

**Minutes of the Annual Meeting of the Association of Medical School Pharmacology
Chairs
Hyatt Regency, Newport Beach, CA February 8-10, 2008.**

Friday, February 8, 2008

The meeting was called to order at 1:00 PM. by AMSPC President Ken Tew.

1. Dr. Don Melnick, President of the National Board of Medical Examiners, presented “**USMLE Today and Tomorrow**”, which focused on some of the revisions under discussion. Dr. Melnick’s Powerpoint presentation has been posted on the meeting web site. The NBME was founded in 1915, and its original mission focused on certification of physician training so as to meet the requirements of all state licensing authorities. The current mission of the NBME is “ to protect the health of the public through state of the art assessment of health professionals. While centered on the assessment of physicians, this mission encompasses the spectrum of health professionals along the continuum of education, training, and practice and includes research in evaluation, as well as in assessment instruments. The NBME, which is based in Philadelphia, conducts approximately 350,000 tests per year, of which the USMLE is the biggest. Others include, specific subject tests, customized tests, self-assessments, tests for other health care professions, such as veterinary medicine, medical technologists, assessment tools for physicians, and also engages in new test research and development. Dr. Melnick also reviewed the membership of the pharmacology committee for the USMLE.

Dr. Melnick presented results of retention studies, which were designed to evaluate how much basic science material tested in Step 1 is retained by medical students taking step 2. This was accomplished by inserting a number of Step 1 questions in the Step 2 exam, without notification to the examinees. Overall, items that were correctly answered approximately 76% of the time in Step 1 were correctly answered approximately 70% of the time in Step 2, and while this difference was statistically significant, the decrement is of obviously small magnitude. There were differences in retention decrements for the different question formats as summarized below:

<u>Question type</u>	<u>% correct Step 1</u>	<u>% correct Step 2</u>
Non-vignette	75%	61%
Science vignette	75%	63%
Patient vignette	77%	74%

There were also some differences in retention across different disciplines, with pharmacology showing an overall retention decrease of approximately 10%, compared with -17% for biochemistry, -13% for microbiology, -11% for histology, and -8% for physiology. There is some concern that retention decrements in all disciplines tend to be increasing.

With respect to future directions, the NBME has been engaged in strategic planning beginning in 2006, which has involved a number of surveys and focus groups,

and coordinated by the Committee to Evaluate the USMLE Program (CEUP). Guiding principles were 1) to retain emphasis on USMLE as a licensing examination that continues to assure licensing authorities that candidates possess knowledge and skills for safe and effective patient care in both supervised and unsupervised settings; 2) to retain secondary purposes (e.g., promotion, evaluation, curriculum assessment) if consistent with the primary role; 3) focus on validity and reliability of the measures of competencies; and 4) to reflect emerging national consensus on what these competencies are. One major theme emerging from this planning is that licensure exams need to support decisions at two points, i.e., to assess readiness to begin direct but supervised patient care and secondly, to assess readiness to begin unsupervised patient care. A second theme emerging is emphasis on integration and synthesis between scientific concepts and clinical practice, rather than emphasizing basic science in Step 1 and clinical science/practice in Step 2, as is the case with the current examinations. The current emphasis on basic science in Step 1 as taken currently at the end of year 2 is viewed by NBME as an impediment to such integration. With the idea that the science of medicine is essential for effective clinical practice, there is a move to integrate basic science concepts throughout the different USMLE examinations, and to move some basic science teaching into the third and fourth years of the curriculum. A third theme emerging focuses on assessment of various competencies, such as patient care, medical knowledge and skills, interpersonal and communication skills, professional behavior and systems-based practice.

Dr. Melnick emphasized that no decisions have been made on modification of the USMLE examinations, but he presented a model that has been proposed for implementation in 2012-2014. With this approach, there would be two 'Gateway' examinations, with Gateway A being taken before supervised medical practice and Gateway B before independent practice. As presented in his Powerpoint slides, it is envisioned that modules would assess the various competencies indicted above. It was not clear from his presentation when these models or gateway examinations would be taken.

Feedback from the basic sciences in these discussions have raised the following concerns:

- 1) the potential dilution of the value of basic sciences in the medical curriculum
- 2) the impact changes in the examination will have on curriculum reform efforts
- 3) whether basic science departments can meet the demand for more teaching in years 3 and 4.
- 4) whether a national assessment tool for basic sciences would be available.

Several interesting points were raised during the discussion. For example, the NBME may not have a valid way of assessing whether any changes in USMLE will result in physicians who are better prepared. It was noted that when some medical schools have tried to integrate basic sciences into the third/fourth years, many logistical problems have been encountered. Finally, the impact of changes in USMLE and medical school curriculum reforms on how M.D./Ph.D. programs currently operate is unknown, and there appears to be significant potential for disruption.

2. Dr. Neil Gibson, Vice President for Oncology at Pfizer (La Jolla, CA), presented a talk entitled, **“Research Collaborations: the Interface Between Drug Companies and Academic Departments.”** He began with the analogy that drug discovery is a game and asked how academic investigators can get on the board. He reviewed some of the steps in drug discovery as practiced by Big Pharma and made the important point that at all stages, speed and flexibility are key. As Dr. Gibson has only recently moved to Pfizer, his major examples of industry/academic partnerships were taken from his time with OSI Pharmaceuticals. At that company, he devoted 50% of his research budget to collaborations with academic researchers. At that time OSI was targeting complex signaling pathways with the goal of developing smart combination therapeutics for cancers. They also wished to maximize revenue opportunities and build an intellectual property base (which he identified as a challenge when dealing with academics, a point widely appreciated by the audience). Dr. Gibson did a detailed analysis of what OSI could do well in house and then developed collaborations with outside investigators to cover areas that were beyond the expertise of OSI scientists. He then presented some examples of collaborations that fit this model that worked well, and other case studies of collaborations that did not go well.

