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A Mission-Based Reporting System
Applied to an Academic Pathology Department

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Abstract

We report how data from the UC Davis mission-based reporting system (MBR) can be used to define contributions for each division within a Department of Pathology based on faculty rank and series, and to evaluate whether these contributions are in alignment with the missions of the department and the goals of the School's leadership. MBR summary reports were generated for each division within the Department of Pathology which illustrated the average contribution for each faculty rank and series in each of the following missions: Investigative/Creative Work (Research), Teaching, Clinical Service, and Administrative/Community Service. All divisions contributed equally to the Teaching mission, averaging approximately one-third of a faculty member's time. Research was the primary mission for faculty in both the Research and Clinical Pathology divisions, while Clinical Service was the primary mission for Anatomic Pathology. Both Anatomic and Clinical Pathology also played a large role in Administration/Community Service. These roles were appropriate based on the division's distribution of faculty in each of the faculty series. The average contribution to both the Research and Administrative/Community Service missions were larger for the Department of Pathology than it was for the School. The Department of Pathology's average contribution to both the Teaching and Clinical Service missions was less than the School's average. We conclude that MBR data creates unique profiles for divisions and the department and enables interdepartmental comparisons that would not be possible by other means. Within the context of our own school, the present analysis illustrates that the

Department of Pathology is fulfilling the expectations of the School's leadership. In a more general sense, these profiles allow appropriate monitoring of the workforce, funds flow analysis, allocation of resources, and strategic planning in an academic medical center.

Introduction

Mission-based management is defined by the Association of American Medical Colleges as “a process for organizational decision making that is mission-driven, ensures internal accountability, distributes resources in alignment with organization-wide goals, and is based on timely, open and accurate information” (1). Since the mid-1990s, American medical schools have been developing mission-based systems to prioritize their resource allocations and align faculty efforts with the missions of the school. Schools have been particularly interested in mission-based systems as a means of highlighting and enhancing their educational mission, since it is generally believed that this component of the mission has been greatly overshadowed by the revenue-generating capabilities of the clinical and research missions. Many schools have reported their experience creating and implementing these systems, and a recent issue of *Academic Medicine* devoted an entire section to this topic (2-15).

The University of California, Davis (UCDavis) School of Medicine has four missions: education, research, clinical service (patient care), and community service. We first began development of our mission-based reporting (MBR) system in 1998. It was piloted on a small group of faculty in 1998-99, tested on eight departments in 1999-2000, and has been in school-wide use for the past two academic years (2000-01, 2001-02). We previously reported the MBR design as a mechanism to provide chairs with quantitative and qualitative information about their departments in each of the School's four missions which we labeled for this purpose: Investigative/Creative Work (Research), Teaching,

Clinical Service, and Administrative/Community Service (14). MBR was intended to be a tool for department chairs to use in evaluating faculty resources and department performance, both retrospectively and prospectively, so that they could better fulfill the missions of their departments and school, plan for the future, and mentor and reward individual faculty members. Acceptance among the faculty was at first slow, but has been steadily increasing. In addition, we found that MBR can create aggregate profile data for comparisons among faculty ranks or academic series. This has yielded interesting insights into division of workload among these different groups and has enabled comparison of this data to the School of Medicine's stated objectives for rank and series (16).

Most of the published reports on mission-based management have focused on school-wide use of mission-based systems. A few have reported their experience in clinical departments, though none has included a pathology department (7,11,17-19). In this report, we describe the UC Davis Department of Pathology's experience with MBR in evaluating contributions to missions by division and by academic series. The Department of Pathology shares the missions of the School of Medicine which it echoes in the Department's mission statement as: "To develop and deliver the highest comprehensive diagnostic services for our diverse community, to pursue relevant research, and to provide education in the field of academic pathology and laboratory medicine". The MBR aggregate results for the Department of Pathology create a unique picture that would not be possible by any other means, and is useful in determining how the

faculty workforce is used to meet school-wide and departmental goals, as well as to show whether productivity is in alignment with the intentions of the leadership.

