

The Johns Hopkins Department of Pathology Novel Organizational Model: A 25-Year-Old Ongoing Experiment

Fred Sanfilippo, MD, PhD¹, Kathleen H. Burns, MD, PhD² , Michael J. Borowitz, MD, PhD², J. Brooks Jackson, MD, MBA³, and Ralph H. Hruban, MD²

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Abstract

In 1993, the present Department of Pathology at Johns Hopkins was established with the leadership of a new chair (ie, referred to as department director at Hopkins) and upon the integration of 3 separate and independent departments at the Johns Hopkins School of Medicine (Pathology) and the Johns Hopkins Hospital (Pathology, Laboratory Medicine). This new department was organized into 17 divisions, each of which was expected to develop and maintain significant clinical, educational, and research programs of excellence. To facilitate performance and alignment across missions and parent organizations, a novel professional and administrative structure was created. Professionally, vice-chairs (ie, deputy directors) for research, teaching, and patient care were appointed to oversee and coordinate these activities across all units of the department. Likewise, to focus and enhance expertise, individual administrators were appointed for academic, clinical, and business affairs. A departmental executive committee was created consisting of the vice-chairs and administrators, which was presided over by the chair. Simultaneously, substantial effort was put into measuring and improving the organizational culture using evidence-based methods. Significant improvements were documented by the year 2000 in departmental performance in research, education, clinical service, culture, and finances. Under 2 successive leaders, the department has maintained its eminence across missions and financial performance. This 25-year experience supports the tenet that innovative and strategic organizational structures and functional alignments can provide sustainable competitive advantages in performance.

Keywords

Department of Pathology, organizational structure, performance, culture, outcomes, strategic priorities

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Introduction

Clinical departments must balance competing priorities of their missions (ie, clinical service, education, and research) while aligning priorities with those of their parent organizations (ie, university, health system, physician practice).¹ For pathology, there is also complexity related to perceived and real divisions between “anatomic pathology” (AP) and “laboratory medicine” (LM) or “clinical pathology” (CP). AP and LM/CP are often separate operational and administrative units within

¹ Department of Pathology and Laboratory Medicine, Emory University, Atlanta, GA, USA

² Department of Pathology, Johns Hopkins University School of Medicine, Baltimore, MD, USA

³ Department of Pathology, University of Iowa School of Medicine, Iowa City, IA, USA

Corresponding Author:

Fred Sanfilippo, 730GCR, 1518 Clifton Road, Atlanta, GA 30322, USA.
Email: fred.sanfilippo@emory.edu



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Table 1. Mission and Organizational Alignments.

Missions (Organizational Units)	Business Models	Culture	Performance Measures
Research (schools, hospitals)	Return on investment	Innovation	Funding Papers Impact
Education (schools, hospitals)	Service	Academic	Student quality Job placement Rankings
Health care (hospitals, practices)	Profit and loss	Command- control	Clinical quality Revenue Net income

departments of pathology and, in some cases, are even distinct medical school departments.

Across academic health centers (AHCs) in the United States, the organization of pathology and LM departments varies greatly. Some departments of pathology are based entirely in a school of medicine, while others in academically oriented hospitals and usually associated with departments in an affiliated medical school. Most, however, span both the medical school and hospital of an AHC. In some cases, other disciplines, notably immunology, microbiology, and anatomy, are also included in pathology departments.

Developing structural integration and functional alignment across the missions and organizational units of an academic department or medical center is difficult in part because of differences in measures of performance, as well as differences among each component's business model and behavioral norms and expectations (ie, culture; Table 1). The value of proper alignment was demonstrated in a recent study of 85 AHCs, which showed that their structural integration across organizational units was associated with functional alignment, which in turn was associated with measures of performance across missions.²

Adding to the complexity of aligning structure and function to mission is the relationship of performance to culture. Organizational performance has been shown to be associated with its culture in both businesses³⁻⁵ and AHCs.^{6,7} Specifically, "constructive" styles of organizational culture (eg, humanistic-encouraging, affiliative, self-actualizing, and achievement) are strongly associated with higher performance than passive/defensive or aggressive/defensive cultures.⁸ The ability to sustain high performance in a competitive environment is tied to many factors, the most important of which is developing signature organizational structures, functions, and cultures that are hard for others to duplicate.⁹

Here we present an "experiment" conducted in a large, multidisciplinary academic pathology department demonstrating that novel organizational structural and functional changes designed to enhance performance across missions and to promote a constructive culture can result in rapid short-term improvement in performance across missions and operations. With 25 years of follow-up, we also show an enduring trajectory of high performance.

Methodology

Departmental Structures and Functions Prior to 1993

Prior to 1993, the Johns Hopkins Hospital (JHH) had 2 independent departments: pathology (AP) and LM (CP), while the School of Medicine (SoM) had a separate academic department of pathology (Figure 1). Historically, the chair of the academic department in the SoM was also the chair of pathology (AP) in the hospital. With the retirement of Dr Robert Heptinstall as chair of the JHH and SoM departments of pathology in 1988, 2 interim directors, Drs John Boitnott and John Yardley were appointed to chair the 2 respective entities. The Department of Laboratory Medicine in JHH continued to be chaired independently by Dr Robert Rock. From the perspective of organizational structure and function, these 3 departments were independent, with separate budgets and reporting relationships, as well as different priorities and measures of success.

The lack of functional alignment was evident in reporting structures. While the academic department of pathology reported to the dean, the 2 hospital departments reported to the JHH chief financial officer, a clear sign that the mission of those departments was focused more on revenue than on clinical research and quality of clinical service. For individual faculty, structural features exacerbated problems aligning missions. All physicians performing clinical services in JHH were required to have a faculty appointment in the SoM. While virtually all faculty in JHH Pathology had their primary faculty appointment in the SoM pathology department, most (but not all) physicians in the JHH Department of Laboratory Medicine had appointments in the Department of Medicine. Leaders were given responsibility for departmental performance, but not commensurate authority over personnel and resource allocation. Many diagnostic labs at Hopkins were physically dispersed in other departments in JHH and in the SoM with no accountability to LM or pathology.

This structure also had a negative impact on research and education, as the JHH departments provided no direct incentives for these activities. Although JHH provided limited funds through a "joint agreement" to the SoM department, which could be used to support faculty research and educational activities, there were no funds made available for these activities in the 2 JHH departments. Because the Johns Hopkins University (JHU) SoM has only a single tenure-track for all Hopkins faculty, it became difficult for those faculty engaged primarily in hospital activities to earn promotion. Graduate and fellowship training positions were relatively limited, and the ability to recruit residents suffered from a lack of AP-CP integration. There were independent residency programs in AP and CP administered by the JHH Department of Pathology and Laboratory Medicine, respectively. Applicants to one program were not guaranteed combined AP-CP training nor permission to complete rotations in the other program.