Important lessons from these collaborations emphasize the above-mentioned “need for speed” and flexibility. He indicated that significant amounts of research support can be available if the academic investigators truly understand the need of the company and especially for speed. Instances in which the collaboration with universities did not go well could often be attributed to delays by university grants and contracts offices. He indicated that setting up the agreements is often the most difficult process, and that universities’ insistence on receiving what are viewed as exorbitant indirect costs can be a reason for failure. In this regard contract Research organizations may provide to be better partners for Big Pharma research programs.

Dr. Gibson then described the current situation at Pfizer, which is emphasizing the use of genomics to investigate disease progression, and development of targeted therapeutics and noninvasive patient monitoring. He indicated that Pfizer has many oncology drugs in the pipeline and cannot advance all in house; hence, opportunities for collaboration exist. He also discussed recent shifts of labor to Asia. For example, Pfizer has major scientific operations in Shanghai and Singapore because of reduced labor costs. He indicated that a science “FTE” in Asia is approximately costs between \$75,000-\$150,000, as compared with \$350,000 in the U.S. and \$225,000 in Europe. However, he acknowledged that there may be issues with quality.

He indicated that Pfizer does review unsolicited applications from university researchers. He indicated that investigators should sell their message on the first page and fine tune the proposed studies to closely match the interests and needs of Pfizer programs.

3. Dr. Ken Tew (Medical University of South Carolina) discussed the recent meeting of the **2007 National Caucus of Basic Biomedical Science Chairs**, which was held in and attended by several members of AMSPC in addition to Ken Tew, including Bob Theobald, Kent Vrana, George Mandel, and Vince Chiapinelli. Powerpoint slides are posted at the meeting web site. In addition to featuring a number of presentations of interest, meetings were also scheduled with key members of the U.S. House of

Representatives and U.S. Senate for discussions of the NIH budget. Dr. Tew summarized some points emphasized by Dr. Mandel that in the post-doubling era, there appears to be a selective deficit in funding of RO-1 grants. For example, even though the overall NIH budget doubled during the recent “doubling era”, RO-1 funding did not. Some of these data are presented in the Powerpoint file. During the discussion, points were made that “big science is on the increase and although this can be good in a number of ways, many scientific advances start from innovative ideas by individuals, especially young investigators. There are numerous implications of the poor level of funding for RO-1’s, that particularly affect young faculty at universities, e.g., job security, tenure, etc.

4. Dr. Joey Barnett (Vanderbilt University) spoke on “What are we doing in graduate training? Results of the 2007 Training Program Survey”. Dr. Barnett’s Powerpoint presentation is posted on the meeting web site. One activity of the National Directors of Graduate Studies (NDOGS) in Pharmacology organization involves conducting a comprehensive survey of graduate programs, which is designed to gather data on a variety of measures related to current practices in graduate training in pharmacology. This effort is being directed by Dr. Lynn Crespo of the University of Central Florida, with the assistance of Ms. Karen Gieg of Vanderbilt, and ASPET is providing generous support. Thus far, responses to the survey have been received from 58 chairs and 43 directors of graduate studies, and Dr. Barnett emphasized that there is still an opportunity to complete the online survey. Next, it is planned to survey the approximately 800 graduate student members of ASPET. Dr. Barnett reviewed some of the initial findings from the survey, but as “data mining” is still ongoing, we will not be posting any of these data,

Dr. Barnett also reviewed the number of interesting presentations related to graduate training on the program of the 2008 ASPET meeting. He also discussed the July 2007 meeting of NDOGS Pharmacology, which was hosted by the Department of Pharmacology and Toxicology at the University of Utah. It is planned to hold the next meeting in conjunction with the EB meeting in April of 2009, which will be hosted by the pharmacology departments at LSU Medical Center and Tulane University School of Medicine. Some topics that are likely to be covered include curriculum, funding and new definitions of underrepresented minorities, and the chair’s group was invited to communicate any other ideas on topics or speakers for the program.

5. Darrell G. Kirch, M.D., President and CEO of the AAMC, presented a talk on **“The Chair of the Future: Crossing the Cultural Divide”.** This Powerpoint presentation is posted on the meeting web site. He started with an historical overview of the academic medical center from the famous Flexner report, which recommended that medical schools be affiliated with universities, rather than exist as stand-alone entities. A common current observation among many stakeholders in academic medical centers (including faculty, administrators and a host of professional groups) is one of decreasing morale, and Dr. Kirch posed the question whether the source of this discontent is solely financial.

He reviewed the by now well known statistics that the NIH budget has not kept pace with biomedical inflation, so that in the post-doubling era, there has been a real decline in funding for research. He also presented data that faculty compensation over

the past decade has barely kept pace with the Consumer Price Index, although there has been a recent trend in which compensation has exceeded the CPI. Affecting primarily M.D. graduates, there has been an increasing percentage of income being consumed by loan repayments, which also contributes to a sense of financial stress. Finally, he discussed the current budget reality of the U.S. government, in which increasing budget deficits could result in a substantial burden that will impede, among other things, increased government spending on biomedical research.

He then posed the question of whether medical centers have failed to find the right strategy to deal with this situation. He reviewed objective evidence for continued growth over the past decade in medical school revenues, support for teaching hospitals, total number of medical school faculty, research expenditures and numbers of faculty in pharmacology departments. Further, there continue to be increases in applicants and number of students admitted to medical schools, and public opinion continues to consider medicine as a desirable profession. Thus, if the problem cannot be totally attributed to financial causes, to what issues should we turn our attention?

