Division of Anatomic Pathology

Anatomic Pathology continues to experience significant growth in service matched by ongoing success in recruiting faculty. Education and research missions remain strong with sustained successes in, 1) recruiting to a growing portfolio of subspecialty fellowships, 2) funding research programs and collaborative projects, 3) peer-reviewed publications, and 4) expanding and maintaining a national and international presence as opinion leaders, educators, and clinician scientists.

Practice growth combined with attrition continues to drive faculty recruitment efforts. Amir Lagstein (Clinical Lecturer), Lindsay Schmidt (Assistant Professor) and Angela Wu (Assistant Professor) joined the faculty in July 2010 to meet needs in genitourinary, gynecologic, placental, and pulmonary pathology. Amir was reappointed as Assistant Professor effective July 2011. Judy Pang (Clinical Lecturer) joined the faculty in September 2010 to support the frozen section practice at East Ann Arbor while also participating in our surgical pathology (breast) and cytopathology practices, and was reappointed as Assistant Professor effective July 2011. Scott Owens (Assistant Professor) and Sandra Camelo-Piragua (Assistant Professor) joined the faculty in October 2010 to meet needs in gastrointestinal pathology and neuropathology, respectively. Scott also serves as Medical Director of Professional Practice Evaluation. Jeffrey Hodgin, previously a Clinical Lecturer, was appointed as Assistant Professor effective October 1.

Alexandra Hristov (Assistant Professor) joined the faculty in June 2011, filling an open position in our dermatopathology service. Additional faculty were recruited in the last two quarters of FY2011 and will join the faculty in the first and second quarters of FY2012 as listed below.

- May Chan (dermatopathology) July 2011
- Julie Jorns (breast, surgical pathology) July 2011
- Amer Heider (pediatric pathology) September 2011
- Aleodor Andea (dermatopathology) December 2011

Safety, quality, and service remain high priorities in anatomic pathology. Our All Faculty and Staff Quality Assurance meetings have emerged as an important vehicle for driving Lean principles and tools more deeply into our clinical operations. A new peer review program was created to meet Joint Commission and UMHS expectations for focused and ongoing professional practice evaluation (FPPE and OPPE).

The first quarter brought expansion into additional hospital space remodeled to accommodate a central accessioning area for all outside (i.e. consult and transfer) cases and new grossing space (“Room 3”) with three incremental grossing stations. Education programs remain strong as demonstrated by ongoing successes in existing fellowships, recruitment to a recently-
accredited fellowship in Pediatric Pathology, and applications for new fellowships in Neuropathology and Forensic Pathology. AP faculty continue to play key roles in support of our residency program and in Medical School teaching.

Success and vitality in our research activities remains very strong as evidenced by continued visibility in peer-reviewed journals considered high impact by the academic anatomic pathology community, an 18.8% increase in both direct (17.8%) and indirect (21.0%) research expenditures, and high visibility in national and international societies.

**CLINICAL ACTIVITIES**

**Surgical Pathology**

A total of 89,785 pathology specimens, including a combination of intramural and extramural cases, were processed in 2011 compared to 80,690 in 2010 and 80,120 in 2009. This represents an annual increase of 11.3% and a 31.5% increase over the last five years. Patient specimens acquired from procedural areas within the UMHHC accounted for 66.1% of cases, down from 72.4% in 2010. This shift in case mix reflects disproportionate growth in all areas of our extramural practice including transfer cases (11.1%) reviewed for patients referred to UMHS for care, M Labs surgical (11.1%), and consultation cases (11.8%). The number of extramural consultation cases grew to 10,598 compared to 8,574 in FY10, a 23.6% increase. Among our “inside” practices only our gastrointestinal (GI), pediatric (IP), and placenta (PL) services saw substantial increases of 3.3% (561 cases), 8.4% (139 cases) and 26.4% (308 cases) respectively.

Growth in the practice combined with sustained funding for research resulted in increased productivity. Faculty generated an average of 5,217 ± 3,330 RVUs compared to 4,824 in FY2010, an 8.1% increase. Productivity increased despite addition of two incremental positions. This continues to reflect disproportionate growth in RVUs compared to case accession numbers (i.e. ↑RVUs/case) in several key surgical pathology services (Figure 1). Indeed, RVUs measured as a 12-month rolling average indicated an annual growth rate of 10.7%.

Measured as RVUs rather than accession numbers, several services have nearly (room 1, GI, breast, GI consults) or more than (GU, TS cases) doubled since FY06.