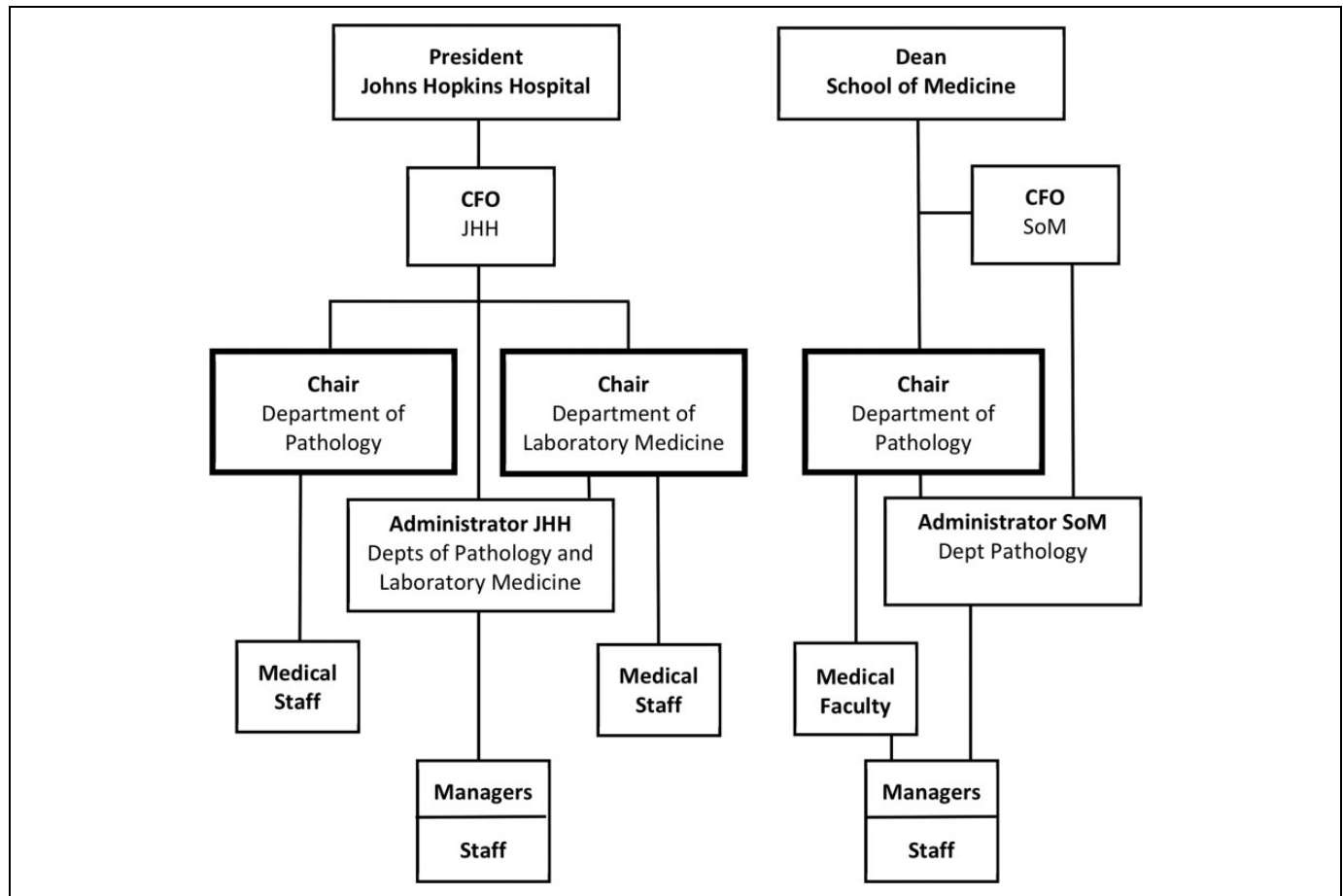


Figure 1. Three independent Departments of Pathology and Laboratory Medicine, prior to 1993. Left: Two distinct clinical departments of Pathology and Laboratory Medicine were led by chairs reporting to the Johns Hopkins Hospital chief financial officer (CFO). Right: The academic Pathology department chair reported to the dean of the School of Medicine and the School of Medicine CFO.

Rationale and Process of Creating a Unified Department: Johns Hopkins Pathology

Despite the lack of functional synergy among the 3 departments prior to 1993, both JHH and SoM had a long history of valuing pathology as a basic and clinical science. The founding dean of Johns Hopkins, Dr William Henry Welch, was also chair of the pathology department, so it is not surprising that the inaugural chairs of other departments all highly valued pathology. The first chair of medicine, Dr William Osler, remarked often on the importance of pathology and that the quality of pathology set the tone for the quality of the institution.¹⁰

The importance of pathology was still recognized by institutional leadership into the early 1990s, and there was a strong desire to enhance the stature of pathology and its contributions to both Johns Hopkins Health System (JHHS) and JHU SoM. A failed national search for a new director following the retirement of Dr Heptinstall in 1988 was largely due to the lack of resources available at the time. After the new Ross Research Building was opened in 1992, with 2 floors allocated to pathology, and with increased funds appropriated for recruitment, the SoM Dean Dr Michael Johns and the newly appointed CEO of JHHS, Dr James Block, reinitiated a chair search.

In 1992, Dr Fred Sanfilippo offered a vision for a unified department and was recruited as both the department chair (JHU SoM) and pathologist-in-chief (JHH and JHHS). It was agreed with both Drs Johns and Block that the 3 departments would be completely integrated into a new single department of pathology, that is, Johns Hopkins Pathology (JHP). It was also agreed that the new chair would have full authority over operational, financial, and personnel matters of the previously 3 independent departments, including “hire-and-fire” authority over JHH and SoM staff employees. The new chair of the integrated department reported directly to the CEO of JHH and the dean of JHU SoM (Figure 2).

Dr Sanfilippo was also given responsibility for the quality of laboratory and pathology services throughout the JHH and JHU SoM, regardless of the department in which the services were provided. As stated in the agreement letter of September 30, 1992, signed by Drs Block, Johns, and Sanfilippo,

Consistent with the concept of a unified Department of Pathology, we agree that all Pathology services in the Johns Hopkins Hospital that are not directly under the Department of Pathology should operate with the concurrence of the