Description of MBR System, Evaluation Methods, and Faculty Series

All faculty in the UC Davis School of Medicine were requested by the Dean to participate in the mission-based reporting project (MBR), and to report their clinical, creative, teaching and service activities for the 2000-2001 and 2001-2002 academic years. Three faculty committees had developed our mission-based reporting system. The process of development, pilot testing and implementation has been previously described (14). Briefly, MBR is a password-protected, web-based self-reporting system in which faculty members provide responses to specific questions about their activities for each of the School's four missions (Investigative/Creative work, Teaching, Clinical Service, and Administration/Community Service). Based on the faculty member's entries, the MBR program using a series of rank and faculty series-appropriate algorithms, computes an estimate of time spent in each mission by means of weighted RVUs embedded in the program (14). Mission summary scores are created based on the sum of the entries. Each mission's summary score is then compared to a previously entered "targeted" or "projected" percent effort, estimated for that faculty member at budget preparation time, following the annual career planning session with each faculty member, and prior to the start of the current academic year. A grand total representing the sum of the

four mission totals is also computed and compared to the total of 100% effort that had been targeted prior to the onset of the current academic year. The scoring algorithm assumes that a 50-hour workweek represents 100% total effort. Thus, an observed grand total of greater than 100% for a % Actual score would indicate a faculty member's total effort that exceeds the "expected" or targeted 50-hour work week. A sample of the MBR guidelines and a completed MBR form may be viewed at: <http://informatics.ucdmc.ucdavis.edu/mbrsample/mbrdoc.html> and <http://informatics.ucdmc.ucdavis.edu/mbrsample/mbrsample.html>.

The department chair (RG) reviewed and verified each faculty member's entry into his or her mission-based record during the faculty member's annual career-planning session. To assess face validity of the algorithms, two of the authors (LPH, TFA) re-reviewed each faculty member's entries for accuracy during scheduled meetings with each department chair. The chair was asked to compare his impression of the faculty member's productivity in each mission with the MBR report. When individual entries seemed to be erroneous, the chair was asked to substantiate the entry. Entry errors that were identified were corrected.

After all corrections were re-entered, the summary report for the department, representing the department's effort by mission, and for the entire school. School-wide summary reports were also created to illustrate the average effort in each mission for each faculty series: Ladder Rank, In-Residence, Adjunct, Clinical X series, Salaried Clinical. These series are defined in Table 1. Briefly, the Ladder-Rank, In-Residence and Adjunct series are all

considered to be research-intensive series which emphasize the scholarship of discovery and require demonstration of independence and impact of the scholarly work for advancement. They are distinguished by state-salary support and opportunity for tenure (Ladder-Rank only) and membership in the Academic Senate (Ladder-Rank and In-Residence). The Adjunct series is not an honorific title, as is typical at some schools, but instead encompasses a large number of our research faculty. Faculty in this series are not expected to participate as heavily in teaching, though teaching is still required. The Clinical X and Salaried Clinical series are for faculty members who have a large role in clinical service and teaching. Neither are eligible for tenure, and are appointed for renewable terms. They are distinguished by membership in the Academic Senate (Clinical X only), and by the requirement for scholarship for advancement. The Clinical X series is the series for clinical-investigators. These faculty members are expected to develop a research program which most often focuses on the scholarship of integration, application or education. They must publish or disseminate their work outside the institution and are afforded a minimum of 20% protected time to accomplish this. Their scholarly work may be more collaborative and is not expected to achieve the same level of independence as faculty in the three research-intensive series. The Salaried Clinical series is expected to support the research program of others. An example of this would be to identify and enroll patients in clinical trials. Publication or dissemination of scholarly work is not required for advancement in the Salaried Clinical series;

therefore, these faculty members are not guaranteed protected time from clinical work for this purpose.

