ASSESSING LABORATORY ADMINISTRATION INSTRUCTION AS PART OF AN OUTCOMES BASED LEARNING PROGRAM FOR PATHOLOGY RESIDENTS IN ACGME ACCREDITED PROGRAMS IN THE UNITED STATES

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by
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ABSTRACT

ASSESSING LABORATORY ADMINISTRATION INSTRUCTION AS PART OF AN OUTCOMES BASED LEARNING PROGRAM FOR PATHOLOGY RESIDENTS IN ACGME ACCREDITED PROGRAMS IN THE UNITED STATES

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Temple University, August, 2009

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In the 1990's the Accreditation Council for Graduate Medical Education (ACGME) recognized a need to fully integrate learning outcomes assessment into the accreditation process for resident physician training programs. ACGME leaders had concluded that by increasing emphasis on curricular development and by evaluating student performance through measurement of learning outcomes, the accreditation process would become a more reliable predictor of the residency program's success. In 1994 the ACGME created an initiative that would transform the current accreditation model of minimum threshold requirements towards a student performance based model of improved learning outcomes based on curricular development.

The Accreditation Council for Graduate Medical Education is responsible for the accreditation of over 8037 physician residency training programs in the United States. One hundred fifty of these programs provide training in the specialty of pathology and its anatomic and clinical sub-disciplines (AMA, 2007). Concurrent with the beginning of the ACGME Outcomes Project (1994), four major pathology education groups in North America entered into a collaboration to improve the quality of pathology resident training. Their focus encompassed improvements in both clinical and

managerial skills. The findings of this joint study culminated in the publishing of the Graylyn Conference Report in 1995 (Smith et al., 2006). One of the major recommendations in the report was that resident training in clinical laboratory administration should be improved. National leaders in pathology education felt that these changes were necessary to accommodate the evolving role of the pathologist as a clinical and administrative leader in a rapidly changing health care delivery setting.

Prior to this current investigation, no studies appear to exist that provide an in-depth analysis of the perceptions of the residency directors about the need of expanded training in laboratory administration. This quantitative study has evaluated the amount of time and priority given to managerial training, the inclusion of administration topics in the curriculum and the extent of learning outcomes assessment in administration that residency program directors believe are being linked to successful professional performance in recent graduates.

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CHAPTER 1

INTRODUCTION

Council for Higher Education Accreditation (CHEA) president Judith Eaton (Eaton, 2002) (Mc Murtrie, 1999) defined one of the roles post secondary accreditation as a vehicle for sustained improvement of quality education by acting as an arbiter of the minimum requirements needed to gain accredited status. Institutions that did not meet the minimal requirements of eligibility, in terms of their financial and academic practices, would not be deemed eligible to become accredited. While meeting minimum requirements may achieve the accreditation standard, neither CHEA nor Eaton were suggesting that post secondary institutions should be satisfied with this level of performance. Eligible learning organizations should be expected to engage in a continuous cycle of quality improvement. Likewise, in graduate medical education during the mid-1990s, the Accreditation Council for Graduate Medical Education (ACGME) began to question whether minimal threshold reviews led to improved performance outcomes for recently graduated resident physicians. The ACGME has had the authority under the auspices of the United States Department of Education (ACGME, 2006a) for the accreditation of all graduate medical training programs in the nation. Most programs are found in acute care hospitals with medical school affiliations. Critics of ACGME performance standards were uncertain whether their review process was supportive of continuous quality improvement (2006a).

There was mounting criticism, both within the medical profession and from the American public, as to whether recently graduated physicians possessed the necessary skills to cope with the rapid change and mounting complexity of the U.S. health care

system. In 1985, the U.S. Department of Education (USDE) had introduced a strategic change in accreditation policy for post secondary education requiring that approved organizations demonstrate progress in improving learning outcomes for students. Tangible evidence, such as improved graduation rates, job placements, graduate school admissions or other valid indicators would be incorporated into the accreditation assessment rubric (2006a). Admittedly, the ACGME did not significantly alter its performance standards immediately to incorporate these expectations. In 1994, the ACGME (2006a) began to examine the steps that would be needed to create valid performance standards for improved learning outcomes in graduate medical education. During that year the ACGME formed the Outcome Project Advisory Group to create a long term initiative to explore competency models predictive of resident success in their subsequent careers. After extensive review of several outcome measures submitted by clinicians and educators, the Project selected six competencies that were believed to improve the objectivity of a residency program site review. Evidence of these six general competencies, approved by the ACGME Board of Directors in 1999, were expected to be demonstrated by recent graduates of accredited residency programs. The six general competencies expected of all graduate residents included: Patient Care, Medical Knowledge, Practice Based Learning, Inter-personal and Communication Skills, Professionalism and Systems-Based Practice.

Beginning in 2001, resident training programs subject to re-accreditation had to demonstrate progress in curricular changes that incorporated training in the six competencies. By 2008, all 8037 residency programs had to show evidence of their competency education and link that training to learning outcomes metrics

(ACGME, 2006b). The metrics are used as a tool to measure continuous quality improvement of the learning process. Metric instruments undergo a validation review to ensure that the measured outcomes have a true predictive value . Professionally recognized indicators of a successful residency program may include a high percentage pass rate in pathology board examinations for recent graduates and having them obtain staff attending and faculty positions in prestigious hospitals. In addition to their fulfillment of medical professional duties, many hospital employers expect recent graduate residents to be competent in administrative leadership. Junior attending physicians are frequently placed into important management assignments as section chiefs or serve on critical hospital policy making committees (Sims & Darcy, 1997) (Kass et al., 2007); (Horowitz, Naritoku & Wagar, 2004).

The accreditation process in residency programs assures the graduation of physicians that are meeting professional standards of performance. Assessing quality performance has changed from using a minimum requirement to using a performance standard that shows actual improvement in student learning outcomes. Confirmation of improved learning outcomes is validated through metrics. After nine years (1999-2008) of engagement in the new process, the question the ACGME seeks to answer is whether accredited programs that focus on improving learning outcomes will produce more competent graduate physicians.

This research study focused on the teaching of ACGME competencies connected to administrative skills needed for pathologists to manage clinical laboratories. It employed primarily quantitative research methods to investigate the curricular design and content of laboratory administration courses taught to pathology residents

enrolled in ACGME accredited training programs in the United States. A survey was administered to all 150 of the known accredited pathology programs sponsored by the Residency Review Committee (RRC) of the Accreditation Council for Graduate Medical Education in the United States (Intersociety Council for Pathology Information, 2007). Based on the survey results, this study has found significant data to provide an explanation of how much time and effort is placed by program directors into training pathology residents in laboratory administration. Additional data was obtained through quantitative analysis on how pathology residency directors perceive the relevance and value of business administrative training to graduating successful pathologists.

The survey was electronically transmitted to the residency directors of the RRC accredited pathology programs in the United States to inquire about the extent and depth of laboratory administration training in the curriculum and the specific competencies evaluated by learning outcomes measurements. Technically, laboratory administration refers to the management of automated and manual test workbench areas and supporting service sections of a clinical pathology department. However, in hospitals in the United States, the vernacular term *laboratory administration* is used and understood by medical professionals as referring to the business management of a pathology department in the sub-specialties of clinical and anatomical pathology.

Problem Statement

The recent changes made by the ACGME Residency Review Committee to reduce certified resident training from five to four years and the rapid progression of technological advances in anatomic and clinical pathology has triggered a concern by

hospital employers that newly hired, board certified graduates are not adequately prepared for their leadership roles. This is especially evident with recent graduates who are employed in community hospitals (Horowitz, Naritoku, & Wagar, 2004). Unlike pathologists practicing in medical school based teaching hospitals, pathologists working in community hospitals often find themselves in clinical laboratory section directorships or as department chairpersons in their first positions after training. Hospital administrators may expect the pathologist to run their department in a business-like way . Their laboratories must remain compliant to government regulation and voluntary accreditation requirements and still remain cost efficient and customer friendly (Kass et al., 2007; Horowitz, 1998, 2004). In 1995 four professional pathology organizations representing the interests of pathology chairpersons and residency directors: the Association of Pathology Chairs, The College of American Pathologists (CAP), the Academy of Clinical Laboratory Physicians and Scientists (ACLPS), and the American Society for Clinical Pathologists (ASCP) joined together to assess the quality and adequacy of clinical pathology resident training for professional practice. A committee was formed with representatives from each of these organizations. It was entitled the *Conjoint Task Force of Clinical Pathology Residency Training Writing Committee*. The committee report, known as the Graylyn Conference Report (1995), recommended several improvements to clinical pathology training, including a significant number of curricular changes focusing on increasing laboratory management training. The report suggested that residents who complete training in the sub-specialty of clinical pathology should acquire sufficient skills to be capable of directing and managing clinical laboratory services. The management curriculum should

include specific training in choosing cost-effective test strategies for clinicians, clinical result interpretation, laboratory instrument evaluation, capital finance analysis, medical informatics to acquire and manage clinical data, strategic planning, organizational development, and inter-personal skills training to engage in dialogue with other medical staff leaders to initiate significant changes in health care delivery (Smith et al., 2006).

While all accredited pathology programs provide curricular coverage in laboratory administration to receive or maintain an accredited status by the ACGME , no studies exist after 1997 (Goldberg-Kahn,Sims & Darcy, 1997) that have directly surveyed residency programs directors about curricular design or learning outcomes measures. Resident training hours for laboratory administration have been surveyed from the early to the mid 1990's. No studies appear to exist within the past decade that have specifically measured the amount of curricular development time and teaching preparation time spent by residency directors and faculty for laboratory administration related disciplines. Accreditation groups and hospital employers are challenging program leaders that the scope and depth of leadership skills shown by recent graduate residents may not be adequate to be considered fully effective. There needs to be a comprehensive study examining how these residency programs are committed to developing laboratory administration instruction and to improving learning performance outcomes for residents.

Pathology residency programs have been successful in measuring the medical , technical, and professional competencies of their trainees during the 71 year history of AMA sponsored accreditation (American Board of Pathology, 2007). However, since the implementation of the six general competencies rubric by the ACGME in 1999,

employer feedback collected through surveys from hundreds of hospitals in the past eight years would suggest adequate management training may be lacking in the compressed four year programs (Horowitz, 2004); (Kass, 2007) . In order for residency directors to produce well rounded, competent pathologists who are prepared for all facets of their position, they must carefully review the scope and depth of their leadership and administrative training curriculum.

Purpose of the Study

This study surveyed the breadth and depth of the laboratory administrative training offered in the 150 ACGME accredited pathology residency programs operating in the United States. A survey questionnaire was sent electronically to the residency director of each program. The respondents were asked to summarize the managerial and financial subjects covered in their curriculum, the pedagogical approach to the course material and the selected competency measures to improved learning outcomes. The major focus of the study was to gain an understanding of the value program directors place on developing pathology residents as competent administrators. The study identified and evaluated the priorities program directors placed on various types of administrative skills that were taught to residents in preparation for their future roles as laboratory leaders. The study explored some of the strategies employed to implement these curricular changes in light of the reduction of training time to four years.

Research Question

This study focused on gathering data to attempt to answer eight questions posed about the current state of pathology resident business education in the 150 ACGME accredited programs in the United States.

Research Question #1 What is the current extent of laboratory administration training in ACGME accredited pathology residency programs located in the United States?

Meeting ACGME curricular standards for accreditation appears to have motivated program directors to expand the business training curriculum for pathology residents (Bagnara, Fenton & Winkleman, 1994). What is the number of laboratory administration curriculum hours currently seen in the residency programs? Is training conducted in a formal series of lectures or integrated into clinical rotations? How many faculty members engage in business training compared to non-physician leaders? Did the directors feel that issues such as reduced training time, ABP examination questions or changes in ACGME accreditation standards had an effect on business curricular change?

Research Question #2 Do community hospitals or other types of non-university based training facilities provide a significantly different level of laboratory administration training compared to their University based teaching hospital counterparts?

The researcher had an interest in determining whether different types of training facilities placed a greater emphasis on laboratory administration compared to others. Survey responses provided insight into how residency directors use the laboratory administration curriculum to link professional practices to management responsibilities in the laboratory. Horowitz (1998, 2004) suggests that directors are receptive to the feedback of hospital employers who have recently hired their graduate residents.

A better trained resident in laboratory administration may perform better for certain types of employers. Did the directors of community hospital based programs provide more curricular hours to prepare trainees for management responsibilities soon after graduation compared to their university based or government sponsored research colleagues or vice versa?

Research Question #3 What are the most important influences affecting a residency director's curricular decisions about providing laboratory administration instruction?

If the ACGME did not require extensive training in management as part of the fulfillment of the six general competencies, would residency directors still use these curricular hours for that purpose? Are other factors equally influential? What type of effect is made on the director's thinking by recent feedback from graduate residents, the opinions of non-faculty business leaders, employer feedback or benchmark national examinations such as the ASCP sponsored Resident In-Service Examination (RISE) or the American Board of Pathology (ABP) graduate board exams? The RISE examination is given to pathology residents at the end of each year of training. In their last year of study, pathology residents are actively engaged in reading and studying for the ABP board certification examinations. In the post-Graylyn era what types of strategies do residency directors employ to keep their trainees focused on both the clinical and administrative aspects of their upcoming professional careers?

Research Question #4 **What are the most commonly used methods to teach residents laboratory administration?**

Did the residency directors use active learning methods such as direct resident involvement hospital performance improvement committees, regulatory mock inspections or on-call rotations compared to passive learning methods such as lectures or case studies?

Research Question #5 **What type of constraints, internal or external to the program, do pathology residency directors face when they attempt to implement laboratory administration training to pathology residents?**

A goal of this study was to derive a sense of how difficult it is for a residency director to expand and develop a laboratory administration curriculum in an abbreviated schedule and within the competitive and cost constrained environment of modern health care delivery systems. Is there enough funding? Do the faculty or residents show interest in the subject matter? Is there enough time to expand the curriculum without sacrificing time for clinical instruction?

Research Question #6 **Do residency directors employ a conscious strategy to initiate incremental curricular change in order to gain faculty support for these changes?**

A curricular model proposed by Smith et al. (2006) suggests that clinical pathology training programs should include learning material covering six of the generally recognized skill areas of clinical laboratory administration: a. Organizational and Leadership Skills, b. Financial Skills, c. Regulatory Compliance Skills, d. Quality Assurance, e. Quality Control, and f. Pre- and Post-Analytic Process Management. Smith (2006) suggests that these specific skill sets are correlated to important learning

outcomes linked to four of the six ACGME general competencies: a. Medical Knowledge, b. Practice-Based Learning and Improvement, c. Interpersonal and Communication Skills, and d. System Based Practice.

A strong consensus appears to have been developed among the leaders of the various national pathology graduate education associations about the direction resident training should proceed in the 21st century. However, this researcher believes that an unanswered question remains concerning the assimilation of those beliefs by faculty at the program level. Program directors may need to employ a *buy-in* strategy to guide the teaching staff through the significant changes that result in a more balanced curricular approach. Are program directors using specific strategies to implement curricular change?

Given the implementation of the reduced training time from five to four years, one of the goals of this study is to collect data to determine whether faculty have the motivation and resources to remove precious time from the clinical professional curriculum and divert it to administrative learning objectives.

Research Question #7 **What specific business competencies do the directors feel to be the most useful measures of improved learning outcomes and will also predict professional success for graduate pathology residents?**

Business management competencies mentioned in previous surveys as being taught to pathology residents were collected and catalogued. These competencies included: a. medical informatics, b. human resources management, c. performance improvement, d. contract negotiations, and e. budgets and cost analysis. Did the surveyed

programs prefer to teach certain competencies more so than others? Did the feedback of recent graduates support their curricular strategy?

Research Question #8 Which methods do Pathology residency directors use to assess learning improvement of residents in Laboratory Administration training?

Since the initial discussions by the ACGME to incorporate business management training as a performance standard began in the mid 1990's and throughout the phase-in period for compliance, residency programs have been searching for effective, efficient methods to measure post curricular learning improvement. Do any particular business subjects or learning assessment strategies stand out in the collective opinions of the pathology residency directors that are predictive of professional success for graduate residents? The ACGME/American Board of Medical Specialties joint initiative, entitled *Toolbox of Assessment Methods,* has suggested several methods for programs to utilize based on submissions from the field: a. Record Review, b. Checklist, c. Global Rating, d. Simulations, e. 360 degree Global Rating, f. Resident Portfolios, g. Standardized Oral Examinations, h. Written Examinations and, i. Procedure/Case Logs. Survey data were collected and analyzed to see if any of these outcome rubrics have been linked to successful performance as graduate pathologists (ACGME, 2005).

Definitions

1. **Accreditation Council for Graduate Medical Education –** Founded in 1981 under the auspices of the American Medical Association. The ACGME is an independent accrediting body for 150 pathology residency programs located in the United States (Accreditation Council Graduate Medical Education, 2006).

2**. American Board of Internal Medicine** – Founded in 1936, administers certifying board examinations for internal medicine specialists practicing in the United States. It is the only certifying board in internal medicine recognized by the American Board of Medical Specialties (American Board of Internal Medicine, 2006).

3. American College of Surgeons – A professional association founded in 1913 devoted to improving the quality of care of surgical patients through education and practice. One of the co-founding groups creating the Liaison Committee of Graduate Medical Education (1942) and the Joint Commission on the Accreditation of Health Care Organizations (1950) (American College of Surgeons, 2006).

4. American Medical Association – The largest physician group in the United States. The AMA acts as both a physician and public health advocate influencing public policy and the quality of medical practice (American Medical Association, 2007).

5. American Society of Clinical Pathologists - Membership includes 140,000 pathologists and technical laboratory professionals. The ASCP is devoted to promoting credentialing and professional research in all aspects of clinical and anatomical pathology practice. It also acts as an interest group advocate for the interests of pathologists in government health care policy decision making (American Society of Clinical Pathologists, 2007).

6. College of American Pathologists (CAP)– A medical society made up exclusively of 16,000 pathologist members worldwide. CAP is devote to the improvement of laboratory practices and professional education. The *College* serves as a deemed status accrediting organization for Federally regulated clinical laboratories (College of American Pathologists, 2007) .

7. Council for Higher Education Accreditation (CHEA) – based in Washington, D. C. Provides supervisory oversight and certification of the quality of higher education accrediting organizations(Council for Higher Education Accreditation, 2007).

8. ECFMG- Educational Commission for Foreign Medical Graduates – Founded in 1956 and endorsed by the ACGME and several medical certification boards, graduates of medical schools outside of North America must be certified by the ECFMG before entering an ACGME accredited residency program (Educational Commission for Foreign Medical Graduates, 2006).

9. Institutional Review – An internal audit of residency program compliance to ACGME standards usually conducted prior to a site visit. The purpose of the review is to determine potential deficiencies in current educational practices in a training program and take corrective action as part of a practice of continuous quality improvement and also determine whether the institution is providing adequate economic resources to allow the program to meet performance standards (Accreditation Council Graduate Medical Education, 2006).

10. JCAHO – Joint Commission for the Accreditation of Health Care Organizations. Founded in 1951, the JCAHO is one of deemed status accrediting bodies sanctioned by the Federal government to certify hospitals, nursing homes and other types of patient care facilities are providing an acceptable level of care. Accreditation is required to receive federal reimbursements of eligible patient Services. Accredited institutions are re-accredited on a three year cycle (Joint Commission for the Accreditation for the Accreditation of Health Care Organizations, 2006).

11. Medical Informatics – An emerging sub-discipline in medical practice where clinicians are able to retrieve information, derived from several sources, vital to the timely, accurate diagnosis of disease and efficient care of the patient. An informatics system is achieved by the integration of resources from information technology, clinical research, professional practice, financial management and performance improvement based initiatives for the acquisition, storage and retrieval of data (Hersh, 2002).

12. **National Resident Matching Program** – Founded under auspices of the AMA and four other major medical education organizations in 1952, the NMRP objectively matches resident applicants to program preferences. The system provides a uniform database of tracking 34,000 candidates for the available 24,000 residency positions available each year (National Resident Matching Program, 2006).

13. Pathologists – Prior to the 1920's the practice of pathology was considered a sub-specialty of Internal Medicine. Pathology became formally recognized by the AMA as a separate specialty in 1936. Pathologists are physicians who routinely examine tissue, blood, urine and other body fluid to provide diagnostic evidence of the presence of disease (College of American Pathologists, 2007).

14. Performance Improvement Committee – A standing committee found in the administrative disciplines of health care organizations that has the purpose of facilitating the identification and resolution of problems in patient care delivery that may significantly reduce quality and safety .

15. Resident Physician – A physician engaged in graduate training in a medical specialty through an accredited program. Most residency programs in the United States are based in acute care hospitals affiliated with American Association of Medical Colleges accredited schools.

16. RISE Exam – Resident In-service Examination: An examination administered by the American Society of Clinical Pathologists designed to measure improvement in learning outcomes for pathology residents. The RISE exam focuses on patient care and medical knowledge competencies (American Society CP, 2006).

17. RRC- Residency Review Committees are responsible for assessing whether a resident physician program meets ACGME accreditation performance standards. This is done through a process that includes document review of program self study and site interviews. There are 26 committees representing the major medical specialties (Accreditation Council Graduate Medical Education, 2006).

