**Surgeons, n**	**Median wRVU**	**Surgeons, n**	**Median wRVU**	**p Value**
General surgery	19	4,001	20	5,346	0.05
ENT	6	5,125	6	4,673	0.02
Vascular	2	3,593	3	6,121	0.01
Plastics	4	4,657	5	4,043	0.05
Transplant	3	3,629	4	3,907	0.02
Surgical oncology	7	2,919	7	3,924	0.07

ENT, otolaryngology; wRVU, work relative value units,

also weighted to reflect difficulty and time, as well as being readily available from practice management software. These features make RVU a valid measure of clinician productivity. What RVU cannot reflect are differences between individual surgeons in terms of actual time spent in the operating room and clinic caring for an individual patient. One surgeon may take an average of 5 hours to perform a pancreaticoduodenectomy; another takes 3 hours. In addition, RVU cannot measure quality. As quality becomes an increasingly important metric (and as yet to be defined), clinician compensation may become increasingly tied to outcomes and less to volume. It is imperative that surgeons drive the development and implementation of the very metrics by which we may one day be measured and compensated.

Academic surgeons have more than 1 duty: they have teaching and research responsibilities depending on their work assignment. One may question whether or not an increase in clinical productivity will result in reduced teaching performance or research productivity. Several studies demonstrated that highly productive physicians can maintain high quality teaching performance while having high clinical productivity loads.[5,6] Indeed, we have observed that those with the busiest clinical practices often are the recipients of teaching awards and are regarded among the best educators in the department, and that research productivity is similarly correlated with above-average clinical productivity. Those who are highly motivated to provide patient care are often highly motivated to contribute to the other missions in an academic surgery department. This is the subject of future avenues of investigation by us and others. Interestingly, others have found that in situations where revenues from busy clinicians cross-subsidize other academic pursuits (ie, teaching and research), there is an inverse relationship between the amount of time a surgeon spends on clinical activities and the amount of salary those surgeons are willing to sacrifice in order to maintain an academic practice.[7] In a compensation system that uses this approach, one can see how those who are spending a great deal of time in the clinical practice of surgery would not want to take a pay cut without some other nonmonetary benefit.

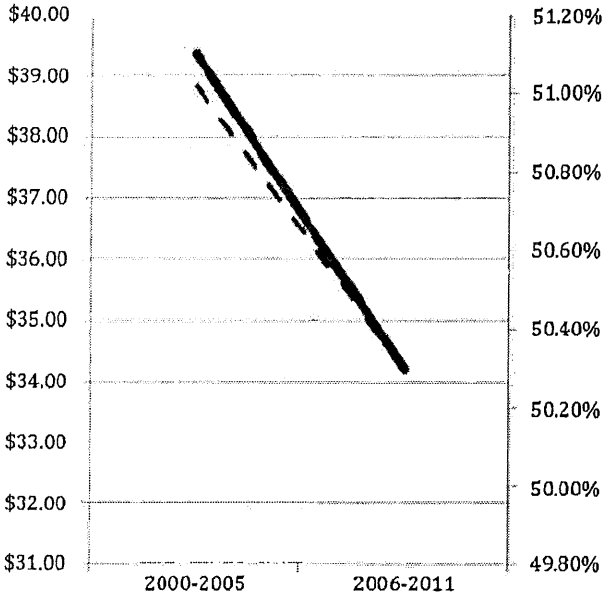

Figure 3. Changes in collections per work relative value units and percentage overhead expenses between the 2 time periods. Dashed line, collections per work relative value unit; solid line, % overhead.

Nevertheless, an "eat-what-you-kill," productivity-based faculty compensation formula is a double-edged sword, and introducing greater peer pressure via transparency of clinical productivity data has potential unintended consequences. There is a bit of a "Catch-22" here: we rely more and more on clinical revenue to fund our research and teaching missions, yet we must be careful that incentivizing clinical productivity does not detract from research and teaching. Consequently, we also publish and distribute a similar academic scorecard that ranks faculty members based on a variety of metrics related to publications, grant funding, and teaching activities. Furthermore, the department chairman has certain discretion regarding the level of base salary and supplemental compensation to adjust for imbalances in payor mix and collection rate, as well as

research and teaching effort among faculty members. This discretion can be reflected by the chairman in an individual surgeon's base university salary. There are as many faculty compensation formulas as there are departments of surgery. The culture, history, and circumstances are unique at each institution. We do not propose that our model is ideal or better than others; it does, however, fit the culture and history of our institution. One advantage of this model is that compensation for clinical work is directly related to the productivity of the individual surgeon. All have a university base salary, and the clinical component of compensation equals the surgeon's collections minus the practice overhead and academic program support taxes. For those who practice in a field with a higher percentage of unfunded or underfunded patients (and therefore, lower expectant collections), the university base salary may be adjusted by the department chairman to ensure that fair, market-value compensation may occur. In this way, we are able to maintain the mix of surgeons and specialties that our institution needs, despite challenging finances and lower reimbursement rates. There is no subjectivity regarding compensation for clinical productivity; no one must make a judgment about how to allocate bonuses. This type of compensation plan, part base salary and part incentive-based, has been shown to be associated with career satisfaction for surgeons.[8]

There are methods of increasing physician productivity. Bringing the issue of productivity and documentation to the forefront has been shown to result in better documentation and increased clinical productivity.[9,10] The amount of change resulting from development of metrics and measuring performance has been debated. One study found a small (6%) increase in clinical productivity with benchmarking in an academic surgical practice.[4] We found a much larger impact in our setting. Perhaps by making productivity data "public" among the departmental faculty, individual surgeons sought to increase their productivity out of a sense of competitiveness. It is human nature to have a sense of being very busy, however, when faculty members can readily see how their performance ranks among their peers, a more realistic picture emerges. This concept also applies to more traditional academic activities, such as teaching and research. When incentivized, academic surgeons can respond positively and increase academic productivity as well.[11] By incentivizing productivity, departmental leadership can cultivate an atmosphere of productivity and corroboration that is synergistic and benefits the entire mission of the department.