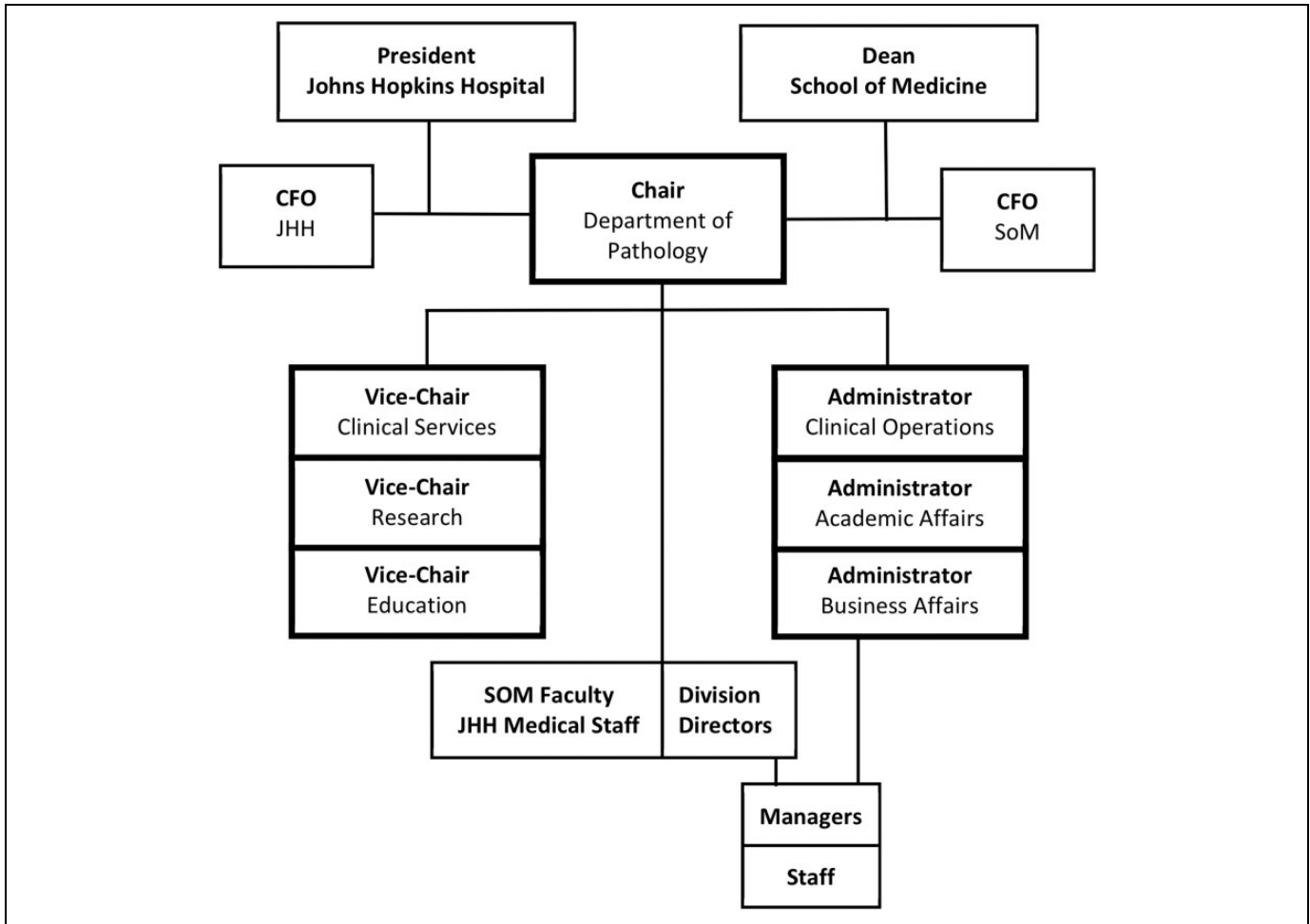


Figure 2. Unified JHP department organizational structure, established in 1993. A single chair led the unified department, with reporting responsibilities to both the president of the Hospital and the dean of the School of Medicine. Three vice-chairs were delegated responsibilities in the areas of clinical services, research, and education, and three administrators were appointed for clinical operations, academic affairs, and business affairs. JHP indicates Johns Hopkins Pathology.

Pathologist-in-Chief who will be responsible for the overall quality of the service.

Consistent with the concept of a unified Department of Pathology and the development of a reference laboratory, we are supportive of the goal of having all “University labs” and the laboratories of the Cancer Center that undertake specialized and routine diagnostic testing operate with the concurrence of the Pathologist-in-Chief who will have overall responsibility for the quality of these services.

The Johns Hopkins Pathology Experiment

In return for the structural changes in the department and the delegation of significant authority and resources to the chair, institutional leadership had high expectations for improvements across all missions. To meet these expectations, Dr Sanfilippo and the department leadership team engaged faculty and staff to effect the changes needed to achieve specific goals. Their primary focus was to align the structure and function of operational units to optimize not each individual component but performance of the department as a whole. The process was

framed at the time as “The Johns Hopkins Pathology (JHP) Experiment.” Tables 2, 3, and 4 outline the formal hypotheses, specific aims, and methods of the experiment, respectively. Academic, financial, and cultural outcomes were planned to be measured regularly to determine success.

Hypotheses. The first hypothesis (Table 2) was that integrating clinical services offered by pathology and lab medicine (ie, AP, CP) would improve quality. To reinforce the notion of a single entity providing diagnostic services, Dr Sanfilippo requested that the new unified department be named Pathology rather than Pathology and Laboratory Medicine. The second hypothesis was that diagnostic pathology is a consultative physician specialty, not a “hospital-based” service. Pathologists performing clinical services brought professional clinical expertise and were to be viewed similarly to other academic physicians, not just as staff overseeing services for the hospital. The third hypothesis was that integrating faculty clinical and research activities would improve overall productivity, opportunity, and achievement. The final hypothesis was that organizational (ie,

Table 2. The JHP Experiment: Hypotheses (1992).*

Structure–function relationships
<ul style="list-style-type: none"> ● Integrated “AP” and “CP” clinical services improve value to patients, physicians, trainees, and staff. ● Diagnostic pathology is a consultative physician specialty, not a hospital service. ● Integration of the clinical and research activities of faculty improves overall productivity, opportunity, and achievement in each. ● Departmental values and culture impact faculty and staff productivity and satisfaction.

Abbreviations: AP, anatomic pathology; CP, clinical pathology; JHP, Johns Hopkins Pathology.

*Original hypotheses as stated in 1992.

Table 3. The JHP Experiment: Specific Aims (1993).*

Clinical
Focus on high quality
<ul style="list-style-type: none"> ● Demonstrate added value, cost-effectiveness ● Esoteric, specialty, second opinion services
Leverage services with research and education
<ul style="list-style-type: none"> ● Biotech and informatics R&D, assessment ● Tech transfer, outcomes studies, CME
Enhance infrastructure, unit cost
<ul style="list-style-type: none"> ● Billing, regulatory expertise ● Optimal volume growth, partnerships ● Consolidate, coordinate services: Johns Hopkins Medical Labs
Research
<ul style="list-style-type: none"> ● Support physician-scientists: opportunity, flexibility ● Expand basic research to complement clinical service ● Access best trainees for basic and clinical research ● Improve research infrastructure and resources ● Enhance technology and translational research ● Develop corporate sponsorship ● Priorities: immunology, cardiovascular, micro-HIV
Education
<ul style="list-style-type: none"> ● Improve quality of residency: service, research ● Enhance medical student teaching: core, electives ● Expand fellowship programs: basic, clinical ● Develop graduate student program: virtual, actual ● Enhance allied health programs ● Improve infrastructure: resources, organization ● Market educational products: CME, text

Abbreviations: CME, continuing medical education; JHP, Johns Hopkins Pathology.

*Original specific aims as stated in 1993.

Table 4. The JHP Experiment: Methods (1993).*

Performance change
<ul style="list-style-type: none"> ● Develop consensus on mission, values, goals ● Create a departmental structure to facilitate function ● Develop decision and resource allocation methodology ● Create linkage of all departmental resources ● Drive and promote changes as experiments ● Assess, change organizational culture: incentive and achievement versus entitlement

Abbreviation: JHP, Johns Hopkins Pathology.

*Original methods as stated in 1993.

departmental) values and culture would have a significant impact on employee (ie, faculty and staff) productivity and satisfaction.³⁻⁷ There was strong support for testing all 4 of these hypotheses, with the sense that the process would significantly enhance departmental performance.

Specific aims. The specific aims of the JHP Experiment were broken down by clinical, research, and education missions as shown in Table 3, and they included anticipated tactics to achieve the strategic priorities of each aim.

Clinical specific aims focused on improving the quality, scope, and value of services. Tactics identified included expanding esoteric, specialty, and second opinion services; improving billing and regulatory processes; developing commercial partnerships; and forming a consolidated reference service lab (Johns Hopkins Medical Labs [JHML]) to provide a portal for outside consumers to access all diagnostic services at JHH and JHU SoM.

Research specific aims included supporting physician-scientists, enhancing technology and translational research, and recruiting and engaging the best basic and clinical research trainees. Priority was given to particular areas of investigation based on perceived opportunities. Tactics included leveraging research programs to complement clinical services, improving research infrastructure and resources, and obtaining corporate sponsorship for suitable research and development projects.