18. United States Department of Education (USDE) – was formed in 1980 by the merger of several federal agencies. The purpose of the USDE is to establish policies on federal financial aid for education, distribute and monitor the distribution of federal financial aid, collect data on the American education system, promote national attention to key educational issues, and promote equal access to education (United States Department of Education, 2007).

19. USMLE Exam – The United States Medical Licensure Examination is a mandatory national test administered in various stages of a physician's training. It is a requirement for state licensure as practicing physician. Levels I (basic sciences) and II (clinical sciences) are taken during a physician's undergraduate training. The Level III exam is taken by recent graduates. Passing this examination is required for entry into an accredited residency program (United States Medical Licensure Examination, 2006).

Delimitations and Limitations of the Study

The sampling of all the 150 ACGME/RRC accredited pathology residency programs constituted a comprehensive study of the potential data pool of participants. The survey was directed to department chairpersons or attending faculty members who multi-tasked as residency program directors. The scope of the respondents sampled provided a rich cross section of opinions and attitudes about the value of laboratory administration training of pathology residents from diverse perspectives. It was the perception of the researcher, with thirty years of senior laboratory administration experience in academic medicine, that the respondents were viewed by hospital leaders as the key decision makers for curricular development and pedagogical practices in business and leadership training for pathology residents.

The limitations of the study depended on the number of respondents and the willingness of the respondents to be candid. Although, this study was independent of any supervision or sponsorship of any accrediting agency, residency accreditation is a high stakes issue for teaching hospitals. Each teaching hospital receives several millions of dollars from the Federal government annually to cover the extra treatment and care expense related to teaching residents. Loss of funding due to a loss or threat of loss of ACGME/RRC accreditation can have dire financial consequences to those institutions that have an unfavorable health insurance payer mix (Murphy, 2006). Responses may have been guarded out of fear that specific responses may somehow be traced to the participants. Those fears were addressed through careful measures that were implemented to fully explain the independence of the investigator from any accrediting authority oversight and clarify the process taken to ensure that each response would be kept in strict confidence. Also, the respondents were given a full explanation of the purpose of the study and its measured objectives to better prepare them to honestly and openly answer the survey questions.

During the sampling, residency directors changed responsibilities and listed names of current directors from website sources were sometimes incorrect. In this study there were three instances where actual directors differed from the published names on the ACGME website. The original list of respondents was obtained from the program directory web site of the Accreditation Council of Graduate Medical Education (ACGME). This data was verified through a triangulation verification method by cross referencing names with internet- based directories (e.g., ASCP) and published directories such as the Inter-society of Pathology Residency Programs. When surveys were

returned a concurrent email was sent to the administrative support team thanking them for their efforts to get the survey completed. This was important because it helped facilitate future cooperation to obtain validation of the quantitative findings through telephone interviews or emails.

The survey was presented to pathology residency directors based on the assumption that these individuals would have a major, if not primary, responsibility for the development of the training curriculum. However, it was possible that residency directors were not aware of all the learning opportunities residents may have had to learn administrative practice. One significant limitation to the true measurement of laboratory administrative learning by residents would be the degree of *shadow learning* acquired by them through random interaction with management decision making opportunities in the course of a training day. While the survey did acknowledge that some programs engaged in management rotations, shadowing pathology directors or attendance as observers in various hospital committee meetings, all of these activities may not necessarily be interpreted as curricular hours of training per se in some programs. The degree of *shadow learning* is most likely determined by the level of interest shown by the resident in learning administrative management, the level of interest and comfort shown by faculty to allow residents to handle daily management challenges and the general climate of trust shown by the faculty and support staff to allow to engage freely with them as part of the pathology team. It is probable that residency directors who frequently engage in dialogue with their residents about administrative learning may be more perceptive to this phenomena, if it actually exists. Further studies of this topic should focus on the level of self directed learning in

laboratory administration conducted by residents independent of any formal curricular structure to determine which organizational factors contribute to a higher level of management competency.

Significance of the Study

The rapid changes occurring in medical laboratory technology will require dynamic leadership by pathologists who are well trained both clinically and administratively. Declining reimbursement for health care services in acute care hospitals make increased laboratory efficiency a primary objective to maintain solvent and viable operations (Horowitz, 2004). In professional ancillary service departments, like the clinical laboratory, non-physician business administrators are not always fully qualified to make the complex decisions needed to balance clinical and fiscal performance requirements. By virtue of their comprehensive curriculum in both administrative and clinical instruction during resident training, there is a rising expectation from senior hospital management that recently graduated pathologists should assume roles of greater responsibility in the growth and differentiation of laboratory service lines. Resident graduates must demonstrate competencies in business, laboratory medicine and surgical pathology to assume roles in the various aspects of departmental leadership (Horowitz,1998). The CAP has predicted a shortage of qualified pathologists during the first half of the 21st century (College of American Pathologists 2004 Task Force Study Group). A firm understanding is needed as to how medical educators are preparing current residents to enter the marketplace fully capable to accept a broad scope of managerial and clinical responsibilities. This study provided a description of the range of the curricular hours

spent on laboratory administration topics in the surveyed programs and their experiences in using outcomes measures that led to more successful professional performance by the recent graduate residents.

CHAPTER 2

LITERATURE REVIEW

A Historic Overview of Graduate Medical Education in the United States

The Accreditation Council for Graduate Medical Education was founded in 1981 as an independent accrediting body in medical education. The ACGME superseded the Liaison Committee for Graduate Education which had supervised residency training for the American Medical Association since 1972. During the 2005 academic year, the ACGME directed the accreditation of 8037 residency programs in 84 sub-specialties (ACGME, 2006 b, c). The collective enrollment of these programs included over 101,100 full and part time resident physicians. Oversight of program accreditation was carried out through 26 resident review committees (RRC). The board and supporting staff of the review committees represent some of the most outstanding clinicians and medical educators in their respective specialty fields.

Early efforts in regulating the quality of graduate medical education can be traced to the creation of the Council of Medical Education and Hospitals (CMEH) by the American Medical Association (AMA) in 1914. The CMEH (Beck, 2004) was created only four years after the explosive findings of the Flexner Report (1910) that condemned the quality of medical training of most medical schools operating in the United States. During the 1920's and 30's the CMEH developed training standards for residency programs and published a list of their approved graduate teaching facilities.

In 1942 the AMA collaborated with the Association of American Medical Colleges (AAMC) to form the Liaison Committee on Medical Education (LCME). The

AAMC was an accreditation organization that focused on undergraduate medical programs. The LCME assumed full responsibility, under the joint sponsorship of the AMA and AAMC for the accreditation of both undergraduate and graduate training programs. The LCME was created in 1940 through conference committees chaired by the American College of Surgeons (ACS) and the American Board of Internal Medicine (ABIM). Both the ACS and ABIM were well respected professional organizations that had been established during the early part of the twentieth century to promote quality standards of training for graduate physicians wishing to specialize in these medical fields. By the late 1940's, the LCME sought to re-organize graduate accreditation into two evaluation tracks :a. improving the quality of resident candidate selection and b. making certain that institutions sponsoring training programs had a minimally acceptable level of teaching resources (quality of faculty, number of libraries, bed size, number of surgical cases, and the size and learning opportunities in teaching clinics). In 1953, the LCME formally separated the approval of residency programs from the resident matching process with the creation of Resident Review Committees (RRC). The committees represent each of the 26 recognized medical specialties. The RRC structure was phased in over a three year period (1953-56) (ACGME, 2006b).

The demand for expanded resident training programs became pronounced during the mid -1960's with the passage of Medicare and Medicaid programs by Congress in 1965 and 1966 respectively. Public policy changes not only created the demand for more well trained residents, but also the need for uniform performance standards and accreditation procedures practiced by each residency review committee. The Higher Education Act (1965) (USDE, 2007) increased federal funding to health care

professional schools. With greater government spending to subsidize physician training and public access to medical treatment, American medical leadership expected increased pressure for more accountability for the quality of professional education. During the early years of the RRC system, the LCME had a growing concern that there was a lack of consistency in quality assessment practices between the various specialty groups. The fear was that some RRC groups were ruled by strong-willed leaders who might have been using their political influence, rather than objective assessment methods, to evaluate the quality of programs. As a result, the most prestigious governance organizations in medicine, including the American Medical Association, the American Hospital Association, the Association of American Medical Colleges, jointly endorsed the creation of the Coordinating Council on Medical Education (CCME) in 1972. The full consensus and support of all organized medicine was backing the revision in accreditation methods used in graduate medical training (ACGME, 2006b).

The CCME administrated the residency review committees through an organizational structure called the Liaison Committee on Graduate Medical Education. Despite the backing of prestigious organizations, the new accrediting structure was viewed as having too many bureaucratic layers. The 2006 ACGME website (ACGME, 2006b) suggested that the 1972 revision "did not produce policies, programs and standards very quickly or very well promote fairness…. these organizations were composed of eminent leaders with strong opinions." This comment appears to suggest that political factionalism within the sponsoring groups had become an impediment to constructive change. While the dialogue on accreditation had expanded by inviting these five powerful, independent

groups into the planning and assessment process, the oversight was neither efficient nor effective .

CCME leadership viewed the swollen bureaucracy as an accountability nightmare for the physician community. They took immediate action to establish an accrediting organization that was independent of the multi-layer bureaucracy. In 1981 the CCME was abolished and the LCGME was renamed the Accreditation Council for Graduate Medical Education (ACGME). In the past twenty-five years, the new organization has evolved into an independent entity, administratively separate from its five original sponsoring organizations. However, the revised charter still required representation from the sponsors on the ACGME boards and the 26 RRC boards. The ACGME addressed the issue of improving their public accountability to preserve high quality graduate medical education by including non-physician members on the board team. Board committees now included advocates representing the interests of the Federal government as well as 26 RRC chairpersons, senior ACGME lay executives and resident physician representatives.

Better consistency has been achieved for performance standards development and policy making between the residency review committees and the revised administrative structure. All significant revisions in RRC accrediting programs must have ACGME approval before implementation in the field. The ACGME website (ACGME, 2006 a, b, c, e) described these changes as part of an effort to become more transparent in its deliberations. They wish to engage in better validation of rigorous performance standards, emphasize outcomes based student learning objectives, show continuous

quality improvement and expect medical professionalism by resident physicians at all times.

Mission and Values of Graduate Medical Education in the United States

The Accreditation Council for Graduate Medical Education directly links the improvement of medical care through training resident physicians in accredited programs. Their mission statement reads, "We improve health care by assessing and advancing the quality of resident physician's education through accreditation" (ACGME, 2006d). The improvement and accreditation of resident education is accomplished through a combination of periodic program and institutional reviews by the member facility. A team site visit by ACGME inspectors corroborates the internal review findings.

The moral framework of the ACGME mission is expressed in three value concepts: *accountability*, *excellence* and *professionalism* (ACGME, 2006d). Improving accountability focuses on the sponsoring institution's inter and intra organizational deliberations about learning performance and student professional training outcomes. Decision making processes should reflect the qualities of good dialogue by being both open and transparent. Stakeholders are not limited to physicians, but embrace other educational organizations, both within and outside of health care, to collaborate on improving resident education. ACGME associates strive to improve investigative rigor in order to assure that outcome measures and program improvement recommendations are consistent and reliable.

Excellence in accreditation means improving assessment practices to make them more efficient and directly link them to improvement in student outcomes. The introduction of the six domains of resident competencies in the ACGME accreditation process in 1999 exemplifies the accelerated trend towards improvement oriented and innovative approaches to increase the quality of resident learning (ACGME, 2006a).

Professionalism links independent practice to responsible and responsive behavior towards peers, non-physician staff and patients. Resident physicians must consistently demonstrate respectful behavior and show a willingness to collaborate in patient management decisions with non-physician colleagues. Graduate medical educators must couch their training agenda with a learning process that emphasizes fairness and integrity (ACGME, 2004). ACGME site visitors to residency programs and their sponsoring institutions seek evidence, through the examination of policies and documented activities, that the mission and values of the program are correlated to performance standards.

The Accreditation Process for Physician Residency Programs, Stakeholders in Residency Accreditation

There are two components to the accreditation of an institutional resident training program. First, institutions must demonstrate fulfillment of detailed performance standards related to the clinical education of residents in that specific medical specialty. Second, institutions must demonstrate that their patient care operations are voluntarily accredited by JCAHO, or an equivalent organization, and also provide ample learning resources to facilitate the teaching of the residents . The financial and professional stakes

are high for teaching programs (usually based in hospitals). Loss of accreditation will lead to a suspension of several millionsof dollars of federal funding for resident education, which may possibly force a hospital into bankruptcy or severely curtail services. Disgraced programs may not be able to recover their ability to attract top resident candidates or re-establish public confidence in the quality of their health care services. Currently, ACGME residency review committees examine approximately one half of their accredited programs annually based on these two performance components (ACGME, 2006e).

In the United States and Canada, the education of resident physicians occurs after their graduation from an AAMC accredited medical school. As senior medical students, the prospective residents participate in the National Resident Matching Program (NRMP). The *Match* allows them to select programs to further their training that best meets their personal lifestyle and career needs (NRMP, 2006). Foreign medical graduates wishing to gain admission into a U.S. hospital residency program must successfully pass the rigorous ECFMG examination (Education Council for Foreign Medical Graduates) and the Level III USMLE national board examination (United States Medical Licensing Examination) (ECFMG, 2006) (USMLE, 2006).

The purpose of resident training is to provide newly graduated physicians with the necessary skills to make them competent, independent medical professionals in their specialty practice. The economic implications of graduating from an ACGME accredited residency programs are considerable. The vast majority of medical specialty boards in North America require the certification candidate to graduate from an ACGME accredited residency program before being eligible to sit for the board examination.

Each of the AMA recognized medical sub specialties has a certifying board of registry which administer a qualifying examination. Successful passage of the board exam provides a widely accepted indication that the resident candidate has adequately demonstrated clinical and didactic skills required to independently practice their medical specialty. Non-board certified resident graduates face bleak prospects for post-graduate employment in their chosen specialty (ACGME, 2006e).

Bringing a Residency Program up to the Standard

A residency program wishing accreditation must comply with the performance standards of the RRC representing their specialty. The institution sponsoring the programs must also comply with a set of institutional requirements that acknowledges that the organization has committed adequate teaching resources to provide support to all their residency programs (ACGME, 2006e).

One half of the 8037 accredited programs receive either a site visit or a document review each year to measure compliance to performance standards. The average time between site visits is approximately four years. Programs that have had difficulties meeting standards receive more frequent site visits. A program applying for initial accreditation goes through a provisional period before receiving a fully accredited status. Non-compliance to standards are classified as deficiencies. A documented corrective action plan must be presented to the RRC for each deficient standard with evidence of progress towards eliminating non-compliance. If a follow up site visit corroborates the findings of the corrective action plan, full accreditation may be given (2006e).

While it is extremely rare, residency programs can lose their accreditation. A program with deficiencies in several performance standards will be given a warning. After a series of warnings and site visits, a program may be placed on probation if there is no significant amount of progress towards performance improvement. However, this usually happens after several warnings. The ACGME is dedicated towards establishing an equitable process that will allow programs with deficiencies a reasonable opportunity to restore their performance to an acceptable level. The ACGME will engage a faltering program in a long process of collaboration to direct the improvement. It appears from the perception of the researcher that one significant reason why the ACGME is not too hasty in withdrawing accredited status is the concern of the high cost and policy implications of protracted litigation if the affected program disputes a withdrawal decision. The ACGME official web site (2006e) does not suggest that any organization providing sub-standard graduate medical education will continue to receive accredited approval. A program making no serious effort towards establishing quality education for residents and posing a danger to patient practice will have accreditation revoked after they are issued several, strong warnings and site visit interventions. However, the ACGME is not known to take abrupt action to suspend accreditation unless a catastrophic event warrants immediate revocation (2006e). As long as a program demonstrates progress towards improving teaching resources, curricula and learning outcomes in a reasonable time frame, accreditation is maintained (Personal Communication, H. Simpkins, 2006). Obviously, loss of residency program accreditation is a high stakes loss for the sponsoring institution.

It is highly probable, out of a sense of survival, that a withdrawn program will consider legal action against the accrediting body if there is a contention that they were unfairly assessed during the re-accreditation review. The possibility that a court could reverse the decision of an accrediting agency could have an important impact on how future accreditation site reviews are handled (Bollag, 2005). Reversals may trigger an avalanche of legal cases disputing ACGME unfavorable decisions. Recently, other post-secondary accreditation organizations outside of medical education have reported court challenges to their revocation decisions due to non-compliance to performance standards (2005).

Agencies such as ACGME and CHEA face strong challenges to their moral *high road* strategy of greater transparency in public reporting of program deficiencies noted during the re-accreditation process. Actual or threatened loss of accredited status involves high stakes for the success of professional careers for physician directors and senior hospital administrators. Supporting institutions face the prospect of a substantial loss of U.S. federal funding for resident education. Loss of these revenues can threaten the viability and solvency of the sponsoring institution. Program directors and health care organizations may look to the courts as their only means of defense against these challenges. In guiding residency programs from a minimum threshold to a competency based, continuous quality improvement model, the ACGME must be careful to encourage open dialogue and transparency in reporting challenges. In turn, program leaders at accredited institutions must create a supportive environment for residents and faculty that eliminates the fear of blame if learning outcomes or other performance indicators are not up to expectation. Otherwise, a potential may exist within the

organization to filter disappointing results from public regulatory bodies (CAP, 2004). Deficient outcomes can be corrected with well executed action plans that are supported by the team work of institutional and program leaders. Accrediting agencies must strike a balance between reporting findings and respecting confidential program dialogue without violating the public's basic right to know. On the other hand, if the accrediting agencies rely solely on private, confidential dialogue, without achieving the necessary improvements, their organizations may be viewed as ineffective. They will not be seen as being committed to improving the quality of post secondary education (Challenges to Accreditation, 2005). The primary challenge moving forward into the 21st century will be how these organizations maintain an appropriate balance between coaching programs towards excellence and, at the same time, holding them accountable for not meeting performance standards.

The Site Visit

All ACGME accredited residency programs must complete a documented self review of their progress towards complying with performance standards. These audits are submitted on a two year cycle. The findings are compiled into an extensive document called the Program Information Form (PIF). The PIF poses questions related to the program's compliance to performance standards. The questions require a description of the performance improvement monitors that have been established internally to assess the quality of teaching and to summarize corrective action in the deficient areas noted in the self study. More importantly, the PIF submission should describe what improvement has been actually achieved. Monitoring efforts at improvement alone is not sufficient to meet performance

standards. If different methods have been tried and have failed to correct deficiencies, the expectation is that other methods will be tried until better results are obtained. To validate the self-reported activities contained in the PIF, the ACGME sends out site visitors to examine program records and conduct interviews of key personnel. Approximately 1900 programs are visited each year. Site visitors are members of the ACGME staff . They may be either physicians or doctoral scientists who are knowledgeable in the performance standards and the technical aspects of the accreditation program (ACGME, 2006f).

The purpose of the site visit is to objectively collect evidence to validate and to clarify the information reported by the program leadership and faculty. Prior to the visit, site visitors will review the current PIF, the program policies and the reported institutional compliance to the stated requirements. This affords the investigator the opportunity to efficiently probe potential weak points in the program. However, it is important to re-emphasize that the site visitor is not a decision maker. Sites visitors are specifically instructed to be neutral and objective in every way. They are instructed not to make any recommendations or provide any opinion as to how the ACGME may make their final decision or recommendations. Their role is to interview the program director, faculty members, residents, administrative leaders and other institutional supporters to make certain the data reported in the Program Information Form is accurate . The site visit narrative report and the PIF are submitted to the Residency Review Committee (RRC) for the decision to accredit the program (2006e).

Institutional Requirements for Accreditation
Review of the Sponsoring Institution

ACGME accreditation guidelines require that a residency training program operate within a qualified sponsoring organization. Most residency training done in the United States is conducted in acute care hospitals accredited by the Joint Commission of Health Care Organizations. The expectation is that the program sponsor provide the appropriate supervision and resources that fosters excellent patient care and a rigorous academic experience for the resident physician (ACGME, 2006f). A sponsoring institution may have one or several ACGME accredited residency programs. The institutional requirements for all the programs are the same. This would mean if the institution has serious deficiencies in attaining ACGME performance standards, all the programs under its sponsorship would be in jeopardy of losing their accreditation.

The ACGME requires that the sponsor have an effective supervisory structure to oversee resident training activities. Participating institutions must create a commitment document outlining how they will manage the residency programs. Management policies are reviewed by the ACGME on a two year cycle. Institutional direction is normally accomplished through an internal Graduate Medical Education Committee (GMEC). The GMEC is lead by a Designated Institutional Official (DIO) who acts as the leadership liaison with the ACGME. The primary responsibility for the enactment and enforcement of institutional performance expectations lies with the DIO. This role is usually delegated to a senior physician leader with administrative support from the hospital organization. The GMEC is required to make periodic internal review reports to the medical staff executive committee. Together, they evaluate the level of

compliance to ACGME performance standards by the institution and the individual residency programs (ACGME, 2006f).

