

**Education in pathology**

# Enhancing preclinical year pathology exposure: the Angevine approach <sup>☆,☆☆</sup>



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**Summary** Less than 2% of graduating US medical seniors select pathology residencies. One major obstacle to attracting prospective residents is the relative “invisibility” of pathology; medical students lacking positive pre-clinical exposure to pathology are unlikely to later select pathology clerkships or residencies. The Angevine Fellowship is a 10-week competitive pathology internship medical students may apply for the summer following their first year of preclinical training at our institution. We sought to determine whether it was an effective pathology recruitment tool and how it compared with the postsophomore pathology fellowship (PSF). Angevine fellow and PSF data from 2000 to 2014 were retrospectively analyzed. Specialty choices of former fellows already matched into residency programs were tabulated. Data regarding annual percentage of graduating seniors at our institution who matched into pathology during the years former fellow cohorts matched were also examined. Our results showed that of the former Angevine fellow cohorts already matched into residency programs, 40% (8/20) matched in pathology and 20% (4/20) at our own institution. Angevine fellows comprised a disproportionately high number of the graduating seniors matching in pathology at our medical school (26.7%). PSFs comprised 6.67%. Although we have endowment funding for 2 Angevine fellows annually, the level of interest among applicants has increased to the point that our department has consistently contributed funding for 1-2 additional fellowship spots since 2011. We conclude that the Angevine Fellowship offers an effective alternative to the postsophomore fellowship. It has proven successful at our institution and could be implemented at others to potentially improve pathology recruitment trends nationwide.

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**1. Introduction**

Traditionally, a minority of US medical graduates have chosen pathology residencies. National Resident Matching Program data indicate that only 1.2% of US seniors graduating in 2015 applied to pathology programs and that only 1.7% of total US seniors matching in 2015 did so in pathology [1]. Among reasons prior studies have cited for the difficulties in attracting prospective residents are the relative “invisibility” of pathology and that medical students lacking positive

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preclinical exposure to pathology are unlikely to later select pathology clerkships or residencies [2–4]. This trend has already resulted in critical pathology workforce shortages in countries such as Canada and Australia [5,6]. Recent data from the Association of American Medical Colleges revealed that approximately 60% of actively practicing US pathologists are 55 years or older and that, as a specialty, pathology ranks third in terms of highest percentage of aging physicians [7]. Current numbers of medical students matriculating into pathology residency programs are insufficient to compensate for the numbers of practicing pathologists who will retire in the coming decade, and predictive modeling suggests a rapidly approaching “cliff” of pathologist shortage in the United States [8].

Although historically postsophomore pathology student fellowships (PSFs) have been successful recruitment tools [9], the year-long time commitment can be perceived as a major deterrent, as can the fact that clinical work completed over the course of the fellowship is no longer credited by the American Board of Pathology toward residency requirements [10]. In addition, the curriculum transformation process undertaken by many medical schools has resulted in loss of the former 2 + 2 preclinical/clinical year distinction with which the PSF formerly dovetailed so well. Although our institution previously offered a PSF, we have recently transitioned entirely to an alternate medical student fellowship option because of its overall greater effectiveness in recruiting pathology candidates. The Angevine Fellowship provides positive pathology exposure at the formative preclinical phase, requires no delays in medical school progression, and can be easily integrated with “transformed” medical school curricula. In this article, we report our experience with more than a decade of Angevine fellows and suggest how this fellowship model could be implemented at other institutions to potentially improve pathology recruitment nationwide.

## 2. Materials and methods

### 2.1. Description of angevine fellowship

Endowment funding for 2 annual summer fellowship positions was donated in the late 1990s by the Angevine family in honor of D. Murray Angevine, MD, a former chair of our pathology department. Medical students who have successfully completed their first year of preclinical training are eligible to apply. Following a competitive application process, selected fellows receive a modest stipend (currently \$2400) as they explore pathology over the course of a summer internship. From late May to early August, they rotate through a total of 8 services including autopsy, surgical pathology, hematopathology, microbiology, chemistry, cytology, transfusion medicine, and molecular pathology. Unless students express a particular preference, their service time is generally allocated as follows: 2 weeks of autopsy, 2 weeks of surgical pathology, and 1 week on each of the other 6 services for a total of 10 weeks.

In addition to rotation-specific education, fellows attend daily educational didactics including the morning pathology residency conference (8:00-9:00 AM) and a noon (12:00-1:00 PM) “introductory” pathology series specifically tailored to the medical student level. The noon lecture series is presented by a combination of pathology residents and faculty. It includes topics pertaining to both anatomic and clinical pathology; topics are scheduled to roughly correlate with the fellows’ current rotation. Anonymous electronic evaluations are submitted by fellows following didactic sessions. The Angevine Fellowship is not graded; however, in the last rotation week, fellows formally present an educational case and/or research project to the pathology department and receive feedback.

### 2.2. Review of Angevine and postsophomore student fellow data

Using departmental records, a list of all Angevine fellows from the years 2000 to 2014 was generated. Of the former fellows who had already matched into residency programs (summer 2000-2011 cohort), specialty choices were tabulated. If the former fellow matched in pathology, it was additionally noted whether the pathology residency program was our own institution versus outside. Until the year 2013, our department also sponsored a year-long PSF in pathology. Data regarding postsophomore fellow specialty choice were likewise tabulated. The Registrar’s Office was contacted for data regarding annual percentage of graduating seniors at the University of Wisconsin School of Medicine and Public Health (UW-SMPH) who matched into pathology during the years our former Angevine fellow cohorts matched, that is, 3 years after completing the fellowship (2003-2014). This study was exempted from review by the University of Wisconsin Health Sciences Institutional Review Board in accordance with 45 CFR 46.102(d).

## 3. Results

### 3.1. Angevine fellowship

Between the years 2000 and 2014, a total of 31 students participated in the Angevine summer fellowship. Overall, there was a slightly higher percentage of men (17/31; 54.8%) than women completing fellowships. The number of Angevine fellows per year ranged from 0 to 4 with an average of 2 fellows per year. There were 3 years in which there were no Angevine fellows (2004, 2005, and 2007). Since 2011, however, the level of interest among applicants has increased to the point that our department has been consistently contributing funding for 1-2 additional fellowship spots. In the current recruitment season (2015), we had 10 well-qualified applicants. Although we would like to encourage all medical students’ interest in pathology, given current space, scheduling, and financial constraints, the maximum number of concurrent Angevine fellows we are able to accommodate is 4.

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