Reclaiming the Autopsy as the Practice of Medicine

A Pathway to Remediation of the Forensic Pathology Workforce Shortage?

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Abstract: The historically constricted forensic pathology workforce pipeline is facing an existential crisis. Pathology residents are exposed to forensic pathology through the American Council of Graduate Medical Education autopsy requirement. In 1950, autopsies were conducted in one half of the patients dying in American hospitals and 90% in teaching hospitals, but they have dwindled to fewer than 5%. Elimination of funding for autopsies is a major contributor to the lack of support for autopsies in departments of pathology. Funding may require reclaiming the autopsy as the practice of medicine. Funding of autopsies would rekindle interest in hospital autopsies and strengthen the forensic pathology workforce pipeline.

Key Words: forensic pathology, pathology, workforce shortage, autopsy, autopsies

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The current forensic pathology (FP) workforce crisis in the United States is well documented in national reports,[1–4] and newspaper articles.[5–8] It is thought that there are currently about 500 practicing board-certified forensic pathologists in the United States. The National Association of Medical Examiners (NAME) reports there were 468 fellows in the organization in 2019. A 2015 report calculated that 1280 forensic pathologists were needed for the US population, based on the NAME accreditation workload standards.[9] At that time, approximately 10% of FP positions were vacant. Forensic pathologists are working harder; a 2019 survey found that approximately 37% of forensic pathologists performed more than 250 autopsies per year, which is a number in excess of the number of autopsies recommended in the NAME Inspection and Accreditation Standards.[10] The shortage has been dramatically exacerbated by an opioid epidemic and evolving polydrug crisis that has greatly increased the need for forensic pathologists.[11]

The FP workforce can be seen as a subset of the pathologist community, which in turn is drawn from the overall physician pool. However, the education and training needed to become a board-certified forensic pathologist requires this career choice to be made during the education and training process. Therefore, the workforce pipeline that supplies forensic pathologists begins with medical students choosing a pathology residency program and then pathology residents choosing a FP fellowship; see Figure 1 and Table 1.

MEDICAL SCHOOL STUDENT SHORTAGE

According to the Association of American Medical Colleges, the total number of applications to US MD-degree granting medical schools during the 2019 to 2020 academic school year was 896,819.[12] There were approximately 62,150 MCAT examinees per year (2015–2017).[13] The Liaison Committee on Medical Education currently accredits MD-degree granting medical schools and lists 152 accredited U.S. schools (2 pending) and 17 Canadian schools,[14] although the US News & World Report surveyed 185 medical schools but ranked only 118.[15] There were 86,044 medical students in US MD-degree granting medical schools in 2018 and 19,544 graduates to enter residency in 2019.[16]

Added to these US MD-degree graduates are substantial numbers of doctors of osteopathy (DOs) and international medical graduates (IMGs) that enter the workforce pipeline; see Figure 1 and Table 2. The IMGs constitute approximately one quarter of the incoming physician pool, but the number of IMGs becoming part of the US physician supply could be significantly greater.[17]

Despite recent increases in medical schools, the overall physician supply is insufficient to meet the demand. The Federation of State Medical Boards reported that in 2018, there were 985,026 actively practicing licensed physicians (M.D. and D.O.) in the United States.[18] The Association of American Medical Colleges has projected that there will be a shortage of up to 122,000 physicians by 2032.[19]

PATHOLOGY RESIDENT SHORTAGE

Medical graduates, including MDs, DOs, and IMGs, enter postgraduate training. In the past, medical graduates usually started their training in a rotating internship before going into specialty training, but today's graduates generally directly enter a medical specialty residency. A 2019 survey revealed that 136,028 medical graduates entered US medical residency programs; see Table 2.[20] The general need for medical residency positions is of such magnitude that a 2019 bill was introduced in Congress to increase the number by 3000 over the next 5 years.[21]

Of the 11,490 medical specialty and subspecialty programs accredited by the American Council of Graduate Medical Education (ACGME), there were only 143 pathology residency programs with 622 first year position slots and 582 first year pathology residents filling these slots; see Tables 1–4.[22] Thus, of 136,028 medical graduates, less than 1% of medical students choose to pursue a pathology career.