**Pediatric Pathology**

The new pediatric pathology service continued to flourish under the leadership of Dr. Raja Rabah. As summarized in Table 1, the service grew at an annual rate of 8.4%, accessioning 1,794 cases from the Mott Hospital ORs as well as a number of transfer cases and staging bone marrows. In addition, the pediatric service absorbed the placenta service effective November 2010 with a marked improvement in service delivery as evidenced by improved turnaround times despite a 26.4% increase in accessioned cases (see Figure 2). With migration to the pediatric service, the practice of archiving a subset of placenta was abandoned and all placentas received for examination include microscopic review.

![Figure 1—Growth in AP Services](image)

<table>
<thead>
<tr>
<th></th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peds (IP)</td>
<td>1562</td>
<td>1655</td>
<td>1794</td>
<td>8.4%</td>
</tr>
<tr>
<td>Placentas (PL)</td>
<td>1212</td>
<td>1166</td>
<td>1474</td>
<td>26.4%</td>
</tr>
</tbody>
</table>

Table 1: Pediatric Pathology Clinical Activity, FY09 – FY11
Dermatopathology

The Dermatopathology Service receives diagnostic case material from four primary sources: (1) UMMC (ID) cases; (2) outside contractual (MD) cases; (3) personal consultation cases; and (4) outside cases reviewed for referred patients (TD).

The Dermatopathology Service continues to be a high volume service (see Table 2) and saw substantial growth in FY11 driven by nearly doubling of outside (MC) cases and a nearly 50% gain in transfer (TD) cases. Combined with modest growth in UMMC (ID) cases, this more than offset a minor dip in consultation cases to result in a 23.0% increase compared to FY10.

Doug Fullen and Lori Lowe continue as Co-Directors of Dermatopathology. In addition to his full-time dermatopathology service responsibilities, Rajiv Patel participates in the soft tissue and orthopedic pathology service. Linglei Ma and Steve Olsen left UMHS in the third quarter to pursue careers in commercial practice. A search committee under the leadership of Doug Fullen successfully recruited Drs. Alexandra Hristov (UCSF) and May Chan (Harvard) to fill the vacated positions. May Chan will also participate in the general surgical pathology (“Room 1”) service upon her arrival in July 2011. In the last quarter of FY11, the same search committee successfully recruited Dr. Aleodor Andea to an incremental position intended to support practice growth and create a new Dermatopathology Molecular Research Laboratory (DMRL) as part of a strategy to establish our dermatopathology practice as a center of excellence for molecular diagnostics applied to cutaneous malignancies. Dr. Andea will join the practice in December 2011 as Director of the MPRL and as Director of our Dermatopathology Fellowship.

We continue our active involvement in the University of Michigan Multidisciplinary Melanoma Clinic (MDMC) and Tumor Board, Multidisciplinary Cutaneous Oncology Clinic (MCOC) and Tumor Board, Cutaneous Lymphoma Conference and Tumor Board, and the University of Michigan Cutaneous Oncology “Destination” Program. Dermatopathology plays an integral role in all of these programs.

<table>
<thead>
<tr>
<th></th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>% change (FY10 - FY11)</th>
</tr>
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<tbody>
<tr>
<td>ID</td>
<td>13,551</td>
<td>13,168</td>
<td>13,441</td>
<td>2.1%</td>
</tr>
<tr>
<td>MD</td>
<td>6,519</td>
<td>5,269</td>
<td>9,691</td>
<td>83.9%</td>
</tr>
<tr>
<td>TD</td>
<td>2,019</td>
<td>1,958</td>
<td>2,828</td>
<td>44.4%</td>
</tr>
<tr>
<td>Consults</td>
<td>2,280</td>
<td>2,440</td>
<td>2,130</td>
<td>-12.7%</td>
</tr>
<tr>
<td>TOTALS</td>
<td>24,369</td>
<td>22,835</td>
<td>28,090</td>
<td>23.0%</td>
</tr>
</tbody>
</table>

Table 2: Dermatopathology Clinical Activity, FY09-FY11
Neuropathology
Mila Blaivas, Sandra Camelo-Piragua, Constance D'Amato, Andrew Lieberman and Paul McKeever contributed to the Neuropathology Service. Ms. D'Amato is Active Emeritus. Sandra Camelo-Piragua was recruited to join the section in October 2010 in the wake of Dr. Blaivas’ retirement in the 2nd quarter.

