

The History of Pathologists' Assistants

A Tale of 2 Educational Mavericks

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• **Context.**—The use of medical technologists to assist with clinical pathology workload has been common since the 1930s. In stark contrast, most aspects of anatomical pathology have traditionally been considered to be medical work that must be performed by pathologists or residents.

Objective.—To describe the history of the pathologists' assistant profession in North America.

Design.—Available primary and secondary historical sources were reviewed.

Results.—The concept of physician assistants, capable of performing delegated medical tasks, was created by Eugene A. Stead Jr, MD, at Duke University in 1965. When this profession began, it was quickly embraced by the American Medical Association, which took ownership related to certification and licensing of practitioners as well as external accreditation of training programs. Because of concerns about pathology manpower in the late 1960s, Thomas D. Kinney, MD, also at Duke University, developed

the first training program for pathologists' assistants in 1969. Pathologists' assistants were not immediately accepted by many academic pathologists, especially related to work in the surgical pathology gross room. Organized pathology did not help the new profession develop standards, and so in 1972 pathologists' assistants created their own professional organization, the American Association of Pathologists' Assistants. Although it took several decades, the association was eventually able to forge relationships with the National Accrediting Agency for Clinical Laboratory Sciences for training program accreditation and the American Society for Clinical Pathology for board certification for practitioners. The development of the profession in Canada is also described.

Conclusions.—The pathologists' assistant profession is now well established in North America.

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The idea of pathologists' assistants (PAs) arose from concerns in the late 1960s about projected pathologist manpower shortages in the short-term future. The concept was not readily accepted by pathologists, especially those in academic centers with pathology residents, as much of the work that PAs were trained to perform was "resident work." Concerns were immediately raised that this new allied health professional would adversely affect resident training. Some staff pathologists were worried about where the funds to pay PAs would come from, as the work was currently being done "for free" by residents in a time long before resident workload limits were being considered or implemented. Others were adamant that PAs should not do medical work, which was a major concern voiced by some clinicians in the mid-1960s when the first physician assistants appeared on the horizon.

The first PA training program began in 1969, shortly on the tail of the first physician assistant training program in 1965. The concepts for both programs were developed by educational mavericks at Duke University (Durham, North Carolina), Eugene A. Stead Jr, MD, and Thomas D. Kinney, MD. There was a fundamental difference between these 2 new professions and all previous allied health professions "because rather than being another support profession working independently on tasks not considered to be the practice of medicine, these individuals were trained to perform tasks previously performed exclusively by physicians."¹ This paper will outline the history of the PA profession.

DR EUGENE A. STEAD JR AND THE ORIGINS OF THE PHYSICIAN ASSISTANT

Eugene Anson Stead Jr (Figure 1) was born on October 6, 1908, in Atlanta, Georgia. He completed his undergraduate and medical training at Emory University (Atlanta, Georgia), internships in both medicine and surgery at the Peter Bent Brigham Hospital (Boston, Massachusetts), a research fellowship at Thorndike Laboratories (Boston City Hospital/Harvard, Boston, Massachusetts), and residency at Cincinnati General Hospital (Cincinnati, Ohio). Stead began his professional career at Brigham Hospital. In 1942, at the age of 33, Stead was recruited back to Emory as its first full-time professor of medicine, where he and James V. Warren, MD, performed groundbreaking research using cardiac

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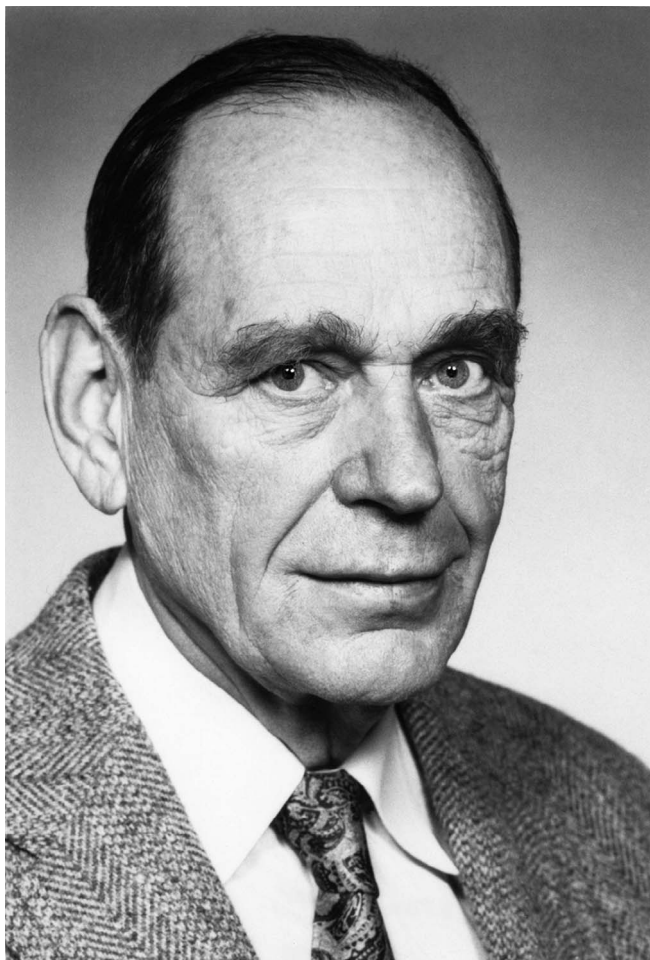