Dr. Kirch then raised the issue of whether a new culture is needed in academic medicine, and used a quote from Andy Grove, former chairman of Intel Corporation, "Culture eats strategy for lunch every day." He summarized some of the attributes of the traditional culture in academic medicine, which he described as individualistic, autonomous, scholarly, expert-centered, competitive, focused, high-achieving and hierarchical. He then presented some attributes of a different culture that he believes may be emerging and that may better serve the medical center of tomorrow. These include collaborative, transparent, outcomes-focused, mutually accountable, team-based, service-oriented and patient-centered. A major theme underlying the new culture is one of collaboration and team approaches, rather than the traditional individualistic approaches.

Dr. Kirch then posed the question of how academic leaders in medical schools, e.g., department chairs change the culture. He presented the following strategies to accomplish this:

1. Make values explicit and use them visibly in everyday decisions.
2. Align governance, leadership and management across organizational and corporate divisions.
3. Use tools of Mission-Based Management (audible groan from audience) to realign and maximize resources.

MBM seeks to unravel the complexities of funds flow so as to better inform critical decision making. For example, it can quantify how clinical income subsidizes education and research at most, if not all, medical centers. MBM can also assist in strategic planning through a model of assessment that evaluates a program's costs and contribution to the missions.

4. Foster collaboration and accountability, accepting nothing short of excellence from "high performance" teams in the mission areas.

Dr. Kirsch discussed the concept of high performance teams, as a replacement for older committee structures. For example, teams assembled at Penn State (as discussed by Kent Vrana) deal with research, physical resources, human resources, finance, clinical issues and academic issues.

5. Focus leadership recruitment on organizational fit and do real succession planning for long term stability.

Dr. Kirch also made reference to a valuable paper dealing with a number of these issues, entitled “The Future–Oriented Department Chair”, published in *Academic Medicine* 79: 571-577, 2004.

6. Rethink our approach to education.

Dr. Kirch reviewed what many consider to be a discontinuity in traditional medical education, which starts out with basic science, preclinical first two years and then progresses to the last two clinical years, and then internship/residency. Related somewhat to the presentation by Dr. Melnick on the USMLE, he presented a model of more integration along the continuum of medical education. He then finished up with various objectives for a new culture in academic medical centers, which would be characterized by: teamwork and collaboration, reliability and quality, evidence rather than eminence, trust, and one in which all teach and all learn,

The meeting was adjourned at 5:00 P.M.

Saturday, February 9, 2008

The meeting was called to order at 8:00 A. M.

1. **Dr. Norka Ruiz Bravo, NIH Director of Extramural Research**, presented a talk on “**NIH: Challenges and Opportunities**”. Dr. Ruiz Bravo’s Powerpoint presentation is posted on the meeting web site. She started by enumerating some of the evolving challenges in public health, which include, prevalence of chronic conditions, the aging population, health disparities, emerging and re-emerging infectious diseases and emerging non-communicable diseases, obesity being a prime example. She also reviewed some of the issues in the NIH budget during the post-doubling era. For example, it has to be recognized that there are many competing priorities, and there is increasing support for doubling the budget for the physical sciences (i.e., NSF) over the next ten years. She noted that NIH has developed some “adaptive strategies for tough time”, including attempts to stabilize the number of competing grants and tried to strengthen support for “at risk” investigators, which include new investigators, investigators undergoing their first competing renewal, and well established investigators with limited grant support, and she expects these efforts to continue.

She reviewed aspects of the new Public Access policy for publications supported by NIH grant funds, which involves development and maintenance of a central repository archive (PubMed Central) of publications funded by NIH; it is envisioned that this will serve as an important resource for investigators as well as for the public. Further information can be found at the Public Access web site on the NIH web site. Part of the new policy is that all investigators funded by the NIH will submit an electronic version of the final, peer-reviewed manuscript upon acceptance for publication.

Dr. Ruiz Bravo also reviewed some of the efforts by NIH to enhance peer review, with view that the complexity of interdisciplinary science is creating challenges for the peer review system. A self study of peer review has been posted at <http://enhancing-peer-review.nih.gov/> Some emerging themes from the self study include 1) administrative burdens; 2) support for investigators at different stages of career development; 3) review quality; 4) strains on the system.

With respect to administrative burden, it is felt that there are too many applications in the system, especially with large numbers of amended applications. It is also felt that investigators may not be getting a clear signal on which applications are unlikely ever to be funded. Some suggested solutions include a prescreening process for clearly non-competitive applications; limiting applications to a single submission only; instituting administrative re-review to assess clearly correctible deficiencies; institute a “not recommended for resubmission” rating for applications that will never receive a fundable score.

With respect to support at different career stages, there is some support for having different grant mechanisms at different career stages. Some suggested programs include funding new investigators at higher success rates, increase support for “interstitial scientists”, e.g., research track, directors of core facilities, who are essential to many laboratories and totally on “soft” money, special awards for senior, established investigators. An interesting comment from the audience is that many of these ideas have already been tried and in some cases abandoned, e.g., first awards, or are still used, e.g., Merit awards.

With respect to review quality, it is felt that priority scores may be mathematically too precise, e.g. that evaluations of merit taken to two decimal places are not valid. In addition, it is felt that there is too much emphasis by reviewers on fine points of methodology and preliminary data, and not enough consideration of the impact and innovation of the proposed research. Concerns are also expressed about reviews’ being very directed in suggesting directions for the PI; it is the role of reviewers to evaluate the merit of the application rather than mentor the PI. Some suggested solutions including dropping the second decimal place of scoring or even changing the scoring to a more expanded, 7-point system, employing a matrix scoring system that separately evaluates and weights different aspects of the application, limiting evaluations to the application, as written, without suggestions for improvement, and limiting the number of submissions. Another suggestion under consideration is a mechanism known as a “transformative RO-1”, which would be an abbreviated application, for research that is revolutionary, create new fields or new paradigms, and that would be reviewed by alternative approaches.