Results

School of Medicine

There are 26 departments in the School of Medicine. 628 of the 672 (93%) eligible faculty members participated by completing MBR records. This represents an improvement from the previous year when 85% of the faculty members completed records. Seventeen departments, including the Department of Pathology, had 100% of their faculty complete records. From the cumulative data, an overall profile for the school was generated which compared the average percentage of actual effort for all faculty by mission to the average targeted percent effort. The average targeted effort for each mission across the entire school was 32% Research, 25% Teaching, 32% Clinical Service, 11% Administrative/Community Service and was unchanged from the previous year. Totaling the % Actual for each mission resulted in a sum greater than 100% (50% Research + 50% Teaching + 17% Administration + 38% Clinical = 155%), and indicates that school-wide, on average, the faculty members are working more than the 50 hours per week that was considered to represent 100% effort. Extra effort was observed in our initial pilot study and in 2000-01 and is not unexpected since our faculty have large clinical workloads related to a rapidly growing referral base from a primary care network in a highly competitive managed care market, in addition to recent expansion of the school's research

grants and contracts (14,16). However, the increase from 135% in 2000-01 to 155% in 2001-02 was chiefly due to increased efforts chiefly in research and teaching, with a decrease in clinical effort. This most likely reflects the increased research funding within the School and a change in the curriculum to small group teaching which is more time-sensitive and requires the involvement of more faculty.

Department of Pathology

Cumulative MBR data from the Department of Pathology have been used to generate profiles for the three divisions of the Department of Pathology (Anatomic Pathology, Clinical Laboratories, and Research Pathology). The data is based on the nine faculty members in the division of Anatomic Pathology, eight faculty members in the division of Clinical Laboratories, and twelve faculty members in the division of Research Pathology appointed at the time of the survey. The profiles illustrate the average effort by division faculty in each of the missions (Figures 1-4). All divisions contribute almost equally to the Teaching mission with an average effort of approximately one-third of their time. Anatomic Pathology is chiefly a clinical division with a minor research component, in keeping with its role as the primary generator of professional income for the department. Most of the faculty are in series for clinician-investigators and clinician-educators (Clinical X and Salaried Clinical). Anatomic Pathology also has a fairly large Administration/Community Service role since

several school and department leaders are in the division, such as the Associate Dean of Academic Affairs, Chair of the Faculty Executive Committee, and directors of the surgical pathology, cytology, and autopsy services. Research is the primary mission for both the divisions of Clinical Laboratory and Research Pathology. The Clinical Laboratories division has a large Administration/Community Service role as well, as would be expected since these faculty members spend much of their time as directors of the health system's clinical laboratories. The Department Chair is also a member of the division of Clinical Laboratories division and, in addition to this administrative role, serves as the Chair of the Council of Chairs. It should be noted that the sum of the mean values for each division in the four missions shown in Figures 1-4 equal approximately 100% for the target (based on the expected 50-hour work week), and exceed 100% for the actual.

Profiles can also be generated from MBR data based on academic series. Figures 5-8 illustrates the average faculty effort for the Department of Pathology and for the School within each series. The average Research and Administrative/Community Service efforts in most of the Department's academic series are greater or equal to that of the entire School. The Department's average Teaching and Clinical Service efforts in most of the series are less than or equal to those of the School.

Discussion

In a recent issue of *Academic Medicine*, Mallon and Jones surveyed the experience of 41 medical schools involved in development of mission-based management systems. A common challenge is that medical schools lack a culture of self-evaluation using quantitative data, and faculty believe that their activities defy quantitative assessment (15). We encountered similar skepticism and constraints in all the academic departments at UC Davis as we developed our MBR system. In addition, we encountered unique challenges in the Department of Pathology requiring special consideration when implementing our school-wide mission-based system. The Department of Pathology has basic science and clinical activities similar to other academic departments; in addition, it also provides directorship of the health system's clinical laboratories. It was difficult at first to decide where these activities should be included in the generic MBR template, in particular for those faculty members in the division of Clinical Laboratories where directorship activities represent one of their major responsibilities. Most of the activities by faculty members do not generate professional fee billing or clinical RVUs. We determined that time spent on clinical laboratory activities that allow professional fee billing, such as interpretation of bone marrow biopsies in hematology, are appropriate to include in the Clinical Service mission. Other clinical laboratory activities that do not generate professional fee billing and that relate chiefly to technical supervision, quality assurance, budgeting, client relations, and consideration of new technologies, equipment and testing methods were included in the Administrative

and Community Service mission. We recognize the limitations of this approach as it does not take into consideration the important role of the clinical pathologist as a clinical consultant (20).