The shortage of pathologists is greater than the overall physician shortage. The College of American Pathologists (CAP) has a membership of approximately 18,000.[23] In 1983, a decline of 29% of the number of pathology residency training programs was reported during the period between 1978 and 1983.[24] In 2013, the CAP hosted a *Pathology Workforce Summit* due to its alarm at the dwindling number of students choosing a pathology career. This historic summit brought together, for the first time, representatives of 20 pathology associations. Then CAP President, Stanley Robboy, was the first author on the ensuing 2 papers published.[25,26] Dr. Robboy wrote:

Through 2010 there were approximately 18,000 practicing pathologists in the U.S. … Our model projects that the absolute and per capita numbers of practicing

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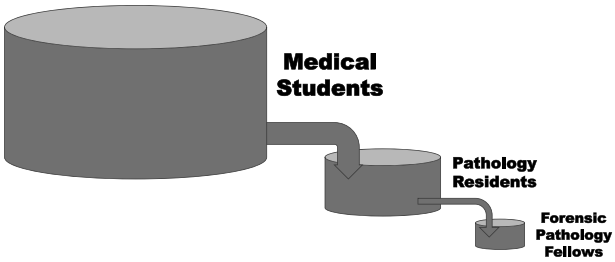

FIGURE 1. The Forensic Pathology Workforce Pipeline. Medical graduates include US medical school graduates, graduates of Doctors of Osteopathy schools, and international medical graduates. Some of the medical graduate pool will enter US pathology residency programs. Some of the pathology residency graduates will enter US forensic pathology fellowship programs. Some of the forensic pathology fellowship graduates will become ABP board certified diplomats in forensic pathology and enter the US FP workforce.

pathologists will decrease to approximately 14,000 full-time equivalent (FTE) pathologists…in the coming 2 decades. …beginning in 2015, the numbers of pathologists retiring will increase precipitously, and is anticipated to peak by 2021. …this trend will continue at least through 2030.

The general shortage of pathologists is now fully evident in 2019, as was predicted.[27–29]

Traditionally, pathology is taught during the first and second (basic science) years of the medical curriculum, but many medical schools now partially or fully integrate pathology into other curricula (McMaster approach)—resulting in a dwindling exposure to the field.[30] After the completion of this course, most medical students have no further exposure to pathology in their careers, unlike all other medical specialties where exposure often begins in the third and fourth clinical years and extends into postgraduate training. A recent study on why medical students choose a pathology career revealed 6 major influencing factors: (1) medical students' accurate and inaccurate perceptions of the role of pathologists in medical care, (2) the second year pathology course (teaching style and personality were more important that content), (3) pathology lifestyle, (4) the influence of student peers, (5) clinical experience and role models, and (6) overcoming the negative pathology stereotypes.[31]

Not only are medical students exposed minimally, if at all, to pathologists, but they also often never see an autopsy.[32] In earlier times, the Liaison Committee on Medical Education inquired into the number of autopsies performed when accrediting U.S. medical schools.[33] It should be noted that it was a group of medical school students who moved the American Medical Association (AMA) to advocate for increasing the number of autopsies for them to see."[34] Furthermore, anatomy, which had once dominated early medical education, has been reduced to short courses and increasingly medical schools are eschewing actual human cadavers for virtual ones.

TABLE 1. Workforce Pipeline (Rounded Numbers)

Medical Graduates	Pathology Graduates	FP Fellows	Board-Certified FPs in Practice
~150,000	~600	~40	~30

FP FELLOW SHORTAGE

Generally, about 3 to 4 dozen pathology residents proceed from anatomic pathology (AP) or anatomic and clinical pathology (AP/CP) to FP. JAMA reported that in 2019 there were 39 FP programs and 36 FP fellows in the United States (at a time there were 582 first year pathology residents); see Tables 3 and 4.[35] Only about one-half of the 78 FP fellowship slots are funded. The National Institute of Justice has funded up to 10 FP fellowships since 2017.[36] It has been reported that 21% of the FP fellows do not go into FP practice.[37] There is evidence that more forensic pathologists are leaving than entering the field.[38]

The shortage of forensic pathologists is more dire than it is for hospital pathologists. Forensic pathologists comprise fewer than 3% of all pathologists. Of the 18,000 CAP members, only about 300 are forensic pathologists.