There were ~1200 neurosurgical cases examined this year, including 138 personal consultation cases (see Figure 3). The Brain Tumor Board of the University of Michigan Cancer Center and Hospitals, supported weekly by a neuropathologist, reviewed more than 150 neuro-oncology patients with challenging diagnostic evaluations. There were just over 400 muscle and nerve biopsies reflecting 34.8% and 27.0% increases, respectively, over the previous year and returning our practice to FY2009 case levels. The nerve and muscle biopsy service is now staffed by Drs. McKeever and Camelo-Piragua.

Medical renal pathology
Our renal biopsy service showed a remarkable 59.2% growth in service, accessioning 984 biopsies in FY11 compared to 618 in FY10 (see Figure 4). Growth in practice was driven in large part by a change in protocol for managing UMHS renal transplant patients linked to the recently-designated Destination Program. Whole slide scanning was implemented as a method for archiving and virtual review of biopsies from renal transplant patients.

Renal Biopsies, FY09 - FY11

![Renal Biopsies Graph]

Figure 4. Renal biopsies showed sharp growth beginning in July 2010 as a consequence of a change in protocol for managing transplant patients.

There were 223 University Hospital brains examined at autopsy. About a quarter of the brains, including all abnormal and some normal specimens, were examined at formal Brain Cutting Conference. Beginning in June 2011, brain cutting will occur weekly and be staffed on a rotating basis by all three neuropathology faculty with the goal of shortened turnaround time for CNS autopsies.

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Cytopathology

Total gynecologic specimens continued to decline as a consequence of changes in follow-up Pap test recommendations for HPV negative women, dropping 6.9% to 34,014 (see Table 3). This reflects Non-gynecologic specimens numbered 9,812, a 4.4% increase from last year. Fine needle aspirations (FNAs) totaled 2,604, a 2.9% increase. FNAs performed by pathologists at the Cancer Center (ASP3) numbered 219, representing a 21.2% decrease from last year. Assisted FNAs (ASP2) grew at an annual rate of 11.5% totaling 1,423, while aspirates performed by clinicians without our assistance (ASP1) dropped 1.5% to a total of 977. The increase in the assisted FNAs is fueled by our continuous communications with clinical colleagues reinforcing the value of on-site cytology assistance and its impact on patient outcomes. It also drives increased demand for laboratory personnel, cytotechnologists, fellows and faculty to provide the needed service across a geographically dispersed campus.

Cytology continued to focus on maintaining high service delivery levels as summarized in Table 4 and invested in a number of Lean projects including deployment of an online, paperless inventory management tool. Cytotechnologists trained in use of the Ventana Image Analysis System (VIAS) for quantitative analysis of ER/PR and HER-2/neu immunostains and now regularly participate in this component of the breast service. In the second year of the program we continue to provide web-based virtual adequacy assessments for thyroid aspirates performed in the endocrinology unit at Domino’s Farms.

Judy Pang joined the faculty in first quarter of FY2011 with joint responsibilities in cytopathology, the East Ann Arbor Ambulatory Surgical Center, and our breast pathology service.

<table>
<thead>
<tr>
<th></th>
<th>MEAN TAT (WKDAYS)</th>
<th>MEAN TAT (ALL DAYS)</th>
<th>% ON-TIME COMPLETION</th>
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<tr>
<td>GYN</td>
<td>2.8</td>
<td>3.8</td>
<td>99.6 % (5 all days)</td>
</tr>
<tr>
<td>NGYN/FNA</td>
<td>1.1</td>
<td>1.6</td>
<td>99.0% (48 hours)</td>
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Table 4: Cytopathology Turnaround time

Autopsy and forensic services

FY2011 continued to be a time of change for our autopsy practice under the leadership of Dr. Jeffrey Jentzen, Director of Autopsy and Forensic Services. This section continues to provide faculty and resident support for both UMHS and the VA hospital, while also supporting forensic pathology, autopsy and death scene investigation for the Washtenaw County Medical Examiner (WCME). Effective October 2011, the Director of Autopsy and Forensic Services will also assume responsibilities as Chief Medical Examiner for Washtenaw County. Administrative support for the autopsy service and the investigative functions of WCME were co-located to the North Ingalls Building in FY2010, allowing for centralization of all medical examiner functions. Negotiations are underway to expand this model to other counties in southeast Michigan.