Internal Review Process

The PIF document chronicles the self study of the residency program by the director and the faculty. However, the process does not stop there. The GMEC is responsible for conducting an institutional internal review sponsored by a multi-disciplinary team of faculty, residents and administrators. Physician participants must have a specialty outside of the reviewed program. The evaluation team provides feedback to the specialty program on their ability to meet curricular objectives and learning outcomes assessment. Through faculty and resident interviews, the team qualitatively assesses the program's success in assisting the residents in their effort to master the six competencies linked to successful medical practice. The internal review acts as a triangulation method to validate the educational methods employed in the resident program. Maxwell (2005) states that "this strategy reduces the risk that your conclusions will reflect only the systematic biases or limitations of a specific source or method…. it allows you to gain a broader and more secure understanding of the issues you are investigating" (pp. 93-94).

Resident programs must select a valid measure of learning outcomes linked to any of the ACGME endorsed six competencies that can be monitored as part of a system of continuous quality improvement. The internal review team may provide consultation in determining whether the assessment tools are adequately measuring the competencies in question. Finally, the internal review program provides a self directed evaluation of the sponsoring institution's level of resource support to resident learning in patient care

technology, resident learning facilities and computer and library access. These findings are included in the institutional review documentation submitted to the ACGME prior to a site visit.

The ACGME Outcomes Project:
Project Goals and Objectives

During the mid 1990's the ACGME faced mounting criticism from the public, hospitals leaders and the medical profession that residents were not prepared to cope with the rapidly changing health care operating environment. After four years of investigation, ACGME leaders proposed in 1998 that programs evaluate the professional development of residents using a framework of six general competencies. The six sets of behaviors that would be used to define expected resident practice would be developed through extensive research backed by grant funding from the Robert Wood Johnson Foundation and several independent projects conducted at residency training sites. Approved by the ACGME Board of Directors in late September 1999, the ACGME Outcomes Project was created to promote the use of competency assessment in the training curriculum. The revisions would be phased into the requirements of accreditation over a nine year period. The 26 Residency Review Programs were required to incorporate competency assessment protocols as part of the accreditation program evaluation by July 2001. Residency programs were to show progress in instituting competency based training by July 2002. In 2008, all residency programs would have to have competency based training and use an external based assessment tool to show proof that a resident could perform effectively. As an example, a typical pathology program will measure the quality of their learning outcomes by the residents' scores in

the RISE Exam (Residents In Service Examination) administered annually by the American Society of Clinical Pathologists (ASCP, 2006) (ACGME, 2006a).

Once a program director can identify the appropriate competencies needed for improved student performance outcomes, a curriculum can be revised by using more suitable learning objectives.

A Response to a USDE Mandate to Use Learning Outcomes Assessment

The required outcomes program for resident training has three components :

a. Develop and adopt learning objectives based on the six general Competencies.

b. Search out validated assessment methods to determine if student performance meets professional standards .

c. Use ongoing performance data in a program of continuous improvement to adjust and refine learning objectives (ACGME, 2006a).

The ACGME Outcome Project website states their purpose is to develop curricula leading to improved learning outcomes, not patient clinical outcomes. The rationale of achieving better resident learning outcomes is viewed by the physician community as being strongly tied to improved patient responses to treatment. The measurement of learning outcomes through validated instruments is an effective means of determining whether your program is meeting its teaching objectives. Spady (1994) defined outcomes as a visible demonstration of student learning. Learning outcomes in graduate medicine has traditionally referred to the ability of the resident to consistently demonstrate an independent practice of professional skills and technical competencies. However, in the early 21st century, outcomes assessment in medicine (Anderson et al., 2004) also

includes the measurement of professional competency in interpersonal and clinical skills.

Whereas outcomes assessment measures learning performance in a school setting, graduate academic medicine competencies measure the ability of a resident to actually perform the learned task in a professional setting. The critical outcome of the learning as Anderson describes it, is for the resident to be able to "transfer learned skills to new work contexts" (pg. 6). Learning outcomes become a longitudinal assessment tool to track the progress of resident learning from the first through final years of their training. As an example, pathology residency directors will use the American Society of Clinical Pathologists sponsored RISE (Resident's In-Service Examination) (ASCP, 2006) exam scores as a tool to monitor progress at each annual developmental stage of the resident's learning. Resident scores are expected to fall into an expected range based on the level of competency congruent to the developmental year of training (Personal Communication, H. Simpkins, 2006). Chambers and Gerrow's (1998) research with dental students suggests that novices, beginner students and competent students approach learning in different ways. Hence, differing methods of teaching and assessment are necessary for each level of residency training.

While competency based education has often been discussed in academic medical literature since the mid-1980's, there was little widespread interest in standardizing resident training using a competency or learning outcomes evaluation framework. During the late 1980s and early 90's the United States Department of Education proposed mandatory changes in accreditation practice in post secondary education to include self directed assessment of learning outcomes by the candidate program. Anderson et al. (2004) defined outcomes as "the consequences or results associated with instructional

experiences; the end results of institutional, program, or curricular goals." Spady (1994) viewed an outcomes based curricular design as when "you develop the curriculum from the outcomes you want students to demonstrate rather than writing objectives for the curriculum you already have" (pg. 53). The ACGME (ACGME Outcomes Project, 2006) (Batalden et al., 2002) feared that resistance to adopting outcomes and competency based measures would create a public misconception that graduate academic medicine lacked a sustained commitment towards continuous performance improvement. By the early 1990s graduate medical education was already behind other health care professional programs in their use and understanding of learning outcomes assessment (ACGME, 2006).

Federal funding of graduate medical education provided a sizable portion of the operating budget of most teaching hospitals. To ignore or dismiss the need for curricular and leadership reform would have been clinically and financially disastrous for teaching hospitals and graduate programs.

Until recently, accreditation assessment models used in graduate medical education in the United States were based almost exclusively on the minimal threshold model. This model dictates that a training program must demonstrate, through site visit inspection and self directed study documents, that it is complying with the minimum performance standards set forth by the RRC in that specialty. Batalden et al. (2002) suggest that this model did not encourage program directors and faculty to employ consistent methods of continuous quality improvement beyond documentation and monitoring activities. In other words, the expectation of learning excellence with self sustained and self directed

drive towards quality improvement, was not communicated well under the minimal threshold system.

Phasing out the Minimal Threshold Model

The proposed USDE changes strengthening the link between accreditation eligibility to improved student learning outcomes encouraged graduate medical educators to open a dialogue for reform. Beginning in 1987, the Council of Graduate Medical Education, the Pew Health Professions Commission, the Association of American Medical Colleges, the Federated Council of Internal Medicine and other prestigious stakeholder organizations began to call for a dramatic change in the scope of training of graduate resident physicians and board certified specialists (Batalden, 2002).

The changing financial climate of hospitals, where most training of resident physicians occurs, was undergoing significant changes due to the transition from retrospective to prospective cost reimbursement during the 1980's. Ambulatory services, which continued to be reimbursed on a *fee for service* basis, created attractive revenue opportunities, provided the doctors were able to treat a sizable volume of patients in hospital clinics. Kowlcyzk (2002) suggests that during this period hospital leaders began to place great pressure upon physician faculty to devote more time to clinical volume. Increased devotion by faculty to treat patients often decreased the time they could spend with their residents. Nationwide, Batalden et al. (2002) indicated that there was a surge in job turnover for residency directors due to their frustration in not being able to devote sufficient time for teaching. The pressures to get more involved as attending physicians and create billable patient care revenue was perceived by many directors as interfering with teaching and curricular responsibilities.

The ACGME decided to step up its efforts to deal with this crisis by encouraging a greater level of collaboration across residency review committees and medical specialty board programs to generate creative solutions. ACGME leaders realized that there was something lacking from graduate training, but none of the stakeholders seemed to be able to reach a consensus on a resolution to the problem. In 1994, they decided to focus on curricular reform that would link teaching objectives to resident learning outcomes (Batalden, 2002). A strategy was developed to encourage the RRCs and board specialty groups to collaborate on creating several generally recognized competency behaviors based on current challenges in the health care environment. With backing from the Robert Wood Johnson Foundation, the ACGME created the Outcome Project Advisory Committee. Suggestions were solicited from the RRCs and specialty boards. Originally, the committee came up with thirteen sets of competencies derived from eighty-six competency projects, contributed from programs throughout the United States. The thirteen competencies would later be reduced to six. Additional feedback was solicited from other stakeholder groups, including medical clinicians, medical educators, allied health educators, federal government policy makers and post secondary education accreditation experts outside the health care profession to begin the refinement process.

The ACGME used a grounded theory approach to fashion the theoretical framework that led to the final selection of the six general competencies for resident education. Merriam (1998) describes grounded theory as a qualitative method of investigation where an attempt is made to postulate a theory from the collected data. Studies usually involve pragmatic situations where a hypothesis is inductively derived from the data.

The refinement process was conducted in two ways: first, the ACGME conducted an extensive literature search to determine if specific competencies were frequently studied and validated by various methods that consistently supported similar findings. They interviewed medical educators and coded the data to retrieve common threads of understanding as to what constituted the behaviors of successful residents. Second, survey feedback was solicited from 200 clinicians and residents and 18 health administration leaders in senior management, nursing, allied health professions as well as patient advocates and employers. The physicians' feedback determined whether the selected competencies were relevant to them and whether they thought that they should be included in resident education. The non-medical survey respondents were asked to critique whether the selected competencies would better prepare residents for the future challenges of health care delivery. The recommendations of these groups led to the original thirteen competencies being reduced to six: a. patient care, b. medical knowledge, c. practice based learning, d. interpersonal and communication skills, e. professionalism and f. systems based practice. As these competencies are introduced and evaluated through the RRC program accreditation process, the theoretical validity of the model will be proven by the improved learning outcome scores of the residents. The ACGME board approved these general competencies to be part of the criteria of accreditation for residency programs in February 1999 (ACGME, 2006a).

The American Board of Medical Specialties (ABMS) has supported the learning of the six general competencies by revising examination questions for board certification in medical specialties to measure compliance with these learning objectives. They are also designing continuing education exercises for mid career physicians to evaluate their

level of proficiency in these competencies and offer developmental exercises to create opportunities for self directed learning (ACGME, 2006a).

Since the inception of graduate medical education accreditation, credentialing of residency programs was based on demonstrating that the program and the institution met minimally acceptable requirements. Changes in performance standards evolved slowly. The types of changes were highly predictable to program directors. They could adapt to new requirements without a major disruption in the status quo of the current training regimen (ACGME, 2006a). Historically, evidence of program compliance was found in well written internal policies and documented practices. Institutional sponsors had to demonstrate that they provided adequate learning resources. What appeared to be missing from the model was an expectation of continuous quality improvement in the learning outcomes for the residents. Quality improvement would include documentation of applied quality measures, statistical evidence that the applied measures improved learning and an external validation that learning improvement actually occurred (Batalden , 2002).

Hospital based residency programs prior to 1999 appeared focused on meeting accreditation requirements verbatim. Batalden et al. (2002) suggest that a total understanding of why those requirements were relevant may have been lacking in many programs. In his investigation of programs' self study required by the ACGME in-between site visits, Batalden's findings indicate that a typical program would show substantial evidence of monitoring of quality measures, but little evidence of an active process to evaluate what was working (or not working) and revision of learning objectives to create improvement. The formal introduction of the six general

competencies, coupled with a policy commitment to judge program performance by resident learning outcomes, presented a concise agenda for program directors. They had to be committed to a process of continuous quality improvement (CQI) by showing tangible evidence that quality measures linked to curricular improvement were meeting expected targets .

External validation that the quality measures have improved learning had to be available. If the measures showed that expectations were not met, evidence of changes in curriculum content or pedagogy would have to be demonstrated as part of the CQI strategy to improve learning for the pathology residents.

The Six Domains of Resident General Competencies

A set of six general competencies were selected for use from a field of 86 project submissions accepted by the ACGME Outcomes Project in 1998 (ACGME, 2006b). The competencies are:

Patient Care "What You Do"

Medical Knowledge "What You Know"

Practice Based Learning & Improvement
"Becoming a Better Doctor"

Interpersonal and Communication Skills
"How You Interact with Others"

Professionalism
"How to Act"

Systems Based Practice
"How You Work Within the System"

Actual patient care competencies will vary with the type of specialty practice. They will often include history taking and exam, diagnostic and procedural skills and the

ability to counsel and educate families in selecting treatment alternatives (Gordon, Thomasa, Kerwin, 2004).

Medical knowledge relates to the ability to recall and synthesize theoretical and didactic information derived from basic science and clinical instruction into effective decision making and procedural performance.

Practice based learning and improvement describes a resident's andragogical learning plan. It may involve reading lists, developing computer research skills, refining evidence based medical diagnostic skills engaging in teaching others and responding to feedback with reflection and dialogue.

Interpersonal and communication skill competencies cover a variety of verbal and non-verbal behaviors. Legible writing and speaking with a moderate tone and clear diction are not the only requirements. Physicians must be able to communicate effectively with patients and other health care providers on a number of levels. They must have good listening and interviewing skills in order to create and sustain a therapeutic relationship with patients (Gordon, Thomasa & Kerwin, 2004).

Professionally behaved residents respond promptly to all pages and medical emergencies. They are respectful of their patients' culture, emotional outlook, age, gender, disabilities and sexual preferences.

Systems based practice means that a resident is savvy with how health care operates in relationship with the general operating environment. The practitioner has a strong working knowledge of health care accounting and financial issues. They learn how to make the best of operating constraints and are able to turn limitations into opportunities. Gordon, Thomasa and Kerwin (2004) have suggested that many program faculty

members have very effective teaching skills that go unnoticed because the traditional business priorities in faculty practice have been focused towards generating clinical revenues. Today, with shrinking reimbursement for clinical services, outstanding graduate medical educators can possibly use their pedagogical skills as competency consultants to other residency programs.

Outcomes Based Education – Theoretical Frameworks
Student Learning Outcomes and Accreditation

In their document entitled a *Statement of Mutual Responsibilities for Student Learning Outcomes: Accreditation, Institutions, and Programs* the Council for Higher Education Accreditation (CHEA, 2003) defines student learning outcomes as those "knowledge, skills and abilities that a student has attained at the end of his or her engagement in a particular set of higher education experiences (pg. 5)." In other words, the student should be able to demonstrate a minimally acceptable level of mastery of what was taught to them. In the general post secondary setting, evidence of learning outcomes can be produced from a variety of sources: comprehensive examinations, licensing or placement examinations, professional board licensure practical exams, and student portfolios. CHEA suggests that any collection of evidence used to assess learning performance must be relevant to the educational objectives set forth in the curriculum, and be obtained from a variety of sources and observers to make the analysis equitable and complete.

In the assessment of graduate level medical training, learning outcomes are not to be confused with clinical outcomes. Clinical outcomes are related to the efficiency and efficacy of a chosen course of diagnosis and subsequent treatment modalities

administered to a patient. Learning outcomes in resident training refer to the demonstration of certain types of competent practice behaviors that are judged by the physician community, and also by non-physician stakeholders, to be exemplary of successful doctors . Successfully accredited residency programs and their sponsoring institutions use learning outcomes as one of their measurement parameters in their evaluation of program effectiveness.

Taxonomy of Learning Outcomes

Benjamin Bloom (Clark, 2001) defined three categories of learning from which academic leaders can formulate a system of learning outcomes measurements based on the achievement of educational objectives placed in the curriculum:

1. Cognitive
2. Affective
3. Behavioral (psychomotor skills)

Cognitive learning is concerned with the acquisition of theoretical and clinical Knowledge (ACGME, 2005) that will equip the resident to perform their professional tasks in a self-assured, confident manner. Cognitive learning skills include comprehension, application, analysis, synthesis and evaluation of learned material. The personal observations of the author have shown that within their medical specialty, a resident may spend several hours a week reading textbooks and journal articles. They acquire information that will be useful to recall when explaining a diagnosis or clinical description to a colleague. During journal club, a periodically scheduled study session for discussing the latest clinical literature, a resident may be asked to provide an informal or a power point presentation to his or her peers or mentors to summarize literature readings and apply their knowledge to recent clinical encounters. Additionally, a

resident may be presented raw technical data, including a patient's medical history, and then asked to perform an evaluation based on various sources of data, while discerning complex interactions of treatment and disease course, and then synthesize a written summary interpretation of the patient's disease to a requesting physician. As a learning outcomes measure, a faculty member may grade the resident's technical preparation of the test results, including validation and quality control, the methodology used in reaching an interpretation and the scope and the depth of information presented by the resident in consultation with the patient's attending physician. Either through a formal checklist or the faculty member's mental checklist, the resident's level of competency is evaluated. Certain minimum standards must be met. However, the true goal of the learning experience is to exceed the minimum threshold of adequate performance. During the post evaluation, a faculty member will engage in dialogue with the resident to discuss the evaluation and suggest ways for the young physician to improve upon current skill levels. Smith et al. (2000) describe how an evidence based skills test is used to apply eight different clinical scenarios to measure a resident's ability to engage in effective clinical questioning and to conduct research using appropriate rubrics and statistical methodologies. Similar survey instruments, tailored to the specific needs of various resident programs, have also been developed by medical educators and are posted on the ACGME website (ACGME, 2006).

Affective learning in medicine primarily deals with the resident's level of motivation to actively participate in the instruction needed to become a successful professional. This not only includes the motivation to engage in a robust level of self-directed Education, but also the drive to question and share information with confidence and

enthusiasm, yet maintain an appropriate level of deference, humility and respect for one's co-workers and patients. Affective learning outcomes measurement is also an evaluation of the values expressed by a resident's behavior in challenging circumstances.

The ACGME provides learning resources guides for the six competencies expected to be measured in accredited training programs. The guides include compendiums of successful outcome measurement projects contributed by program directors to share collegially successful modeling discovered mostly through action research. Fung et al. (2000) describe an outcome measure, under the competency of practice based learning and improvement, where a faculty mentor encourages a resident to keep a log of significant events and surprise challenges felt during patient interaction in clinical rounds. The resident reflects on their personal strengths and weaknesses they sense in their bedside approach and dialogue with their preceptor about creating a corrective action plan to improve their inter-personal performance.

Behavioral learning focuses on the specific procedural, diagnostic or treatment skills necessary to conduct a successful practice of medicine. For example, a pathology resident learns highly specialized techniques to perform gross dissections of surgically excised human tissues. They also learn to properly remove organs during the practice of autopsy post mortem procedures. The primary teaching technique is based on a kinesthetic method that fosters *a show, not do* approach to student learning. Progress through the learning process is measured through trial and error and imitation. Achievement of competency is largely accomplished through practice and coaching. The student is expected to create a personal mechanism to be able to effortlessly perform these skills and be able to apply them to complex patient care situations.

Learning outcomes measurement in surgical pathology is largely conducted through faculty discussion and consensus review of observed skill behaviors.

Learning Outcomes Assessment as Part of the Criteria of Accreditation: Is it an effective model of continuous quality improvement?

The ACGME holds residency programs and their institutions individually accountable for measuring learning outcomes, assessing their efficacy and implementing constructive changes to improve the overall quality of the resident physician's learning experience. Several questions arise as to how and why this should be done. First, is there a sufficient body of research knowledge definitively linking student learning outcomes assessments, conducted over several years, towards positive student performance or achievement of institutional goals? Second, does a program like the ACGME provide clear expectations on how to measure competencies using validated instruments? In their study of post secondary institutions, Friedlander and Serban (2004) pointed to the irony of regional regulators requiring colleges and universities to create improved student learning outcomes as a condition of accreditation, yet the "knowledge base that might drive such accreditation decisions, especially the measurement of student learning, has not been fully informed by practice" (p. 102).

Bers (2001) suggests that the recent phenomenon of demonstrating improved competency based learning, measured in part by improved student outcomes metrics, is driven by students wanting to possess clearly recognized marketable skills and employers wanting applicants with the skills they need. Post secondary faculty and employers must come to a clear consensus, as to what is considered competent professional or vocational behaviors. Bedard-Voorhees (2001) and Bers (2001) indicate

that there are not enough validated instruments available that are both versatile and consistent to be widely recognized by faculty, employers and students as effective measures of performance. Bedard-Voorhees (2001) believes that professional educational programs, such as academic medicine, enjoy a more "natural connection" (pg. 84) to competency based learning models. A consensus has emerged among some professional groups, such as medicine and accounting, that connecting certain successful competency performance by students leads to successful entry into the profession. The challenges that have arisen is that while several metrics instruments have been created to measure a wide array of competencies, the field of consistently valid measures has not been sorted out.

As an example, there are no formally recognized validity measures that can be used for all six competencies included in the ACGME accreditation process. Numerous instruments have been created by residency programs and independent researchers, that are shared on the ACGME Outcomes Project web site, but very few have been established as having moderately strong construct validity for specific competencies and none are recognized as universally valid in measuring all six competencies.

Friedlander and Serban (2004) suggest that the framework to build valid measures of student competency of learned material is based upon careful study over time at three levels: course, program and institution. At each level there has to be a clear understanding of what competencies are universally recognized as being important to successful outcomes. What this means in graduate medical education is that consensus not only extends to immediate peers and faculty, but also to important stakeholders such as patients and administrators.

Implications for Residency Program "Cycle" Preparation
Faculty Buy-in to the Assessment Process

Hubbell and Burt (2004) have suggested that one of the challenges of moving curricular reform from a teaching centered to a learning centered framework is recognizing that not everyone learns in the same way. Academic departments and senior institutional leaders need to engage a wide community of stakeholders to map out a collegial understanding of the diverse challenges of undertaking a transition in strategic thinking. The researcher has perceived that the rate of learning varies in residency programs due to the technology, curricular design, faculty teaching style and cultural context of the training environment. Learning centered curriculum design improves the communication of program goals and expectations to both students and other stakeholder. It provides a gauge of accomplishment that allows educational leaders to plan alternate strategies to correct potential misalignments between learning and teaching styles. The learning centered approach also provides a more flexible guide to the overall design of the curriculum, including the development of course content and course objectives.

