

## EDUCATION

## Advancing research transdisciplinarity within our discipline

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Advancement in biomedical knowledge is crucial to the understanding of disease pathophysiology, diagnosis, treatment, and the maintenance of health. As is the case in all areas of medicine, the field of obstetrics and gynecology (OBGYN) requires the ongoing input of new information that can shed light on issues affecting women's health—such as pregnancy, fertility, gynecologic cancer, female pelvic floor health, contraception, and gender-specific medicine. Although our specialty has been somewhat fragmented by the well-justified need for subspecialties, synergistic ties among scientists who use basic and translational (transbasic) methods and those taking clinical research approaches should bolster pursuits and advance knowledge in each subspecialty. Furthermore, the researcher-physician dialog should be bidirectional, commonly known as bench to bedside and back, with laboratory-based observations or new technologies translated into improved care and wellness, and clinical questions stemming from patient-physician encounters answered by transbasic or clinical investigation.

Advancing biomedical knowledge is crucial to the understanding of disease pathophysiology, diagnosis, treatment, and the maintenance of health. Whereas collaborative pursuits among basic and translational scientists, clinical researchers, and clinicians should advance biomedical progress and its translation to better medicine. The field of obstetrics and gynecology and its subspecialties has not escaped this problem. Obstetrics and gynecology specialists and subspecialists have limited opportunities to interact with translational or basic investigators, and cross-fertilization and collaborations are further challenged by the current healthcare and funding climate. This opinion manuscript focuses on the field of maternal-fetal medicine, serving as an example that illustrates the risks and opportunities that might exist within our obstetrics and gynecology academic community. A Pregnancy Task Force recently sought to identify ways to overcome hurdles related to research training, and ensure a sufficient pool of physician-scientists pursuing pertinent questions in the field. The group discussed strategies to promote a culture of intellectual curiosity and research excellence, securing additional resources for trainees, and attracting current and next generation basic, translational, and clinical scholars to our field. Recommendations encompassed activities within annual academic meetings, training initiatives, and additional funding opportunities. Inferences from these discussions can be made to all obstetrics and gynecology subspecialty areas.

**Key words:** maternal-fetal medicine, scholars, reproductive sciences, transdisciplinarity

While the benefits of synergy between transbasic and clinical researchers may seem obvious, the gap between the 2 camps has not meaningfully narrowed. Clinical subspecialists within OBGYN departments, who play a key role in

clinical research, have limited opportunities to interact with transbasic investigators. The rift is heightened as these opportunities for interaction must compete with clinical, teaching, and administrative demands, and the increasing pressure of revenue generation imposed on OBGYN clinical specialists. Some OBGYN-related national meetings are relatively segregated by investigative approaches rather than by shared biologic questions. In addition, exposure to meaningful research training during OBGYN residency programs remains very limited. Most academic fellowship programs have not expanded their research training opportunities in recent years, and others (eg, maternal-fetal medicine) recently reduced the minimum required time for research. Physician-scientists, who are greatly sought after as they play a pivotal role in bridging biologic and clinical disciplines, are under escalating pressure for funding and the attainment of

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tenure. Consequently, the research enterprise within OBGYN disciplines continues to lag behind other areas of medicine, and opportunities for cross-fertilization and advancing knowledge in the field are missed, even in OBGYN departments located within research-intensive medical schools.

Although the problem exists in every OBGYN subspecialty, here we focus on maternal-fetal medicine, where perinatologists, pregnancy epidemiologists, prenatal geneticists, and reproductive biologists all appreciate the critical impact of the 9 months of pregnancy on human development and disease susceptibility. Research on pregnancy is also challenged by the unique biology, a suboptimal culture of discovery, increasing constraints on research support, and scant interest by industry. Insufficient crosstalk between researchers and academic perinatologists impedes progress. Even in organizations such as the Society for Maternal-Fetal Medicine (SMFM), which has been home to excellent scientific research related to pregnancy and provides a platform for scholarly interaction, insufficient scientific crosstalk continues to hamper progress.