A total of 516 autopsies were performed in FY2011, a 5.1% increase over the 491 cases performed in FY2010 and a remarkable 76.7% increase over the 292 autopsies performed in FY2009. Growth is largely due to the impact of full integration of WCME cases in October 2009. The 516 autopsies included 186 in-house autopsies, a 21.5% decline from the 237 performed in FY2010. Most (161) were non-restricted while 13 were restricted and an additional 12 were limited to examination of the brain only. The UMHS hospital autopsy percentage rate declined from its previous level of 19% in FY2010 and 2009 to a new low of 15.8% of hospital deaths. Two hundred fifty-four (52%) autopsies were performed for the WCME. We continue to make improvements in autopsy turnaround times.

The current director provides autopsy coverage for 30-40 percent of days and the remainder is distributed among eight other faculty. The coordinator of the autopsy service is assisted by two FTE autopsy assistants and on-call coverage. An autopsy assistant left the university in June 2011 and recruitment is underway to fill the vacated position. A dedicated Administrative Assistant provides clerical, administrative, and computer support.
Another member of the staff monitors the on-line death investigation software, MDlog, completes all death certificates, and provides administrative coverage for the medical examiner. This has facilitated centralization of all death certificates and provided additional support for the autopsy and forensic services. Improvement initiatives of the section continue to revolve around autopsy turnaround time and communication with the clinical staff. Gross pathological diagnoses are routinely communicated to the clinical staff immediately following completion of the autopsy. We continue to work with the office of Decedent Affairs to improve the autopsy service to the UM hospital patients.

Application for an ACGME accredited forensic fellowship is in process with the intent of recruiting for July 2012. The fellow will obtain training and experience in all aspects of forensic medicine including toxicology, criminology, forensic anthropology, forensic pathology, and courtroom testimony. The forensic autopsy experience will be augmented with cases from the office of the Wayne County medical examiner in nearby Detroit.

RESEARCH ACTIVITIES

The Anatomic Pathology faculty remains remarkably productive despite the demands of patient care (see Table 6). Despite an incomplete dataset, thirty three faculty reported an average of 5.1 (median 5) peer-reviewed publications for a total of 157 papers either in print or in press at the end of the fiscal year. This reflects a 10.8% drop compared to a year ago but is virtually unchanged from FY07 (157). In addition faculty reported the results of their work in abstract form on 90 occasions, a 12.5% increase over last year. Twenty-nine faculty served as invited lecturers, speakers or visiting professors on 120 occasions, for an overall average of 4.1 per participant. Clearly, our faculty remain top-of-mind when looking for cutting edge speakers in anatomic pathology. In addition, fifteen different faculty reported being members of 29 editorial boards, including a Senior Editor for Cancer Research (Dr. Kathleen Cho).

Research expenditures increased nearly 19% compared to the previous year, reflecting 34.5% growth compared to FY2006 and nearly recovering to FY2009 levels (see Figure 5). The total number of funded FTEs rose from 4.5 to 4.9, an 8.9% annual increase and growth of 25.6% compared to FY2009. Maintaining this level of funding in today’s environment reflects the remarkable success of our laboratory investigators, all of whom also have substantial commitments to patient care.

Research expenditures grew 18.8% in FY11 compared to FY10, and 34.5% in the five years since FY2006. Mean research expenditures over the same five year period is $3.6 million.

Funding for AP Projects diminished by over 50%, from $84,894 in FY2010 to $36,950 in FY2011.

<table>
<thead>
<tr>
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<th>FY2009</th>
<th>FY2010</th>
<th>FY2011</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>publications</td>
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<td>176</td>
<td>157</td>
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</tr>
<tr>
<td>abstracts</td>
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<td>80</td>
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</tr>
<tr>
<td>invited lectures</td>
<td>121</td>
<td>108</td>
<td>120</td>
<td>11.1%</td>
</tr>
<tr>
<td>editorial boards</td>
<td>30</td>
<td>27</td>
<td>29</td>
<td>7.4%</td>
</tr>
<tr>
<td>FTEs funded</td>
<td>3.9</td>
<td>4.5</td>
<td>4.9</td>
<td>8.9%</td>
</tr>
<tr>
<td>research expenditures</td>
<td>$4,489,863</td>
<td>$3,473,969</td>
<td>$4,125,489</td>
<td>18.8%</td>
</tr>
</tbody>
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Table 6: Academic Productivity in AP, FY09-FY11
We hosted our second Annual Research Day on January 29, 2011, in collaboration with Hematopathology and Molecular Pathology. The day included 36 abstracts presented as posters (28) and platforms (8). Unfortunately, a winter storm prevented our invited keynote speaker, Dr. Boris Bastian, James Ewing Alumni Chair of Pathology at Memorial Sloan-Kettering Cancer Center, from reaching Ann Arbor but Dr. Tom Giordano stepped in on short notice and gave a great talk focusing on genomic investigations of adrenal neoplasms. The target audience was departmental trainees and faculty with the goal of increasing collaboration and projects. The Annual Research Day was launched in 2010 as a response to a substantial drop-off in FY2009 in the number of projects supported by the AP Projects Fund. A dramatic rebound occurred in FY2010 reflected by nearly $85,000 in allocations compared to $16,050 in FY09 but allocated funds dropped again in FY2011 by just over 56% to $36,950 (see Figure 6). The Molecular Pathology Research Laboratory (MPRL) continues to be an important asset for faculty in AP. Funded projects executed with support from the MPRL in which AP faculty were either Primary Investigators or collaborators were well represented at our Annual Research Day and also resulted in multiple abstract presentations at the 2011 Annual Meeting of the USCAP as well as manuscripts in press or in print in peer reviewed journals. Linglei Ma was promoted to Associate Professor of Pathology (clinical track) effective September 2010.