The top specific aim in education was to improve the quality of the residency program. This was to be accomplished by integrating AP and CP training, providing residents with more research and broader service opportunities, creating more research and clinical fellowships for training beyond residency, and improving infrastructure supporting the residency program. Other educational specific aims were to enhance the medical student experience in the pathology core course and expand electives, enhance allied health programs, and develop a pathobiology PhD graduate program. Tactics included increasing resources for educational initiatives and administration of departmental educational programs and developing educational products and services such as textbooks and continuing medical education (CME) courses.

Methods

The methods proposed to test the hypotheses, achieve the specific aims, and drive performance change are shown in Table 4. The key approach was to first develop consensus on the new department’s mission, values, and goals and subsequently to create a departmental structure to reflect these priorities and meet these goals. This involved defining operational units (ie, divisions and programs) and leadership positions (ie, division directors, vice-chairs or deputy directors, and administrators).

Several additional processes were proposed to achieve department goals, including developing decision and resource allocation methodologies, linking and aligning all departmental resources, driving and promoting changes as experiments, improving organizational culture and achievement by

Table 5. JHP Department Faculty/Staff Engagement.

Annual one-on-one faculty-director meetings
– Summary of achievements
– Review expectations for coming year
– Career planning, promotion
Development of a new department faculty compensation plan ¹¹
– Part A: standardized for rank and years at rank
– Part B: roles and responsibilities
– Part C: incentive for performance expectation for each mission area
Establishment of department-wide meetings
– Regular faculty meetings to review resources, update performance
– Weekly Pathology Grand Rounds: faculty and trainees
– Monthly CPC with other departments
– Annual off-site retreats to discuss strategy, tactics, performance (Table 7)
Restructure of department leadership
– Division directors with line authority, responsibility; direct report to director
– Deputy directors for research, education, clinical services to coordinate activities across divisions without line authority; direct report to director
– Administrators for academic, clinical, and business affairs
– Executive Committee (Pathology Operations Group, POG) of deputy directors and administrators with operational authority, responsibility
Provide resources to promote productivity
– Resource allocation transparency based on strategic priorities
– Departmental professional development and tech transfer director
– Research Advisory Committee: review, advise, assist extramural grant submissions

Abbreviations: CPC, Clinical-Pathological Conference; JHP, Johns Hopkins Pathology.

providing incentives, and continuously assessing outcomes and performance.

Faculty/Staff Engagement

A major priority of the JHP Experiment was to enhance faculty and staff engagement. Table 5 lists the activities used to achieve this goal. The department was among the first to institute annual one-on-one meetings between each faculty member and the chair to review performance across each mission, to assign administrative responsibilities, and to agree on expectations for the coming year. A priority of the review was to ensure that appropriate resources to support each faculty member's productivity were provided to enable their eventual promotion to full professor with tenure under Hopkins' rigorous single-track promotion system. In addition, a new department faculty compensation plan¹¹ was developed that comprised 3 components: academic rank and years in rank (part A), administrative roles and responsibilities (part B), and bonus based on performance relative to expectations (part C). The annual review, by designating time to discuss responsibilities and performance, provided every faculty member the opportunity to understand the basis for his or her compensation.

Table 6. Off-Site JHP Department Faculty and Staff Retreats.

Date	Topic
January 1994	Changing the Paradigm, Culture
March 1994	Follow-Up to January '94 Retreat
November 1994	Collective Academic Mission
April 1995	Teaching/Education
December 1995	Department Structure, Policies, Processes
April 1996	Improving Efficiency and Effectiveness
November 1997	New & Alternative Revenue Sources
November 1998	Opportunities to Prioritize Future Growth
March 2000	Defining the Cutting Edge

Abbreviation: JHP, Johns Hopkins Pathology.

To communicate changes to the faculty, and to engage them in the reorganization process, a 2-day off-site retreat was held in January 1994, with a second retreat to follow up on issues raised 2 months later. The success of these retreats led to a series of regular, mostly 1-day off-site retreats (Table 6), held at frequencies to match the pace of change. Subsequent retreats focused on specific topics agreed upon by department leadership, with different faculty members assigned to design programs and lead discussion, with the goals of addressing critical issues as well as engaging a variety of faculty in the process. To provide transparency, each retreat began with an introduction of new faculty, a description of any administrative changes, and an update on departmental financial performance.

Culture Inventory Assessment

As a component of the JHP Experiment, surveys of all full-time faculty and senior administrative staff were conducted to assess organizational culture. A commercially available culture assessment, the *Organizational Culture Inventory* (OCI; Human Synergistics)¹² was used to measure culture. The results are displayed as percentile scores on a circumplex with 12 cultural norms grouped into 3 clusters.⁷ The OCI surveys of participants were coded to maintain anonymity and were taken longitudinally in years 1 (1993), 4 (1996), and 7 (1999) of the JHP Experiment. During this period (1993-1999), several faculty left the department, and other new faculty were recruited into the department. It should therefore be noted that there was some, but not complete overlap in the study participants.

Outcome Tracking and Follow-Up

Outcome measures were identified for research, education, clinical service, faculty, and financial performance. Measures were tracked annually from 1992 through 2001 and presented at faculty and staff meetings and annual retreats.

Results

Changes in Departmental Structure and Administration

The initiating event of the JHP Experiment was the consolidation of 3 pathology and LM departments (Figures 1 and 2). This

Table 7. JHP Department Divisions Established in 1993.

Divisions	Associated Labs/Clinical Services
Autopsy pathology	Autopsy service
Cardiovascular pathology	
Clinical chemistry	General chemistry lab Toxicology lab Special chemistry lab
Comparative pathology	
Cytopathology	Cytopath lab
Gastrointestinal-liver pathology	GI path lab
Gynecologic pathology	GYN path lab
Hematopathology	Coagulation/special hematology lab Flow cytometry lab
Immunopathology	Diagnostic immunology lab Immunopathology lab
Informatics	Image analysis Path data systems (PDS) Photography lab/graphic services
Kidney/genitourologic pathology	
Medical microbiology	Bacteriology lab Microimmunology lab Special microbiology lab Mycology lab Virology lab Parasitology lab Mycobacteriology lab
Molecular pathology	Molecular One lab
Neuropathology	Neuropathology lab
Pediatric pathology	
Surgical pathology	Electron microscopy Histology labs
Transfusion medicine	Blood bank

Abbreviations: GI, gastrointestinal; GYN, gynecologic; JHP, Johns Hopkins Pathology.

facilitated other changes in department function, culture, and performance. In the context of this restructuring, 17 divisions were created, each of which was expected to have substantial and high-performing activities in clinical service, research, and education (Table 7). Directors were appointed to lead each division and reported directly to the chair.

This novel divisional structure was created to fully integrate the traditional pathology department divisions and operational units of AP, CP, and experimental pathology. For example, the new Division of Hematologic Pathology included what traditionally had been tissue hematopathology in the department of pathology (AP) and clinical hematology in the department of LM (CP). The new Division of Neuropathology combined the research division in the SoM Department of Pathology with the AP services in the JHH department. The new Division of Informatics was created in anticipation of its future importance, and this quickly became a hub of health services and outcomes research with substantial research funding, while at the same time operating the laboratory information system for the JHH.

New department-level leadership positions were created to enhance alignment, improve operational efficiency, and help

decentralize decision-making (Figure 3). Two vice-chair (deputy director) positions were created initially to oversee clinical services and administrative activities, which were filled by Drs Patricia Charache and John Boitnott, respectively. Shortly thereafter, the vice-chair position for administration was split into vice-chairs for research and education. Drs Donald Price and Michael Borowitz were appointed, respectively, providing a total of 3 vice-chairs to oversee the 3 mission activities of clinical services, research, and education. Dr Brooks Jackson was subsequently recruited as vice-chair for clinical affairs. While division directors had full delegated authority for decisions within their divisions and reported directly to the chair, they also had dotted-line reporting responsibility to the vice-chairs as appropriate. Issues beyond a division could be resolved when the appropriate division chief(s) and vice-chair(s) agreed. In cases where there was no agreement, issues were brought to the Pathology Operations Group (POG; see below) for resolution.