Figure 1. Eugene Stead, MD. Credit: Duke University Medical Center Archives.

catheterization to characterize a variety of cardiac diseases. In his last year at Emory, he also served as dean, which he did not enjoy. In 1946, he became the chair of medicine at Duke University; during the next 20 years, Stead built an outstanding academic department. Throughout his entire academic career, Stead was an outspoken, clinically brilliant internist and a maverick medical educator.²⁻⁴

As his biographers noted:

It is very rare that a single individual can be identified as the architect of a whole new career field, one that allows people with lesser training to carry out, and carry out well, many of the duties hitherto reserved to highly trained doctors. In conceiving the idea of the Physician Assistant Program, Eugene Stead was precisely that. He not only conceived the idea, but he developed the educational program to be undertaken, fought the battles that led to acceptance of this new category of allied health professionals, and nurtured the fledgling profession as it developed standards for licensing and credentialing. And he carried out this tour de force while continuing all of his other duties and responsibilities.^{3(p173)}

According to John B. Hickam, MD, chair of medicine at Indiana University (and one of Stead's former trainees), "the most attractive and compelling intellectual feature of Dr

Stead has always been his tremendous ability to analyze a complicated problem, reduce it to essentials, and express it with clarity."^{2(p994)} This is essentially what Stead was doing when, out of necessity, he created the new profession.

While Stead was working at Duke University in the early 1960s, there was a general nursing shortage and he was having trouble finding skilled people to work in his cardiac catheter laboratory; although Stead was able to recruit some of the best nurses to work with him, this created considerable hostility with the hospital nursing service. At about the same time, Stead's team had also agreed to provide consultative services for the new catheter laboratory at Portsmouth Naval Hospital (Portsmouth, Virginia); here Stead was exposed for the first time to medical corpsmen. He found them highly professional and was comfortable that they could be trained to assist in the Portsmouth Naval catheter laboratory. This experience led him to employ former medical corpsmen in the Duke catheter laboratory as well. However, the need continued to increase. In 1962, the nation's first 3 coronary care units appeared. As Stead opened his own coronary care unit at Duke in 1964, the local nursing shortage intensified, as he needed 1 nurse for every 2 patients.

According to his colleague Henry McIntosh, MD, Stead responded to the unmet staffing need as follows:

We thought that there must be people who could be quickly trained to watch patients. We hit on the idea of using firemen, and went down to the Durham Fire Department to recruit them. It seemed to us that firemen had experience with risk, with life-and-death sorts of things. They were medically uneducated, but they were used to moonlighting and they were reliable people who were getting good fringe benefits from the city, so they could be hired reasonably cheaply. So we trained firemen to monitor blood pressure and heart rate in the Catheter lab, and to talk with the patient while we were catheterizing. Their loyalty was to us because we paid them and we had trained them and certified them, but somewhere along the line it was politically feasible for us to let the Nursing Service take a couple of these people to work in the Recovery Room. So for a period of about four or five years there was a small cadre of firemen being used either in the Coronary Care Unit or in the Recovery Room.^{3(p174)}

Another issue made nurse coverage problematic. Stead believed that "doctors had to have somebody who could be an extension of themselves, someone not restricted to eight hour shifts and who could be on call 24 hours a day."^{3(p175)} Stead determined that this was not something that the nursing profession expressed interest in. Stead informed Duke nursing leadership that "there's a lot of turf out there, and if they didn't want to claim it, somebody else would."^{3(p175)} This was a major impetus for Stead to develop physician assistants.

The observation that nurses could sometimes be replaced by specially trained firemen provoked even more radical thinking. Stead began to realize that many things normally done by a doctor do not really require a doctor. According to Stead:

Persons with high-school education, a reasonable rate of learning, and a tolerance of the unavoidably irrational demands often made by sick people can learn

to do well those things which a doctor does each day. Under the wing of the doctor, such a physician's assistant can collect clinical data, including the history and physical examination, organize the material in a way that allows its use in diagnosis, and carry out any required therapeutic procedure that the doctor commonly uses. He can, of course, master any technical procedure that the doctor uses frequently.^{3(p173)}

In attempting to improve the doctor's ability to provide more service, we looked at how he should be supplied with assistants. We separated those things the doctor does that require judgement from those that require intelligence and skill but are done repetitively every day. If you break down the activities of the doctor this way, it becomes obvious that many things done by doctors can be done by non-doctors.^{3(p324)}

Always having something controversial to say, Stead noted that "the discovery by the doctor that his assistant can do, on any one day, the majority of things he himself does raises some interesting questions about medical education. Why does it take so long to educate the doctor and so little time to educate the assistant?"^{3(p173)}

Cost containment was another facet of Stead's analysis. According to Stead:

Any organization that is interested in providing the highest quality service at the least possible cost will turn to a mix of individuals rather than use MDs exclusively. ...