Hubbell and Burt (2004), along with several other investigators have also stated that transitions in curricular framework should be implemented in an incremental fashion. The ACGME planning strategy has mirrored this approach. The roll out of the six competencies, CQI programs and learning outcomes metrics have been introduced over a twelve year period that started in 1999 and will end in 2011. Each step of the phase-in program has been carefully reviewed to make sure that the published performance standards really help the residency programs achieve improved learning outcomes. Throughout this process, the ACGME has been diligent in maintaining positive and supportive dialogue with residency program and institutional directors to

make sure that these efforts are leading to meaningful change and actually help improve resident professional performance.

To initiate incremental change in the curriculum of post secondary academic departments, Hubbell and Burt (2004) propose that a sequence of steps should be followed:

- Establishing a *conceptual framework* for making the curricular changes.
- Developing *practical strategies* for implementing those changes in a timely, efficient and reasonable way.
- Addressing *learning context strategies* that allow improved teamwork, more resources, effective leadership and better stakeholder representation.
- Using *planning strategies* to define global and specific learning outcomes that will "drive the curricula, teaching and learning process" (pg 54).
- Selecting *assessment strategies* that will provide a validated measurement of resident learning and provide an indication of whether the curricular change are actually working.
- Creating *programming strategies* that embrace a wide diversity of learning methods to be explored and evaluated to determine whether their inclusion into the curriculum would be helpful.

To implement these strategies, the authors suggest that a mobilization stage be initiated involving all the stakeholders in open-dialogue in a *town-hall* type of setting (Cox, 2004). Weinstein (2006) suggests that one of the major problems with significant curricular changes,such as learning outcomes assessment, is that senior leaders do not fully explain the purpose and the motivation for making the changes. Unfortunately, leadership decisions for such changes often come down to the faculty *as a take or leave it* edicts that create defensive and evasive behavior. In traditionally conservative fields, such as academic medicine, overcoming the inertia of faculty

resistance to teaching practice or curricular changes can be formidable. Post-secondary departments, such as those in a medical school or a hospital residency program become, as Schneider and Schoenberg (1999) suggest, isolated, self-contained *silos* of study. The climate of interaction between students and faculty often do not allow for inquiry as to what types of learning experiences work well with the students. Student-faculty interactions in residency training are highly ritualized (Murphy, 2006). Often, comments are heard from the faculty about the staggering amount of material that has to be learned by residents in a very short time period. Yet, faculty may also say that their workload as students was equally daunting and helped them to become better pathologists. Since the faculty members became successful practitioners by coming through this rigorous training, they reason that it should be the same for the new generation of residents as well. Faculty may be ignoring the changing context of medicine and the changing demands of students learning with the current body of professional knowledge.

Schneider and Schoenberg (1999) propose that rigid faculty mindsets can be positively influenced through multi-disciplinary dialogue with residents, other medical specialist faculty, program directors and administrators. The world has become a more complex place since the faculty were residents. They have to become more accountable for embracing these changes and to incorporate resident feedback into the revisions of their teaching delivery and educational objectives.

Complex changes in learning have also required curricular changes to be integrated into newly developed learning models in both a horizontal and vertical fashion. As an example, the Temple University School of Medicine (Murphy, 2006) has changed from a discipline based to an organ system based curriculum for medical undergraduates.

Previously, a specialty like pathology, would present a lecture series describing the pathology of all the organ systems in a contiguous format. Now, the lectures are set up based on the renal system, cardiac system, hepatic system, etc. The pathology lecturer will do a learning segment within the organ system curriculum. Hubbell and Burt (2004) suggest that these changes require close interaction and detailed planning between the organ system facilitator (presenting the global view of the system) and the sub-topic specialty presenters. To check on the reactions to the curricular changes, feedback should be solicited through a practice stage in the implementation sequence. Surveys, focus groups, test score reviews may be continually engaged during the period of implementation to assess whether the planned changes have met educational objectives for improved learning outcomes.

The Laboratory Management Curriculum During Pathology Resident Training: Introduction of Management Skills Training For Pathology Residents

AMA endorsed hospital training programs in pathology began in 1926. During the late 1920's certified training required a post graduate apprenticeship with an experienced practitioner. Formal certification through an examination conducted by a board of experts was introduced in 1936 by the American Board of Pathology (ABP) . The earliest evidence of management training as a formal learning program for pathology residents appeared during the 1970s (Sims & Darcy, 1997). In 1975 the American Board of Pathology introduced management questions in their certification examinations. By 1979, well recognized Pathology textbooks such as *Davidson and Henry: Clinical Diagnosis by Laboratory Methods* began to devote separate chapters on laboratory administration. Textbook topics focused on daily operational issues such as

quality control, administrative skills, budgeting, laboratory work flow design and test cost accounting.

During the past 25 years the research literature in Pathology graduate education reveals several studies where programs in laboratory administration have been introduced into the Clinical and Anatomic Pathology resident training curriculum (Hale,1987; Connolly, 2003; Wells, 2006; ADASP, 2006; Horowitz, 2004). The majority of these new programs have introduced specialized laboratory management skills such as professional billing, coding, regulatory compliance and accreditation, cost effectiveness analysis of laboratory test methods, knowledge of quality assurance, risk management and informatics.

National Surveys Evaluating Pathology Resident Business Management Competence

Between 1982 and 1997, three national surveys were conducted to evaluate pathology resident training in business management and finance (Winkelman, 1982; Brugnara, Fenton & Winkelman, 1994; Goldberg-Kahn et al., 1997). Questionnaires were sent to program directors of ACGME accredited programs in North America. Each study provided a descriptive statistical analysis of the extent and content of the business curricula and the range of teaching hours. One of the studies provided additional insight into the reasons why certain management topics were covered during training as well as describing the relationship between the size of the resident program and the scope of the curriculum.

The earliest known study (unpublished) was conducted by James Winkelman in 1982 (Brugnara,1994). A brief questionnaire was sent to 90 program directors with

33 institutions responding. Thirty-seven percent of these programs (12 hospitals) had formal management instruction in their curriculum. Twelve years later, Brugnara, Fenton and Winkelman (1994) conducted a more detailed follow up study. Surveys were sent to 187 ACGME accredited programs and a 73. 8% (138) response was obtained.

Forty-four per cent of the respondents (61/138) had formal management instruction. This was only a 7% increase over Winkelman's 1982 study. Teaching times in formal programs in the 1994 study ranged from 21.9 to 31.7 hours annually. Sixty-five percent of the residency program directors acknowledged that business leadership training was important and should be given more time in the curriculum. In those programs with a formal curriculum, 53% had fiscal management topics such as cost analysis, reimbursement, professional billing and budgeting. Ninety-two percent included traditional laboratory business topics such as leadership, human resources, regulatory compliance, accreditation and organizational development. Only 32% of the programs provided quality assurance training. Informally, 82% of the programs encouraged residents to participate in quality assurance projects or engage in hospital committee work. The Brugnara study strongly suggested that residency program directors were divided in their opinions about curricular content and the amount of didactic instruction devoted to management topics.

The 1994 survey was a two page, eleven question instrument. Five of the questions required a Yes/No response. Three of the questions required numerical responses. The Yes/No questions also provided an opportunity for the respondents to provide short comments or detailed explanations. The remaining three questions required either a

check or circle. More detailed opinions were encouraged in the cover letter instructions. Respondents were also strongly encouraged to send a copy of the business curriculum along with the survey response.

The breakdown in pedagogy for management training included 20% lecture only, 4% case study only and 41% using a mixed format of case study and lecture. Twenty-nine percent used other active learning or self directed learning methods e.g., senior resident or attending mentors, readings, shadowing, committee work, CAP mock or actual inspections, *director for a day*…. etc.

The reasons for management training were obtained from 59% (82/138) of the respondents. Twelve percent of the respondents were compelled exclusively by accreditation needs and 6% provided training in response to resident feedback. Twenty-nine percent provided training in response to a combination of perceived accreditation needs and resident expectations. In programs offering learning opportunities in fiscal management, one third of the programs had the residents engage in activities involving the preparation of capital and operational expense budgeting. About 23% of the programs had the residents analyze and explain budget variances. Formal training had a higher probability of offering fiscal management, workbench quality control and quality assurance topics compared to a non-formal curriculum. The study did not define a formal versus a non-formal curriculum. From the personal experience of the researcher, the term formal would imply a published curriculum and a schedule of teaching that included management topics plus discussions with the residents about being prepared for the ABP board questions on laboratory management.

The most recent national survey sent to accredited pathology residency programs in North America occurred about a year after the introduction of the ACGME Outcomes Based Learning Project in 1994. A two-page questionnaire was sent to 176 ACGME programs in August of 1995. Eighty-four programs (48%) responded to the questionnaire (Goldberg-Kahn, Darcy, & Sims, 1997). Eighty-one programs offered formal training compared to 61 programs three years earlier. Management training was largely integrated into Clinical Pathology rotations. Management topics covered included a similar pattern compared to previous studies: budgeting, human resource management, quality assurance and instrument evaluation. Only 23% (19) of the programs reported having pathology residents engaged in a separate, exclusive management rotation.

The pedagogical methods reported included apprenticeship, lecture, assigned readings, independent study and mentors. This study noted the significant use of non-pathologist faculty as lecturers in business practice and theory. Attending pathologists mentored residents in business and leadership practices. Residents were also expected to participate in journal clubs, case studies and hospital committee work in quality assurance and quality improvement.

All of these studies were helpful in describing the general practice of management instruction in pathology residency programs in North American hospitals. None of the studies provided much insight as to whether program directors truly valued the substitution of clinical instruction for business training in the compressed four year curriculum.

Preparation of Resident Graduates for Leadership Roles as Junior Attending Physicians

In his study of professional competency of recent resident graduates by their hospital employers, Horowitz and his investigative team (2004) expressed concern that pathology residency programs on a nationwide scale do not provide adequate business management training. They suggested that many programs do not have faculty who have either the motivation, expertise or time to teach management. To address this issue, a consortium of six pathology residency programs in Southern California developed a comprehensive management training program. Expert pathologist and non pathologist leaders comprised the program faculty. Seminars were delivered on alternate months over a two year period. Residents and faculty reported improved preparation for the American Board of Pathology examinations.

Management competence is an important tool for attending pathologists to acquire. Horowitz (1998) reported findings from a survey of 75 community hospital pathologists that 96% felt that it was essential for junior attending staff to have management and computer skills. The 1998 survey finding indicated that pathologists spent fifteen percent of their work hours devoted to administrative duties. Twenty percent of this group reported spending more than 25% of their work time on management activities.

The College of American Pathologists, along with other prominent leadership organizations devoted to pathology graduate education, had increasing concerns over the adequacy of training since the 1995 Graylyn Conference recommendations reduced the requirements for graduation from five to four years (Kass, 2007). One of the major barometers of training adequacy would be the feedback from employers of recent graduate residents. In 2006 a national survey was sent to chairpersons of academic and

private hospital pathology departments. In general, the survey results concluded that employers were satisfied with the skills and training of their recent hires with the exception of their abilities in laboratory administration and their judgmental skills in special stain selection. Private employers, however, were less satisfied than their academic counterparts with the performance of recently hired junior attending pathologists.

It is important to note that the impetus to reduce the training time from five to four years in the 1990's was driven by the projected manpower shortages in pathology in the 21st century (Future of Pathology Task Force CAP Group, 2004). In 2004, the College of American Pathologists sponsored a task force to address the deficiencies in leadership training for residents. Data collected from quarterly meetings by this task force had indicated that the aging American population would require more pathologists in the future . Second, with reduced learning time, the group expressed serious concerns as to how competencies were to be achieved. Third, could pathology training be improved to remain attractive to graduates from American medical schools? Improved training in laboratory administration and clinical pathology was recommended by the Graylyn Conference in 1995. Concurrently, the ACGME was developing an accreditation paradigm that would assess student performance in resident programs by learning outcomes. Outcomes measurement would eventually be demonstrated by the model framework developed by the ACGME in the late 1990's called the Six General Competencies. Pathology leadership organizations had anticipated that a comprehensive laboratory management curriculum and an accompanying measure of learning outcomes in this sub-discipline would be incorporated into the ACGME mandated general

competencies. Detailed recommendations for curricular changes and competency measures were provided by the Academy of Clinical Laboratory Physicians and Scientists and the Association of Directors of Anatomic and Surgical Pathology in 2003 and 2006.

In the 2006 survey conducted by Kass (2007), most employers (74%) rated medical knowledge and inter-personal skills as the key drivers in selecting a pathologist candidate to be hired as a junior attending physician. Recent graduates indicated in the survey (69%) that their training programs prepared them to take their specialty boards (ABP), but only half of the respondents (50%) felt that their programs prepared them to obtain employment after graduation. Employer respondents have indicated that learning administration skills is of greater importance now than it was ten years ago.

A Proposed Curricular Model for Laboratory Model Based on the ACGME Six General Competencies

In 1995, the Graylyn Conference convened four major pathology organizations: Association of Pathology Chairs, College of American Pathologists CAP, Academy of Clinical Laboratory Physicians and Scientists (ACLPS), and the American Society For Clinical Pathology (CP) to examine issues related to optimal CP training. The conference participants recommended competencies that pathology residents should learn in order to manage clinical laboratories: a. cost effective testing, b. equipment selection, c. laboratory testing systems, d. managing laboratory resources, e. adopting medical informatics, and f. being a champion for laboratory medicine.

Smith et al. (2006) developed a clinical pathology curriculum proposal that could be applied to an outcome measurement model based on five of the six ACGME general

competencies. Specific, measurable curricular objectives were assigned to each competency goal:

1. Medical Knowledge
    a. Acquire and evaluate evidence based information from peer journals.

    b. Maintain knowledge base in basic clinical sciences in order to engage in lab medicine consultation.

    c. Obtain knowledge necessary to determine clinically optimal cost effective testing for patient care management, achieving proper test result turnaround times, and knowing when to bring a test in house.

    d. Understand and employ Quality Control statistics.

    e. Be able to modify reference ranges on the basis of age or demographic characteristics.

    f. Have familiarity with CLSI standards (Clinical Laboratory Standards Institute, formerly NCCLS). Know when to apply the standards to policy or test methodology development.

    g. Knowledge of CAP, American Assoc. of Blood Banks (AAB) proficiency programs, order and selection, interpretation of results. Investigate and prepare a Proficiency Testing Exception Summary (PTES) responses if a proficiency test value is out of peer defined performance limits.

    h. Demonstrate skills in research methodology and experimental design. Translate evidence based research findings into evidence based practice.

2. Practice-Based Learning & Improvement

    a. Critically assess scientific literature.

    b. Demonstrate knowledge of evidence based research, be able to apply findings to professional practice.

c. Use multiple reference sources. Pursue lifelong learning opportunities.

d. Be aware of one's gaps in medical knowledge and develop a remediation learning plan.

e. Learn to develop process improvements for patient safety.

f. Establish continuing competency programs for pathologists.

g. Use proficiency programs to improve lab practices.

3. Inter-personal and Communication Skills

a. Be able to produce legible, articulate, and concise diagnostic or consultation reports.

b. Communicate well to multi-disciplinary groups.

c. Express a leadership vision about quality and cost effectiveness.

d. Be proficient in all modes of verbal and non-verbal communication.

e. Demonstrate proficiency in patient communication.

f. Employ pedagogical skills with residents, technologists, non-physician and health care workers.

4. Professionalism

a. Demonstrate compassion for patients, visitors, colleagues and employees.

b. Respect for diversity.

c. Positive work habits e.g., punctuality, dependability.

d. Responsive to patient needs.

e. Respect for confidentiality and demonstrate proficiency on how to manage information in a confidential manner.

f. Knowledge of regulatory compliance.

g. Commitment to excellence and personal development.

h. Demonstrate good inter-personal skills w/in a multi-disciplinary setting.

5. Systems-Based Practice

a. Understand the role of the clinical laboratory in the health care system.

b. Design resource-effective diagnostics plans congruent with known best practices.

c. Demonstrate knowledge of reimbursement and professional billing procedures.

d. Have knowledge of the laboratory regulatory environment.

e. Understand and implement policies related to patient safety.

The proposed curricular model suggested five pedagogical methods to be used with pathology residents to build knowledge and skill based behaviors:

a. Participate in rotations in the laboratory technical sections with graduated responsibilities as skills develop.

b. Prepare learning portfolios to demonstrate their learned skills.

c. Engage in case presentations, research seminars and journals clubs.

d. Assume on-call responsibilities to deal with clinical and administrative inquiries.

e. Develop and implement a new technical assay.

The authors note that the increasing complexity of medical care is requiring some pathologists to engage in sub-specialty training to keep up with consultative demands. These demands include the use of administrative skills to solve

laboratory technical, operational and financial challenges. Smith's proposal has specific recommendations to develop resident competencies in laboratory administration and leadership to better prepare the pathology residents for their initial employment as junior attending physicians. As examples, under the general competency criteria of medical knowledge, curricular topics would include organizational development and leadership, finance, regulatory compliance, and quality assurance/quality control management. To achieve proficiency in laboratory management under the ACGME general competency of professional practice would require the resident to be able to file a professional billing requisition using the proper technical billing and diagnosis codes to ensure a valid claim. A resident would have to know how to do a root cause investigation of a medical error in order to participate in the revision of employee training and work flow design to prevent future occurrences. They would have a respect for diversity and the *other* voice of stakeholders in the health care system. They would also be able to communicate detailed, complex medical information in a calm, confident manner. The competency of practice based learning would have a resident conduct a self inspection of their laboratory's degree of regulatory compliance according the performance standards set by the College of American Pathologists. Interpersonal skills general competencies would require the pathology resident to demonstrate emotional intelligence in their interaction with patients, clinicians, technical support staff and administrators. The general competency of systems based practice would require a resident to able to distinguish between different types of professional practice models, understand the legal terminology of practice group contracts and how to develop a business plan in either a hospital or private practice setting.

Smith's proposed model consists of primary skill levels which are considered essential to a graduate pathologist's success as a practicing physician and secondary skill levels which will provide the necessary knowledge to quickly assume an expanded role as a section director or a senior administrator in a clinical laboratory.

As an adjunct faculty member participating in laboratory administrative training, the researcher believes that these suggested revisions are beginning to be incorporated into the curricular learning objectives with an increasing frequency. However, with the reduction of training time from five to four years, residents are placed under time pressure to acquire professional competency. Most of their time is spent acquiring clinical and technical skills to aid clinicians in diagnosing disease. However, Kass (2007) reports that pathologists are engaged up to 25% of their time in management related issues. Do pathology faculty have sufficient *buy-in* to provide additional time to laboratory administration training and do they see the intrinsic value of these skills in helping graduate residents become better pathologists?

CHAPTER 3

METHODOLOGY

Assumptions and Rationale

The primary method that was used to explore the proposed research questions was a quantitative analysis employing a survey questionnaire directed at the leaders of ACGME accredited pathology residency programs. It was assumed that the vast majority of the respondents were employed in teaching hospitals that maintained a significant affiliation to a local medical school. These programs were not free standing or isolated, but were present with several other residency specialty programs sponsored by the institution. The programs received complete financial support from the sponsoring hospital. Since access to this specific information is proprietary and privileged, the researcher assumed that each of the respondents was supervising a fully accredited program. However, it was highly probable that a small percentage of the respondents may have been supervising programs that were in a conditional accreditation status and were engaged in a remediation plan to re-establish full ACGME accreditation. All programs surveyed were also assumed to be active (i.e., there were no immediate plans to close or phase out the residency program).

Residency director respondents were attending pathologists board certified by the American Board of Pathology (ABP) who were engaged in supervision of the training curriculum on a full or part time basis. Part time directors split their time in the professional practice of surgical or clinical pathology. Some may also have had administrative positions as sectional laboratory directors or department chairpersons in pathology and laboratory medicine. As a condition of accreditation by the ACGME

supervised Residency Review Committee (RRC), each program must appoint a residency director. The director is expected to supervise the training program to maintain compliance ACGME performance standards (ACGME, 2006b). With the approval of the sponsoring organization's graduate medical education review committee and the pathology department chairperson, the director develops the training curriculum, supervises the faculty and monitors the resident cohort's progress towards achievement of the prescribed learning outcomes establishing recognition of professional competency in their medical specialty . The survey questionnaire was addressed to the residency director because of their well defined role, as set by the RRC protocol, in running the program.

The recent work of Smith et al. (2006) has shown that the teaching of laboratory administration topics is linked to at least five of the six ACGME designated general competencies where improved learning outcomes are periodically measured. The presence of business administration training in the curriculum is a required performance standard for re-accreditation by the ACGME. The current literature appears to be devoid of any study within the past five years providing a composite analysis of how all the U.S. pathology programs handle laboratory administrative training and how they measure improved learning outcomes for those competencies. No study has been found that has attempted to study how program directors use learning outcomes measures to determine whether directors purposefully link professional success to competent performance in business management and financial administration. The eight questions posed in the research section of this proposal were designed to address the void in the current body of investigative literature in this subject.