Three new administrator positions, responsible for academic, clinical, and business affairs, also were created to span all divisions and activities across the new department. Mabel Smith, the previous administrator for the pathology department in the SoM, was appointed administrator for academic affairs, and James Creech, the previous administrator for the JHH pathology and lab medicine departments, was appointed administrator for clinical operations. Edward Pigo, an expert in business, finance, and the reimbursement system in the state of Maryland, was recruited to the position of administrator for business affairs. New job descriptions for each of these positions were intended to focus their activities, avoid overlap, and promote collaboration. A departmental executive committee, the POG, was appointed consisting of the vice-chairs and administrators, which met weekly to review progress and deal with operational as well as strategic matters.

Change in Departmental Organizational Culture

Results of the baseline OCI survey made in 1993 are shown in Figure 4. These demonstrated a low-performance culture characterized by tendencies toward “aggressive/defensive” styles and low “constructive” styles. Concurrent with changes in departmental organization and the methods used to engage faculty and staff as described above (Tables 5-7), departmental OCI surveys showed desirable changes in 11 of 12 styles by 1996 (Figure 4). These encompassed gains in all 4 subcategories of constructive styles (achievement, self-actualizing, humanistic-encouraging, and affiliative) and reductions in aggressive/defensive and passive/defensive styles. By 1999, all 12 styles had changed in a desirable direction (Figure 4). The most notable changes were the large increases in constructive styles, showing a mean increase from the 38.5th to 68.0th percentile ($P < .001$). Desired decreases were also seen in all passive/defensive styles (mean 44.3-22.8, $P < .039$) and all 4 aggressive/defensive styles (mean 67.0-54.0, $P < .10$).

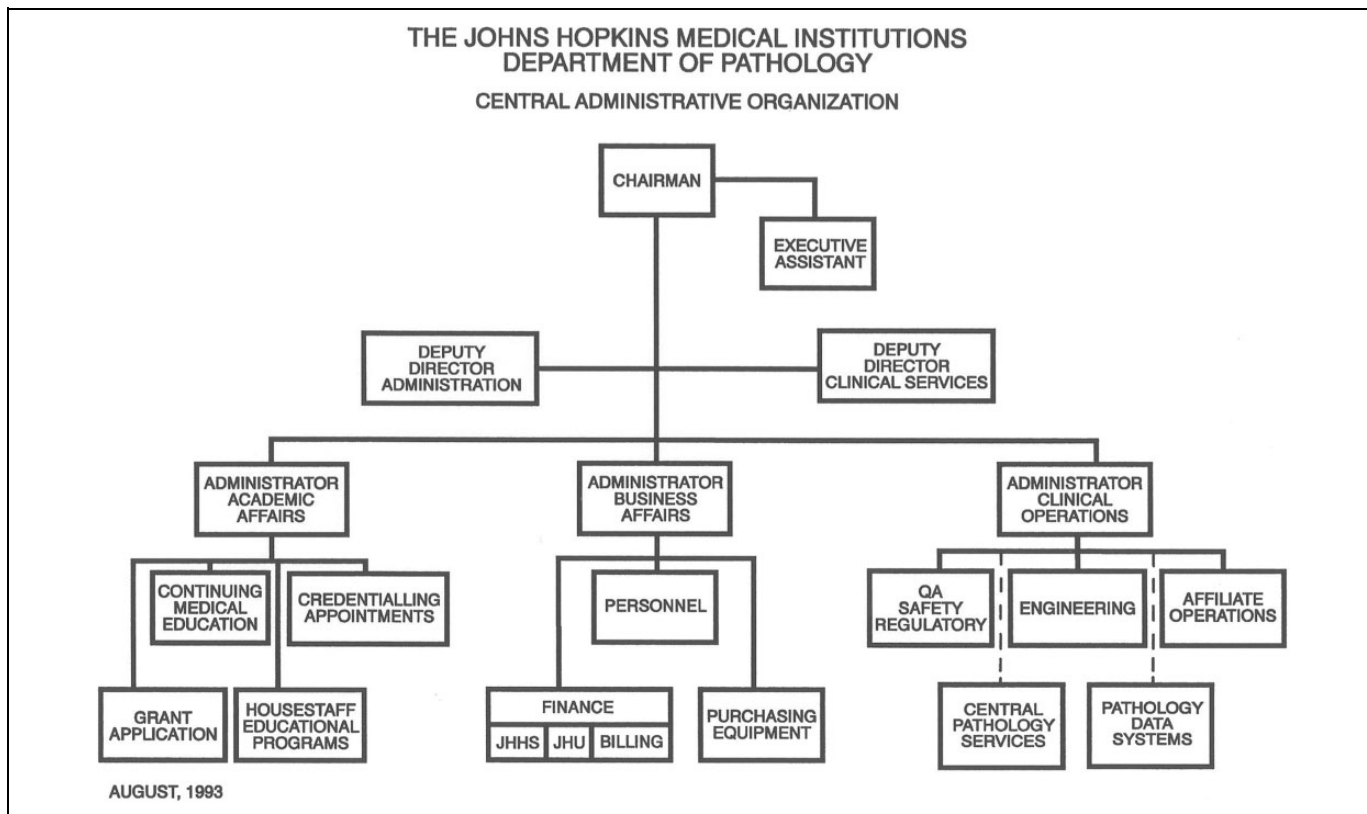


Figure 3. The JHP administrative organization, original chart from 1993. Three administrators led department operations in the areas of academic affairs, business affairs, and clinical operations. Note the deputy director (vice-chair) position for administration was divided into vice-chairs for research and education by late 1993. JHP indicates Johns Hopkins Pathology.

Performance Improvement 1992 to 2000

Clinical services. Immediately prior to the consolidation in 1992, there were more labs outside the 3 pathology-lab medicine departments (18) than were within the 3 departments (17), and these had inferior performance based on Joint Commission on Accreditation of Healthcare Organizations (JCAHO) survey data. The outside labs were responsible for all 24 serious type 1 deficiencies (Table 8). To address this situation, the vice-chair for clinical affairs was delegated authority to inspect all labs across the institutions, and a full-time expert in quality assurance was hired to help perform the detailed reviews. Outside labs unable to meet quality standards set by the Department of Pathology were closed with the concurrence of their department chairs. As a result of these changes, 1995 and 1998 inspections identified no type 1 deficiencies (Table 8).

Improvement in service quality was accompanied by improved cost performance. Prior to 1993, JHH lab services costs ranked in the top 20 of 47 hospitals in the state based on the Maryland Health Services Cost Review Commission at \$0.91/RVU. By 1999, JHH ranked as the third lowest in lab services cost (45 of 47) with direct expenses of \$0.54/RVU compared to the Maryland state and Baltimore city averages of both \$0.73/RVU (Table 8).

To further enhance and expand services, a commercial reference laboratory, designated the JHML, was created to offer

specialized laboratory tests and consultative pathology services. In providing a single portal for these services across Hopkins, it helped to rapidly grow these activities and their associated revenue.