Aligning clinical productivity and compensation can increase productivity.[12,13] Under our faculty compensation model, a significant proportion of the overall compensation is dependent on productivity. The amount of "at-risk" compensation over the study time period has not changed. We believe that aligning one's compensation with amount of work performed reflects a fair and balanced method of physician reimbursement. Those who work hard and produce more will have larger paychecks. Clinicians are accustomed to reacting to feedback. Paxton and colleagues[4] demonstrated that the institution of a clinical performance feedback system resulted in a significant increase in clinical performance. Over the course of this study, we have not seen a shift away from tenure faculty to term (which carries less demand for research and publication) or a change in the overall faculty "rank" in terms of junior faculty vs more senior faculty with well established referral practices. There was no change in the median age of the surgeons between the 2 time periods.

We did find some interesting variability among the various divisions within our department. Our department has grown steadily over time, and the medial total number of surgeons in period A was 41 vs 45 for period B (Table 2). Although this is slightly higher in number, the median wRVU per surgeon probably better reflects the impact of the transparency metric on an individual surgeon's productivity. The largest division by far, general surgery, as well as vascular and transplant surgery (both with high wRVU-generating procedures), saw increases in their median wRVU between the 2 time periods. Furthermore, adoption of endovascular techniques may have played an important role in vascular surgery's increase. Surgical oncology, another field with high wRVU procedures, saw no change. This might be due to a shift in this division's personnel, as there was some significant surgeon turnover during the study period. Interestingly, ENT and plastic surgery both saw reductions in the median wRVU per surgeon. Similar to surgical oncology, ENT and plastic surgery had some physician turnover, and perhaps with more time their median wRVU will continue to rise and a difference would become evident.

We acknowledge that our study has limitations. Essentially, we have shown an association between the transparency of clinical productivity metrics and increased clinical performance, not causation. However, the compensation formula remained exactly the same throughout both study periods, There are simply too many confounding factors to consider, and it is possible that other factors are responsible for increased clinical productivity. Furthermore, external factors such as reduced clinical productivity by the surrounding community surgeons is possible, and we have no method for determining a shift in the amount of work being done by surgeons outside of

our department. Another factor that must be considered is the fact that 1 year before adoption of the transparency model, our departmental leadership changed and the impact of this change cannot be directly measured, but may have played an important part in the cultural shift toward clinical productivity. Furthermore, the RVU system is not static, but changes periodically (which it did during the course of this study). Some procedures did not have a defined current procedural terminology (CPT) code at the beginning of this study, but one was developed along with an associated RVU during the later time period. Although this certainly had some impact, this should reflect a minor component of the total amount of work performed by a diverse surgical faculty that is composed of multiple divisions. Furthermore, the amount of change in the wRVU for a procedure might change over time, but not by much. Our surgeons do their own coding, and have done so over the entire study period. Improvements in coding might also play a role in this effect.

CONCLUSIONS

In conclusion, we have shown that introduction of comparative performance metrics between the faculty members in an academic surgical practice is associated with improved clinical productivity. Transparency may be a simple method for increasing clinical revenues and improving overall clinical performance.

Author Contributions

Study conception and design: Scoggins, McMasters
Acquisition of data: Crockett, Wafford
Analysis and interpretation of data: Scoggins, Crockett, Wafford, Cannon, McMasters
Drafting of manuscript: Scoggins
Critical revision: Scoggins, Crockett, Wafford, McMasters

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Discussion

INVITED DISCUSSANT: DR MERRIL T DAYTON (Buffalo, NY): I thank the Program Committee for the opportunity to discuss this specific paper dealing with finances in the department—something all of us chairs really wrestle with. If there is anything I've learned in a decade as chair at SUNY Buffalo, it is: the quickest way to get fired as a chair at a medical school is to mismanage the finances of a department and don't mess with the pocket book of your faculty members without getting extensive feedback from them first.

Drs Scoggins, McMasters, and their colleagues at Louisville have decided to give extensive feedback to their faculty and this paper is an evaluation of the outcome. Financial and productivity records including relative value units (RVUs), charges, collections, costs, and lag time in billing were evaluated in this 8-division department between 2000 and 2011. They divided their analyses into 2 groups: group A (2000 to 2005) and group B (2006 to 2011). The only difference between the 2 groups was in group A, faculty were shown only their own individual productivity accomplishments; in group B they did something very bold—they showed all faculty everyone else's productivity metrics. They then compared the groups to ascertain whether there was a statistically significant difference. They discovered that there was a 36% increase in RVUs, a 50% increase in faculty who met their criteria for a full time employee (11,000 RVUs), and an increase in RVU productivity per surgeon. All of these were significant increases. All of this occurred while reimbursement levels were decreasing. The authors concluded that the increased transparency in group B was associated with greater productivity by the faculty.