Determining the amount of time to credit to clinical laboratory directorship activities posed another unique challenge since accepted measures like clinical RVUs do not exist, nor is the time spent in these activities scheduled or as easily measured as it is for clinic or operating time. For this purpose, it would have been useful if industry benchmarks existed for the amount of physician time typically required to provide clinical consultation and to staff and/or direct clinical laboratories of various sizes, and in particular for a laboratory at an academic medical center, which typically must offer esoteric and complex, round-the-clock testing. To date, none of the professional organizations in pathology have created such a metric. The Permanente Medical Group had created a formula used by their department chiefs in Northern California (21). However, this is not applicable to an academic medical center since it does not include teaching or research time, and was developed before enactment of several federal regulations which increased administrative and consultative duties for laboratory directors, including the Clinical Laboratory Improvement Act of 1988 and its more recent updates. To complete MBR in the absence of such benchmarks, the department chair created an estimate for how much time a faculty member was expected to devote on director and clinical consultative activities, based on the percentage of the faculty member's salary supported by an administrative stipend paid to support such activities. This provides a simple and reasonable estimate

of time spent. However, a method which accounted for actual productivity and work performed would be superior and could potentially represent a future area of development for MBR in clinical pathology and the technical component of anatomic pathology. As Mallon and Jones acknowledge in their report, simplicity is a key aspect to success of mission-based management systems. They emphasize that a system does not need to be all-inclusive, and that inclusion of most of the key activities is sufficient to provide valuable information (15).

Our original intention at UC Davis was that MBR provide department chairs with a tool to aid them in their annual review of faculty performance. One of the most interesting and unanticipated outcomes from MBR is the ability to use aggregate profile data to compare faculty ranks and series across the School (19). Comparing aggregate profiles for the department to the School's profile can help a department define its role and contribution to the institution's missions, and assess its productivity. The profiles generated for a department graphically illustrate whether faculty efforts are going in the direction that the leadership intends, where deficits or excesses may lie, and what types of faculty may be needed to fill gaps. For the Department of Pathology, the average research effort in most of the Department's academic series is greater or equal to that of the School. This is appropriate for a department which is expected to have a large basic science research component and shows that the Department of Pathology is fulfilling the broad expectations of the school's leadership. The profiles indicate that it is chiefly the faculty within the Clinical Laboratories and Research Pathology divisions which are satisfying the goals of the research

mission. The MBR profiles illustrate that this is most likely due to the fact that these divisions are chiefly composed of faculty members in series defined as research scholars, i.e. the Ladder-Rank, In-Residence and Adjunct faculty. The division of Anatomic Pathology, on the other hand, has a fairly large number of faculty members who are in the Salaried Clinical series, a series for clinician-educators that does not require research or creative work for advancement. If increasing clinical research in Anatomic Pathology became a goal of the department, it becomes apparent that this could best be accomplished by increasing the faculty within series other than Salaried Clinical, or increasing the protected academic time for the Clinician-Investigators (Clinical X faculty). In this regard, it should be pointed out that some of the faculty designated as Research Pathology are trained anatomic pathologists who are in the Ladder-Rank or In-Residence series but who perform little or no clinical service.