With respect to strains on the system, obvious concerns are the finite amount of resources available for NIH funding and indirect costs, but concerns have also been raised on the optimal number of RO-1s, whether there is too much overlap in the types of research being supported, and whether team science is undervalued. One suggested solution involves requiring more salary support for faculty from institutions.

Dr. Ruiz Bravo discussed other issues related to grants and peer review, and indicated that the multiple PI designation has been fully implemented, after some initial pilot studies. She also discussed some workforce issues of concern to NIH. She indicated that NIH is committed to support the existence of a stable scientific workforce. However, of some concern is the health of the pipeline, with one example, the increasing age of investigators receiving their first RO-1 grant, which is now in the low 40’s, as compared with early 30’s in 1980. It may be difficult to recruit individuals into traditional careers as NIH-funded investigators if it seems highly unlikely that individuals will be able to receive research funding in such a way as to meet requirements for promotion and tenure decisions. She reviewed data that first-time grant awardees hit an all time low in 2006. Overall, it appears that there is considerable instability in the

profession at present, and the question may be posed whether we will have enough new investigators to conduct the health-related research of the future.

NIH is developing a number of mechanisms that attempt to address these concerns, and a major goal is to move new investigators to RO1s and independence earlier in their careers. For example, a new mechanism is the recent “kangaroo” mechanism, or K to R approach supports a pathway from a mentored K-type fellowship to R-type grants. NIH is also considering the optimal number of “new” vs. established investigators

2. Ms. **Carolyn “Bo” Aldige, President and Founder of the Prevent Cancer Foundation**, Alexandria, VA, presented a talk on **“The Role of Philanthropy in Funding Research”**. Her Powerpoint presentation is posted on the meeting web site. She described the mission of the Prevent Cancer Foundation as focused on cancer prevention and early detection, with particular emphasis on breast, cervical, colorectal, lung, oral, prostate, skin and testicular cancers. She pointed out the importance of foundation-sponsored research in view of the flat NIH budgets. She reviewed some of the philanthropic organizations that make significant grants to support biomedical research; these include the Robert Wood Johnson Foundation, Doris Duke Charitable Foundation. Cancer research in particular receives funding from the American Association for Cancer Research, American Cancer Society, Susan G. Komen Foundation and others. She also noted that virtually every type of cancer has at least one advocacy group.

The Prevent Cancer Foundation has supported over 300 scientists from 150 medical centers since its founding in 1985. They especially seek to support innovative projects with seed funding, which are then expected to lead to peer-reviewed grant applications, but the projects must be clearly related to prevention and early detection. They support research that is basic, clinical and/or translational in nature. A typical award is \$40,000 per year for two years; no indirect costs are provided. In addition, eligible applicants include new assistant professors as well as more senior faculty who have shifted emphasis, and could use funds to generate data to support new grant applications. In addition, they have provided some post-doctoral, but not pre-doctoral fellowships. The applications are peer-reviewed by NIH standards.

Ms. Aldige indicated that funds to the Prevent Cancer Foundation are obtained through standard development activities, e.g., memorials, planned gifts, online donations, etc. Submission deadlines are March 15 and September 15, and electronic submission is used. The web site is www.preventcancer.org.

3. Dr. **Rich Eisenberg** of the **University of Minnesota**, presented a report on the **AAMC Medical School Objectives Project (MSOP) Expert Panel on Education in Safe and Effective Prescribing Practices**. His Powerpoint presentation is posted at the meeting site. He indicated that AAMC is sponsoring a number of MSOPs, and he is on a committee charged with considering education in pharmacology. The charge to the committee was to consider 1) what should medical students learn in order to become knowledgeable, safe and effective prescribers of medications, 2) what is the optimal educational environment for learning about the optimal prescribing of medications; and 3) what kind of educational experiences would allow students to achieve those learning

objectives. With respect to specifics of the proposed knowledge objectives, a hard copy of the draft report was handed out to members at the meeting. The ‘meat’ of the report consists of two sections, one dealing with specific knowledge objectives, and the second, a consideration of different models for providing clinical pharmacology education.

The rest of the talk was focused on issues related to how these recommendations would be implemented. For example, questions include: what are the current dynamics facing pharmacology and other basic sciences in the curriculum? What will be the impact of the new USMLE Board exam at the end of year 3? Will pharmacology be taught into year 3? Who should teach pharmacology—basic scientists, M.D.s, Pharm.D.s, teams, etc?.; Do basic science faculty need to become more clinically savvy for the classroom?

4. Drs. **Tom Westfall (St. Louis University)** and **J. R. Haywood (Michigan State University)** presented a talk on “**Medical School Assessment: Role of High-Stake External Examinations.**” Drs. Westfall and Haywood are representatives from AMSPC to the Council of Academic Societies of the AAMC; their Powerpoint presentation is posted on the meeting web site. They summarized the discussions that have been underway, and reviewed two-gateway proposal under consideration by the USMLE, as detailed above in Dr. Melnick’s presentation. Again, a major theme emerging from these studies is that the current, 2-part examination structure is widely viewed as promoting an artificial separation between basic and clinical sciences; thus, the weight of opinion among both basic scientists and clinicians in these discussions favors more substantial integration of basic science and clinical concepts throughout the four years of the medical curriculum. A common misconception of the two-gateway model is that one exam will combine the current step 1 and step 2, with the current step 3 administered subsequently. Drs. Westfall and Haywood emphasized that this is not the case. Rather, it is anticipated that the new approach will involve developing new test items that measure mastery of basic science material and also the ability to deal with emerging concepts with future relevance for the practice of medicine.