Physician Assistant utilization in surgery is a classic example. The surgical disciplines began to appreciate the numbers of tasks that required trained personnel—tasks that had traditionally been performed by medical students, interns, and residents. Many surgeons and many hospital administrators appreciated the fact that trained Physician Assistants—with a low turnover—would be more useful and in the end would help in cost containment as compared to the old system.^{4(p121)}

Stead believed that the physician assistant "can put time back into the day of the practicing physician, provided the doctor is able to organize his own day and is capable of being a good supervisor" but bemoaned that "we do not select medical students for this talent."^{3(p177)} To achieve his vision for more efficient health care, he was an early advocate for broadening the intake of medical students to include nontraditional fields and believed that training in business and information technologies was particularly valuable.

The first physician assistant training program opened its doors at Duke University in 1965; the American Medical Association (AMA), and especially its president-elect, Charles Lowell Hudson, MD, who had been enthusiastically pushing the concept, was on board.⁵ Not surprisingly, its entry class was all ex-military corpsmen. The second and third programs were opened by Hu Myers, MD, at Alderson-Broadus College (Philippi, West Virginia) in 1968 and Richard Smith, MD, at the University of Washington (Seattle) in 1969. Almost immediately, a large "amount of time and effort [was] expended within and outside the AMA to gain recognition of the [physician assistant] profession."^{5(p130)} There were many legal issues

related to whether such work was actually medical practice without a license that needed to be addressed. But by 1969, the state of Colorado had enacted enabling legislation for physician assistants; 16 more states had followed suit by 1972. In 1971, the AMA House of Delegates developed educational guidelines, certification procedures, and accreditation of training programs through the AMA's Council on Medical Education.⁵ The initial accrediting body, the Joint Review Committee for Educational Programs for the Assistant to Primary Care Physician, after extensive involvement by the American College of Surgeons and colleges representing other medical specialties, was renamed the Accreditation Review Committee on Education for the Physician Assistant in 1988.⁶ Today, there are 173 Accreditation Review Committee on Education for the Physician Assistant-accredited training programs in the United States. The AMA also led the public relations campaign for the new profession. For more than a year (1970–1971), the AMA, recognizing that the public might not accept this new profession, launched a publicity campaign including a powerful full-page advertisement in *Life* magazine showing a highly trained African American veteran, who had worked in Vietnam making life and death triage decisions as a medic, now cleaning windshields for a living in a gas station; the title of the advertisement was "We want to put this man in the hospital," and then the advertisement explained about the physician assistant profession. All of this regulatory and public relations activities are in stark contrast to what happened when PAs came into existence, as organized medicine and even organized pathology wanted little to do with the new PA profession.

DR THOMAS DEARMAN KINNEY AND THE ORIGINS OF THE PA

Thomas D. Kinney (Figure 2) was born in Franklin, Pennsylvania, on March 19, 1909. He received his BA from the University of Pennsylvania (Philadelphia) in 1931 and his MD from Duke University in 1936. His postgraduate training included a 2-year internship in medicine and surgery at Johns Hopkins Hospital (Baltimore, Maryland), 1 year of pathology at Yale (New Haven, Connecticut), and a 4-year residency at the Mallory Institute of Pathology (Boston, Massachusetts). From 1943 to 1947, he served as associate pathologist at the Peter Bent Brigham Hospital and instructor in pathology at Harvard Medical School. In 1947, Kinney was recruited to Cleveland Metropolitan General Hospital (Cleveland, Ohio) and was appointed pathologist in chief as well as associate professor of pathology at Western Reserve University (Cleveland, Ohio). Three years later, he was promoted to full professor. In 1960, he was recruited to Duke University as professor and chairman of pathology; it was the first time a Duke medical school graduate had ever been appointed chair of a medical school department at Duke. In 1967, Kinney was named the first R.J. Reynolds Professor of Medical Education. In 1969 he was appointed director of medical and allied health education, in 1973 he was appointed associate provost, and in 1975 he administratively retired. He died on June 12, 1977.^{7–11}

Dr Kinney published extensively on iron metabolism and a variety of other topics throughout his career, including pathology manpower and clinical laboratory automation; in total, he published at least 149 papers during 37 years.



Figure 2. Thomas D. Kinney, MD. Credit: Duke University Medical Center Archives.

However, his most important contributions to the medical literature were as journal editor. In 1951, he was appointed the new editor of the *Bulletin of the International Association of Medical Museums, a Journal of Technical Methods*, which has been described as the “Almanac of Grandmother’s Favorite Recipes for Pickling Museum Specimens.”^{10(p327)} In slightly more than a year’s time, Kinney transformed the *Bulletin* into a new journal, *Laboratory Investigation*, with an impressive 10-member editorial board and a new, modern focus on experimental pathology. This transition foreshadowed the renaming of the International Association of Medical Museums as the International Academy of Pathology in 1955. After 15 years as editor of *Laboratory Investigation*, he became editor of the *American Journal of Pathology* in 1966 and continued in this role until his death. Kinney served in leadership roles in most of the important organizations related to pathology and laboratory medicine. He was also on the advisory board of the Veterans Administration (VA), which likely played a facilitative role in the VA’s providing grant funding to establish the first 3 PA training programs (see below). Kinney was also a recipient of the highly prestigious Gold Headed Cane Award of the American Association of Pathologists in 1977.