As both an educator and an administrator in an academic medical setting, the researcher was interested in determining whether pathology program leaders valued business training as an integral part of the training of a competent graduate pathologist. This notion went beyond simply providing learning material to pass a specialty board examination. No studies were known to exist assessing if and why pathology educators value this type of training or if they consider these skills critical to the success of their graduates.

Program accreditation is a high stakes requirement for the pathology department and the sponsoring institution to retain millions of dollars of Federal funding for resident education. A specific question pursued in the study was whether the fulfillment of RRC laboratory administration performance standards were seen by resident directors as a necessary evil to retain approved status and prepare the residents to pass the American Board of Pathology examination rather than a meaningful end in itself. It was important to understand whether pathology leaders wanted business administrators to run daily operations almost exclusively and have their residents acquire their business acumen only from *on the job experience*?

Another objective of this study was to determine whether residency directors consciously value and employ a strategy for the curricular design and pedagogy of laboratory administrative training, as it applies to the management of clinical and anatomic pathology operations, for a resident's graduate medical education in pathology. A section of the survey instrument included questions polling whether directors used specific strategies for adaptation of curricular design similar to those proposed by Hubell and Burt (2004).

The Role of the Researcher

The researcher in this study was a doctoral student with a concentration in higher education administration at a large urban public university located in the northeastern part of the United States. Having spent over thirty years as an administrator of large, clinical departments in several academic teaching hospitals, the researcher was familiar with the didactic and clinical training of pathology residents. His responsibility as a senior department administrator required him to provide lectures and case study learning experiences to pathology residents. He also participated in the preparation of self study compilations to the RRC as they were required to sustain fully accredited status for a pathology residency program. The researcher was also an adjunct faculty member of a graduate program in health administration at a major urban university (R-1, Old Carnegie Classification) in the northeastern United States for over 24 years. Part of the course work taught by the researcher included specialized applications of business management, accounting, medical economics and regulatory compliance pertinent to the operation of clinical departments in health care organizations. Many of the students taught by the author were practicing registered nurses, allied health professionals and licensed physicians.

The researcher professed to a bias that an understanding of laboratory administration by pathologists does lead to more effective collaboration in running a clinical laboratory with lay administrators. His interest in the subject was derived from his observations of resident training and his active engagement in curricular development and teaching residents business leadership skills. However, the researcher was also intimately aware of the constraints placed on residency educators and respected how

these constraints could possibly have a profound effect on their decisions. He was open to all the possible ideas that could be applied to deal with learning constraints through open dialogue with all the key stakeholders. This view did not distort the collection of data or the presentation of findings in the study. To minimize possible bias, the use of an objective, well designed survey allowed the researcher to gain the cooperation and confidence of most respondents to participate in the survey without fear that their answers would be misrepresented in the research findings. The survey was sent to all the ACGME accredited programs located in the United States and Puerto Rico. The data from the respondents closely matched the geographical distribution of all the programs and the gender distribution of the listed residency directors. A strong emphasis was made to clearly explain the purpose of the study and how the study would be conducted in a confidential and anonymous manner. The researcher followed up the implementation of the Likert scale survey instrument and with a series of telephone interviews with purposefully selected respondents for data triangulation. This approach allowed for frank, unencumbered conveyance of information and insight into how respondents viewed their management course designs and the success of their trainee's learning outcomes.

Data Collection Procedures

One- hundred- fifty pathology residency programs were surveyed in this study. With the exception of one site, all the programs were located in the United States and Puerto Rico and were currently accredited by the Accreditation Council of Graduate Medical Education. The exception site closed its program in mid-2007. The sample group represented all of the known ACGME accredited pathology residency programs

located in the United States and the commonwealth possessions. Current postal addresses, telephone numbers and email addresses for the residency directors were obtained from the ACGME website located on the Internet (World Wide Web). After a pilot distribution to evaluate the question format, the survey was sent out as a first wave over a two month period (April through May 2008) by a combination of email or faxes to all of the programs. Potential respondents were telephoned in advance to apprise them that the survey was coming. In most instances, office support personnel i.e., administrative assistants or pathology residency coordinators received these messages and passed the information to the program director. Two to three weeks were allowed for the respondents to return their surveys. Some chose to respond by email using a Microsoft word or PDF attachment. They used an electronic signature either on the survey itself or used the email response as their signature recognition. If no response was obtained after three weeks, a repeat email was sent to the same Internet address. A small number of programs did not have email addresses listed on the ACGME roster.

This required the author to do an internet search to locate the specific address of the program director and resend the documents. If the search did not provide an email address, a copy of the survey was sent by fax machine or surface mail. Tallies were maintained of those who responded and those who did not respond. Those who did respond were thanked by an email or a follow up telephone call. Fifteen program directors responded outright that they did not wish to participate in the survey. Several cited that they did not have the time to complete the survey. Others noted that they had

to deal with other surveys or did not have access to the information that was being requested.

Between June and October 2008, a second, third, and fourth round of emailed or faxed surveys were sent to obtain more responses. By this time, evidence began to mount that some of the emailed surveys were not reaching their targeted recipients. As a follow up to this challenge, the author learned that many institutions used *spam filters* which could deter emails with file attachments. As a counter measure, the author notified the affected respondents of the resending of the survey and then followed up with either a telephone call or email to confirm its arrival to the potential respondent or his/her administrative support personnel.

It was anticipated that several reminders would have to be given to obtain a robust response to the survey instrument. Pathology residency directors normally perform their resident education duties as an adjunct responsibility to their clinical activities. The intercession of interviewing new resident candidates, vacations, vacation coverage for colleagues, on-call, surgical pathology or clinical pathology cases as well as administrative duties as section clinical leaders could make finding the time for survey responses difficult.

Another significant challenge to data collection was the length of the survey. This instrument included forty-two questions. Previous surveys on this topic did not cover the breadth and depth of the questions posed on this survey. The largest and most successful of previous studies (Brugnara, 1994) only had eleven questions . The majority of the questions in the Brugnara survey were for demographic or descriptive information about the management curriculum. Unlike this current study,

the number of specific questions evaluating the director's viewpoints on various aspects of the laboratory administration curriculum were quite limited.

During the data collection phase for this study, four respondents expressed concern that the information being requested in this survey was highly sensitive and must be kept confidential. Written or verbal assurances were given by the researcher that their survey response records, whether they were kept in paper or electronic form, were secured from scrutiny by anyone except the investigator and, wherever appropriate, members of the dissertation committee. The survey cover letter provided contact information about the Temple University Institutional Research Board (IRB) if the respondents had additional concerns.

The Survey Instrument

The survey for this study contained 42 questions divided into six sections: a. Description of the Program, b. Faculty Participation, c. Institutional Support, d. Introducing Curricular Change/ Assessing the Usefulness of Business Training e. Predictors to Post Graduate Success and f. Creative Curricular Adoption. The questions were designed to provide the necessary data for the eight research questions posed in the study.

In section one, the respondent was asked to provide descriptive data of the size and scope of their program including the number of resident training positions, pathology specialties taught, the number of faculty devoted to laboratory administration training, the facility type, the general method of teaching and the major influences on curricular decision making.

The questions in section two asked for data on the extent previous business training by the physician and the scientific faculty, the number of non-physician faculty members teaching laboratory administration, the training methods employed and the trend in the number of curricular hours used since the introduction of the business management competency performance standards by the ACGME in 2001.

Issues pertaining to the level of institutional support by the organization's graduate Medical education committee (GMEC) was the main focus of the questions presented in section three. Respondents were also asked to rank the significance of various resource constraints e.g., faculty skills and interests, available teaching time, etc. to the development of the laboratory administration curriculum.

The fourth section contained nineteen Likert scale formatted questions asking for the residency director's perceptions of the importance of implementing curricular changes and whether or not they used any specific methods to create faculty *buy in* for those proposed changes. The remaining questions in this section focused on the various ways directors assessed the usefulness of laboratory administration training.

Section five of the survey asked directors about the types of administrative skills they believed were helpful for graduate pathology residents to learn in order to be successful in their professional careers. This section also asked for data in the use of formal learning outcome measures and the statistical methods used to measure learning improvement.

The sixth and final section of the survey asked for data on specific ways that directors employ creative methods to make curricular changes. Combined with the questions posed in section three, the data derived here was used to achieve a better

understanding of how faculty cope with institutional and departmental constraints to administrative learning for the residents.

Data Analysis

Data collection was concluded in early December 2008. Survey responses were transcribed onto an Excel spread sheet for statistical analysis. The initial analysis used descriptive and inferential quantitative statistical methods that were completed using computer software to determine the findings and trends in the data.

Maxwell (2005) indicates,

> Quantitative researchers tend to be interested in whether and to what extent variance in x causes variance in y. Qualitative researchers, on the other hand, tend to ask how x plays a role in causing y, what the process is that connects x and y. (pg. 23)

The last section of the survey included a general comments section where the respondents could provide any type of opinion or insight on the subject of business leadership training. Eighteen respondents out of 67 surveys collected provided information. The information was collected with the intent to use it to understand the quantitative responses and the inferential statistical findings.

One of the survey goals was to explore the adoption of specific curricular strategies and outcomes assessment models as recommended by Smith et al. (2006) by the ACGME accredited programs. The current curricular design used by the respondents was probed extensively by the frequency and specificity of the instrument questions. The collected data were used to assess the beliefs of the residency directors as to whether their training efforts in laboratory administration were both meeting

accreditation standards and were also providing graduate residents with good business leadership skills to be successful in their professional careers.

Most of the survey questions were quantitative statistical measures employing a five point Likert scale. The statistical variance of the response scores were compared to several independent variables using inferential methods.

A small number of open ended, probing questions in the comment sections were posed to the directors to gain insight into the selection of laboratory administration topics and competency models predictive of a resident's success in the American Board of Pathology (ABP) examinations and their subsequent professional careers. Patton (1990, cited by Maxwell, 2005 pg. 24) suggests that open ended questions often are more credible sources of insight into the day- to-day challenges of a running program, allowing for more expression of the residency director's perspective in the study.

The survey design also employed a structured approach. Maxwell indicated (pg. 80) that a structured approach "can help ensure the comparability of data across individuals, times, settings, and researchers, and thus are particularly useful in answering…. . questions that deal with differences between things. " Since the research design was quantitative in nature, the researcher began by comparing data among the 150 resident director survey respondents using descriptive and inferential statistical analysis. The independent variables measured included: size of the program (No. of residents), geographic location (NE,SE,NW,SW) and academic medical center v. community hospital. The descriptive statistics measured the intensity of commitment of teaching business practices relative to clinical professional curricular subjects. The inferential statistics analyzed the relationship between the commitment to teach

laboratory administration to pathology residents and the selected independent variables. The data were analyzed using several methods including the *t*-test, the *F* test, Pearson's coefficient of correlation, ANOVA and Factor analysis. Other multi-variable methods were employed as the clues encased in the data unfolded in the analysis.

A Constant Comparative Approach

This study used a quantitative data collection method. Data derived from the survey responses were collected and categorized as they pertained to one of the eight research questions. Second, through inductive analysis, patterns or properties detected from the measured responses of the pathology resident directors were presented and discussed. Response patterns were examined and compared not only within a specific research question category, but also between categories to detect statistically linked patterns. Third, from the significant findings noted in the response patterns, a substantive theory was derived. The theory will help explain the perceived level of importance of laboratory administrative training by residency directors to the development of competent graduate pathologists.

As an example, one of the research questions posed by this study was to assess the commitment residency directors gave to curricular development and teaching time to laboratory administration. Significant contextual constraints appear to include limited training time, specialty board examination questions, and perceived priorities of medical professional practice. As Merriam (1998) explains the methodology, the theories developed came from a constant comparative approach. Data derived from multiple

questions were added to the database and evaluated within the emerging framework of inductive analysis.

Methods of Verification

The researcher used multiple approaches to validate the findings and conclusions from the quantitative analysis. First, a target goal was set to sample at least one half of the available ACGME accredited pathology residency programs located in the United States. Schools were sorted by geographical sectors: Northeast, Southeast, Southwest and Northwest. Second, following the calculation of descriptive statistics of the Likert scale questions and the coding of the opinion questions for key word and phrase patterns, the findings and conclusions were subject to member check validation. This activity helped establish an appropriate contextual meaning of the documented responses from the perspective of the participants. Maxwell (pg. 94) suggests that member-checks help prevent the imposition of the researcher's opinion on the findings when the participants wished to convey a significantly different meaning with their responses.

Member check inquiries were conducted by telephone, email or in person in February of 2008 with a small group of survey respondents and experts who were not surveyed. A summary of the quantitative findings were given to the reviewers to assess whether the findings appeared congruent to their perception of what is happening in the field.

Outcome of the Study and its Relation to Theory and Literature

The objective of this study was to achieve an accurate measure of the opinions of pathology residency directors on the importance of laboratory administrative training

for their trainees. During the past 25 years, the trend of the research literature suggests that pathology educators were slowly beginning to acknowledge the importance of this training to improve the preparation of graduate pathologists for their professional and leadership roles in hospitals, government, academia and commercial business organizations. As Horowitz (2004) indicates, the perception of a quality pathology residency program is often determined by the ease that recent graduates are able to assimilate into leadership roles as junior attending physicians. Recent studies found in the literature suggest that curricular revisions in accredited programs are gradually providing more contact hours for resident training in personnel management, financial skills as well as laboratory specific skills in regulatory compliance, quality assurance and quality control. National organizations that oversee pathology resident education, such as the ACGME, ASCP and CAP, have clearly stated in their strategic planning platforms that graduate residents must show competency in business management and leadership skills. In 1995, consensus guidelines were agreed to by the various education leadership groups represented in the Graylyn Conference. From that time the ACGME has required the Pathology RRC to closely examine progress in inspected programs for evidence of compliance to performance standards noting improved resident learning outcomes in laboratory administrative training. In a twelve year period since 1995, the ACGME has compiled a considerable body of knowledge from accredited pathology programs measuring what is believed by their leaders to be a validated learning improvement rubric. This study was designed to add insight into whether pathology residency directors *in the field* share the opinions of their national

leaders in pathology education about the value of expanding laboratory administration accreditation performance standards.

The survey questions were based on ideas derived from the incremental curricular change model proposed by Hubbell and Burt (2004). They propose a comprehensive method of introducing and maintaining substantive change: a creating a conceptual framework for the change, b. developing practical strategies to implement the change, c. addressing learning context strategies to address specific concerns of learners, such as time constraints, d. planning strategies to define learning outcomes linked to future professional success, e. assessment strategies that create a validated rubric of outcomes measurement and curricular success and f. programming strategies to constantly strive to seek and adopt the best pedagogical practices.

The researcher felt that the Hubell and Burt curricular model represented a realistic and practical representation of how changes in residency education actually occur. Rarely are these curricular changes completed in a quick, even, sequential manner. Changes occur in starts and stops, with assertions and concessions, and certainly with a Great deal of discourse and dialogue among directors and faculty. It is also the belief of the researcher, that on the basis of the literature review, there has been significant progress in the evolution of business education for pathology residents. The literature up to this point, has provided descriptive studies of the growth and development of curricular programs in accredited North American sites. This study intended to provide a deeper investigation into the way pathology directors feel about administrative training in general, what challenges lie ahead in linking learning

improvement to curricular and pedagogical methods, and how they intend to approach further changes in administrative training in the future.

Ethical Issues

No professional programs engaged in the study were listed by name or specific location. Any quantitative or qualitative data acquired in the study, including policies or proprietary information were kept confidential. The boundaries of the study were agreed upon in advance with the signing of a *Letter of Understanding* with each participating program.

CHAPTER 4

RESULTS

Summary of the Research Questions

Eight research questions were addressed in this study to learn more about the perceived importance for resident training in laboratory administration as expressed by residency directors, their thoughts about any barriers to implement their programs and their thoughts about the ways to achieve this learning in the curriculum:

Research Question #1	What is the current extent of laboratory administration training in ACGME accredited pathology residency programs located in the United States?
Research Question #2	Do community hospitals or other types of non-university based training facilities provide a significantly different level of laboratory administration training compared to their University based teaching hospital counterparts?
Research Question #3	What are the most important influences affecting a residency director's curricular decisions about providing laboratory administration instruction?
Research Question #4	What are the most commonly used methods to teach residents laboratory administration?
Research Question #5	What type of constraints, internal or external to the program, do pathology residency directors face when they attempt to implement laboratory administration training to pathology residents?
Research Question #6	Do residency directors employ a conscious strategy to initiate incremental curricular change in order to gain faculty support for these changes?

Research Question #7 What specific business competencies do the directors feel to be the most useful measures of improved learning outcomes and will also predict professional success for graduate pathology residents?

Research Question #8 Which methods do Pathology residency directors use to assess learning improvement of residents in Laboratory Administration training?

Descriptive Statistics

General background information was requested of the respondents in Section I of the survey. Additional information, including the geographical locale of the training site, were obtained from the ACGME web site.

Table 4. 1. Questionnaire Response Breakdown

Number Faxed or Emailed	Frequency	Percentage	No. Completed	Percentage	No. Refuted	Percentage
150	67	45. 0%	63	42. 0%	14	9. 0%

Table 4. 2. Gender Distribution of Questionnaires Returned by the Program Directors

Gender	Frequency (N=67)	Percentage	No. of 2008 ACGME Pathology Program Directors By Gender	Frequency (N=150)
Male	47	70. 0%	105	70. 0%
Female	20	30. 0%	45	30. 0%

Note. Information pertaining to the gender of the ACGME pathology residency program directors was obtained from the ACGME website: http//www. ACGME. org.

The targeted respondents for this study were pathology residency program directors of ACGME accredited programs located in the United States . All the states had at least one accredited program with the exception of Alaska, Delaware, Idaho, Maine, Montana, Nevada, North Dakota and Wyoming. All the respondents were physicians trained in the specialty practice of pathology. In the gross sample (N=67) (Table 4. 2), 47 respondents were male (70% of the total sample) and 20 (30%) were female. Based on a review of program directors listed on the ACGME web site, 105 listed directors were male (70%) and 45 were (30%) female. Therefore, this sample was representative of the gender distribution for all possible respondents.

Table 4. 3. Reported Pathology Specialties in ACGME Accredited Residency Programs in the United States

Specialty	Frequency (N=67)	Percentage
Clinical Pathology	67	100%
Anatomic Pathology	67	100%

All of the programs provided specialty training in clinical and anatomical pathology. Some of the programs also provided sub-specialty training in such areas as cytology, transfusion medicine, neuro-pathology, dermato-pathology and renal pathology.

Table 4. 4. ACGME Pathology Residency Programs Located in the United States or Its Territories

Quadrant	States or Jurisdictions	Frequency (N=150)
NE	District of Columbia, Illinois, Indiana, Iowa Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont Wisconsin (Maine & Delaware do not have ACGME accredited Pathology residencies)	75
SE	Alabama, Arkansas, Florida, Georgia, Kentucky Mississippi, Louisiana, North Carolina, Puerto Rico South Carolina, Tennessee, Texas, Virginia, West Virginia	40
SW	Arizona, California, Hawaii, Kansas, Missouri, New Mexico, Oklahoma (Nevada does not have an ACGME accredited pathology residency)	26
NW	Colorado, Minnesota, Nebraska, Oregon, South Dakota, Washington (Alaska, Idaho, Montana, North Dakota and Wyoming do not have ACGME accredited pathology residencies)	9

Note. For the purpose of tracking geographical distribution of the survey respondents, the continental United States was divided into four quadrants: NE, SE, NW and SW.

Frequencies measured the total number of accredited Pathology residency programs reported by the Accreditation Council for Graduate Medical Education (ACGME) in 2008 for that defined region.

Table 4. 5. Questionnaires Returned By Geographical Location

Geographical Quadrant	Frequency (N=67)	Percentage	Number of Programs in the Quadrant	Percentage of Total Programs
NE	29	43. 0%	75	50%
SE	20	30. 0%	40	27%
NW	5	7. 0%	9	6%
SW	13	20. 0%	26	17%

Eight states did not have ACGME accredited pathology residency programs. Forty-three percent of the surveys were returned from the Northeastern quadrant which contained 50% of all the programs. However, the sample segment represented 38% of the programs located in the NE quadrant. Proportionally larger samples were obtained in the other three quadrants: Southeastern SE (50% return), Northwestern NW (56% return) and Southwestern SW (50% return). Seventy-seven percent of all the ACGME accredited programs in the United States are located in the eastern half of the country.

Table 4. 6. Size Distribution of Responding Residency Programs

Number of Training Positions	**Frequency (N=67)**	**Percentage**
Less than 5	0	0%
5 to 8	6	9. 0%
9 to 12	14	21. 0%
13 to 15	7	11. 0%
Greater than 15	39	58. 0%
Non-Respondent	1	1. 0%

The majority of responding programs were large. Fifty-eight percent of the sites had greater than 15 training slots. None of the responding sites had fewer than 5 training positions.