PATHOLOGY RESIDENT EXPOSURE TO FP THROUGH AUTOPSIES

The immediate choke point in the FP workforce pipeline is the shortage of medical students choosing pathology as a career choice. Most departments of pathology have no forensic pathologists as members of the faculty and anecdotal evidence suggests that many pathology faculty members actively discourage their pathology residents to go into FP. Pathology residents are exposed to FP through an ACGME autopsy requirement. Often this requirement is met by sending pathology residents to the medical examiner's office. However, support for this requirement is weak and dwindling. In 1983, the then 100 autopsy pathology residency training requirement was reported to be a major deficiency of various programs cited by the Residency Review Committee.[39] In 2014, the Association of Pathology Chairs, in response to a call to abolish autopsy from pathology training on the one hand and for more rigorous autopsy training on the other, formed an Autopsy Working Group. The group consisted of 14 pathologists, including 3 forensic pathologists (G.D., M.N., and B.S.).[40] They concluded that the autopsy should remain a component of anatomic pathology training and the current minimum number of 50 autopsies should not be reduced until the changes recommended above have been implemented. This recommendation was conditionally implemented as noted in a 2018 ACGME website:

Why are autopsies included in pathology residency? [Program Requirements: IV.A.5. and UV.A.6.] The autopsy experience remains an important part of pathology residency education. As an educational tool, it serves to integrate medical clinical and scientific knowledge, and clinical laboratory data and procedures. While autopsy performance rates have declined nationally and subspecialization has shifted professional practice patterns, pathologists entering practice do need

TABLE 2. Total and First Year Residents, Pathology Residents, and FP Fellows (as of December 31, 2018)

	Total	First Year
Total	136,028	47,475
AP/CP	2261	582
FP	36	36

[Brotherton, Etzel, *JAMA* 322(10):996–1016, 2019, Table 3. pp. 1002 & 1004].

TABLE 3. Program and Source Data of Residents, Pathology Residents, and FP Fellows (as of December 31, 2018)

	Programs	Residents/Fellows	USMDs	IMGs	DOs	Canadians
Total	11,490	136,028	85,289 (62.7%)	31,238 (23.0%)	19,363 (14.2%)	138 (0.1%)
AP/CP	143	2,261 (1.7%)	1,040 (46.0%)	1,028 (45.5%)	191 (8.4%)	2 (0.1%)
FP	39	36 (<0.1%)	18 (50%)	10 (27.8%)	8 (22%)	0

[Brotherton, Etzel, *JAMA* 322(10): 996–1016, 2019, Table 2. Pp. 998 & 1000].
USMD, US MD-degree

to be able to perform medical autopsies and understand their role in current practice.

Why are 50 autopsies required, and what types of autopsies count? [Program Requirement IV.A.6.f.] While the requirement for 50 autopsies does not ensure resident competence, it does ensure a certain level of exposure to case material. The 50-autopsy requirement will remain until a competency-based system can be validated and implemented to potentially replace it. The 8 components of the autopsy, as appropriate to the case, are integral to the autopsy process.[41]

The pathology competencies were subsequently published by the Association of Pathology Chairs. The autopsy is a competency for only 9 of 498 objectives.[42]

DECLINE OF HOSPITAL AUTOPSIES

Autopsy rates have plummeted. In 1950, autopsies were conducted on approximately half of the patients dying in American hospitals and 90% in teaching hospitals.[43] Hospital autopsy rates are now thought to be less than 5%.[44] In fact, hospitals are generally now built without morgues.