Kinney’s undergraduate medical education contributions were many. While in Cleveland, he was instrumental in implementing Western Reserve’s revolutionary integrated curriculum in the 1950s. In Durham, he helped initiate a new medical curriculum at Duke, created its successful MD-PhD program, and developed a program to recruit minority students into medicine. His teaching was so legendary that the medical students created the Kinney Award, which is awarded annually for teaching excellence. According to

Nathan Kaufman, a former colleague and chair of pathology at Queen’s University in Kingston, Ontario, Canada:

He was instrumental in shaping changes in medical education. His background, experience, resources, and appointments (both within and outside of the academic sphere) were just right to exploit the opportunities offered and indeed to create the opportunities to be exploited. And this he did.^{9(p537)}

Because of pathology manpower concerns and because he was aware of Stead’s physician assistant program, Kinney conceived of the idea of physician assistants specializing in pathology. Other medical and surgical specialties wanting subspecialist physician assistants took broadly trained generalists and then provided 1-year residencies to develop the additional needed skills.¹² As patient care skills were not applicable, Kinney developed a more practical approach specifically for pathology, the PA.

UNCERTAINTIES RELATED TO PATHOLOGY MANPOWER

Although the term *manpower* is inherently sexist and has been replaced by other terms such as *workforce* or *human resource needs* today, it was the terminology used in the 1960s and 1970s and so is historically correct. Clearly, concern about pathology manpower was the driving force behind Kinney’s developing the PA concept. Kinney was the chair of an ad hoc Committee on Manpower Needs in Pathology of the Committee of Pathology, Division of Medical Sciences, of the National Academy of Sciences–National Research Council. Studying data from 1960, 1965, 1969, and 1970, his committee was tasked “to project the supply of and demand for academic pathologists between now [1973] and 1980, and to predict trends in the production of academic pathologists.”^{13(p526)} Overall, the committee predicted a 25% increase in the number of US medical schools between 1970 and 1980; based upon this and other projections, they concluded that the need for academic pathologists would increase at a much greater rate than the supply. They noted that pathology had not done well in recruiting medical graduates and advocated targeted recruitment of women physicians.

Manpower shortages were widely anticipated specialty-wide in pathology, not just in academic pathology. This naturally raised concerns about rising autopsy workload and ways to deal with it. For example, a paper by John R. Carter, MD, and Dale L. Martin at Case Western Reserve in 1969 provides an excellent example:

The critical shortage of pathologists demands that more efficient mechanisms be instituted to adjust for the increased number of necropsies. Considering the growing number of older people in our society, the construction of new hospitals and medical schools, the emphasis on necropsy percentage for accreditation ... it can be predicted by 1975, every anatomic pathologist may be responsible for a minimum of 4 or 5 complete necropsies each day, every day of the year. Such a workload is obviously impractical. ... The alternatives are to provide additional staff to perform necropsies or to limit the number of necropsies performed.^{14(pp26–27)}

These authors, concluding that there was no way to fairly limit the number of autopsies, outlined a program they had

developed to train licensed morticians to perform autopsies under a pathologist's supervision. Such a system was actually implemented at University Hospitals of Cleveland (Cleveland, Ohio), the University of Iowa (Iowa City), and the Kansas Medical Center (Andover).

Many in the late 1960s and early 1970s shared concerns that the hospital-based autopsy workload would rapidly increase to the point that it would be unmanageable.^{15,16} In addition to the use of morticians, other "morphotechnologist" solutions were also being considered¹⁷; in a survey of 51 pathologists, almost 90% of whom worked in nonacademic centers, 88% answered yes to the question "Do you feel a morphotechnologist would be a benefit to pathology in general?" and 76% answered yes to the question "Could you use a morphotechnologist in your department several years from now?" Interestingly, only 8% and 14%, respectively, answered no to these 2 questions, suggesting a willingness to delegate some autopsy work.¹⁷ However, as shown below, pathologists were less willing to delegate medical work in surgical pathology. Not surprisingly, Kinney participated in the survey and opportunistically provided its principal investigator with a 1-page description of his new PA training program, which was appended to his publication.¹⁷

Since 1929, accreditation for American hospitals wanting to train interns and residents had been dependent upon maintaining at least a 15% autopsy rate.¹⁸ Because these teaching hospitals had become dependent upon having trainees as an essential part of their workforce, it was imperative to seek consent for an autopsy whenever a patient died. This became competitive, and soon a hospital's status was in part dependent upon maintaining higher consent rates than its competitors.¹⁹ Before 1970, the autopsy consent rate in most American hospitals had risen to between 40% and 60% of all hospital deaths. Because of this, it was reasonable for pathologists to worry about increasing autopsy workload. However, what none of these pathologists anticipated was that hospital accreditation criteria would soon cease to be dependent upon maintaining a minimum autopsy rate and that the number of autopsies would drop precipitously during the next few decades. Instead of too many autopsies, after several decades of decline, there ended up being insufficient autopsies to adequately train residents. In recent years less than 5% of hospital deaths have resulted in autopsies.^{20,21} All of the planning to develop various forms of special technologists for autopsies became moot. But there are still at least 10 schools where students can train to be an autopsy technician by earning a 2-year associate degree or a 4-year bachelor's degree.²²