Table 4. 7. Type of Training Facility

Type of Facility	**Frequency (N=67)**	**Percentage**
University Based Teaching Hospital	48	72. 0%
Community Hospital Affiliate of a Medical School Based Teaching Program	13	19. 0%
Other: e. g., Military, Clinic	6	9. 0%
Total:	67	

Seventy-two percent of the respondents described their training facilities as university based teaching hospitals. The American Hospital Association describes university based teaching hospitals as short term acute facilities owned by a post-secondary educational institution, often affiliated with a university sponsored medical school, which provides training of resident physicians and also engage in clinical research (AHA, 2002). Most university based teaching hospitals in the United States are located in urban areas. They comprise approximately 80% of the total number of the U.S. ACGME pathology residency programs.

Nineteen percent of the respondents were community hospitals that maintained affiliate agreements with medical school sponsored graduate medical education programs. Most community hospitals are tax exempt organizations that are publicly owned. Compared to university based teaching hospitals, their specialty care is usually not as extensive and their advanced intensive care of critically ill patients is also limited. Wherever necessary, residents in these programs supplement their training with rotations in tertiary and quaternary level specialty care facilities. Despite some restrictions, community hospital based programs provide rich learning opportunities for pathology residents with high quality professional training.

The remaining 9% of the respondents were programs based in military installations, public or private clinics or federally owned health care research facilities.

Research Question Findings

Research Question #1 What is the current extent of laboratory administration training in ACGME accredited pathology residency programs located in the United States?

Table 4. 8. Annual Curricular Hours Devoted to Business, Management, or Administrative Training for Residents

Annual Curricular Hours	**Number Returned (N=63)**	**Percent of Total Returned**
Less than 10 hours	13	21. 0%
11 to 15 hours	18	29. 0%
16 to 20 hours	11	17. 0%
21 to 25 hours	6	9. 0%
26 to 30 hours	1	2. 0%
Greater than 30 hours	14	22. 0%

Annual Curricular Hours Devoted Laboratory Administration Training

Fifty percent of the respondents indicated that they only dedicate 15 hours or less to managerial training each year or 60 hours or less for a complete four year training program. Twenty-two percent of the programs devoted greater than 30 hours of management training each year.

Table 4. 9. Trends in Curricular Hours Used to Teach Business Management During the Previous Seven Years

Sites Reporting: (N=67)	Increased Hours	Decreased Hours	No Change	Not Reported
67	57	2	6	2

Table 4. 10. Sites Reporting Significant Increases in Curricular Hours for Business Management During the Previous Seven Years

Sites Reporting: (N=67)	5-25%	25-50%	Greater than 50%	Not Reported
43	22	5	16	14

Trends in Curricular Hours –
Significant Increases in Curricular Hours

In the past seven years since the formal introduction of management competencies by the ACGME as an accreditation performance standard, 85% (57 out of 67) of the responding programs reported an increase in their curricular hours devoted to administration training. Thirty-nine percent of this group reported an increase in hours between 5-25% and 28% reported an increase greater than 50%.

Table 4. 11. Percentage of Pathology Faculty with Previous Business Management Training

Type of Program	Frequency (N=67)	Percentage
Less than 20%	55	82. 0%
21-40%	5	8. 0%
41-60%	3	4. 0%
61-80%	0	0%
Greater than 80%	2	3. 0%
Not Reported	2	3. 0%

Directors were asked to report the extent of their faculty's previous business training. Eighty-two percent of the respondents indicated that less 20% of their faculty engaged in laboratory administrative training had any previous instruction (e.g., courses, seminars, business degrees).

Table 4. 12. Percentage of Physician or Doctoral Faculty Teaching Laboratory Administration

Percentage Of Total Faculty (N=63)	< 25%	25-50%	51-75%	>75%
No. of Programs/ Percentage of Survey Sample	10 (16. 0%)	21 (34. 0%)	13 (21. 0%)	18 (29. 0%)

One half of the responding programs (Table 4. 12) indicated that 50% or less of the laboratory administration faculty were pathologists. Within this sub group, 10 programs (16% of the total sample) included less than one quarter as pathology faculty. Twenty-

one programs (34% of the total sample) had between 25% to 50% as pathology faculty. Of the remaining 31 programs in the sample, 13 (21% of the total sample) had between 50% to 75% as pathology faculty and 18 (29% of the total sample) had over 75%. Twelve programs (20% of the total sample) had a business training faculty made up completely of pathologists.

Table 4. 13 . Type of Laboratory Administration Training Program Provided to Pathology Residents

Type of Program	**No. of Programs (N=67)**	**Frequency**
Formal Program with Mgt. Lectures Separate From Clinical/Professional Training	29	44. 0%
Formal Program with Mgt. Training Integrated Into Clinical/Professional Training	23	35. 0%
No Formal Program,some Lectures or Mgt. Projects Given When Faculty are Available	14	21. 0%
No Laboratory Administration Training Available for Pathology Residents	0	0%

Seventy-nine percent of the responding programs offered formal laboratory administration training to their residents. All the programs offered some sort of administrative training.

Research Question #2 – Do community hospitals or other types of non-university based training facilities provide a significantly different level of laboratory administration training compared to their University based teaching hospital counterparts?

Table 4. 14 . Type of Training Facility vs. Annual Curricular Hours, Total # of Faculty

Between-Subjects Factors

Type of Training Facility		N
1	University Based Teaching Hospital	43
2	Community Hospital	11
3	Other Type of Facility	6

Descriptive Statistics

Type of Training Facility	Mean	Std. Deviation	N
Annual curricular Hours	3.		
1	02	1. 87	43
2	2. 55	1. 04	11
3	3. 83	2. 14	6
Total	3. 02	1. 78	60
Total No. of Faculty Teaching Lab. Adm.	5.		
1	72	6. 00	43
2	3. 45	2. 07	11
3	4. 50	2. 74	6
Total	5. 18	5. 27	60
Total No. of Non-Physician Lab Adm. Faculty			
1	40. 12	31. 02	43
2	31. 18	31. 38	11
3	11. 50	14. 29	6
Total	35. 62	30. 77	60

Multivariate Tests (Design: Intercept + Type of Training Facility)

Effect	Value	F	Hypothesis d. f.	Error d. f.	Sig.
Wilk's Lambda	. 861	1. 429	6. 000	110. 000	. 210

Note. None of the measures was statistically significant at the $p < .05$ level.

A multivariate analysis was conducted to determine whether there was a statistically significant difference ($p < .05$) with the level of instruction of laboratory administration conducted in the various types of training facilities: University-based teaching hospitals, community Hospitals, and other Facilities, such as government funded research centers or military medical training programs. Three dependent variables were chosen to answer this research question: Annual Curricular Hours, Total No. of Faculty, and Total No. of Non-Physician Faculty. No statistically significant relationships were found between the independent and dependent variables.

Research Question #3 What are the most important influences affecting a residency director's curricular decisions about providing laboratory administration instruction?

Table 4. 15. Ranking Summary of Professional/Departmental Factors Affecting Curricular Decisions Concerning Business Management Training (N=65)

Factor	**Ranking:**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**N/R**
ACGME Requirements		39	11	7	4	2	1	1
	Weighted Scores	3. 9	2. 2	2. 1	1. 6	1. 0	. 6	11. 4
Recent Graduate Feedback		14	14	9	17	7	1	3
	Weighted Scores	1. 4	2. 8	2. 7	6. 8	3. 5	. 6	17. 8
Employer Feedback About Recent Graduate Hires		4	6	9	6	19	15	6
	Weighted Scores	. 4	1. 2	2. 7	2. 4	9. 5	9. 0	25. 2
Opinion of Non-Physician Administrators		1	5	7	9	10	29	4
	Weighted Scores	. 1	1. 0	2. 1	3. 6	5. 0	17. 4	29. 2
Results of ABP Exam Scores		3	19	14	7	12	6	4
	Weighted Scores	. 3	3. 8	4. 2	2. 8	6. 0	3. 6	20. 7
Results of RISE Exam Scores		8	13	19	16	1	5	3
	Weighted Scores	. 8	2. 6	5. 7	6. 4	. 5	3. 0	19. 0

Ranking of Influences Affecting Curricular Decisions

Six factors were selected for ordinal ranking by the survey respondents. The chosen factors were based on the experience of the investigator in the clinical laboratory profession and his observations of residency training programs.

The appropriateness of the selected factors was reviewed by pathology educators and residency program directors in the geographical locale of the researcher. The data were analyzed by preparing a distribution of rank selections for each factor. A raw score of ranking was calculated by selecting the highest number of selections per ordinal category. The raw score selection was as follows:

1. ACGME Requirements (19 1st place votes)
2. Results of ABP Exam Scores (19 2nd place votes)
3. Results of the RISE Exam Scores (19 3rd place votes)
4. Recent Graduate Feedback (17 4th place votes)
5. Employer Feedback About Recent Graduate Hires (19 5th place votes)
6. Opinions of Non-Physician Administrators (29 6th place votes)

The raw selection did not provide a weighted score of the distribution of all rank selections for each factor . To correct for this, a weighted factor score was assigned for each rank category. Scoring was done in an inverse way. This meant that high rank selections received lower scores compared to lower rank selections. The aggregate score distribution of rank selections in each factor measure was used to determine the overall ordinal ranking. An overall lower score meant that the factor would have a higher ranking. When calculated in this way, the ordinal ranking was as follows.

Table 4. 16. Weighted Factor Score of Professional/Departmental Factors Affecting Curricular Decisions Concerning Laboratory Administration Training

Overall Ranking		Ranking Summary
1st	ACGME requirements Weighted Score 11. 4	50 combined 1st & 2nd place votes
2nd	Recent Graduate Feedback Weighted Score 17. 8	28 combined 1st & 2nd place votes
3rd	Results of RISE exam scores Weighted Score 19. 0	21 combined 1st & 2nd place votes
4th	Results of ABP exam scores Weighted Score 20. 7	22 combined 1st & 2nd place votes
5th	Employer Feedback About Recent Graduate Hires Weighted Score 25. 2	10 combined 1st & 2nd place votes
6th	Opinion of Non-Physician Administrators Weighted Score 29. 2	39 combined 5th & 6th place votes

When evaluating changes to the laboratory administration curriculum, the residency directors placed greater emphasis on meeting ACGME accreditation standards and on the feedback from recent program graduates. They relied least upon the feedback from employers of recent graduates or from suggestions provided by non-physician administrators.

Research Question #4 What are the most commonly used methods to teach residents laboratory administration?

Table 4. 17. Primary of Methods of Instruction in Laboratory Administration/Business Management Employed by Pathology Faculty to Train Residents
(Expressed as a Percentage of Total Methods Employed)

Type of Method	**None**	**1-25%**	**26-49%**	**50%**	**51-80%**	**> 80%**
		(Number of Sites Reporting) (N=66)				
Lecture	4	25	11	6	13	6 (61)
Case Study Exercises	40	20	5	0	0	0 (25)
Mgt. Rotation in Clinical Or Surgical Pathology	30	16	9	4	6	0 (35)
Assignment to a Hospital Performance Improvement Committee	21	41	2	1	0	0 (44)
Participation in an Accreditation Or Regulatory Compliance Inspection	10	49	5	0	0	1 (54)
Administrative On-Call for Laboratory Operational Issues	35	24	5	0	0	0 (24)
Have Residents Compile Mgt. Learning Portfolios	51	13	1	0	0	0 (14)
Other	56	5	2	1	0	1 (9)

Table 4. 18. Ranking of Frequency of Pedagogical Methods Employed (Number of Sites Reporting) (N=66)

Method	# of Sites	Sample Percentage
1. Lecture	61 sites	91%
2. Regulatory Compliance Inspection	54 sites	81%
3. Performance Improvement Committee	44 sites	66%
4. Management Rotation	35 sites	52%
5. Case Study Exercises	25 sites	37%
6. Administrative On-Call	24 sites	36%
7. Resident Portfolios	14 sites	21%
8. Other	9 sites	14%

Teaching Methods Used

The selection of teaching methods used in the survey was based on information provided about management competencies from the ACGME website, the literature review for this dissertation and from the direct experience of the investigator. The lecture was the most frequent method used to teach laboratory administration to pathology residents . Ninety-one percent of the responding sites reported using lectures as part of their pedagogy. The use of residents in mock regulatory compliance inspections

or as observers in actual inspections was the second most frequent teaching method. Eighty-one percent of the respondents reported using this method.

Research Question #5 What type of constraints, internal or external to the program, do pathology residency directors face when they attempt to implement laboratory administration training to pathology residents?

Table 4. 19. Institutional Support: Barriers Preventing a Rapid Adoption of Laboratory Administration Training in the Residency Program (N=65)

Factor w/Weighted Score	**Ranking: 1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**Not Reported**
Lack of Competent Faculty	14 1. 4	10 2. 0	7 2. 1	9 3. 6	10 5. 0	9 5. 4	6 19. 5
Financial Resources	7 . 7	3 . 6	11 3. 3	6 2. 4	10 5. 0	24 14. 4	4 26. 4
Lack of Faculty Interest	13 1. 3	17 3. 4	13 3. 9	9 3. 6	8 4. 0	1 . 6	4 16. 8
Lack of Resident Interest	6 . 6	9 1. 8	11 3. 3	12 4. 8	8 4. 0	13 7. 8	6 22. 3
Lack of Available Faculty Teaching Time	19 1. 9	14 2. 8	11 3. 3	10 4. 0	8 4. 0	1 . 6	2 16. 6
Lack of Available Resident Learning Time	8 . 8	21 4. 2	6 1. 8	11 4. 4	10 5. 0	6 3. 6	3 19. 8

Table 4. 20. Ranking Summary: Institutional Support: Barriers Preventing A Rapid Adoption of Laboratory Administration Training

Factor	Weighted Score
1st Lack of Available Faculty Teaching Time	16. 6
2nd Lack of Faculty Interest	16. 8
3rd Lack of Competent Faculty	19. 5
4th Lack of Available Resident Learning Time	19. 8
5th Lack of Resident Interest	22. 3
6th Financial Resources	26. 4

Barriers to Rapid Adoption of a Business Training Curriculum

The two most commonly reported barriers to effective administrative training for residents were lack of qualified faculty and lack of interest by the faculty to teach business.

The third most frequently reported barrier was a lack of competent faculty. It appeared that pathologists wanted business faculty to be trained pathologists to provide the necessary balanced perspective of being both a clinical leader and an executive of a large professional ancillary hospital department. The least significant factors reported as institutional barriers were a lack of financial resources to teach laboratory administration or a lack of resident interest.

Table 4. 21. Extent of Your Institution's GMEC Committee Dialogue on Curricular Development of Administrative Training for Pathology Residents

Type of Discussion	Number Returned (N=66)	Percentage of Total Returned
Extensive Discussions, Evaluation of Learning Outcome Measures, Setting Achievement Goals	6	9%
Some General Discussions Without Specific Expectations or Goals	20	30%
No Discussions in Graduate Medical Education Committee, Issue Only Discussed in the Pathology Department	38	58%
Not Reported	2	3%

GMEC Involvement in the Promotion of Laboratory Administrative Training for Pathology Residents

The Graduate Medical Education Committee of a hospital or related resident training facility provides overall supervision through policy development, learning systems improvement, accreditation compliance support and meaningful dialogue with faculty leaders. Only 9% of the respondents reported active dialogue in the GMEC committee about administrative training goals or curricular changes. Thirty percent of the respondents indicated that dialogue did occur in the GMEC about the management curriculum, but it did not lead to specific learning outcome measures or teaching strategies. The majority of programs (58%) indicated that discussions about management training were confined to the pathology faculty.

Research Question #6 Do residency directors employ a conscious strategy to initiate incremental curricular change in order to gain faculty support for these changes?

Introducing Curricular Change/Assessing Usefulness

Note: A five point Likert scale question format was used in Section IV, V, and VI of the survey. The selections were as follows:

1 = Strongly Agree 2= Agree 3= Neither Agree or Disagree
4= Disagree 5= Strongly Disagree

Table 4. 22. Ranking Summary of Residency Director Responses to Introducing Curricular Change/Assessing Usefulness of Business Training (Strong Agreement with the Survey Question Premise) (See Survey for Specific Question) (N=66)

Ranking	**Question**	**Mean**	**s. d.**
1st	IV(r) Laboratory Mgt. training will prepare pathologists to be stronger leaders who will be better prepared to assume broader leadership roles …	1. 64	. 69
2nd	IV(f) I frequently meet with the residents and faculty to solicit feedback on the relevance of the training…	2. 14	. 86
3rd	IV(q) It is important to promote a faculty cultural norm that encourages experimentation with diverse learning methods to improve laboratory mgt. training…	2. 18	. 77
4th	IV(a) I use a specific strategy to introduce curricular change in the pathology residency program…	2. 26	. 85

Table 4. 23. Ranking Summary of Residency Director Responses to Introducing Curricular Change/Assessing Usefulness of Business Training
(Strong Disagreement with the Survey Question Premise)
(See Survey for Specific Question) (N=66)

Ranking	**Question**	**Mean**	**s. d.**
1st	IV(p) I actively seek feedback from employers of our recent graduates to improve the laboratory mgt. curriculum for current resident trainees…	3. 55	1. 01
2nd	IV(n) I use inferential statistics as the primary way to validate learning outcomes measures…	3. 54	. 85
3rd	IV(g) I try to seek more budget resources each fiscal to facilitate administrative learning.	3. 52	. 92

Table 4. 24. Ranking Summary of Residency Director Responses To Creative Curricular Adoption Strategies (N=66)

Ranking	Question	Mean	s. d.
1st	VI(a) Encourage faculty to engage in dialogue with residents to explore diverse learning methods to help learning outcomes…	2. 36	. 82
2nd	VI(b) Encourage residents to keep a portfolio of their administrative learning experiences …	2. 38	1. 09
3rd	VI(c) I would prefer to use on-line learning modules… as a means to reduce the amount of time taken away from clinical requirements …	2. 65	. 97
4th -	VI (d) After providing core competencies to prepare for the ABP examination, I leave the decision for learning more about laboratory administration strictly to the discretion of the student…	3. 18	1. 08

Pathology residency directors placed a high value on the benefit of laboratory administration training and actively sought feedback from their residents to make curricular adjustments. They believed it was important to use specific strategies to institute curricular changes in this subject and to encourage their faculty members to experiment with different teaching methods to improve management learning.

The residency directors strongly disagreed with the statement that they actively sought feedback from employers about the administrative skills of recent graduates. They also did not use inferential statistic methods to study the effectiveness of their curricular methods in improving learning outcomes of the residents nor did they seek addition financial resources to maintain or expand the laboratory administration curriculum.

Research Question #7 What specific business competencies do the directors feel to be the most useful measures of improved learning outcomes that will predict professional success for graduate pathology residents?

Table 4. 25. Subject Areas Used for Formal Learning Outcomes Measures In Assessing Levels of Resident Competency in Laboratory Administration (N=66)

Learning Outcome Metric	**Reported Use**	**Percentage of Total Reported**
Medical Informatics	21	32%
Human Resources Mgt.	11	17%
Performance Improvement Committee Work	24	37%
Contract Negotiations	7	11%
Budgets/ Cost Analysis	15	23%
Provide Some Instruction In Some Or All of the Above But Do Not Use These Items As Formal Learning Outcome Improvement Measures	41	63%

Competency Measures for Residents in Laboratory Administration

Five competency measures in pathology management that were frequently mentioned in the literature review search conducted for this study included: a. Medical Informatics, b. Human Resources Management, c. Performance Improvement Committee Work, d. Contract Negotiations and e. Budget Cost Analysis. The use of these competency measures ranged from a low of 11% for training in contract negotiations to a high of 37% for the use of performance improvement committee work. Sixty-three percent of the respondents taught at least one or several of these subjects but did not use any of them as formal learning competency measures.

Table 4. 26. Ranking Summary of Residency Director Responses to Predictors of Post Graduate Success (N=66)

Ranking	Question	Mean	s. d.
1st	V(c) Residents should be actively involved in Performance Improvement, CQI, hospital committee work as a training rotation …	1. 77	. 74
2nd	V(a) Training should provide enough information to allow a pathologists to be comfortable in reviewing budgets…capital	1. 83	. 57
3rd	V(b) Training should provide enough information to allow a pathologists to be comfortable in engaging with vendors in contract negotiations…	1. 89	. 68
4th	V(e) Training in medical informatics is essential for a graduate resident to be competent professional …	1. 91	. 81
5th	V (d) Pathology residents should actively study human resource management to help improve their inter-personal communication skills …	2. 15	. 82

Predictors of Post Graduate Success

The means of all the responses to the questions listed in section V, Predictors of Post Graduate Success, were indicative of strong agreement by the pathology residency directors that resident learning in the principles of laboratory administration was important to post graduate success. The results suggest that directors believe that residents should be most active in learning about laboratory quality assurance activities,

understanding operating budgets and being able to perform capital equipment financial analysis.

Research Question #8 Which methods do Pathology residency directors use to assess learning improvement of residents in laboratory administration training?

Table 4. 27. Methods Employed to Measure Improvement in Learning By Pathology Residents In Laboratory Administration (N=65)

Pedagogical Method	**Reported Use**	**Percentage of Total Sites Surveyed**
Record Review	15	23%
Checklists	23	35%
Global Ratings	29	45%
Simulations	5	8%
Resident Portfolios	28	43%
Standardized Oral Exams	3	5%
Written Exams	33	51%
360 Global Ratings	34	52%
Case Logs	17	26%
Do Not Use Methods To Measure Learning Improvement	12	18%

Methods Used to Measure Learning Improvement

Almost one-fifth of the reporting sites (18%) did not use any formal measures to attempt to determine whether their training program had any beneficial effect in improving the residents' knowledge of laboratory administration. The most widely used

measures reported by over 50% of the respondents were written exams (reviewing trends in the RISE exams) and "360" Global ratings or residents' performance in laboratory management rotations or exercises. Clinical case simulations or oral exams were the least used measures to track learning improvement.