They presented a list of positives that might result from the modifications under consideration. These include: better longitudinal integration of basic science and clinical curricula; possible innovative curriculum development by removing the artificial distinction between basic and clinical science; better learning of basic science concepts by students as material is spread into 3rd and 4th years. However, potential negatives include: potential for diminution of emphasis on basic sciences; loss of external benchmarks used by many schools to evaluate progress through the curriculum; “forcing” curriculum integration, the logistics of which could be difficult; impact on M.D./Ph.D. programs as currently configured. Other potential negatives include the high anxiety that may be engendered by having one high stakes examination in medical school, and the potential impact this modification may have on residency program directors who use the current scores in the admissions/evaluation process. The timing and availability of scores may also impact the latter process. It was emphasized that these discussions and consideration are continuing and that the USMLE is inviting input (www.usmle.org/comprev)

A number of additional concerns were aired during the general discussion. In general, a major concern is how the modifications to the USMLE will affect the future of

basic science departments and how they will participate in medical education. Compounding this is the fact that many medical schools are dealing with curriculum reform, which itself has the potential to have an impact on basic science departments. How these two trends will affect each other is not clear at present. There appear to be major logistical and political problems associated with moving basic science teaching into the third and fourth years, which are common proposals to promote integration. For example, integrating teaching with medical clerkships as they currently operate may be very difficult, and is likely to be opposed by clinical educators.

5. **Dr. Christie Carrico, Executive Director of ASPET**, presented the **ASPET Update**. Her Powerpoint presentation is posted on the meeting web site. She mainly reviewed the events for the upcoming Centennial celebration of ASPET at EB 08. These include eleven centennial symposia, a number of special publications that have been appearing since last year. A history of ASPET will appear in *Molecular Interventions*. An article detailing the history of great discoveries in pharmacology by Dr. Ron Rubin appeared in the December 2007 issue of *Pharmacological Reviews*. She also described plans for a large block party, sponsored by ASPET, to be held at some point during the meeting in the Gaslight district.

Dr. Carrico announced that Dr. Jim Barrett is the new chair of the Board of Publications Trustees. She also indicated that ASPET is looking into a system for automatic deposit of publications from ASPET journals into the PubMed Central system to enable authors to meet NIH requirements. She also indicated that ASPET is participating in the USMLE discussions described by other speakers.

6. **Dr. Bob Theobald, Treasurer (A.T. Still University)** presented the **Treasurer's Report** to the membership.

The meeting was adjourned at 12:15 PM.

Sunday, February 10, 2008

The meeting was called to order at 8:00 A. M.

Bill Crowley, Secretary, announced that the new Nominating Committee will consist of Gloria Meredith, Tom Westfall and Curt Klaasen.

1. **Dr. John Lazo, University of Pittsburgh**, presented a talk entitled “**A Balance: Departments vs. Centers or Institutes**”. This talk reviewed his experiences in establishing a new Drug Discovery Institute at the University of Pittsburgh, and his “take home” message was that centers or institutes may be an emerging opportunity for departments of pharmacology. He started by discussing several “reality checks”. Reality Check #1 is that Deans love centers and institutes for several reasons, including, a) that they can control them better, b) that they provide potential for interdisciplinary synergy, c) that they can attract new funding, and d) that they can launch new departments. Reality Check # 2 states that a) institutes and centers are here to stay, b) their numbers are likely to increase, and c) pharmacology (and other) departments should exploit them to their benefit. Dr. Lazo reviewed a number of issues regarding the

relationships between departments and institutes/centers that may be problematic. For example, goals of the two entities may not align, the two entities may compete for resources, centers/institutes must seek departmental participation in order to make faculty appointments, and centers/institutes may duplicate departmental activities.

Dr. Lazo then reviewed how the Drug Discovery Institute was established at the University of Pittsburgh. He started by detailing the reasons why the Dean thought it would not work. However, the Institute has been successfully established, and some keys to this success were an initial donation, a commitment by the University to a new building, and recruitment of a new chair of pharmaceutical sciences, who was very supportive. The Institute is based on interactions between chemistry (computational and combinatorial chemistry), pharmacology and the pharmaceutical sciences, and structural biology, and especially focuses on orphan and neglected diseases. The Institute also has a big educational component, particularly in training the next generation of drug discovery researchers, and in encouraging regional economic development.

Dr. Lazo reviewed some of the issues that changed the Dean's mind. These include support from other deans, which helped promote the concept of interdisciplinary synergy, and engaged clinical faculty, NIH initiatives consistent with objectives of the Institute, the potential for development of new income streams, educational opportunities, and the fact that other important institutions are setting up similar centers.

Dr. Lazo also reviewed some of the factors suggesting that drug discovery can be successful in academia. He cited a number of examples in the oncology field (cf. Nature Reviews Drug Discovery 4: 891, 2005). He also pointed out the current struggles of Big Pharma, which can impede their drug discovery efforts. A number of nonprofit institutions have small molecule screening programs, and NIH has a molecular library screening center network in place. At present, there are 10 centers in the U.S. doing such screening (including Pittsburgh), and four of these are headed by a pharmacologist.

In summary, Dr. Lazo expressed the opinion that centers/institutes can enhance the academic environment, and can foster interactions, but are expensive and require constant and considerable attention to be successful. He indicated that such entities can provide are numerous opportunities for research in pharmacology, including, drug discovery and drug development, pharmacogenomics and genetics, computational pharmacology, ADME and drug metabolism. Dr. Lazo identified a number of factors critical for success, including the need for a) good relationships among various administrators, b) developing a win/win interaction between center/institute and department, c) clear agreement on goals, d) avoiding mission overlap, and e) publicizing each others' activities and successes.