THE FIRST PA TRAINING PROGRAMS

The first PA training program was at Duke University and the Durham VA Medical Center (Durham, North Carolina). It began as a 1-year-long certificate program in 1969, but within a few years became a 2-year program. According to Kinney in 1974: "Students are admitted to the program after they have completed two years of college with satisfactory grades in inorganic chemistry and general biology and a demonstrated proficiency in writing the English language. They enter the Pathologists' Assistant Program at the third year college level and receive the Bachelor of Health Sciences degree after two years."^{23(p504)} This was part of a pilot program funded by the VA, likely primarily through

the influence of Kinney in his role as a member of the advisory board of the VA (nb, this likely had a spinoff effect as the VA became active in physician assistant education in the early 1970s⁵). It later became an MSc degree (see below).

Two other VA hospitals had similar pilot programs. One of these was a partnership among Quinnipiac University (Hamden, Connecticut), Yale Medical School (New Haven, Connecticut), and the West Haven VA Medical Center (West Haven, Connecticut); its first entry class was in September 1971, and it is active today.²⁴ The other was a partnership between the University of Alabama (Birmingham) and the Birmingham VA Medical Center (Birmingham, Alabama). It closed after the pilot study. The University of Maryland (College Park) developed the fourth approved (see below) PA training program, the first that was not a part of the VA pilot program.²⁵

Other training programs quickly materialized in hospitals not affiliated with medical schools; these could provide some degree of practical training but were uninterested in developing the full curriculum needed to provide the necessary theoretical framework critical to Kinney's vision of PA preparation. This happened because organized medicine (eg, the AMA) and organized pathology (American Society of Clinical Pathologists [ASCP], College of American Pathologists, etc) did not become involved in PA certification and PA program accreditation. It is beyond the scope of this paper to study these other unapproved training programs further, but they are an historically important source of on-the-job-trained PAs (see below). Kinney in 1974 alludes to "at least 12 training programs [that] already have been initiated in hospitals and medical schools and others [that] are in the planning stage."^{23(p504)} In some ways, these programs would have been the PA equivalent of the proprietary medical schools (non-university-based) that flourished in 19th-century America and met their demise later that century and in the early 20th century after the Flexner Report.²⁶

Kinney, in his only publication on PAs, noted the following in 1974:

The Pathology and Allied Science Service of the Veterans Administration has supported several of the better programs and has been in the forefront in developing the concept. At the present time there are marked differences among these different programs regarding admission standards, time required for training, and academic quality. At least three programs now award the baccalaureate degree and one the Master of Science degree. The fact that there is such a wide diversity of quality and objectives among the existing programs poses a serious problem, which organized pathology should attempt to solve. It is now time to establish standards of the certification of individual pathology assistants.^{23(p504)}

Unfortunately, "organized pathology" did not choose to take on these tasks and so the better-trained PAs, astutely having recognized this need themselves, banded together and self-organized, forming the American Association of Pathologists' Assistants (AAPA) (see below). Essentially, they learned this from observing physicians, as this is what the better-trained members of medical subspecialties and the surgical profession had done more than 50 years earlier.¹⁸ It is perhaps surprising that organized pathology did not seize this opportunity, as the ASCP, very early in its

existence, had formed a registry for clinical laboratory technicians in 1928 “to pass on qualifications of laboratory technicians and to approve schools for training these workers.”^{19(p134)} It should also be noted that the ASCP, the registry, and the AMA aggressively undermined unapproved schools and their “graduates ... who are ineligible for the Registry’s examination.”^{19(p136)} However, this absence of apparent interest from organized pathology shows how radical this new profession really was. Many academic pathologists opposed the PA profession, especially if their skills were to be applied to surgical pathology.

Although some PA training programs began in the 1970s as bachelor of science degrees, by the 1980s, it was clear to most involved in PA training that these should be MSc-level training programs.²⁵ Currently, it should be noted that all PA training programs are at the MSc-degree level. Many of these MSc programs were initially thesis-based, as this was the course of least resistance to begin a PA training program at many universities. However, once established, most converted to course-based MSc degrees.

When it was clear that PA training programs were here to stay, accreditation became a major focus. According to Mergner et al in 1981, “It is important for the future of the pathologists’ assistant programs that only accredited programs be permitted to graduate students.”^{25(p211)} Because no programs were yet independently accredited (all were AAPA approved) and because no independent accreditation process yet existed, efforts were redoubled to develop a mechanism for this. Establishing the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) accreditation process took another decade.

THE HISTORY OF THE WORK THAT CAN BE DONE BY PAs

Pathologists’ assistants are primarily trained to assist pathologists with grossing surgical pathology specimens, to assist pathologists by cutting intraoperative frozen sections, and to assist pathologists with performing autopsies. I will very briefly review the history of these 3 activities.