Additional Analysis

Two additional research questions were posed by the investigator after an evaluation of the findings. The following two questions were posed to ascertain whether certain single attributes or combined attributes of the independent variables had a significant effect on GMEC support of laboratory administration training or the level of ranking of the three most listed institutional constraints from the survey respondents:

1. Does GMEC Involvement in Laboratory Administration Curricular Dialogue change according to program size, type of training facility, Percentage of professional faculty engaged in teaching subject?

2. The top three institutional constraints listed by the respondents were:
   a. Lack of Faculty Time
   b. Lack of Faculty Interest
   c. Lack of Faculty Competency

Do mean scores significantly differ by program size, geography, annual curricular hours, type of training facility, or the percentage of professional faculty teaching laboratory administration?

The dependent variable for question one was the numeric selection in survey question III (d) indicating the level of discussion about laboratory administration training programs at the host institution's Graduate Medical Education Committee. In question two, the dependent variables were the three highest ranking selections

for institutional restraints. The independent variables for both questions were the program size, type of training facility and percentage of professional faculty teaching laboratory administration. The relationships measured between the independent and dependent variables in either question were not found to be statistically significant.

Overview of the Findings

1. The type of training facility does not significantly alter the level of administrative training provided to residents in ACGME accredited programs.

2. In the seven year period since the ACGME included demonstration of laboratory administration training as part of the accreditation standard of performance, 85% (57 out of 67) of the responding programs reported an increase to their curricular hours devoted to business training.

3. Despite a reported increase in management related curricular hours by 85% of the respondents, 50% of the reporting programs provided less than 30 hours of laboratory administration instruction each year.

4. Director's changes to the laboratory administration curriculum were influenced primarily by ACGME accreditation standards and by improving instruction based on the feedback of recent program graduates. They relied least upon the feedback from employers of recent graduates or from suggestions provided by non-physician administrators.

5. The two most widely used pedagogical methods for laboratory administration training were lectures (91%) and resident participation in regulatory compliance inspections (81%).

6. Adding more laboratory administration training to the resident curriculum is perceived by directors to be impeded by a lack of available time, a lack of interest and a lack of competency by the professional faculty.

7. Only 39% of the programs indicated that they engaged in any sort of dialogue with their organization's graduate medical education committee (GMEC) about laboratory administration training. Fifty eight percent of the responding programs limited discussion about laboratory administration training solely within the pathology department.

8. Residency directors strongly believe that laboratory administration training will prepare pathologists to be better leaders.

9. Directors believe that they actively engage residents in dialogue about curricular relevance and they are dedicated to making changes in faculty cultural norms to encourage experimentation with diverse learning methods.

10. Directors believe that they consciously employ a specific strategic plan to introduce curricular change in regards to laboratory administration training.

11. Directors do not use inferential statistics as a primary way to validate learning outcomes measures.

12. Most programs report adequate budget resources to facilitate administrative learning.

13. The directors appear to believe that the most important administrative competency for residents to learn is to engage in work assignments with their organization's performance improvement committee.

14. To achieve post graduate career success in regards to their future role as leaders, the data suggests that directors feel that residents should be most active in learning about laboratory quality assurance activities, operating budgets and capital equipment financial analysis.

15. The majority of pathology residency programs used written exams such as the ASCP sponsored RISE instrument and "360" global ratings to assess resident improvement in laboratory management rotations or exercises.

CHAPTER 5

DISCUSSION

Overall Response to the Survey

While many respondents were interested in participating in this study and were looking forward to the published findings, others expressed their frustrations to the time constraints they faced both in complying with ACGME requirements to provide competency measures for administrative training and taking the time to complete this survey. Out of 150 surveys sent by email or fax, 67 surveys were returned. The unadjusted return rate was 45%. Shosteck (1979) has reported that physician responses to email surveys may range from 41 to 80% dependent upon doctor specialty, questionnaire length, the research sponsor, required follow up and the relevance of the topic to the respondent. Kittleson and Brown (2005) reported response rates for email surveys to health education professionals of 43% . The investigator obtained documented refusals to participate from 14 program directors. This group comprised 9. 4% of the potential respondents. Of the 67 surveys returned, 63 had all the questions completed.

The pilot survey yielded 17 surveys (11. 3%) during the first two weeks of the initial mailing. Response rate was improved by engaging in a variety of strategies to remind residency directors to complete the survey. It was important to provide a follow-up telephone call to the director's administrative assistant or residency coordinator to enlist their support in getting the survey completed . Very often, hospitals had *spam filters* that prevented email attachments from reaching respondents for fear of spreading viruses in their IT systems. Contacting these support personnel provided guidance to alternate email addresses or fax options that allowed information to reach the right person.

Targeted respondents were called directly or left a voice mail message explaining the purpose of the survey and the expected time of arrival. It was important to acknowledge the effort they were making by taking time from their busy schedules to complete the survey.

Fourteen directors (14/150, 9. 4%) responded that they did not wish to participate in the survey. Twelve members of this group stated that they were too busy to respond. One director indicated that he did not have either the time or the information available to respond appropriately. The fourteenth director stated they were uncomfortable providing what they considered sensitive, confidential information about their program. They also felt that any information about this aspect of their program could be obtained directly from the ACGME website.

Previous surveys exploring administrative training for pathology residents included up to 11 questions (Bugnara,1994). This survey had 42 questions, several of which measured the perceptions of the director respondents about the value of administrative training in light of the time constraints brought about by the Graylyn conference in 1995. It was estimated by the investigator that a respondent would have to spend 20-25 minutes to thoughtfully answer all the questions. The survey had six sections: I. "Description of Your Program", II. "Faculty Participation", III. "Institutional Support", IV. "Introducing Curricular Change/Assessing Usefulness of Business Training", V. "Predictors of Post Graduate Success" and VI. "Creative Curricular Adoption Strategies" . The first three sections contained twelve informational questions and one factor ranking question to provide a clear picture of the current levels of administrative training in the ACGME accredited programs in the United States. The fourth section contained 19 five point Likert scale

questions. The fifth section had in addition to five Likert scale questions, and two *check all that apply* questions about choices of learning outcome metrics and and pedagogical methods. The sixth and final section included five Likert questions and a question for open ended comments.

Implications of the Research Findings

The current extent of laboratory administration training in ACGME accredited pathology residency programs located in the United States

1. Types of Management Training Programs Offered to Pathology Residents

All the respondents provided some sort of laboratory administration training to their residents. Forty- four percent of the respondents offered a formal program with a lecture series on various business related subjects. Thirty-five percent had a formal management training program integrated into a clinical or surgical pathology rotation. The combined total equaled 79% of the surveyed programs having formal management training. This represented a 35 % increase over the 1994 study conducted by Brugnara and Winkelman (1994) (44% of the programs were reported as "formal").

The remaining twenty-one percent offered an informal array of lectures when faculty or guest speakers were available. Based on the ranking of influential factors affecting curricular decisions in laboratory administration (Table 4. 16) the findings would appear to suggest that at least one significant reason that all ACGME accredited programs adopted administration programs was to be compliant with accreditation performance standards . Since the ACGME introduced the *phase-in* of the six general competencies in 2001, 85% of the survey respondents noted an increase in their curricular hours for

laboratory administration. Twenty-eight percent of the respondents had increased curriculum greater than 50% in that seven year period.

Another supportive finding was a strong measured agreement mean score by the directors to Likert scale question IV (r) (mean 1. 64, s. d. 694) stating that laboratory management training will prepare pathologists to be stronger leaders. This finding would suggest that in addition to meeting ACGME accreditation standards, resident training in laboratory administration was viewed by the program directors as being an important part of the resident's overall training.

Finally, the second most significant factor affecting curricular decisions in laboratory administration was feedback from recent graduates. In order to attract and retain highly qualified pathology residents, directors must remain responsive to residents' recommendations to how directors can improve graduate pathologists' readiness to assume professional responsibilities (Smith et al., 2006). Readiness often refers to the ability of pathology residents to perform well on the annual RISE examination and the American Board of Pathology examination immediately before graduation. Each examination has several questions pertaining to various aspects of laboratory administration. Resident feedback had prompted pathology directors to include administrative training to increases their trainees' prospects of performing well on these exams.

2. Annual Curricular Hours Devoted Laboratory Administration Training

Time constraints were listed in the quantitative findings as significant barriers to adopting more laboratory administration training. Directors ranked "lack of available faculty teaching time" first as an institutional barrier to rapid adoption of laboratory administration training. This may explain why 50% of the responding programs devoted only 15 hours or less to this type of instruction.

Two multivariate analyses were conducted in this survey to measure any correlation between the rate of annual curricular hours (as the dependent variable) and the type of training facility and the size of the residency program (No. of training slots) as independent variables. Neither measure indicated a statistically significant relationship at the $p < .05$ level between the dependent and independent variables.

3. Faculty with Previous Management Training

Eight-two percent of the survey respondents reported less than 20% of their faculty had any sort of the business instruction. The survey did not pursue the specific question about why residency directors and pathology faculty have not pursued more formal business instruction. One reason, derived from some of the findings in this study, may provide insight as to why this is prevalent. The majority of programs have less than 15 curricular hours devoted to laboratory administration instruction. The number of faculty required to teach this amount of hours is relatively small. It is probable that many pathologists have sufficient "on the job experience" to provide adequate instruction in the general concepts of administration with the assistance of non-physician faculty to provide instruction in specific technical skills. In the ranking study measuring factors affecting curricular decisions, the least important factor listed by directors was input

from non-physician administrators (Tables 4. 15 and 4. 16). Yet, only 20% of the programs had 100% of the administration faculty made up of pathologists and only 50% of the programs had a majority of their faculty as pathologists. Directors acknowledged the importance of administrative training, but they were facing very serious time constraints to provide ample time for professional clinical training. They recognized that they needed the expertise of non-physician faculty to teach these subjects, but they did not want administrators to take over this instruction entirely. Instruction had to maintain the perspective of the pathologist primarily as a clinician who applies business skills to administrative decision making or at least understands the concepts when participating in joint decision making opportunities. The data suggest that directors respect the body of knowledge provided by administrative instruction and they want to incorporate this training in a way that professional pathology practice is enhanced .

It is important to note that the increased expectations held by the ACGME to demonstrate tangible improvement in resident learning of management competencies may prompt more pathology faculty members to pursue administrative training in the future.

Differences in Teaching by Type of Training Facilities

A question arose from the investigator's interest in whether community hospital programs would provide a wider use of administration training on the assumption that graduate residents from these programs may accept employment in smaller hospitals and take on a wider array of administrative assignments. Hospitals, regardless of their bed size, have to take on a large scope of responsibilities for monitoring performance improvement and quality patient care initiatives. Community hospital pathology

training programs in facilities with 200-300 beds are more likely to have smaller faculty staff compared to their university based teaching hospital counterparts. Because of their size and the probable increase in administrative workload per faculty member, would these programs focus more on administrative training because their graduates would be expected to model their behavior from their mentors? Could a similar argument be presented for research or military facilities? A multivariate analysis was performed using "Type of Training Facility" as the independent variable and Annual Curricular Hours, Total No. of Faculty, and Total No. of Non-Physician Faculty as the dependent variables. No statistically significant relationships were found between the independent and dependent variables. The data would then suggest that laboratory administration training is being approached in a similar fashion in all the training venues. The only measure approaching statistical significance between facility types was the use of non-physician faculty (sig. =. 088).

Important Influences Affecting Residency Director's Curricular Decisions

Residency programs provide ample Federal reimbursement to hospital training facilities. In a climate of declining reimbursement from other payor sources, an efficient, fully credentialed teaching program is one of the keys to the financial subsidization of the hospital's infrastructure services. Residency programs are in keen competition with each other to attract the best candidates . Very capable graduates can reflect the skills of the program faculty. A pathologist's professional income is highly reliant upon case referrals . If good graduate pathologists come out of a training program it may be assumed that the faculty are excellent teacher clinicians. Other physicians may perceive

that they are well versed on the latest scientific and medical knowledge pertaining to the field. A good reputation will inspire confidence in referring physicians to send more surgical and biopsy cases to the institution. More referrals translate into more income for the pathologist and the institution. Brighter trainees will allow more efficient processing of surgical caseloads. Increased efficiency often leads to reduced turn around times for final reports. Clinicians can treat patients in less time and can reduce hospital length of stay, an important quality indicator. Finally, capable resident trainees provide strong internal candidates to replace faculty vacancies.

The ranking data from Tables 4. 15 and 4. 16 suggest that the two most critical issues affecting curricular design for laboratory administration training are maintaining ACGME accreditation and soliciting feedback about the content of the program from recent graduates. As of 2008, if a ACGME accredited program did not meet a performance standard for management competencies, it would be considered out of compliance. A corrective plan would be required to be implemented and improvement would have to be monitored and reported periodically. While it is relatively rare that a program would be completely disqualified, responding to deficiencies to maintain compliance standards requires an extensive amount of time and resources. Desirable prospective students may become aware of a program's deficiencies and choose not to apply. Feedback from recent graduates to improve the program curriculum often focuses on the level of preparation the training provided to take the American Board of Pathology examination in Clinical and Anatomical Pathology. Resident annual progress in laboratory administration competency is also measured in the RISE exam (Resident In-Service Examination) which is administered by the American Society of Clinical

Pathologists. Residents have been found to view program choices from the perspective of whether a site will meet their professional and personal life style needs. Graduate feedback prompts a residency director to focus on improving programmatic areas valued by the candidates.

The findings would suggest that the directors believe that traditional business training alone is not sufficient for pathology leadership roles. Administrative training for pathology residents is a unique combination of business, analytic, and organizational skills coupled with a strong value perspective as to how clinicians can be helped to perform their jobs more effectively.

It is interesting to note that the respondents ranked the RISE exam scores as being more influential in curricular decisions that the American Board of Pathology examination scores. A recurring comment seen in the survey responses was that directors or residents were not able to see specific ABP exam questions or able to receive specific scores on the laboratory administration section of the test. The metrics of the RISE exams are readily available from the American Society of Clinical Pathologists (ASCP). While passing the *ABP boards* was more critical to a graduate resident's career, feedback from the exam was very limited for educators. Residents took the RISE examination each year of their training. Detailed scoring comparisons were available to residency directors. Tracking of improvement in learning outcome metrics was able to be achieved through the RISE examination.

The Most Commonly Used Methods to Teach Residents Laboratory Administration

The selection of teaching methods used in the survey was acquired from the information provided about management competencies in the ACGME website, the literature review for this study and from the direct experience of the investigator in his day-to-day involvement with resident teaching programs. Ninety-four percent of the respondents to this question category used multiple teaching methods.

The most predominant method used to teach laboratory administration to residents was the lecture. Ninety-one percent of the respondents used lecture as a teaching method. The lecture method is easy to implement and to present to a group of students. Lectures can be recorded and re-played at a more convenient time for the resident to listen. They are generally considered a passive form of learning although active training design can transform lecture into a dynamic learning exercise (Silberman, 1998).

The second most frequent method was having residents become involved in regulatory compliance inspections conducted by a state department of health agency, the College of American Pathologists, the American Association of Blood Banks, and the FDA, among others. Involvement may be with residents conducting mock inspections of testing sites to evaluate their state of survey readiness, engaging in corrective action exercises to discovered regulatory deficiencies or participation as peer inspectors in other laboratory facilities. Eighty-one percent of the sites reported using residents in these types of learning activities. This measure correlated very closely with the 1994 findings of the Brugnara-Fenton-Winkelman study (82%). Current laboratory accreditation protocols employ the *tracer method* (CAP, 2009) which requires an inspector to evaluate all the steps in the laboratory testing process for compliance to

best practices. This provides a comprehensive learning experience with practical applications linked to the resident's future role as a laboratory leader that requires minimal expense in teaching resources. Sixty-six percent of the sites had pathology residents shadow their faculty at performance improvement meetings or have them engage in process improvement projects and report their findings to a hospital committee. These type of projects would require a resident to become very familiar with various types of work flow processes (pre-analytic, testing, post-analytic phases of laboratory testing) and evaluate whether the laboratory's performance met targeted goals. As an example, one of the most common measures of laboratory quality is test turnaround time (TAT). The faster a test result is returned to the clinician, the faster the physician is able to provide timely medical intervention to a patient. Residents may report a pre and post turnaround time study TAT after analyzing a work flow process and make changes to improve efficiency and responsiveness to clinician's needs.

Fifty two percent of the respondents had their residents do a management rotation. The rotation was often in the form of a *shadowing* of an administrator or faculty member. Very often these activities were not purely business oriented, but included a clinical aspect as well. As an example, residents on Blood Bank rotations may be asked to speak with clinicians involved in significant deviations from established policy. Based on their findings, corrective actions could be initiated that would affect the accreditation standing for the laboratory, create an assessment of risk for certain types of clinical practices and also teach the resident how to become a better resource to help clinicians overcome medical treatment challenges. Often coupled with a management rotation, a resident would have administrative on call. Thirty-six percent of the

programs noted their use of on-call as a training tool. Residents would have the *safety net* of the attending pathologist on call to act as a mentor if a situation they encountered was beyond their skills to manage effectively.

Thirty-seven percent of the reporting programs used case studies to develop administrative leadership skills. Typical areas of case study demonstrated on the ACGME web site included progressive discipline, cost accounting analysis of laboratory test methods, medical staff governance and regulatory compliance. A 2007 review of the ACGME website by the investigator indicated that several residencies in various medical specialties were encouraging residents to compile diaries of learning experiences called learning portfolios. The portfolios contained thoughts, opinions and narratives expressed by the resident about significant experiences in administrative management activities. They would also include project summaries, statistical projects tracking improvement in quality metrics of various types of laboratory work processes. In this survey, 21% of the respondents reported using this pedagogical method.

Types of Constraints, Internal or External to the Program, Affecting the Rate of Curricular Adoption of Laboratory Administration Training

The data extracted from Tables 4. 19 and 4. 20 would strongly suggest that the most formidable barriers to the expansion and development of laboratory administration learning are the time, interest and skill of the pathology faculty to teach this subject. Judging by the significant disagreement response to survey question IV (i) that residency directors actively seek advice and counsel of non-physicians administrators to develop and refine the laboratory administration curriculum, it would appear that residency

directors want control of the management curriculum to remain with the professional faculty despite these barriers. At least 50% of the programs currently use non-physician faculty. These findings indicate that the laboratory administration curriculum will not be used to train pathology residents as if they are graduate students in business or health administration. The unique perspective of the pathologist as an administrative leader and clinical consultant must be present in the training curriculum. The general findings also indicated that the directors did not find a lack of interest or time by the residents to be a barrier to adopting the curriculum nor did they see a lack of financial resources as a barrier to implementation as well.

The Graduate Medical Education Committee governs the training activities of all accredited resident programs in a health care facility. The GMEC plays a critical governance role in formulating policies and guidelines to regulate in house programs to stay in compliance with the ACGME institutional accreditation standards. Committee meetings act as a forum to discuss and inform directors about the areas of compliance that are of concern to the accreditation team visitors. The general findings of this survey (Table 4. 21) indicate very little direct discussion about resident laboratory administration training in a detailed and sustained level. Only 9% of the respondents reported active dialogue in the GMEC committee about administrative training goals or curricular changes. Thirty percent of the respondents indicated that dialogue did occur in the GMEC about management curriculum but it did not lead to specific learning outcome measures or teaching strategies. The majority of programs (58%) indicated that discussions about administrative training were confined to departmental faculty meetings. Since the adoption of laboratory training was gradual, it is possible that programs

may not have had a great deal of feedback from site visitors in their current inspection cycles due to recent adoption of management competencies as a performance standard.

Use of Strategies to Initiate Curricular Changes and Gain Faculty Support

The residency directors were in strong agreement that teaching laboratory Administration was a worthwhile part of the curriculum (Table 4.22, mean 1.64, s. d. . 69). There was also solid agreement (question IV(a) mean 2.26, s. d. .85) among the directors that they employed or would employ specific strategies to introduce curricular change in laboratory administration. One strategy that appeared to be relied upon heavily was using resident feedback about course design to guide faculty in revamping pedagogy (question IV(f) mean 2.14, s. d. .86). The directors also highly valued the idea that cultural norms expressed by the faculty about business management training needed to be changed (question IV(q) mean 2.18, s. d. .77). There was strong to moderate agreement by the directors that faculty should use creative strategies like open dialogue with the residents to promote learning diversity, have residents keep learning portfolios of their administrative experiences and use on-line learning modules to better cope with time management challenges. As a group, the directors were ambivalent about leaving laboratory administration learning at the complete discretion of the residents (question VI(d) mean 3. 18, s. d. 1. 080). The residency directors expressed disagreement about the value of employer feedback in curriculum design, the use of inferential statistics to track improvement in learning outcome metrics and making frequent efforts to obtain more funding for laboratory administration training (Table 4. 23).

The overall findings conclude that the directors thought that administrative training was useful and that they were willing to explore using creative teaching methods to create interest in the subject matter and fulfill accreditation standards.