Many reasons have been given for the decline,[45–50] despite their historical and continued value.[51–59] Abraham Flexner, in his landmark 1910 report on the state of medical school education in America, declared that good hospitals had high autopsy rates, otherwise physicians would bury their mistakes.[60] More recently, the media has echoed this sentiment:

Without autopsies, hospitals bury their mistakes. Hospital autopsies have become a rarity. As a result, experts say, diagnostic errors are missed, opportunities to improve medical treatment are lost, and health-care statistics are skewed.[61]

Many point to the elimination of an autopsy requirement for hospital accreditation as the primary reason for the decline. The Joint Commission on Accreditation of Hospitals (now Joint Commission on Healthcare Organizations) established a 20% to 25% autopsy requirement for hospital accreditation in 1965.[62] This was understood in practice as 20% for community hospitals and 25% for teaching hospitals. This explicit numerical standard was eliminated in 1970. The Director of the Joint Commission, Dr. John Porterfield, described the decision:

…it appeared to the Board, its Committee, and its advisors that the previous benchmark of a nonqualitative percentage of hospital death cases going to autopsy was a rather insensitive approach…a blind demand only that the quota be reached. …The Board therefore chose the qualitative approach and ignored the fixed percentage.[63]

The new requirement substituted a permissive "appropriate" (*qualitative*) autopsy percentage, although the new *Accreditation Manual for Hospitals* required appropriate audits, and encouraged autopsies and clinicopathologic conferences.[64] Although the decline in autopsy rates had begun before the new standard, the rate dropped rapidly thereafter.[65]

ELIMINATION OF FUNDING FOR AUTOPSIES

An unquestionably significant factor for the low rate of hospital autopsies is the lack of funding for autopsies. One pathologist wrote in 1962 that the autopsy is the only free medical service remaining in medicine[66] and other pathologists claimed as early as 1988 that "the autopsy problem cannot be solved without solving the reimbursement problem."[67]

For centuries, physicians performed autopsies on their own patients at their own expense to further their own medical skills.[68] Sir William Osler performed over 1,000 autopsies of his own patients before he helped found the Johns Hopkins Medical School.[69] Care came to be provided at hospitals and the hospitals paid for autopsies as part of their expenses.

Public hospitals to serve the poor were established from the birth of our nation.[70] Medical schools tended to be associated with these public hospitals. Eventually, specialists, *pathologists*, performed the autopsies and held clinicopathologic conferences that served the broad educational need of hospital staffs.[71] The then Dean of the Yale School of Medicine replied in response to a question as to whether hospitals should be reimbursed for autopsies, "Yes. It is an old problem as to whether this is patient care or education."[72] Private health care insurance became available in the

TABLE 4. Diversity of Residents, Pathology Residents, and FP Fellows (as of Dec 31, 2018)

	Total	Female	White	Black	Asian	Hispanic	Other
Total	136,028	61,980 (45.6%)	76,400 (56.2%)	7430 (5.5%)	36,033 (26.5%)	10,963 (8.1%)	5202 (3.8%)
AP/CP	2261	1128 (49.9%)	1211 (53.6%)	112 (5.0%)	651 (28.8%)	188 (8.3%)	99 (%)
FP	36	31 (86.1)	25 (69.4%)	2 (5.6%)	5 (13.9%)	5 (13.9%)	0

[Brotherton, Etzel, *JAMA* 322(10): 996–1016, 2019, Table 2. pp. 1010 & 1012].

first half of the 20th century, but autopsies have not been covered by health care insurance.[73]

The US federal government began significant subsidization of health care upon passage of the Medicare and Medicaid Act of 1965.[74,75] At least initially, autopsies were intended to be paid by Medicare but not Medicaid. However, in 1984, Dr. Lundberg noted that a "remarkable plummet commenced shortly after the enactment of the Medicare law ..."[76]

Medicare reimbursement was through the Health Care Finance Administration (HCFA, now the Center for Medicare and Medicaid Services [CMS]). Medicare Part A included general hospital inpatient services and Part B included specific physician services medically necessary for specific individual patients. A "Part C" would have specifically covered hospital-based physicians such as pathologists, but was dropped from the legislation just before its enactment. Part B was applicable to surgical pathology and cytopathology and Part A to hospital laboratory costs, but reimbursement for the professional component of clinical pathology was left in limbo–most pathologists billed it as a Part B expense. The HCFA declined to recognize autopsies as a direct medical service to a patient payable from the Medicare Part B trust fund.[77,78] The CAP advocated then and still advocates for reimbursement as a physician service and billable on a "reasonable charge basis" under Part B of Medicare as a valuable physician medical service.[79]