Surgical pathology was not practiced in most hospitals until the 1920s.²⁷ Although the first intraoperative frozen section technique had been published in 1895, intraoperative frozen sections were not popular until the mid to late 1920s for a variety of reasons beyond the scope of this paper.^{28,29} In most hospitals, surgical specimens were discarded as garbage until having a pathologist examine them became important for hospital accreditation after 1927.^{18,27} All of these activities, except for cutting frozen sections, were done exclusively by pathologists or residents until the last 3 decades of the 20th century. Transition of this work to PAs was spawned by increasing workload, decreasing ability to use residents as an unlimited source of labor in the gross room and the autopsy suite, and increasing pathologist remuneration.

For several hundred years, dieners have assisted with autopsies. According to Wikipedia,

A diener is a morgue worker responsible for handling, moving, and cleaning the corpse (though, at some institutions dieners perform the entire dissection at autopsy). Dieners are also referred to as morgue attendants, autopsy technicians, and other titles that can vary from region to region. The word is derived from the German word *Leichendiener*, which literally means *corpse servant* (“diener” means *servant*).³⁰

According to Kinney in 1974:

For the most part, dieners are employed by large departments of pathology that perform large numbers of autopsies each year, but the turnover in dieners has always been high and their training is minimal. Actually most of them do little more than prepare the body after the autopsy for delivery to the mortician. The autopsy itself is of little interest to most dieners and little understood by them. ... The services performed by the diener are essential for the efficient operation of an autopsy service and must be continued. Nevertheless there is a need for a more knowledgeable technical assistant that will enable the pathologist to devote himself exclusively to the scientific evaluation of the autopsy and surgical pathology material.^{23(p503)}

Most practicing pathologists have worked with dieners. Although many current dieners are highly professional, this was not always the case. Historically speaking, the few available sources have described them as incompetent, scary coworkers. Dieners at Blockley (Philadelphia General Hospital (Philadelphia, Pennsylvania) in the 1880s, who were also institutional inmates (ie, patients), reportedly drank the alcohol-based fixatives (replacing them with water), rendering museum specimens useless; frequently mixed up organs when multiple autopsies were being performed simultaneously; regularly returned organs to the wrong bodies; and exhibited scary demeanors such as telling other living Blockley inmates and coworkers that their skeletons would make fine museum specimens. On at least one occasion, the incompetence of a Blockley diener prevented possible murder charges when he mixed up organs needed for chemical testing for poisons. Another Blockley diener, “Cadaver Charlie,” who assisted William Osler during his Philadelphia years, reportedly created a horrible decorative wall ornament for the autopsy suite using an embalmed severed head from a patient and crossed femurs; this haunted Arthur Ames Bliss, MD, a resident physician at Blockley from 1883 to 1884, for the rest of his life.^{31–34}

Kinney clearly had someone more knowledgeable, skilled, and professional in mind when he decided that PAs should also work in the autopsy suite. He wanted them to be an extension of the pathologist.

PAs BECOME A PROFESSION

Pathologists’ assistants quickly understood that it was important to become a profession rather than a trade. They accomplished this by immediately forming a professional organization, by seeking to ensure that all training programs were accredited, by seeking to develop a board certification process and examination, and by requiring continuing education to maintain certification. However, unlike physician assistants, they found that they were on their own in doing this:

At its inception, the physician assistant profession was mentored and structured by the American Medical Association and accreditation of training programs and certification of individuals were established. Because of the small number of pathologists’ assistants, high degree of specialization, and uneven initial acceptance of the profession by national pathology organizations, no guiding physician or pathology organization would

establish criteria for training programs and credentials for individuals. This task was assumed by the national professional organization of pathologists' assistants.¹

The AAPA was founded in 1972 under state of Ohio statutes as a nonprofit organization. The organizations objectives were and continue to be:

1. Benefit and further the profession by promoting and maintaining high standards of ethical conduct.
2. Provide continuing education (CE) for its members and work for the development of additional pathologists' assistant training programs.
3. Inform the public and medical community as to the goals and professional capabilities of the pathologists' assistant.
4. Implement new programs that will help maintain the status of the AAPA and its members as a vital link in the healthcare chain.³⁵

In 1975, the AAPA held its first annual Continuing Education and Business Conference and immediately set lofty goals, especially considering it was on its own in pursuing them:

The first goals set by the organization were guidelines for training programs, a mechanism for approval of training programs, and the development of an examination for fellow status of membership in the AAPA. Graduates from AAPA approved programs or persons with a bachelor's degree and three years of AAPA approved on-the-job-training were eligible to sit for the examination. The major long-term goal of the AAPA was to achieve professional recognition for pathologists' assistants through establishing both independent accreditation of training programs and national certification of individual practitioners. The program approval and membership examination of the AAPA ... served as de facto accreditation and certification [for many years].¹

Then in 1993, the AAPA established an affiliation agreement with NAACLS, an international agency, based in the United States, that accredits training programs of allied health professionals who work in anatomic pathology or clinical pathology laboratories.³⁶ By 1995, these 2 organizations developed an accreditation process for training programs. During the next 2 years, all of the AAPA-“approved” training programs became NAACLS accredited. Currently, there are 8 accredited American training programs (Drexel University [Philadelphia, Pennsylvania], Duke University, Indiana University [Indianapolis], Quinnipiac University, Rosalind Franklin University [North Chicago, Illinois], University of Maryland, Wayne State University [Detroit, Michigan], and West Virginia University [Morgantown]) and 2 accredited Canadian training programs (Western University [London, Ontario, Canada] and the University of Calgary [Calgary, Alberta, Canada]). Two additional American programs (Loma Linda University [Loma Linda, California] and the University of Toledo [Toledo, Ohio]) appear to be on the verge of NAACLS accreditation (ie, so-called serious applicant status).³⁷