Specific Business Competencies by the Directors that are Perceived to be Useful Measures of Improved Learning Outcomes and Will Predict Professional Success for Graduate Pathologists

The strongest perceived measure of administrative competence by the directors was The participation of the pathology residents in hospital performance improvement committees. From the personal observations of the researcher, residents who participate in performance improvement committees may be called upon to discuss findings of intra-departmental audits. Common topics of these audits may include measures of turnaround time on critical tests or procedures or a review of error rates found in the various steps of processing and reporting of test results. Competency in handling contract negotiations, understanding capital budgets, using medical informatics in clinical reporting and developing inter-personal skills were also seen as predictors of a successful post graduate career. Only 37% of the respondents actually used any of these specific learning subjects in their formal competency measurements. The majority of respondents taught one or more of the management subjects listed in the survey question, but did not use any of them as monitors or indicators when formally measuring learning outcomes improvement. These findings suggest that residency directors know that certain business skills related to effective committee work are important to teach. However, there does not appear to be a consensus list of management subjects which should be standardized for laboratory administration curriculums in all ACGME accredited pathology residency programs. To achieve this type of

consensus, educational leaders will probably look to organizations such as CAP, ASCP, ACGME and the Association of Pathology Chairs for collaboration and further guidance.

Methods Employed to Measure Improvement in Learning of Pathology Residents in Laboratory Administration

Slightly over one half of the survey respondents who answered this part of the survey used written exams (RISE) or *360* ratings to formally measure laboratory management competencies. Other competency measures like learning portfolios and global ratings were also frequently used. Least used methods were simulation programs and standardized oral examinations. These findings from the Likert scale questions in sections four through six, plus the ranking data, support the conclusion that pathology residency directors who choose to use learning outcomes metrics rely extensively on their professional associations, like the ASCP, to help them track resident progress. While all the respondents had some level of administrative training, 18% of the survey participants did not use formal metric monitoring of learning outcomes for the laboratory administration subjects they taught in their curriculum.

Time Constraints

The directors expressed concerns in getting faculty to find time to add management learning to their busy schedules. As one director eloquently defined the status of the current situation "There is already too much material the residents need. I would like to include more management, but there isn't time…" Directors appear to consciously rely on an incremental approach (Hubell & Burt, 2004) to introduce laboratory administration curricular changes due to time constraints.

Education Support from Professional Groups

Residency directors appreciate and need support from non-physician business experts to help teach some aspects of management and administration. The data from the quantitative data indicate that the management approach should be pathologist oriented. The findings of this study indicate that this mind set demonstrated by the responses of the residency directors is a key tenet in the conceptual framework of the laboratory administration curriculum. As suggested by the curricular adoption model of Hubell and Burt (2004), directors are looking towards practical strategies to make these curricular changes by using non-physician faculty and adopting more on-line learning resources sponsored by their professional associations. Appropriate learning context strategies are introduced through dialogue and consensus building with faculty and residents.

A pathology leader's focus is usually directed towards developing work flow systems that incorporate best practices that help clinicians treat patients. Programming strategies rely on the use of learning materials provided by the CAP and the ASCP to teach residents how to engage in teamwork with diverse stakeholders with an equally diverse array of viewpoints. This curricular objective supports the essential goals of the ACGME mission: accountability, excellence and professionalism (ACGME, 2006d).

The data collected in this study indicated that the primary strategy used by directors to assess improvement in resident business learning was to employ the RISE examination sponsored by the American Society of Clinical Pathologists (ASCP). While the survey findings indicated that directors were not prone to use inferential

statistical calculations, they did rely on a validated instrument that is nationally recognized and used by most residency programs.

Institutional Support

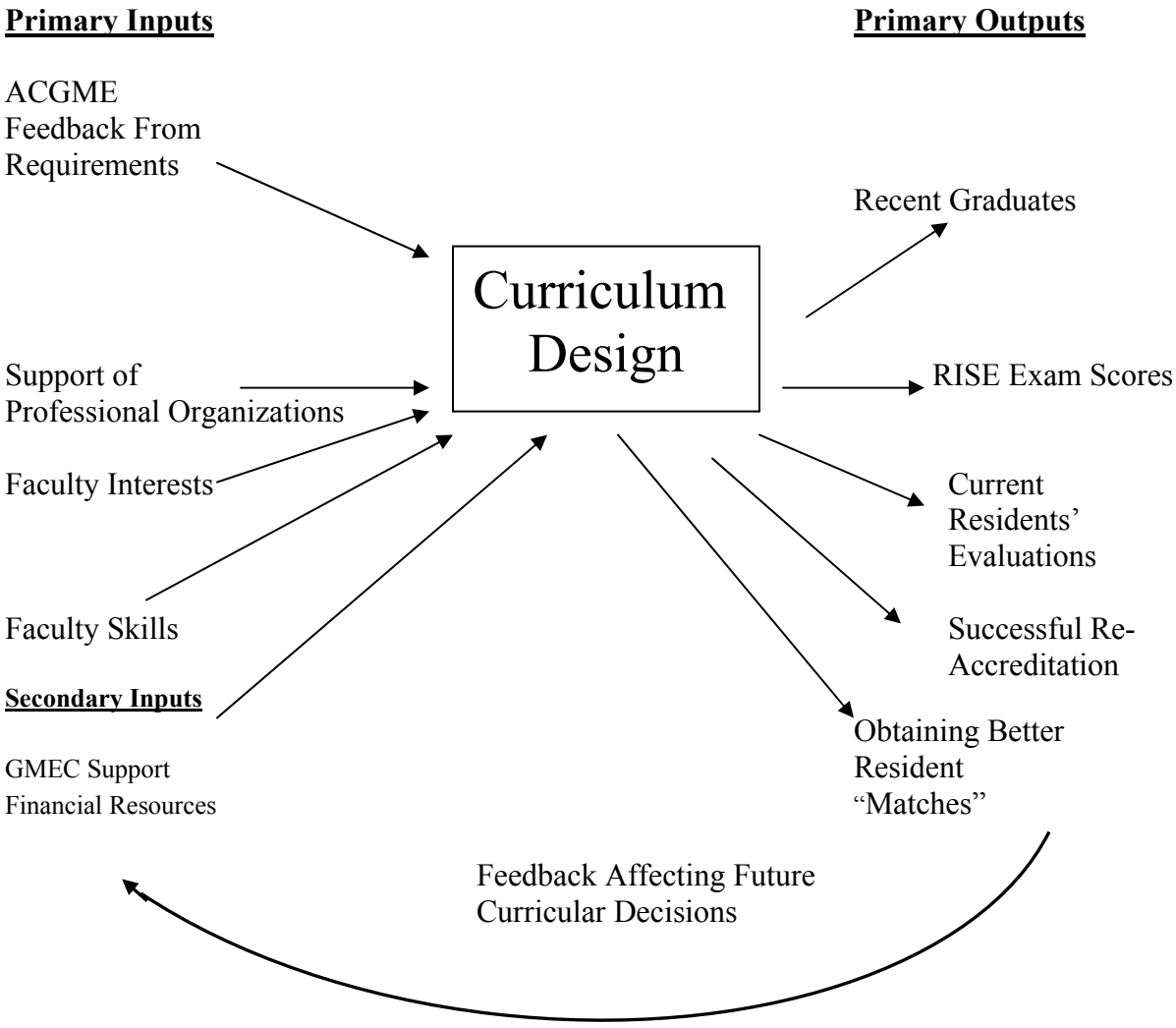
There is very little focused or intense discussion about administrative training for pathology residents in the graduate medical education committees. The data from this study appears to suggest that while management training supports the need of the resident to master the six general competencies outlined by the ACGME, the pathway to achieve this goal will largely be at the discretion of the program director and faculty. Most of the conversations in the GMEC about this topic, if any, appeared to be limited to general discussions involving several medical specialty programs.

Feedback from Recent Graduates

The directors received significant feedback about the value of laboratory administrative training. According to the directors, the resident's appreciation of management training grew as they encountered leadership challenges in their first professional career positions. While as residents they may have had an intuitive understanding of the value of this training, however, their focus of study was to acquire enough knowledge to perform well on the RISE or the pathology board examination. As junior attending pathologists, leadership responsibilities will be expected to be carried out with the same level of professionalism as their clinical practices . The impact of the realization that this knowledge was valuable to help them perform competently in their new jobs was enough to communicate these findings to their former mentors.

A Decision Making Model Derived From
Analysis of the Collected Data

Table 5. 1 Important Decision Making Factors Considered by Residency Directors Affecting Curricular Design of Laboratory Administration Training



The data collected from the quantitative methods employed in this study would appear to suggest that the residency directors employ an open systems model to evaluate and implement changes to the curricular design of their laboratory administration training programs. Based on the ranking data collected from the survey respondents, the directors are significantly influenced by the performance standards of the ACGME accreditation program, the availability of time for instruction by the pathology faculty, the faculty's skills and expertise in administration and to a lesser extent influenced by recommendations of the organization's graduate medical education committee and the operating budget to make design changes. These factors represent the primary decision making inputs affecting the curricular design.

The output of the implementation of the design creates learning outcomes demonstrated by the resident trainees. These outcomes are measured or recognized through several communication channels. These may include: a. feedback from recent graduates of the residency programs who are in their first professional assignment as junior attending physicians and faculty, b. changes in statistical measures of learning outcomes as tracked by the ASCP RISE examination scores and rate of learning progress between the various class levels, c. evaluations of the program's accommodation to learning needs by the current class of residents, d. successful re-accreditation of the ACGME pathology residency program by meeting performance standards for this aspect of the training curriculum, and e. obtaining more suitable matches of resident candidates in future national resident matching programs. The measure of success expressed by the outputs would be expected to have a profound effect on the nature of future inputs to the curricular design and its pedagogical delivery since the outputs provide benefit

to the training programs both in terms of prestige in the professional community and a potential increase in revenue.

The open nature of the feedback system is due to receiving influences, not only from the internal deliberations of the pathology faculty, but also from significant influences outside the department such as the national benchmarking of the ASCP sponsored RISE examination or comments about the relevance of administration training from recent alumni. Successful site visits by the ACGME staff, particularly comments on effective resident learning of the six general competencies, as they pertain to management training would also exert a positive outside influence. Perhaps the most effective measure external to the department is increased interest in attending the program as measured by improved matching with the NRMP program. It would appear from the findings that satisfied residents will be more inclined to provide favorable recommendations to future candidates about a program if they strongly believed they were receiving complete training for all aspects of their future roles as leaders.

Conclusions: Resident Training in Laboratory Administration

The long term business pattern in hospitals across the nation has been a significant decline in operating revenues coupled with an insatiable public demand for more health care services provided in an efficient, high quality manner. This places pressure on professional ancillary departments, like pathology, to come up with creative solutions to become more efficient and exceed public expectations.

This scenario is a harbinger of the future role of pathologists as both clinical and administrative leaders. Successful laboratory administration will require a balanced perspective of the pathologist who will be in the best position to fully understand the clinical impact of financial driven decisions to alter work flow processes.

The findings in this study appear to support the perception that training pathology residents in laboratory administration is important and should be integrated into the residency training curriculum. The data in this study indicates that the realization of this need by residency directors is influenced by positive feedback generated by ACGME accreditation performance standards and comments from recent graduate residents. This trend is not to suggest that the role of non-physician administrators will diminish in relation to physician credentialed pathology managers. Rather, trained pathologists will enter into more intensive collaborative relationships with lay administrators to influence strategic planning decisions involving the scope and nature of laboratory operations. The end result will be most likely be better quality decisions that will get more support from physician champions than in the past. Cultural changes among medical providers will have to come at a much more rapid pace in the future. Those physician providers who are skilled in business decision making will clearly be in control of their own destinies.

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APPENDIX A
INTRODUCTORY LETTER TO SURVEY PARTICIPANTS

(A Letter of Understanding Concerning the Parameters of the Study)

Dear Doctor,

I am a doctoral student in Education who is engaged in a study of of U.S. health care institutions who sponsor ACGME (Accreditation Council for Graduate Medical Education) accredited residency programs in the specialty of Pathology. In addition to my role as a graduate student,I am also an experienced administrator in a medical school affiliated clinical department in a teaching hospital. I have occasionally served as an adjunct faculty member to educate graduate medical students in business administration courses related to clinical administration and leadership. For the purposes of this investigation however, the researcher is collecting data solely for the purpose of a dissertation study. The specific focus of this study is the portion of the residency curriculum devoted to training in laboratory business management and administration. To help me gain insight into the value and effort placed by program directors into business and leadership skills competencies for Pathology residents I will ask you to participate in a survey that should take about twenty minutes to complete.

The survey data you return to me will be recorded anonymously and your participation, plus any written comments you may provide, will be held in the strictest confidence. Upon submission of your completed survey, you may be contacted for a follow up interview by telephone in order for the researcher to have a deeper understanding and confirmation of your insights and information. Any recorded and

transcribed notes related to these conversations will also be coded to protect the identity of the respondent. The survey questionnaire will be sent to the program directors of all 150 ACGME programs in the United States. I am an independent researcher and do not represent the interests of my place of employment, any accrediting body or regulatory agency.

I welcome questions about this study at any time. Your participation in this study is on a voluntary basis, and you may refuse to participate at any time without consequence or prejudice. If you wish further information regarding your rights as a research subject, you may contact Mr. Richard Throm, Office of the Vice President for Research, Institutional Review Board, Temple University, 3400 N. Broad St. , Philadelphia, Pa. 19140 215/707-3249.

_____ _____

Participant's Signature Date

_____ _____

Participant's Signature Date

APPENDIX B
SURVEY QUESTIONAIRE

Section I. Description of Your Program

a. What is the total number of training slots in the program?

Less than 5 ___ 5-8 ___ 8-12 ___ 12-15 ___ Greater Than 15 ___

b. Specialty training provided:

Clinical Pathology Only ____ Anatomical Pathology ____

Clinical & Anatomical Pathology ____ Pathology Sub-specialties (specify) _____
_____

_____

c. How many annual curricular hours are devoted to business, management or administrative training for residents?

Less than 10 hours ___ 10-15 hours ___ 15-20 hours ___ 20-25 hours ___
25-30 hours ___ Greater than 30 hours ___

d. What is the total # of faculty used to teach laboratory administration? _____

% Physician/Doctoral Scientific Faculty teaching laboratory administration _____

% Non-Physician Faculty teaching laboratory administration _____

e. Indicate the type of training facility for your residency program:

University Based Teaching Hospital _____

Community Hospital Affiliate of a Medical School Based Teaching Program_____

Other (Please Describe)
_____

_____

_____

f. What type of business training program do you provide for your Pathology residents?

(Check One)

Formal Program with separate management lectures and/or rotations from other clinical or professional/technical training ____

Formal Program with management training integrated into Clinical or Surgical Pathology
lectures and rotations ____

No Formal Program. Some lectures or management projects given when faculty are
available. ____

No Laboratory Administration training for Pathology residents ____

g. Evaluate the following six items in order of importance towards influencing curricular decisions about business management training:
(1 being the most important, 6 being the least important)

ACGME Requirements _____(rank)

Recent graduate resident feedback _____(rank)

Employer feedback about recent graduate resident competencies _____ (rank)

Opinions of non-physician/ Administrators _____(rank)

Results of ABP exam scores _____(rank)

Results of RISE exam scores _____(rank)

Section II. Faculty Participation

a. What percentage of the Physician faculty have had previous business management training?

Less than 20% ____ 20-40 % ____ 40-60% ____ 60-80% ____
Greater than 80% ____

b. What are the teaching methods used to train residents in laboratory administration? Check all that apply, indicate the percentage that the method is used as a primary means of instruction.

Lecture ___ % Case Study Exercises ___ %

Management Rotation in a Clinical or Surgical Pathology Section ___ %

Assignment to a Hospital Performance Improvement Committee ___ %

Participation in a STATE DOH, CAP, JCAHO or other related compliance inspection ____%

Administrative On-call for Laboratory Operational Issues ____ %

Have Residents Compile Management Learning Portfolios _____%
Other _____ %

c. Has the number of pedagogical methods used in business training increased or decreased in the past seven years? Increased ___ Decreased ___

d. During the past seven years how much has your program changed laboratory administration curricula contact hours for the Pathology residents? (check all that apply)

Increased ____ Decreased ____ No Change ____
Less than 5% ____ 5-25% ____ 25-50% ____ Greater than 50% ____

Section III. Institutional Support

a. Rank the importance of the constraints that may prevent you from creating a more rapid adoption of business training in your residency program?

(1 being the most important, 6 being the least important)

Lack of Competent Faculty ____ (rank)

Financial Resources ____ (rank)

Lack of Faculty Interest ____ (rank)

Lack of Resident Interest ____ (rank)

Lack of Available Faculty Teaching Time ____ (rank)

Lack of Available Resident Learning Time ____ (rank)

b. To what extent has your institution's graduate medical educational committee (GMEC) discussed the curricular development of administrative training for your pathology residency training program? (Check One)

Extensive discussions, including evaluation of learning outcome measures and specific goals and objectives to be achieved. ____

Some general discussions without specific expectations or goals. ____

No discussions in the graduate medical education committee.
This issue has only been discussed within the pathology department. ____

Other (please explain)

_____

_____

_____

_____

Section IV. Introducing Curricular Change/ Assessing Usefulness of Business Training
(Circle or "X" Your Number Choice)

a. **I use a specific strategy to introduce curricular change in the pathology residency program**.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

b. **With the reduction of training time from five to four years, I see very little opportunity to increase the number of contact hours in the laboratory administration curriculum.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

c. Increasing the number of contact hours for the laboratory administrative curriculum is a difficult sell to the faculty.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

d. The faculty generally feels that laboratory administrative training is a good use of curricular teaching time to make the residents better doctors.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree

1	2	3	4	5

e. I constantly try to develop new strategies to make business management and financial training relevant to the resident's future role as a leader.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

f. **I frequently meet with the residents and faculty to solicit feedback on the relevance of the training.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

g. **I try to seek more budget resources each fiscal year to facilitate administrative training.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

h. **I make it a point to develop faculty and resident champions to promote stakeholder buy-into the administrative curriculum.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

i. **I actively seek counsel and feedback from non-physician leaders to develop and refine the laboratory administrative curriculum.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

j. **I work with the faculty to define both specific and global learning outcomes for laboratory administrative skills.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

k. **I always try to connect curricular planning for laboratory administrative skills to the program mission statement and strategic objectives.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

l. **I use multiple assessment methods to determine whether the learning methods used in the resident's management training produce the desired outcomes.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

m. **I solicit feedback from all stakeholder groups e. g. faculty, residents, administrators to assess the validity of the metrics used to measure management learning.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

n. **I use inferential statistics as the primary way to validate learning outcome measures.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

o. **I use the opinions of faculty experts as the primary way to validate management learning outcome measures**.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

p. **I actively seek feedback from employers of our recent graduates to improve the laboratory management curriculum for current resident trainees.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

q. **It is important to promote a faculty cultural norm that encourages experimentation with diverse learning methods to improve laboratory management training.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

r. **Laboratory management training will prepare pathologists to be stronger leaders who will be better prepared to assume broader leadership roles in health care organizations**.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

s. **I rely primarily upon professional organizations such as the College of American Pathologists, American Society of Clinical Pathologists, Clinical Laboratory Management Association or the American Board of Pathologists to provide guidance on how to design a laboratory administration curriculum.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

Section V. Predictors of Post Graduate Success

a. **Training should provide enough information to allow a pathologist to be comfortable reviewing budgets and test/capital equipment cost analyses.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

b. **Training should provide enough information to allow a pathologist to be comfortable in engaging with vendors in contract negotiations.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

c. **If possible, I found it to be of great value if all pathology residents were actively involved in hospital committee work e. g. Performance Improvement, CQI …etc. as a training rotation in Laboratory Administration**.

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

d. **Pathology residents should actively study human resource management to help improve their inter-personal communication skills in their post graduate careers.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

e. **Training in medical informatics is essential for a graduate resident to be a competent professional.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

f. **I currently use the following items as formal learning outcomes measures for laboratory administration competencies**: **(check all that apply)**

Medical Informatics ___ Human Resources Management. ___

Performance Improvement Committee work ___ Contract Negotiations ___

Budgets/Cost Analysis ___ Provide instruction in some or all of the above but do not use these items as formal learning outcome improvement measures ___

g. **I use the following pedagogical methods to measure improved learning outcomes in resident laboratory administration skills**: **(check all that apply)**

Record review ___ Checklists ___ Global Ratings ___

Simulations ___ Resident Portfolios ___ Standardized Oral Exams ___

Written Exams ___ 360 Global Ratings ___ Case Logs ___

Do not measure learning improvement in laboratory administration ___

Section VI. Creative Curricular Adoption Strategies

a. **I actively encourage my faculty to engage in a dialogue with the residents to explore diverse learning methods that will help improve learning outcomes.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

b. **I encourage the residents to keep a portfolio of their administrative learning experiences and use it as part of the resident's performance evaluation.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

c. **I would prefer to use on-line learning modules, lunchtime video conferences, or similar learning modalities devoted to laboratory administration as a means to reduce the amount of time taken away from clinical requirements.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

d. **After providing core competencies to prepare for the ABP Examination, I leave the decision for learning more about laboratory administration strictly to the discretion of the resident.**

Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1	2	3	4	5

Any other general comments or observations

Thank You For Your Participation