The 1983 implementation of the Tax Equity and Fiscal Responsibility Act declared (§108) that professional medical services personally rendered for an individual patient and which contribute to the diagnosis or treatment of the individual patient may be reimbursed under Part B, but services which are rendered for the general benefit to patients in a hospital may be reimbursed only on a reasonable cost basis under Part A.[80] Both the technical and professional components of autopsies, could be reimbursed by HCFA through part A. The HCFA would reimburse hospital-based physicians for Part A services based upon the reasonable compensation equivalents for the time actually spent by the physician. However, the shift from Part B to Part A reimbursement of the professional component of clinical pathology services, created the erroneous perception that such services were no longer covered.[81–83]

Within a year, Congress passed further legislation that phased in a prospective payment system by 1987. This system invoked diagnosis-related groups as a basis of payment, in which the government would no longer pay based on actual costs, but rather a set amount for a given diagnosis-related group. This law did not require payment to pathologists and hospitals were strongly dis-incentivized to pay pathologists for professional component services.[84,85] Then new legislation implemented the resource-based relative value scale, to pay medical providers for Medicare services. Currently, there is no assigned relative value for autopsies under the resource-based relative value scale fee schedule, despite an AMA's Current Procedural Terminology code and thus a pathologist cannot bill for either the technical or professional component of an autopsy as can be done for other laboratory services.[86]

Thus, health care reforms have eliminated any federal funding mechanism for autopsies. Since managed care organizations and third-party insurers do not cover autopsy costs, hospitals are left to absorb the expense. College of American Pathologists acknowledges that CMS does not provide reimbursement for autopsies,[87] but opines that pathologists should be paid for their professional services.

AUTOPSY AS THE PRACTICE OF MEDICINE

Center for Medicare and Medicaid Services has not covered the performance of autopsies, because they are not "medically necessary" procedures for a "specific patient" as required by the statutory language; essentially CMS does not view autopsies as medical care or treatment of a patient. Initially, CMS (then HCFA) would pay for autopsies as a general hospital good, whether viewed as hospital staff education or a quality assurance tool; however, this was not well understood by the pathologists, hospital administrators, and hospital counsel. Later, during transformations of Medicare reimbursement in a quest to reduce costs, payments for autopsies were disincentivized and then the mechanisms eliminated. Center for Medicare and Medicaid Services continues to espouse that autopsies are valuable, but will not pay for the medical skill and expertise to perform them.

Outside of this Medicare funding context, the autopsy is universally considered the practice of medicine—as both a medical procedure and the interpretation of the autopsy requires medical expertise. In defining medical practice, the relevant sources of law, include medical practice statutes, licensure board regulations, and caselaw. A search of the Westlaw legal database by one of the authors (M.J.M.) revealed that no court failed to recognize the autopsy as the practice of medicine, but that no case addressed the federal funding of autopsies. State statutory laws are also in accord. Recently (2018), California enacted code 27522. (a) which specifically declares: "A forensic autopsy shall only be conducted by a licensed physician and surgeon. The results of a forensic autopsy shall only be determined by a licensed physician and surgeon."[88] A review of the medical examiner and coroner statutes reveals that 20 states (AZ, CO, CT, DE, FL, HI, IN, IA, KS, KY, MD, NH, NM, ND, OK, OR, UT, VA, WV, WI) and the District of Columbia specifically make reference to forensic pathologists performing autopsies, although autopsy assistants are used in all of these jurisdictions.[89]

CMS should recognize autopsies as the practice of medicine and should pay for them. In a 1985 article, the former head of the National Institutes of Health autopsy service wrote:

[I]f the autopsy is to be saved, it will take more than the outcry of concerned physicians. The question must be examined by health care policymakers and regulatory commissions, who are in a position to effect change. It is commonly recognized that quality control procedures and educational opportunities are not usually self-funding. From a business perspective, the autopsy has never been a lucrative procedure for pathologists. Rather, it has been a service offered by pathologists and subsidized by revenues gained from clinical pathology laboratories, surgical pathology services, and the general hospital overhead. We recommend that the autopsy, as the most challenging and revealing of medical examinations, be recognized as a physician service, billable on a "reasonable charge basis" under Part B of Medicare.[90]

ELIMINATION OF THE HOSPITAL AUTOPSY REQUIREMENT

In accordance with President Trump's Executive Order 13771, "Reducing Regulation and Controlling Regulatory Costs," CMS conducted a review of its regulatory health and safety standards and determined that the Medicare autopsy regulation CFR § 482.22(d) is "obsolete, duplicative, or unnecessary requirement." In September 2018, CMS declared:

We propose to remove the requirement for hospitals at Sec. 482.22(d), which states that a hospital's medical

staff should attempt to secure autopsies in all cases of unusual and of medical-legal and educational interest. Because this requirement is redundant and more detailed, specific requirements regarding medical-legal investigative autopsies are required by individual state law.[91]

CMS recognized that this requirement contemplates medical examiner and coroners cases governed by state law as well as cases of unusual deaths or for educational interest performed as hospital autopsies. CMS comments that the provision is redundant of state law in cases of medicolegal autopsies, but eliminates the provision for both medicolegal and hospital autopsies.

Over the objection of organized medicine, CMS announced its Final Rule in September of 2019, which eliminated this last vestige of the autopsy requirement, as weak as it was, for hospital participation in Medicare. In their final ruling, CMS commented:

[W]e believe that it is appropriate to remove the duplicative and burdensome requirement that hospitals attempt to secure autopsies for other cases of unusual deaths or for educational interest. We clarify that removing this requirement would not prohibit hospitals from performing autopsies and we believe that hospitals will implement their own policies regarding autopsies. While we understand the commenter's concerns regarding the decline in the national autopsy rate, we disagree that the removal of this specific requirement will cause a measurable decrease in the autopsy rate, impact quality of care, or dissuade hospitals from performing autopsies. ... Although we are finalizing our proposal, we note that the removal of this requirement should not be construed as a diminution of our support for hospitals continuing to perform autopsies for various purposes, and we encourage hospitals to establish policies regarding autopsies.[92]

George Lundberg, who once declared "war on the nonautopsy,"[93] issued a *call to arms* in the wake of the 2019 CMS final ruling on the elimination of the autopsy requirement:

[O]n this issue, [CMS is] wrong. ... Today, the first day of the rest of our lives, is when our knowledgeable organizations, especially AMA, College of American Pathologists, American Society for Clinical Pathology, United States & Canadian Academy of Pathology, National Association of Medical Examiners, and Association of Molecular Pathology, plus the professionals of CMS, simply must overturn this new rule [CMS Omnibus Burden Reduction Final Rule].[94]

CONCLUSIONS

For various good reasons, the autopsy should be reclaimed as a physician-based medical service reimbursable by Medicare Part B, not the least of which is to stem the grave and existential threats due to the FP workforce pipeline. Paying for autopsies would result in more hospital autopsies, greater support from departments of pathology for autopsies, greater exposure of pathology residents, and more forensic pathologists in the workforce pipeline.

Perhaps, alternatively, both hospital and medicolegal autopsies should be paid as a public health service. It is of note in this regard, that in fiscal year 2018, state spending on public health was US $11.8 billion; both state and local health departments receive the majority of their funding from grants provided by the Prevention and Public Health Fund established under the Affordable Care Act.[95]

Regardless of the mechanism of payment and by whom, the value of the venerable autopsy should be recognized and paid for:

Actually, government, private insurance, and the public pay for whatever services that the medical profession and public demand. The allegation that there is no money to pay for autopsies is a cop-out. Government and private industry respond to public demands. In a free society, government is still by the consent of the governed.[96]

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