Research. Between 1992 and 2001, the department saw a 4-fold increase in the number of grant awards, from 30 to 117, and a commensurate increase in extramural-sponsored funding (total costs) from \$5.9 million to over \$25 million (Table 8). National Institutes of Health (NIH) R01 grants increased 5-fold from 5 to 27 with a doubling of funding from \$2.8 million to \$5.6 million. This increase in research and development activity led to an increase in technology transfer activity, which increased significantly from an annual average of 19 inventions, patents, licenses, and agreements to 89, with a revenue increase from \$3000 to \$147,000.

A major factor contributing to the success of research activities was the recruitment of new research faculty members and an increase in the number of clinically oriented faculty engaged in research. Also contributing was an improved infrastructure for faculty engaged in research. This included the creation of a departmental Research Advisory Committee under the vice-chair for research, which helped individuals in the grant writing and submission process, as well as hiring a full-time expert in technology transfer and fund-raising.

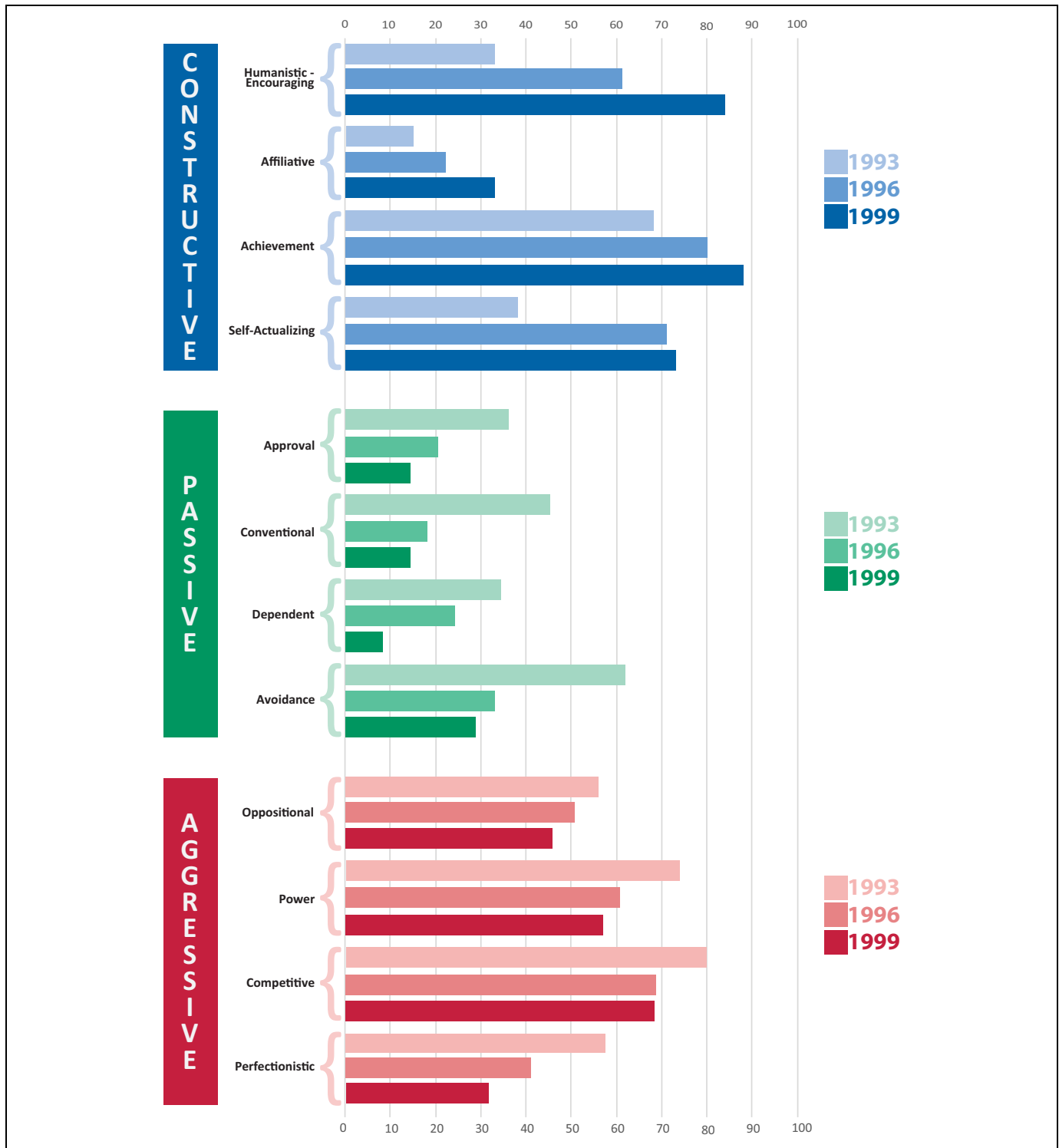


Figure 4. The JHP department *Organizational Culture Inventory* changes. Results are shown from 3 successive surveys in 1993, 1996, and 1999. Trends show gains in all constructive styles (blue), including humanistic-encouraging (33%-84%, +151%), affiliative (15%-38%, +153%), achievement (68%-88%, +29%), and self-actualizing (38%-73%, +92%). There were concurrent decreases in aggressive/defensive (red) and passive/defensive (green) styles. JHP indicates Johns Hopkins Pathology.

Education. The integration of the AP and CP residency programs gave JHP residents flexibility to enroll in AP or CP or AP-CP programs and to move from one program to another during their training. Two chief residents were selected

annually by the chair to assist with program administration and serve as liaisons between residents and department leadership. A large, centrally located residents' room was constructed. Each resident was provided support to attend one national

Table 8. JHP Department Short- and Long-Term Performance Changes.

	1992-1993	2000-2001	2016-2017
Clinical			
Quality: JCAHO type I deficiencies (all labs)	24*	0	0 [†]
Quality: JCAHO total deficiencies (all labs)	55	10	6 [†]
Scale: Number of department (all) lab services	17 (35)	38 (63)	22 (39)
Efficiency: Lab services unit cost (HSCRC rank)	<20/47	45/47	NA [‡]
Efficiency: Lab services unit cost (\$/RVU)	0.91	0.54	0.97
Research			
Grants/contracts (annual total number)	30	117	182
Extramural-sponsored funding (annual total cost)	\$5.9 million	\$25.4 million	\$67.7 million
NIH R01 grants (annual total number)	5	27	19 [§]
NIH research grants (annual direct cost)	\$2.8 million	\$5.6 million	\$53.7 million [§]
Technology transfer (inventions, patents, agreements)	19	89	111
Technology transfer (royalty revenue)	\$3000	\$147 000	\$716 000
Education			
Postdoctoral fellows (clinical, research)	25	90	139
Predoctoral graduate students	17	32	49
Resident national presentations	10	25	36
NIH training grants direct costs (total #)	\$6000 (6)	\$681 000 (12)	NA [‡]
CME program funding (number)	\$51 000 (1)	\$183 000 (10)	\$15 000 (1)
Faculty (FT tenure track)			
Primary faculty (instructor to professor)	50	88	96
Primary MD-PhD faculty	1	22	31
Secondary faculty (assistant professor to professor)	8	40	94
Total JHP primary and secondary faculty	58	128	190
Financial			
Annual JHP net revenue (JHU SoM general funds)	\$0.9 million	\$1.0 million	\$1.6 million
Annual JHP net revenue (JHH, Joint Agreement)	\$2.2 million	\$4.3 million	\$7.1 million
Annual JHP professional fee revenue (JHU CPA)	\$2.3 million	\$11.7 million	\$26.1 million
Annual JHP total net revenue (SoM + JHH + CPA)	\$5.4 million	\$17.0 million	\$34.8 million
JHP fund balance (starting UEF \$\$)	\$1.2 million	\$5.5 million	NA [‡]

Abbreviations: CME, continuing medical education; CPA, Clinical Practice Association; FT, full-time; HSCRC, Health Services Cost Review Commission; JCAHO, Joint Commission on Accreditation of Healthcare Organizations; JHH, Johns Hopkins Hospital; JHP, Johns Hopkins Pathology; JHU, Johns Hopkins University; NA, not applicable; NIH, National Institutes of Health; SoM, School of Medicine.