Establishing an independent certification process followed:

In 2000, the National Commission for the Certification of Pathologists' Assistants was formed and held its

first meeting in Toronto in conjunction with the annual AAPA meeting. The Commission was comprised of representatives from most major stakeholders in the practice of pathology. The Commission was charged with assuring the development and implementation of a national certification process for Pathologists' Assistants. The Commission partnered with the American Society of Clinical Pathology and the first national certification was held in Boston in September 2005 in conjunction with the annual AAPA meeting. Certification is now available only to graduates of NAACLS accredited Pathologists' Assistant Programs, no longer to on-the-job-trained individuals and the board of certification examination is offered through the ASCP as Computer Adaptive Testing at multiple Pearson Professional Centers throughout the United States. Every three years, a certified PA must demonstrate sufficient CME to maintain ASCP certification.¹

Prior to the existence of the ASCP Board of Certification examination, membership in the AAPA was used to demonstrate competency, as members needed to pass its membership examination within 15 months of joining the association.³⁸ However, internal certification was not as rigorous as external certification. Currently, only graduates of NAACLS-accredited training programs who pass the ASCP Board of Certification examination and maintain sufficient continuing education credits hold the PA(ASCP) designation.

Pathologists' assistants do not normally require state licenses to practice. Currently, some states license laboratory technicians, even though this was strenuously opposed by the ASCP and the AMA back in the late 1920s and 1930s.¹⁹ For complicated reasons beyond the scope of this historical review, these various state regulations, which are very old, are deemed not to apply to PAs. However, it should be noted that there have been exceptions. For example, in the 1980s, the Oregon Board of Medical Examiners required all physician assistants, including PAs, to be licensed before they could practice. Unfortunately, the board also required all PAs to pass the generalist physician assistant board examination before they could subspecialize, essentially precluding PAs from working in Oregon.²⁵ More details on the confusing topic of licensing can be obtained elsewhere.³⁹

In Canada, the approach has been similar to that in the United States but is still evolving. The Canadian Association of Pathologists/Association canadienne des pathologistes formed a PA section in 2006, and it has been functioning in a role similar to the AAPA.⁴⁰ It published its position statement outlining policy topics including membership requirements and key competencies and responsibilities for Canadian PAs.⁴¹

There was initially considerable enthusiasm in Canada for simply adopting the American process, and this almost happened. However, this approach did not address the needs of Canadian on-the-job-trained PAs who began the profession in Canada. Ironically, it should be noted that for a short time period when the certification process was being developed for American PAs, grandfathering allowed senior American on-the-job-trained PAs to be ASCP certified. This was hugely contentious and was time limited, and then this option was forever closed in 2007. All of this happened just as the Canadian Association of Pathologists/Association canadienne des pathologistes PA section was forming. Canadian Association of Pathologists/Association canadi-

enne des pathologists PA section leadership held discussions with both the NAACLS and the ASCP to determine whether they would consider time-limited grandfathering for senior Canadian on-the-job-trained PAs (documented in correspondence in author's possession while serving as an informal mediator during these discussions; the author's medical history files are bequeathed to the Ohio State University Medical Heritage Center after his death). Because these organizations had no appetite for the turmoil that kind of compromise would generate, this proved impossible, and a separate Canadian Certification Council of Pathologists' Assistants was created in 2012; after it achieved ISO 17024 compliance, a Canadian certification examination was implemented on June 12, 2017.⁴²

Program accreditation is an area of confusion in Canada. There are now 4 PA MSc training programs, but only 2 are accredited. The University of Manitoba (Winnipeg) developed the first Canadian program in 2003; it normally accepts one trainee every other year and, because of its small size and because it was the first Canadian program with no precedent to follow, it did not seek NAACLS accreditation. The University of Western Ontario (since renamed Western University) established the first NAACLS-accredited PA training program in Canada; it opened its doors under NAACLS serious applicant status in 2007 and was accredited in 2009, and currently accepts 6 incoming trainees per year. This was followed by the University of Calgary program, which opened its doors under NAACLS serious applicant status in 2012 and became NAACLS accredited in 2016; it currently accepts 6 incoming trainees per year. In 2015, the University of Alberta (Edmonton) opened an unaccredited training program that currently accepts 2 incoming MSc students per year. Cumulatively, more than 75% of Canadian trainees are currently in NAACLS-accredited MSc training programs. In early 2018, there was a brief debate as to whether a new Canadian accreditation system should be developed de novo.^{42,43} The leadership of the 2 large NAACLS-accredited Canadian training programs opposed this, believing that NAACLS accreditation is the gold standard.⁴³ As this paper goes to press, it now appears that the 2 unaccredited Canadian training programs are applying for NAACLS accreditation. It should be stressed that graduates of NAACLS-accredited MSc programs in Canada are eligible to write both the Canadian and American board examinations, opening up job possibilities on both sides of the border.