The average Administrative/Clinical Service effort for most of the academic series within the Department is also greater than that of the School. This chiefly reflects the considerable administrative load of managing the health system's clinical laboratories. Quantifying this effort is potentially useful in negotiating the annual stipend to support this activity from the hospital or health system. In regard to the Teaching mission, the Department shows significant effort, but the average Teaching effort in most of the series is less than or equal to those for the School. This is expected and appropriate since Pathology has fewer teaching opportunities than many of the clinical departments. Pathology has a relatively small residency program and fewer students rotate into

Pathology for clinical clerkships than in other departments. The profiles also indicate that each division contributes almost equally to the teaching mission, suggesting that departmental resources to support education should be distributed equally among the divisions. The teaching contributions for the different divisions may increase since the school is in the process of transitioning to a new curriculum. In the new curriculum, pathology education is being integrated into clinical courses throughout the academic year, and there are new courses in problem-based learning, both of which require increased participation by pathology faculty. MBR offers an excellent opportunity to monitor and document changes in teaching contribution, and assign resources and reward accordingly.

In the Clinical Service mission, the Department's average effort is less than the average for the School as a whole. This reflects the Department's large administrative and research role, and the fact that only a small subset of the faculty (Anatomic Pathology and a few members within Clinical Laboratories) can generate professional fee billing for clinical work. The majority of the faculty in the Clinical Laboratories carry out patient care service that is considered administrative and is therefore not included in the Clinical Service category. In addition, the Department is more generous in the amount of protected time it gives for academic work than are many clinical departments. MBR illustrates that this protected time has paid off with research productivity which is greater than the average for the School.

Though MBR has been in place for three years at UC Davis, it has not yet been fully integrated as a well-accepted part of the fabric of the School. A major challenge in MBR implementation at UC Davis has been getting faculty to take the time to complete the web-based worksheet. To ensure data integrity and increase compliance, the School of Medicine is developing electronic methods of data storage with automated reporting. In addition, basic science departments remain reluctant to participate since they believe that the system does not adequately represent their activities and portrays them unfavorably. However, the favorable profile from the Research Pathology division may help dispel that impression. In fact, our findings illustrate that a pathology department can be an excellent place to pilot a mission-based management program since it represents the microcosm of a medical school with strong participation in all missions, including basic and clinical research, clinical service, teaching, and administration and community service.

In summary, we have shown that our MBR system provides useful departmental profiles of divisional activities and can be used to compare faculty activities by academic series or rank against those of the School for use in attaining mission goals. Current use of MBR includes on-going workload monitoring both school-wide and by department to ensure workload meets the University's definitions for academic series while fulfilling the School's goals for each mission. In addition, future considerations include consideration of some elements to streamline merit and promotion process, to identify missions to direct faculty development activities, and for resource allocation through funds flow

analysis, particularly to support teaching activities. Individual departments are encouraged to use the aggregate profiles of their faculty for their own monitoring of faculty workload, strategic planning, and development purposes. In addition to these uses, we believe that MBR can be used advantageously in the setting of an academic pathology department to achieve several goals. These include the monitoring of mission in relation to the School as a whole, comparison of effort among faculty within different divisions and branches of pathology and negotiation with hospitals regarding stipend or part A reimbursement for non-billable clinical activities.

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Table 1: Definitions of Academic Series at UC Davis

	Ladder-Rank	In-Residence	Adjunct	Clinical X	Salaried Clinical
Salary support by state funds	Yes	No	No	No	No
Member of Academic Senate	Yes	Yes	No	Yes	No
Role	Research Scholar	Research Scholar	Research Scholar	Clinician-investigator and educator	Clinician-educator
Investig./ Creative Work (Research)	Independent, thematic, hypothesis-based, discovery-type research with extramural support	Independent, thematic, hypothesis-based, discovery-type research with extramural support	Independent, thematic, hypothesis-based, discovery-type research with extramural support	Independent, thematic clinical research program. May include clinical trials, translational or integrative projects, health services research, case series, educational research, or bench research. Extramural support is not required.	Not required.
Teaching	Required. May include clinical,	Required. May include clinical,	Required, though less amount than LR	Required. Emphasis on clinical teaching of	Required. Emphasis on clinical teaching of

	classroom or lab teaching of medical students, & housestaff, or graduate student/post-doc supervision	classroom or lab teaching of medical students, & housestaff, or graduate student/post-doc supervision	and IR. May include classroom or lab teaching of medical students, or graduate student/post-doc supervision	students & housestaff. Also usually includes classroom or lab teaching of medical students.	students & housestaff, May include classroom or lab teaching of medical students.
Clinical Service	Optional.	Optional.	No.	Required by definition.	Required by definition.
Admin/Community Service	Required.	Required.	Required.	Required.	Required.