2. **Dr. Hans Zingg, McGill University**, presented the **Canadian Pharmacology Report**. Dr. Zingg's presentation is posted on the meeting web site. At present, there are ten departments of pharmacology in Canada, and pharmacology forms a stream within another five departments that are interdisciplinary, and life science-focused. Some recent successes include the establishment of Canada Research Chairs, which provide 5-7 years of salary support for junior or senior faculty, and the Canadian foundation for Innovation, which provides infrastructure support for new initiatives, and especially for new faculty recruits. A major problem in recent years has been what Dr. Zingg referred

to as a funding “crisis” in the major funding agency, the Canadian Institute for Health Research (CIHR), leading to a funding success rate of only 16%.

At present, approximately 500 graduate students are pursuing the Ph.D. in pharmacology at Canadian institutions. Approximately 50 Ph.D.’s, and 60 M.S. degrees in pharmacology are granted each year by Canadian institutions. Funding for graduate students is a major limiting factor, and Dr. Zingg indicated that they could train more if more student support were available. Stipend levels vary from \$17,500-\$23,000 (Canadian); however, students are responsible for tuition and fees, which can range from approximately \$3,200 for Canadian citizens to \$12,000 for foreign nationals.

Dr. Zingg indicated that challenges facing Canadian pharmacology departments tend to be very similar to those facing American universities, such as the need for more interactions (e.g., with industry and clinical departments) to survive. Some new initiatives in graduate training include a program in conducting clinical trials (Dalhousie university), a program in pharmacogenetics at the University of Montreal, a combined Ph.D in pharmacology with MBA at McGill University, and a graduate program in therapeutics at the University of British Columbia. Dr. Zingg indicated that there appears to be a clear need to develop clinical pharmacology opportunities, but because most clinical pharmacology is conducted within clinical departments, it is important for strong leaders in basic and clinical pharmacology to work together to bring these disciplines closer. From July 27-August 1, 2008, the Ninth World Congress on Clinical Pharmacology and Therapeutics will be held in Quebec (cf. www.cpt2008.com).

The following are notes compiled by discussion leaders for the two breakout sessions.

Integrated Teaching/ Fate of Pharmacology AMSPC Feb 10, 2008

What Worked

- 1. Having Pharmacology department involved in design and planning**
 - This seemed imperative in order to have courses that taught Pharmacology effectively. Inclusion of Pharmacology departments in designing curriculum has worked very well. When this hasn't happened, students have been dissatisfied, and changes have been made in some cases.
 - Chairs who have had success with the PBL model emphasized being involved, being persistent, and being flexible. Creating partnerships with clinicians or teaching departments has been helpful in many cases.
 - Another option has been targeting specific blocks and getting Pharmacology lectures integrated into those blocks. Interacting with student representatives has also been helpful in getting Pharmacology included.

- 2. Use of Wrap-Up sessions where all necessary material is covered**
 - In order to ensure that all learning objectives are covered for each student, a Wrap-Up session at the end of each module or week was very effective. This session was lecture based, and often integrated with several departments.

- 3. Ensuring that material given to students and faculty/tutors contain all teaching objectives**
 - In one program, tutor guides were created that contain all the teaching objectives, in order to ensure that each group gets the information that they need. This has worked very well. The material in the tutor guide is then covered in lecture during the wrap-up session.
 - Taping lectures and having all faculty watch them has helped various disciplines to better integrate material.

- 4. Provide separate lectures (maybe in short blocks) to cover specific aspects of Pharmacology that may not fit well in integrated curriculum**
 - PBL and Integrated Systems do not lend themselves well to covering some very important areas of Pharmacology such as General Principles, Pharmacokinetics, etc. Students were sometimes exposed to drugs prior to getting this information, or didn't get it at all. Creating a distinct set of lectures or block to address this has worked in many programs to rectify the problem.

- 5. Use e-learning, Web CT, etc to provide extra cases and questions to focus on specific areas of Pharmacology**

- Another mechanism to address shortcomings in the curriculum has been to use online learning to post topics, provide information, and set up questions that students must answer and submit. This allows supplementation of areas that may not be covered sufficiently in the Integrated or PBL curriculum.
- 6. Maintain some lecture hours in a PBL curriculum**
 - There is information that students require that is best presented in a lecture format. Students generally report satisfaction with lectures.
 - 7. Have exam questions in Pharmacology written by Pharmacologists**
 - Collaboration between faculty delivering course is important and needed in developing effective exams. Having Pharmacologists write and have input into questions pertaining to Pharmacology ensures that important concepts and drugs are emphasized and that questions test knowledge appropriately.
 - 8. Involvement of clinicians works well in partnerships**
 - Clinician involvement is critical in PBL. Having a Pharmacology faculty member work closely with a clinician has been effective. Monitoring information provided by clinicians has been helpful in ensuring that material is up-to-date, accurate, and relevant to knowledge of Pharmacology.
 - 9. Emphasize the need for training in Pharmacology**
 - Prescribing errors have been estimated to cause many deaths. A recent AACM survey of 4th year graduating medical students and residents revealed that 70% of them felt insufficiently prepared in Pharmacology.
 - It is imperative that we increase our efforts to emphasize the importance of Pharmacology in physician training both within the universities and in the general population.
 - 10. There has been little long-term difference in Board performance with different types of curricula- Didactic, Integrated Systems, and PBL**
 - Medical students have different learning styles, and some prefer one method of instruction over another. It is possible that they self-select into programs offering their style of learning, or that they adapt to learn whatever they need to regardless of the type of curriculum.
 - 11. Clinical anecdotes are very useful to students and should be included regardless of the type of curriculum**
 - One of the benefits of PBL is the focus on Clinical Cases and clinical scenarios. The students generally like this and feel that it is relevant to their training. However, it is possible and highly desirable to include clinical scenarios in any type of curriculum.
 - 12. Promoting the importance of Pharmacology is critical**
 - According to studies cited in the Institute of Medicine report, *To Err Is Human: Building a Safer Health System*, 44,000 to 98,000 Americans die each

year as a result of medical errors. As Chairs of Pharmacology departments, it is imperative that we ensure that adequate teaching of Pharmacology be included in all medical school curricula, regardless of type.