*All type I deficiencies in labs outside the 3 departments of pathology and lab medicine.

[†]Although the CAP terminology is different, the 2017 CAP inspection identified 0 "phase I" and 6 "phase II" deficiencies out of 4127 total checklist requirements.

[‡]No longer published or tracked.

[§]Based on Blue Ridge Institute for Medical Research.¹⁴

meeting a year of their choice, as well as any others for which they had an accepted presentation. By 1998, the number of publications involving residents increased from less than 70 to over 100, national presentations by residents more than doubled, and the number of postdoctoral clinical and research fellows more than tripled (Table 8).

A novel Pathobiology PhD Graduate Program was also created. This drew from faculty both within and outside the department and significantly increased the number of graduate students in the department (Table 8). The number of NIH training grants that included pathology faculty doubled from 6 to 12 along with associated funding (Table 8). The number of CME programs involving pathology faculty increased from 1 to 10 per year, also with an increase in revenue from tuition (Table 8).

The preclinical medical student pathology course was restructured to include clinical exposure to pathology services, and each medical student was assigned a resident mentor during their preclinical pathology course. A new weekly Pathology

Grand Rounds series was organized, each session made to include a short case report by a resident and a faculty seminar. At least quarterly, visiting speakers nationally recognized for their expertise in pathology were invited to present at Grand Rounds and spend time with faculty and trainees. These individuals also often provided advice to the chair on a variety of departmental issues.

Faculty. To achieve the significant growth in clinical service, research, and education, a considerable expansion of the faculty was initiated. The recruitment of the new chair included financial support for 6 new faculty. With the rapidly successful financial performance of the department, 75 new primary tenure-track faculty were recruited between 1993 and 2000 with a net increase of 38 faculty from 50 to 88 (Table 8). Efforts to recruit and retain physician-scientists were particularly successful, with an increase in MD-PhD faculty from 1 to 22 (Table 8).

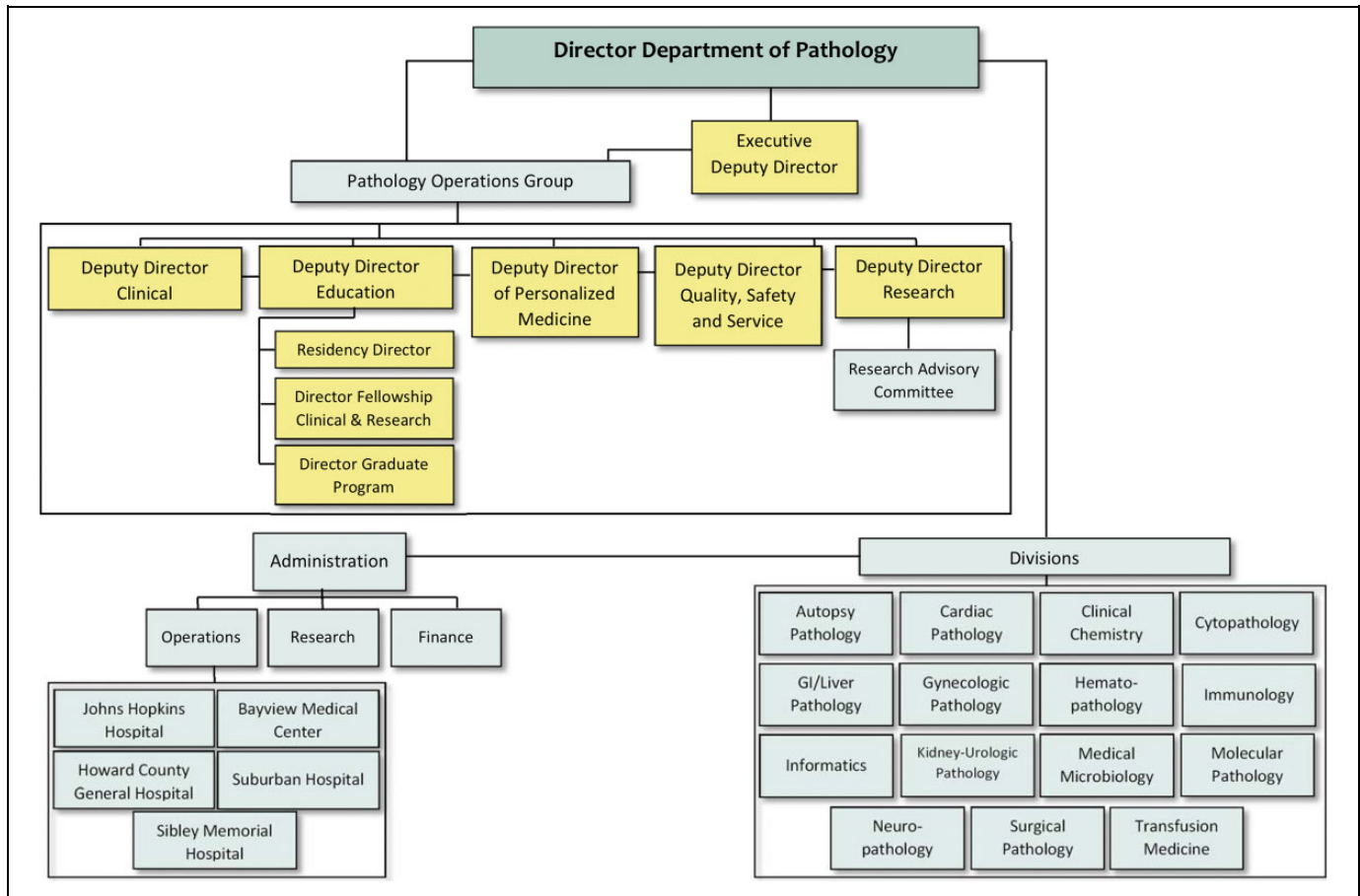


Figure 5. The JHP organizational structure 25 years after restructuring, 2018. JHP indicates Johns Hopkins Pathology.

In addition, there was a concerted effort to provide secondary appointments in pathology to appropriate faculty in other departments. There was a 5-fold increase in faculty with secondary appointments in pathology (from 8 to 40), contributing significantly to total faculty in the department, which more than doubled from 58 to 128 (Table 8). As a result, the new department of pathology was more visible and well integrated within the institution.

Financial. Sources of funding for the department included direct funding from JHH for operating the hospital-based services and funds transferred from JHH to JHU SoM under the “joint agreement” to support faculty activities; direct funding from the SoM for teaching, research, administrative, and other activities; professional fee revenue through the SoM Clinical Practice Association (CPA); and funds generated through CME, tech transfer, and fund-raising. Aggregate net revenue increased 3-fold from \$5.7 million to \$17.0 million from 1992 to 2000, and the JHP fund balance (reserves) increased almost 5-fold from \$1.2 million to \$5.5 million (Table 8). The major increases in revenue came from clinical professional fee revenue, which also increased almost 5-fold. By 2000, JHP had the highest annual net margin of all clinical departments in the CPA, almost double that of the next highest department.