Figure Legends

Figure 1: Average faculty contribution to the research mission by division. The research and clinical divisions show an emphasis on research and exceed their target.

Figure 2: Average faculty contribution to the teaching mission by division. All divisions show an equal contribution to the teaching mission and exceed their target.

Figure 3: Average faculty contribution to the administrative/community service mission by division. The anatomic and clinical divisions show an emphasis on administration and community service, appropriate to their roles as clinical laboratory directors and leaders in the School.

Figure 4: Average faculty contribution to the clinical service mission by division. The anatomic division is the major contributor to clinical mission, as is expected regarding opportunity for professional fee reimbursement for their activities.

Figure 5: Average School and Pathology department contribution to the research mission by academic series. The average pathology faculty member has greater research productivity than that of the school, appropriate to the department's role as a leader in research.

Figure 6: Average School and Pathology department contribution to the teaching mission by academic series. The average pathology faculty member has lower

teaching productivity than that of the school. This is due chiefly to fewer teaching opportunities.

Figure 7: Average School and Pathology department contribution to the administrative/community service mission by academic series. The average pathology faculty member has greater administrative/community service responsibilities than that of the school, appropriate to its role directing the clinical laboratories and other leadership responsibilities within the School.

Figure 8: Average School and Pathology department contribution to the clinical service mission by academic series. The average pathology faculty member has lower clinical productivity than that of the school since fewer of its patient-care activities are eligible for professional billing.

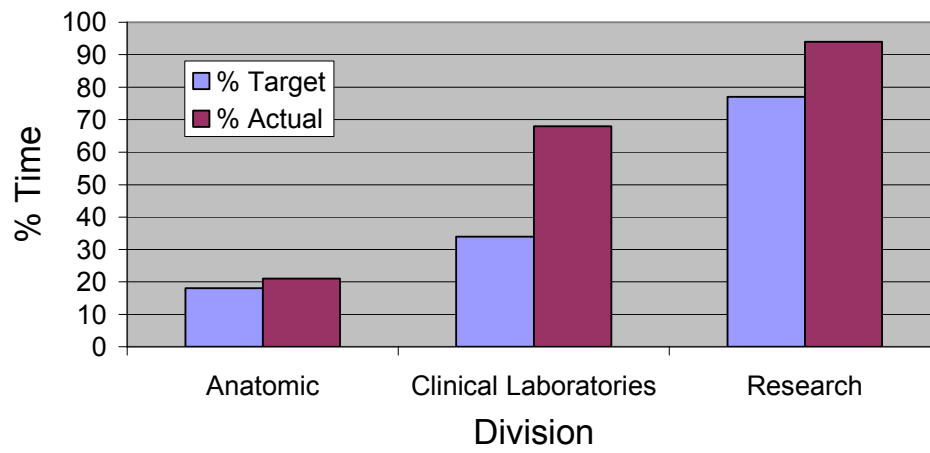
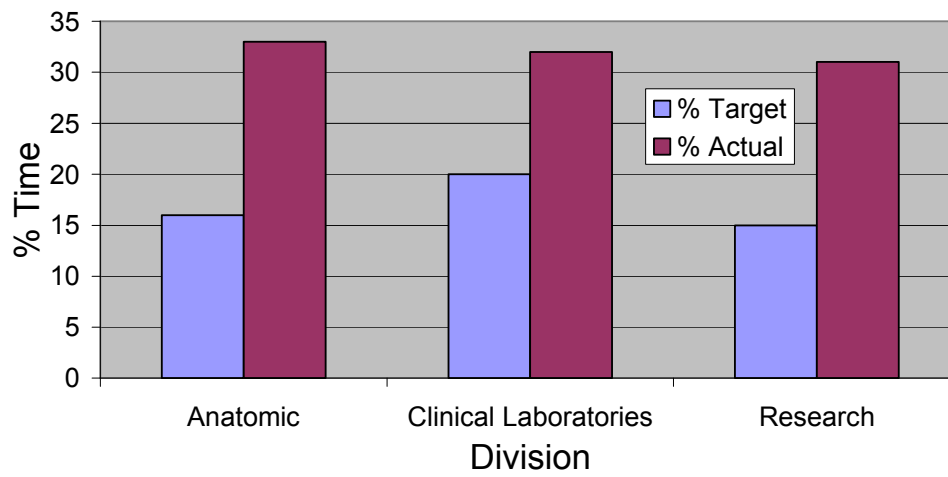
Figure 1**Figure 2**