What Didn't Work

1. Not being involved in designing curriculum

- Some programs were designed without input from the Pharmacology department, and the results were often poor until the program was re-designed. Pharmacology doesn't always fit well into Integrated or PBL teaching, and important concepts may be left out, especially if the people designing the course are not well versed in Pharmacology.

2. PBL is very time and labor intensive

- Workshop and case-based courses require small groups. Clinicians are generally involved in teaching as well as basic science faculty. The courses are very labor-intensive, and it is hard for the faculty, especially those in clinical practice, to find sufficient time to fulfill the teaching requirements. It is also prohibitive for departments with very small faculties. Some programs estimated a 10-12 fold increase in faculty workload.

3. Graduate students are not able to take Medical Pharmacology

- Because Pharmacology is integrated into all the other medical subjects in Integrated and PBL based programs, Pharmacology graduate students are no longer able to take Medical Pharmacology. This requires the department to have a separate course for the graduate students, or it may leave the students deficient in the knowledge and experience they need to take on teaching roles following graduation.

4. Students often don't like it

- Attendance in small group sessions is usually mandatory. Students who prefer lectures, or who prefer to have more choice about whether to attend class or study on their own, often don't like the mandatory small groups.

5. Use of non-expert tutors is a waste of valuable tutor and student time

- Some programs emphasize using tutors who are not experts in the field that they are teaching. Many people experiencing this feel that it is a waste of valuable knowledge and expertise. Also, it has the potential to waste significant student time because the tutor may not know how to focus or direct the material in a profitable direction to ensure that the important concepts are learned by the students.

6. Bad relationships with Medical Education (or other similarly named) departments

- In some programs, departments or Associate Deans specializing in education have viewed Basic Science chairs as threats. In other programs, interactions have worked.

7. Board exams are necessary to ensure that knowledge of Pharmacology is tested

- The current system of Step 1 board exams measures performance in Pharmacology. This is not always tested or ensured in integrated programs, so the board exams are an important and necessary indicator.

Other Issues

Do 4th year students feel that they are deficient in Pharmacology training?

- There was a concern about an AAMC survey that 4th year students felt they were deficient in Pharmacology training. However, the 2007 survey from the web site below appeared to indicate that approximately 70% of the graduating students felt they were adequately prepared in both Pharmacology and Clinical Pharmacology.
- <http://www.aamc.org/data/gq/allschoolsreports/2007.pdf>

Can Pharmacology be integrated into 3rd or 4th year curriculum?

- Some departments are starting to include Pharmacology review lectures in the 3 or 4th year medical student curriculum. This provides an advantage prior to Step 2 board exams
- One main difficulty is that students are often off campus during this part of their training. E-learning or taping lectures has been used, but face-to-face seems better if it can be done.
- In one school, the students come back for didactic lectures about 3 months before Step 2, and Pharmacology provides case-based review sessions. Performance on boards has been very good.

Will students come to class if lectures are video- or audio-taped and PODcasted or otherwise distributed?

- Some programs have found attendance at lectures dropped if this was done, but the majority have found no difference.
- Some programs ask questions during lectures to keep students engaged.
- One program uses quizzes and Powerpoll to determine whether students are attending lectures.
- The consensus was that if lectures are useful and interesting, students will come to class.

Some experiences related from specific programs:

Southern Illinois University, Carl Feingold:

- At SIU, new curriculum was designed in 2000 by committees that did not include suggestions from basic science faculty. Both students and faculty felt that the curriculum didn't work.
- For example, Neuroscience and Cardiovascular were combined on one test, which was too much material for the students.
- When the curriculum was deemed a failure, they went through the whole program and got rid of the aspects that didn't work
- The Pharmacology department was involved in the re-design, and the new system works very well
- Kept PBL sessions that were useful and necessary
- Used tutor groups and did follow-ups with integrated presentations that included faculty from several different areas
- Pharmacology department contribution has been very useful
- Approximately 4-6 hours tutor group, 4-6 hours lecture per week
- Inclusion of clinical material is very useful to the students
- Experts in each area are involved in the Wrap-Up sessions
- Material that cannot easily be included in the tutor sessions are put on to Web CT. The students are required to go through the material and answer questions about the cases. They are not graded, but must be done in order to pass the course.
- Tutor guides contain all learning objectives to ensure that all students learn all necessary and relevant information
- Fourth year students are sometimes used as facilitators
- Basic Science faculty write the portion of exams that cover their subjects, clinicians write the clinical sections
- A stand-alone session on Basic Principles is done at the beginning of the course, then Pharmacology lectures are given where appropriate/needed

North Dakota, Jonathan Geiger:

- Course was designed without involvement of Pharmacology, students were getting drugs in Neuro section before any General Principles
- Pharmacology got involved with the course, and worked to have material put in where needed and useful
- Got involved with Neuro block and instituted short course in General Principles to precede Neuro
- Pharmacology is now regaining control and getting lecture hours back
- Taping lectures so faculty in other departments can view them and see what is taught has helped with integration and decreased redundancy
- If the taping works well, they may encourage making them available to students.