Since 2002, the Pregnancy Foundation (formerly the SMFM Foundation) and the American Association of Obstetricians and Gynecologists Foundation (AAOGF) have joined forces for the purpose of funding promising young scholars in the field of maternal-fetal medicine. This SMFM/AAOGF program has been a tremendous success and has buttressed the career of many graduating scholars, yet the challenges discussed above continue to hamper the progress of high-quality research and the translation of discoveries arising from it. To address these challenges, a Pregnancy Task Force met in February 2013 to discuss the future of research in maternal-fetal medicine and to identify strategies to ensure a sufficient pool of physician-scientists pursuing key questions in our field. The discussions centered on items that are within the domain of our academic community and professional society. The group discussed strategies to positively impact the

field of maternal-fetal medicine by promoting a culture of intellectual curiosity and research excellence, securing additional resources for trainees, and making the SMFM and the Pregnancy Meeting truly attractive to current and next generation basic, translational, and clinical scholars in the field.

Discussions centered on the SMFM/AAOGF grant and on the research performance of maternal-fetal medicine specialists who trained in similar faculty training programs. These included the Reproductive Scientist Development Program (RSDP), the Building Interdisciplinary Research Careers in Women's Health Program (BIRCWH), and the Women's Reproductive Health Research Career Development Program (WRHR). Demographic data pointed to a similar gender distribution among the programs with, overall, 61.5% of the scholars being women. Approximately 20% of graduating scholars currently serve as principal investigators on 1 or more NIH grants, and approximately 15% of the current and past scholars in all programs have been awarded at least 1 R01 grant, with no significant differences among the programs. A notable finding was a general decline in the last 3 years in the number of applicants to the training programs.

To motivate bright junior scholars to focus their research on perinatal sciences, foster transdisciplinary initiatives among transbasic and clinical researchers, and promote innovative perinatal research, recommendations were made, focusing on the SMFM and the annual SMFM meeting, scholars' training programs, and other avenues. Key items are listed below:

1. Activities designed to promote better science at the Society's annual meeting:
  - Hosting a Bench to Bedside and Back session at the annual meeting, focusing on hot science lectures by invited speakers who can bridge clinical and basic research and discuss the application of knowledge gained from research to clinical perinatology
  - Attracting basic sciences researchers (PhD, MD, or DVM) to

the meeting, dedicating oral sessions to basic sciences, and increasing the involvement of transbasic researchers in the abstract review process

- Conducting special interactive presentations, designed to encourage junior trainees, including residents and fellows, to engage in scientific pursuits and emphasizing diversity and the participation of women
  - Inviting members of other societies, with expertise relevant to the biology of pregnancy, to attend the annual meeting and possibly conduct a pre- or postmeeting satellite meeting.
2. Initiatives to improve the scholar's training:
    - Creating a National Career Development Mentoring program, where mentors outside the home department and institution can advise trainees regarding personal or academic needs
    - Extending the duration of the SMFM/AAOGF program, currently designed for 3 years of research training, to 5 years, allowing the scholars to expand knowledge, attain an additional graduate degree in the sciences, and become more competitive as they transition to independence
    - Offering a Pregnancy Research Boot Camp, which can be done during a fellowship annual retreat or in a minisabbatical format and can include a review of transbasic science methodology; training in grantsmanship; and focused time with mentors, targeting selected career development topics
    - Developing and web-advertising a repository of relevant laboratories and opportunities to gain experience in research methodologies
  3. Additional resources:
    - Allocating additional funds to the Pregnancy Foundation to support the programs discussed in the previous sections
    - Extending SMFM-based bridge-funding opportunities to promising suitable scholars who need

additional support as they transition to independence

- Hosting SMFM donors at the annual meeting, and stimulating support to theme-specific research

Inferences can be made from the field of perinatal biology and medicine to other OBGYN subspecialties. An expanded core of well-trained, well-funded physician-scientists in OBGYN subspecialties will promote scientific bridges between transbasic and clinical scholars, fostering pursuits that embrace synthetic investigative approaches. The vertical transdisciplinarity of transbasic and clinical researchers will result in a new level of knowledge that can spur the advancement of clinical medicine. Realization of its commercial potential may also attract a higher degree of industry support. And last, in highlighting the importance of women's health, in general, as contributory to a healthy society,

we may stimulate a horizontal transdisciplinarity, forging synergies among reproductive biologists, developmental biologists, stem cell biologists, bioengineers, epigeneticists, and the like.

A successful transdisciplinary synergy may motivate previously separate thematic fields to merge into one discipline. One example of a successful neodisciplinarity is the field of computational biology, resulting from the recent fusion of computer science and biology. Although the recognition of perinatal genomics as a new discipline seems remote, intense collaborative interactions between transbasic and clinical researchers within our specialty may make this, and similar neodisciplines, a reality in the near future. ■

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