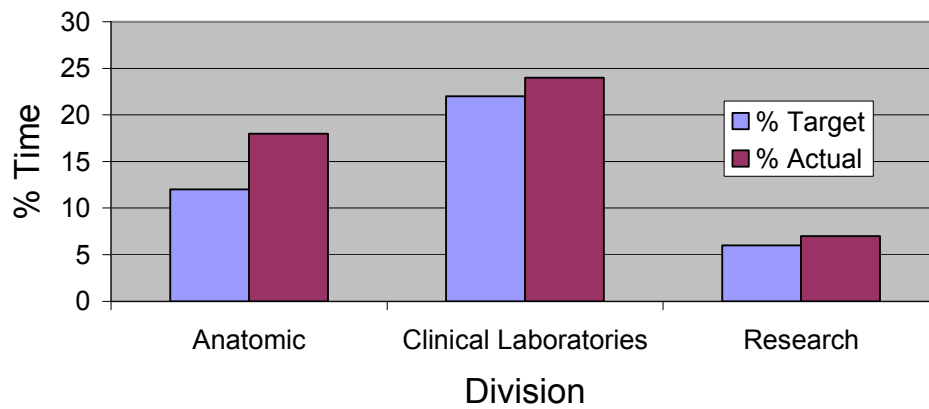
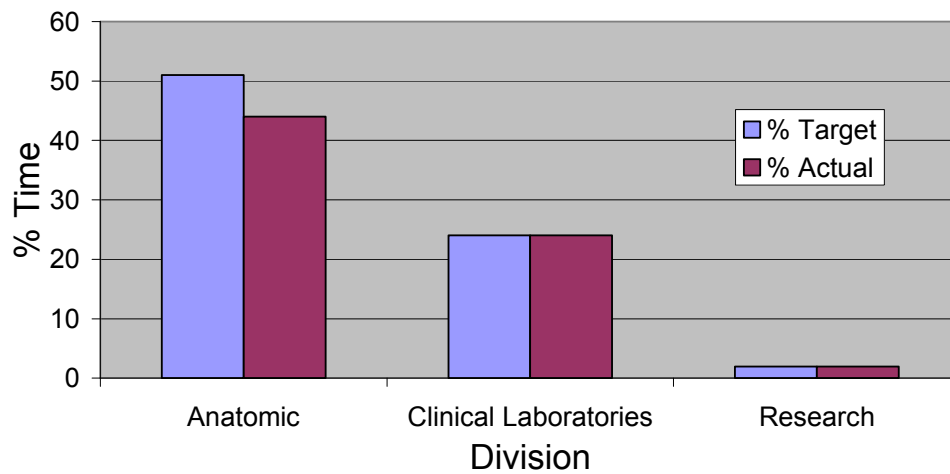
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