Rush University, Paul Carvey

- Students were divided into different tracks- traditional didactic lectures or PBL. In the beginning, students did better in PBL, probably because they had self-

selected for that type of learning. However, over time, there were no differences due to the type of instruction.

- Students liked PBL for the clinical experience, but were just as happy if clinical anecdotes were included in lectures.
- Clinicians had to give up teaching because they didn't have time for labor-intense small groups.
- Sometimes facilitators who had little knowledge of the content of the module were problematic.

University of Alberta, Sandy Clanachan:

- Anatomy department designed Integrated course, very little Pharmacology included.
- Students felt they needed more Pharmacology
- There are now 17 learning groups, which is extremely faculty-intensive
- Both students and facilitators find use of non-expert tutors frustrating

Michigan State, Ken Moore

- There are three programs offered here. The Medical school gets PBL in the second year, which includes Pharmacology. The Osteopathic Medical school has an Organ System based program, and the Vet school does the traditional didactic lecture Pharmacology.
- The faculty don't like doing the PBL teaching, would prefer more lectures and more teaching.
- The clinicians are not always able to show up for workshop sessions
- Testing is done by the PBL group

Brown University, Wayne Bowen

- Pharmacology faculty don't teach medical students
- Pharmacology is integrated with Pathology and Pathophysiology
- The courses are taught by clinicians, but they are screened by the Pharmacology department, and Pharmacology prepares the exam questions
- The Pharmacology department put together a block of 5 lectures in General Principles which are given before the first drugs are introduced in second year
- Pharmacology is then plugged in where needed

Midwestern University, Walt Prozialeck

- Including Pharmacology review in 4th year prior to Step 2 boards has resulted in very good board scores.
- Basic Science faculty and Clinicians are working in pairs assigned by the Dean. This has increased integration of clinical information into Basic Science lectures and has worked very well.

Breakout group #2 Summary

How is the funding environment and job market influencing graduate student recruitment and attitudes? What can we do?

A general discussion of student recruitment began the discussion. One issue with recruitment is the different motivations and expectations found in GenX and GenY students. Faculty need to understand these motivations and expectations in order to effectively recruit and train graduate students. A beginning resource may be found at <http://www.pharmacy.utah.edu/pharmtox/ndogs07/program.html> in the presentations given by Drs. Vicki Whiting and Beth Fischer.

How do we increase the pool of students that apply to our program?

Missed opportunities. An example given is the minority scientific meetings where ASPET has a presence but few individual programs send representatives. Given the GenX/GenY emphasis on forming relationships (loyalty) with individuals over organizations or institutions, program representation may be key in putting a face with a program and recruiting the best students.

Undergraduate course. Most undergraduates are not exposed to Pharmacology. An undergraduate program can be a feeder to your graduate program and increase pharmacology awareness.

Emphasizing Breadth of Career Opportunities. A unique feature of pharmacology training programs is that students generally have a broad background and specialized training in skills marketable in industry. Academic careers are possible but pharmacology trainees are uniquely suited to be performers in industry and regulatory settings. Embracing and emphasizing this facet of training will give us a recruiting edge for talented, career savvy trainees who are looking at nonacademic jobs.

Give students a wide choice of mentors/allow them to bridge projects. Some programs in pharmacology are narrowly defined and it may be possible to increase recruiting success by widening the definition of pharmacology. This will also help the discipline as students trained in pharmacology contribute to laboratories and efforts outside of departmental boundaries or narrowly defined areas. The potential of these efforts may be seen in the success of interdisciplinary programs (umbrella recruiting programs) where students often act as “bridges” to bring together programs or investigators. Again, given the emphasis of GenX/GenY on personal over institutional loyalty, de-emphasizing making an early commitment to a department or group may allow mentors to compete more effectively for the best students.

Undergraduate schools. Establish relationships where students and faculty visit undergraduate schools and invite faculty to bring interested students to events on your campus. This gets you at the front of the line for the best students in your area.

High schools. Volunteer to raise the interest in, and excitement around, science. These longterm efforts to help us and science in general

How do we recruit once students are on the campus?

Umbrella Programs. Be proactive! Identify students from colleagues and contacts and follow them through the admissions process. These students generate loyalty to individuals, be available early to form these critical relationships. If you can, get a list of all umbrella applicants and identify students who have an interest or that you want. Contact them and track them through the admissions process. Remember students are undifferentiated. Emphasize pharmacology career possibilities and push the merits of our discipline and your program.

How do we recruit and retain underrepresented minorities?

See above about meetings.

Relationships with historically black colleges. Bring in faculty for summer research and send faculty to these colleges.

Mentoring commitment. Faculty must understand that the commitment to mentor these students may be different from majority students. This may include identifying student or peer mentors and helping the student connect with an appropriate culture or community on campus. The importance of this support mechanism, which is ubiquitous and often unrecognized for majority students, must be valued and accommodated for minority students.

Multiple entry points. One successful mechanism used is multiple entry points. Even the most qualified minority candidate may be apprehensive about graduate school and succeeding in a new environment away from the support network discussed above. Flexibility in admissions that allow students to come early to “try on” the new environment before heavy coursework responsibilities allow the more difficult process of finding community to occur. Retention is also aided by having this network in place early. Examples of these efforts may be found in currently existing “Bridge Programs”, “PREP Programs” and “IMSD Programs”.

The meeting was adjourned at 12:15 PM.

Respectfully, submitted
William R. Crowley
University of Utah
Secretary