ACCEPTANCE OF PAs

As alluded to already, the new PA profession was not immediately embraced by all pathologists. It should be remembered that use of medical technologists in clinical pathology was not uniformly accepted by pathologists in the 1920s, the decade when hospital-based clinical laboratories became common. This is not surprising, as concerns that technologists were replacing pathologists had been raised by pathologists whose operations were small enough that they did all of their own laboratory work. However, as well-trained technologists graduating from accredited training programs working under the supervision of pathologists became more common and as workloads increased, this resistance ceased.¹⁹

Even at Duke, where the controversial first PA training program began, there were nagging concerns by some Duke surgical pathologists. In fact, the Duke training program was

even temporarily closed after Kinney's death. Robin T. Vollmer, MD, tells the interesting inner story of the Duke PA program. As noted above, it began as a joint Duke-Durham VA pilot project in 1969. According to Vollmer:

The first students were allowed just to passively observe gross analysis in surgical pathology. Because this level of training was no more practical for a PA than it would be for a resident, by 1975 Duke switched its PA training in surgical pathology from Duke Medical Center to the affiliated Veterans Affairs Medical Center, where from 1975 until 1985, I was the instructor. ... Then in 1985, Duke terminated the program.^{44(p597)}

Concerns had been voiced by some Duke surgical pathologists. According to Vollmer:

Critics believed that gross and microscopic analyses in surgical pathology were professional activities appropriately performed only by pathologists or residents. Thus, some feared that PAs would decrease the quality of work. Because PAs were paid less than pathologists, some also feared that trained PAs would take jobs otherwise available to board-eligible residents.^{44(p597)}

Vollmer also relays the story of the first PA hired at Duke Medical Center:

After a period of not allowing any PAs or PA students to actively participate in gross surgical pathology analysis and after closing its training program, those administering the department of pathology decided in 1989 to hire a PA for surgical pathology. Because some of the previously critical faculty were still in place and clearly not confident about this change, the task for this first Duke PA was daunting. She had to deal with sometimes skeptical faculty in surgical pathology and surgery. Nevertheless, the quality of work was so high the skeptics were won over.^{44(p598)}

After this, Duke hired 3 more PAs and restarted its training program.⁴⁴

On the other hand, overworked pathologists in community hospitals without pathology residents much more readily accepted the concept. According to Mergner et al:

Pathologists in a 400 bed community hospital charged with a multitude of laboratory responsibilities cannot process the work unless they are assisted by qualified personnel. This was revealed quite clearly by the enthusiastic acceptance of pathologists' assistants in many community hospitals, contrasting with the reluctant acceptance by some medical center faculty.^{25(p210)}

In fact, older studies show that employers were quickly satisfied with the work done by PAs⁴⁵ and that there were clear economic advantages to using them.⁴⁶⁻⁴⁸

However, there are even less expensive alternatives to PAs. The results⁴⁹ of a mail-out survey sent to 968 US pathologists practicing anatomic pathology were published in 2004 showing that 56% of total respondents reported using physician extenders to assist with surgical specimen grossing. Pathologists' assistants were employed by 41% of these pathologists, but they also used histotechnicians, cytotechnologists, medical technologists, medical laboratory

technicians, and foreign medical graduates; 14% of these pathologists reported using only non-PA physician extenders.⁴⁹ Although the overall response rate in this study was low (22%), this is expected with a voluntary mailed questionnaire. Interestingly, when the same survey was sent to 77 directors of anatomic and/or surgical pathology at US academic centers, the response rate was much higher (42%); 91% of these respondents used physician extenders, and 90% of these were PAs; none of the directors reported using only non-PAs, but 25% did report using a combination of PA and non-PA physician extenders. Therefore, it appears that, by 2004, academic surgical pathologists were no longer uncomfortable using PAs in the surgical pathology gross room.⁴⁹

There is no evidence that use of PAs with appropriate pathologist supervision adversely affects the quality of surgical specimen processing. In fact, several recent studies have shown improved grossing, especially with tasks like lymph node retrieval from colectomy specimens.^{50–52}

One of the initial concerns was how the PA profession would interact with pathology residents, as they were taking some of their work and might diminish their learning experience. A study in which anonymous questionnaires were mailed to 2531 residents across the United States (response rate 19.4%) showed that “the majority of residents expressed overall positive attitudes and opinions about pathologists’ assistants and felt that pathologists’ assistants enhanced resident training by optimizing resident workload.”^{53(p666)}

Perhaps this should not be surprising, as Stead likely would have predicted this. According to Stead, “The point we came to quickly was that doctors had to be trained alongside Physician Assistants; otherwise, the doctors really wouldn’t know how to use ... them.”^{53(p325)} The same seems to be true for pathology residents and PAs.

In addition to the traditional roles of grossing surgical specimens, assisting on autopsies, and cutting intraoperative frozen sections, PAs in many locations across the United States are currently involved in laboratory administration/management, teaching, and research duties.^{54,55} There is currently more clarity about the scope of work that can be done by PAs, which has been reviewed elsewhere.^{56–58} A recent review summarizes the world literature on PA surgical pathology roles in both North America and Europe.⁵⁹

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