Training the Physician-Scientist in Internal Medicine

The need for the physician scientist to develop broad skillsets to successfully transition into an independent academic faculty position has led to a diverse array of post graduate training programs in the Internal Medicine field. While many trainees acquire scientific skills during graduate medical education (MSTP, MD, PhD degree) most require additional, post-graduate training to successfully integrate clinical and scientific expertise allowing for the development of an academic program to maximally impact patient care. This level of success is reliant upon being able to effectively manage a balance of delivering high quality patient care while successfully leading the development of a program that integrates science with medicine. The need for this complex level of training has led to development models that can be generally categorized as physician-scientist training programs (PSTP) or research in residency (RiR) programs.

The PSTP model most commonly integrates clinical training in internal medicine and a subspecialty with research activities over a six to seven-year period of training time. PSTP candidates must demonstrate significant research experience with productive publication record, presentation of research work at national or international research venues and successful record of research funding. While many PSTPs allow for simultaneous application for residency and fellowship training, most programs do not require that candidates have decided on subspecialty. Application through ERAS often utilizes a specific PSTP match number for the NRMP process, that is separate from the match number for the categorical program.

PSTPs often incorporate the American Board of Internal Medicine’s Research Pathway to guide clinical training in general internal medicine residency and subspecialty fellowship programs allowing for expedited board certification in internal medicine (two year clinical training compared to three years in a traditional categorical training program). The general timeline for clinical training includes 24 months of internal medicine residency training followed by 12 – 24 months of clinical fellowship training depending upon the subspecialty fellowship program. The basic elements that are provided by most PSTPs include an organized, longitudinal mentorship plan, financial support for career development needs (travel, computer, journal subscription etc.), and basic curriculum focused on critical skills needed for successful publication, ability to mentor and obtain grant submission. Mentorship is often achieved via a team approach including the PSTP program director, primary mentor, and basic/translational/clinical faculty. While PSTPs often focus on intensive clinical training during the initial three years of training, mentorship activities and monthly research conferences keep trainees engaged scientifically allowing for a more seamless transition into the research phase of training. Common goals during clinical training period of PSTPs focus on obtaining clinical skill and knowledge base in medicine and fellowship while targeting potential laboratories to promote opportunities for scientific engagement and preparation of institutional funding opportunities during PGY 3 (ie T32, institutional career development training programs).
During the PSTP research years (PGY 4-6 depending on subspecialty fellowship), trainees continue to maintain a clinical presence with a half day clinic but have at least 80% of time devoted to research. This period is critical for the effective integration of clinical and scientific research skill sets and development of a laboratory research program as the trainee transitions into faculty position. Most programs continue to provide financial support and some offer salary stipends allowing trainees to focus on career development without distractions of seeking supplementary income from additional clinical activities (ie. Moonlighting). Common goals during the research phase of PSTPs include building grant writing skills (K workshops), publishing, acquiring mentorship skills, and development of a thematic research program incorporating clinical and scientific investigation. Trainees who demonstrate exceptional ability (funding of K award or other NIH-equivalent CDA, multiple publications etc.) can take advantage of the ABIM’s policy to transition into a faculty position one year early (PGY 5 or 6 depending on subspecialty fellowship).

The RiR model allows categorical residents in traditional three year training programs to simultaneously engage in activities from a co-existing PSTP or a unique research curriculum dedicated to residents training in internal medicine. RiRs address the need for growing the physician scientist workforce by providing novel opportunities for research training during residency and provide an “on ramp” for trainees who become interested in pursuing an academic career. Trainees following this pathway engage in research opportunities ranging from elective training blocks to dedicated, formal integrated programs during residency. Some RiRs offer training opportunities allowing for dedicated research time periods of 12-24 months within a structured research residency program. The NIH Stimulating Access to Research in Residency (StARR) R38 program seeks to recruit talented post-doctoral resident trainees into academic medical fields focused on clinical investigation and / or basic and translational medicine. Multiple NIH Institutes, including the National Cancer Institute, National Institute of Allergy and Infectious Diseases, National heart, Lung and Blood Institute, and National Institute on Aging have committed to this training mechanism and developed visionary statements for RiRs. A major goal for trainees in the StARR pathway are to continue their training on the Stimulating Access to Research in Residency Transition Support (StARRTS) where they receive support through the K38 mentored training grant. Outside the StARR training mechanism, the majority of research occurs during the fellowship years. Multiple national career development programs (ie: American Society of Clinical Oncology, American Heart Association CDAs) and institutional training opportunities exist for post-doctoral fellows in RiRs including NIH extramural T32, F32, K12, or KL2 programs. Completion of RiR training often bridges to faculty positions where additional mentored support is provided by NIH CDAs such as K08, K99 or, provided the trainee has achieved sufficient level of independence, NIH R01 or R21 grant mechanisms.

Umbrella PSTPs are broad programs seeking to develop an institutional culture that promotes the growth and diversity of the physician scientist workforce at all levels of education and training ranging from undergraduate and medical school to trainees transitioning into faculty positions. These programs often work to provide resources
(mentorship, funding, career development, networking opportunities) to trainees at all levels within a broad spectrum of disciplines including medicine, surgical, and pediatric fields. Many umbrella programs provide a broad curriculum delivering career development sessions, journal clubs, and activities to enhance transition from one phase of training to the next. An overarching goal for Umbrella PSTPs seeks to provide an experience to drive the development of a physician scientist workforce that is innovative and able to engage in multidisciplinary collaboration to advance medical science and patient care. Recently, the Burroughs Wellcome Fund announced a Physician-Scientist Institutional Award (PSIA) to increase the number of single degree M.D.’s who enter research, via research training programs. These awards are meant to catalyze institutional programs to enhance physician-scientist training, and typically take an Umbrella format.