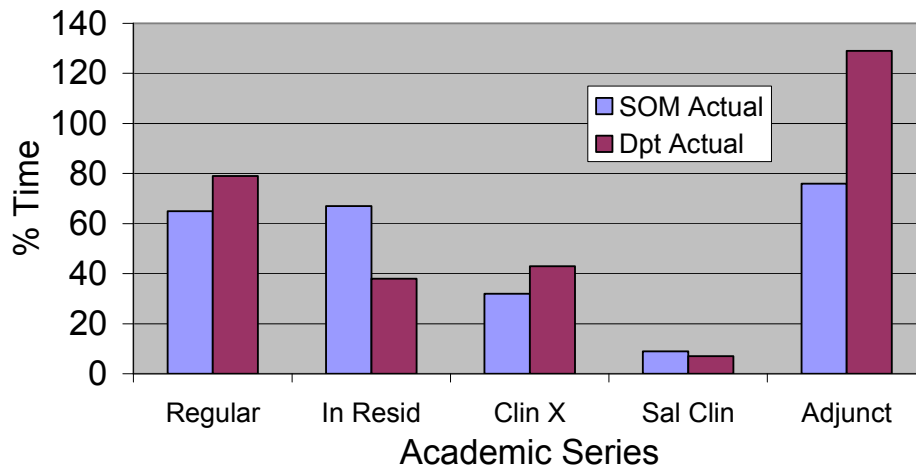
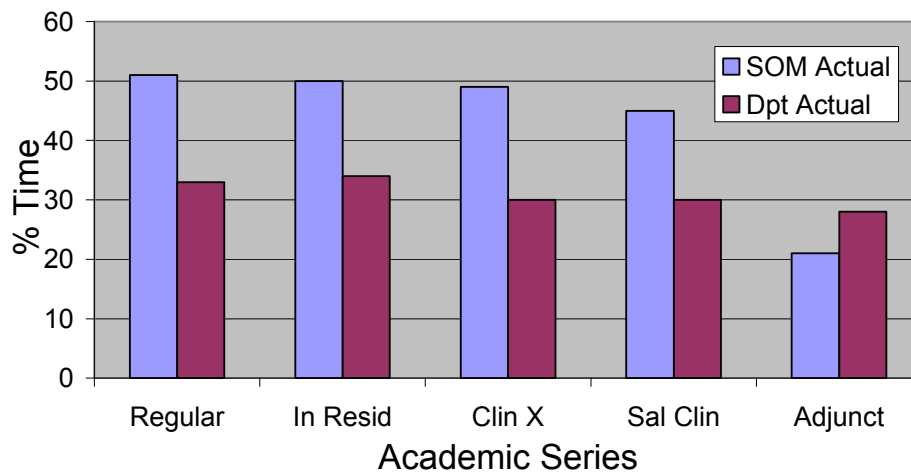
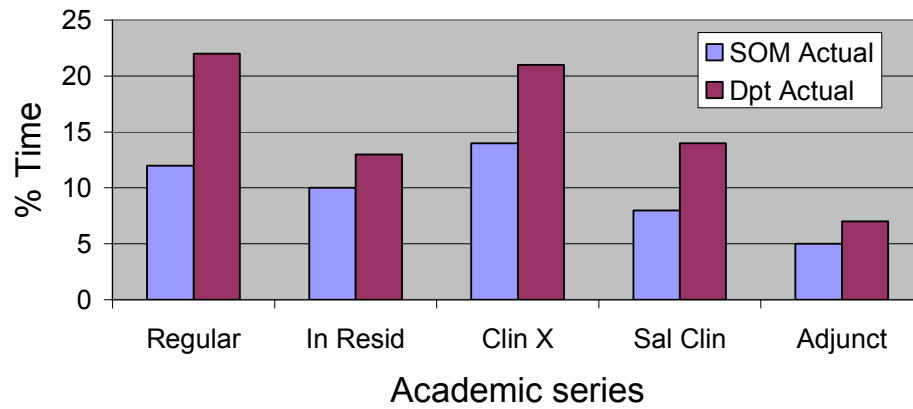
Figure 5**Figure 6**

Figure 7**Figure 8**