EDUCATIONAL ACTIVITIES

Education is an essential and vibrant component of our mission. Anatomic Pathology continues to provide a robust experience for trainees, including standard rotations in autopsy, surgical and cytopathology as well as required and elective rotations in various subspecialties. Fellowships in breast pathology (1), cytopathology (2), gastrointestinal pathology (1), dermatopathology (2), genitourinary (1), pediatric (1), pulmonary (1) and surgical pathology (3) were filled by competitive candidates in the 2010-2011 academic year. Within the next two years, our portfolio of fellowships will expand to include forensic and neuropathology. Trainees continued to actively participate in various research projects during the course of the year and served as authors or co-authors for 20 different abstracts presented at the 2011 annual spring meeting of the USCAP in San Antonio.

Educational programs within our autopsy and forensic services continue to benefit from our integrated hospital and medical examiner service. Residents complete three one-month rotations on the autopsy service to comply with ACGME autopsy requirements. Medical students receive exposure to autopsies during their second year. A one-month rotation dedicated to forensic medicine is offered to senior medical students. Educational conferences in autopsy pathology include a weekly autopsy gross conference, a monthly extended gross conference emphasizing clinico-pathological correlations, and presentations in mortality conferences serving the clinical services within the hospital. A monthly didactic forensic pathology conference along with multidisciplinary forensic sign-out conference is also provided by the faculty.

Faculty in Anatomic Pathology continue to play significant roles in the Medical School, including primary responsibility for first and second year courses in pathology as lecturers, laboratory instructors, advisers and mentors. Electives for senior students remain popular and are supported by a number of faculty including Drs. Dave Lucas, Jonathan McHugh and Stewart Knoepp. Multiple faculty also participate in teaching dental students.

Nearly all faculty in Anatomic Pathology participate in supporting an impressive array of interdisciplinary conferences including Tumor Boards for bone and soft tissue (weekly), brain (weekly), breast (weekly), endocrine oncology (weekly), gastrointestinal (weekly), genito-urinary (weekly), gynecologic (weekly), liver (monthly), pediatric (semi-monthly), and lung (weekly) tumors. Faculty also regularly participate in various other conferences including brain cutting, dementia brain cases (quarterly), diagnostic dermatology, cutaneous T-cell lymphoma, nephrology, nerve and muscle (weekly and monthly), multiple pediatric subspecialties (GI, hematology-oncology, lung, surgery) and adult non-neoplastic lung disease (semi-monthly). Educational conferences targeting primarily pathology trainees in which faculty participate include weekly slide (Monday) and didactic (Tuesday) teaching sessions, weekly autopsy gross conferences (Tuesday and Friday), a semimonthly cytology conference (every other Thursday), and a monthly “extended” gross conference.
Multiple faculty participated in our fourth on-campus CME workshop entitled *New Frontiers in Pathology* presented in collaboration with the A. James French Society. Dr. Dwayne Lawrence served as guest faculty and the A. James French Lecturer. We attracted over 100 attendees whose evaluations reflected high praise for the world-class quality of this annual event. Proceedings of the 2009 meeting were published in the October 2010 issue of Archives of Pathology and Laboratory Medicine. The 2011 meeting will feature Dr. Elaine Jaffe as the A. James French Lecturer.

Our CME offerings included the second year of *Advances in Forensic Medicine and Pathology*, hosted in collaboration with the Washtenaw County Medical Examiner’s Office in May 2011 at The Inn at St. John’s in Plymouth, MI. Feedback was extremely positive and this will continue to be an annual component of our CME programs.