Sustained Development of the Department

Structure. The rapid growth realized from restructuring JHP 25 years ago remains sustained today (Figure 5). The fundamental organizational structure codified then has lasted through 2 changes in departmental directors, both of whom were internal candidates named after rigorous national searches. Today there are 15 divisions and essentially all encompass both academic and clinical activities related to a specialty within pathology. There no longer are divisions of comparative pathology or of pediatric pathology; comparative pathology is now a stand-alone department (Department of Molecular and Comparative Biology), and Johns Hopkins has acquired All Children’s Hospital, providing rich pediatric pathology research and training opportunities in that entity. The department leadership team, the POG, continues to meet regularly with the chair. Three new vice-chair (deputy director) positions have been recently added to the POG. Two of these positions, the deputy director for Personalized Medicine and deputy director for Quality, Safety and Service, reflect emerging areas of focus for Johns Hopkins. The third, creation of an executive deputy director, reflects the need for more administrative depth in an increasingly complex department and recognizes the value of continuity of senior leadership. The POG includes a mix of mid-career and senior faculty.

Clinical. Clinical and quality metrics continue to be sustained and evolve. With the addition of a vice-chair for Quality, Safety and Service, the department has an impactful continuous quality improvement effort.¹³ For the 2017 College of American Pathologists (CAP) inspection cycle, JHP had a total of 6 CAP phase II deficiencies out of 4127 total checklist requirements (that includes both phases I and II) with an overall deficiency rate of just 0.15% (Table 8).

Research. The Department has been ranked first in NIH funding among pathology departments for 9 of the past 10 years, and total extramural research spending in 2016 to 2017 amounted to \$67.7 million (Table 8). In 2016 to 2017, the faculty held 50 NIH grants, including 2 training grants, and 2 very large NIH contracts. Based on the Blue Ridge Institute for Medical Research,¹⁴ the department's total NIH funding for 2016 to 2017 was \$53.7 million (Table 8). This represents 8.8% of all NIH academic pathology funding (\$613 million) and is more than 15 times the median amount (\$3.5 million) of NIH funding for departments of pathology in the United States.

Education. The 139 fellows in the department in 2016 to 2017 included 15 clinical fellows and 124 research fellows. There were 34 residents and 42 graduate students in our Pathobiology PhD Program (Table 8).

Faculty. As shown in Table 8, for the 2016 to 2017 academic year, there were 98 full-time tenure-track faculty, 9 assistants, and 9 research associates in the department. Of the 98, 36 were MD only, 30 PhD only, 31 MD, PhD, and 1 held 2 master's degrees. The faculty compensation plan has been recently modified but retains the basic structure developed in 1993.¹²

Financial. The total revenue for the department was \$34.8 million (Table 8).

Discussion

Twenty-five years ago, the 3 pathology and LM departments in the JHH and SoM were consolidated and fundamentally reorganized through a process internally called "The Johns Hopkins Pathology (JHP) Experiment." The structural changes initiating the JHP Experiment facilitated subsequent functional and cultural changes, with improved overall performance across all missions and metrics. Although there have continued to be modifications in response to the changing academic and clinical environment, the basic structures instituted at that time endure today and continue to be a successful model for departmental operation.

A fundamental premise of the JHP Experiment was that a single pathology department that integrated research, laboratory services, and AP diagnostics would be more productive in meeting all aspects of the Hopkins mission. The new chair and departmental leadership structured JHP internally to optimize activities across the department by creating 17 discipline-based divisions and an overarching supportive administrative organization. With this arrangement, the departmental leadership was

able to focus on optimizing the performance of the department as a whole.

The unique features of the reorganization that were put in place as part of the JHP Experiment included: (1) elimination of traditional AP/LM/experimental pathology lines of authority, replacing them with divisions whose directors all had direct reports to the department chair; (2) creation of a mission-based leadership team of faculty vice-chairs and administrators; (3) initiation of a culture change process to improve faculty and staff engagement and performance; and (4) a focus on process and quality improvement to increase productivity and generate resources. As a result of these changes, and an extensive recruiting effort that more than doubled the size of the department in 8 years, the department evolved into one of the most successful pathology departments in the country in terms of its clinical, research, and education programs, as well as reputation.

To our knowledge, the structure of the Pathology Department at Johns Hopkins has remained unique, although indeed it is difficult to find any 2 large, research-oriented pathology departments that are organized the same way anywhere in the country. Although there are still a few institutions that have separate academic departments of pathology and LM, the great majority now have a single, unified department. However, most unified departments have separate vice-chairs or directors for AP and CP with faculty reporting through them for operational and often financial and academic issues. Most institutions also still maintain an experimental or research pathology division, often with a specific focus such as immunology or neurobiology or both, largely related to their historical successes in those areas.

One of the strengths of the JHP structure is the integration of basic and translational research with clinical services within divisions, each of which is expected to provide the full spectrum of research, education, and clinical service. This structure facilitated academic productivity among all faculty, something that was necessary given that Hopkins does not have separate tracks for promotion.¹⁵ In fact, the single tenure-track system at Hopkins helped drive the process of integration and alignment across missions in JHP by necessity to ensure all faculty had the opportunity for scholarship. The successes of the department—financially and academically—have allowed even primarily clinical faculty substantial protected time for scholarship and a rich environment for collaboration.

An important part of the JHP Experiment was to enhance the organizational culture. The ability to change culture to more constructive styles has been well demonstrated in business organizations and shown to be associated with changes in performance, productivity, and job satisfaction.³⁻⁵ Although the culture of medical schools and departments within university medical centers is commonly cited as a distinguishing characteristic, virtually no quantitative measures of organizational culture had been reported for any clinical specialty until 1993.⁶ The JHP Experiment demonstrated significant short-term shifts toward a more constructive culture that paralleled significant changes in performance and productivity of faculty

and staff, confirming the prior results seen in industry and providing the basis for a subsequent medical center-wide study at Ohio State University.⁷

In addition to the impacts of the JHP Experiment on mission performance and culture, the financial successes for the department and both parent institutions were important factors in sustaining the change. In particular, consolidation of the 3 departments into JHP significantly increased the contribution margins of pathology to both JHH and JHU SoM. The rapid turn-around from a deficit spending department to one that had the highest contribution margins for JHH and JHU SoM also provided significant latitude for the department to operate with flexibility. This included being allowed to create a novel incentive-based compensation plan,¹¹ hire a tech transfer and development officer, create and operate an institution-wide reference lab (JHML), develop a new graduate program, and on average hire 10 new faculty a year during the first 7 years of the experiment.

In summary, in 1993, JHH and JHU SoM embarked on a transformative experiment by consolidating its 3 departments of pathology and LM under a single chair who was given significant authority and responsibilities. In turn, faculty and staff leadership of JHP shaped new departmental structures and fostered a culture of experimentation to discover best practices. Cultural inventories showed significant increases in faculty and staff tendencies to work responsibly toward goals, think creatively, respond positively to criticism and conflict, and cooperate with colleagues. Clinical services saw significant improvement in quality, scope, and cost. Research achievement and funding increased. Educational programs grew and gained status. These changes rapidly transformed JHP into one of the premier departments of pathology in the world. Now 25 years later, the basic structure and functions of the organization remain largely intact as does the level of departmental achievement and recognition. This ongoing JHP Experiment supports the premise that novel organizational structures and leadership behaviors can provide sustainable competitive advantage, which may become even more important in the future with the increasing challenges facing academic medicine across all its missions.

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ORCID iD

Kathleen H. Burns  <http://orcid.org/0000-0003-1620-3761>

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