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40 Years of Training Physician-Scientists: A Journey From Clinical Pearls to Evidence-Based Practice and Policies

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During the past 4 decades, the training of physician-scientists has been driven by the information needs of clinicians; policymakers; and, more recently, patients who have voiced a strong desire to move from case-based, opinion-driven clinical care to practice informed by evidence. Thought leaders, primarily from the fields of internal medicine, epidemiology, and public health, proposed that this task could best be accomplished by developing researchers grounded in clinical medicine but armed with the skills needed to ask and answer the most pressing clinical and health care delivery questions in medicine. One long-lasting result was the Clinical Scholars Program (CSP), initially funded by the Carnegie Corporation and the Commonwealth Foundation and later by the Robert Wood Johnson Foundation (RWJF) (1).

In 1972, when the CSP began, the principal scholarly forum for what was then called clinical epidemiology (2) and health care research (3) was the annual scientific meeting of the Tri Societies—at that time, the leading academic internal medicine meeting where trainees showed their wares and young faculty made their reputations. In a small room among the meeting's numerous and much larger subspecialty sessions, abstracts were presented by a limited cadre of researchers on the fringes of the biomedical revolution of modern academic departments. Two memorable leaders who vigorously proselytized for better scientific methods were Alvan Feinstein (4) and David Sackett. Sackett emphasized randomized, controlled trials, whereas Feinstein focused more on methodological advances in case-control and cohort studies. In the then-nascent field of general internal medicine, they were joined by the early leaders of health care research, including Robert Brook and Jack Wennberg, who were taking the groundbreaking work of Kerr White and colleagues (3) to the next level. Although the vast majority of young researchers who led the renaissance in modern clinical research were general internists, the excitement of patient-oriented and outcomes research quickly spread to the medical subspecialties: pediatrics, family medicine, and the surgical specialties. The CSP, recognizing the importance of bringing research training to the clinicians whose practices would focus on a wide array of relevant problems, followed suit.

The success of the RWJF CSP stimulated other foundations, including the Henry J. Kaiser Family Foundation and the Milbank Foundation, to join its efforts. By the late 1980s, typical T-32 National Research Service Award (NRSA) training grants began to fund a small number of research-oriented fellowship programs in clinical epidemiology, health services research, and geriatrics, while the Health Resources and Services Administration (HRSA)

funded faculty development grants in general internal medicine, general pediatrics, and family medicine. Finally, many subspecialty T-32 grants incorporated training in clinical epidemiology and health services as an alternative pathway for nongeneralists who wished to pursue academic careers in clinical research.

This growing workforce, which now includes more than 1200 CSP alumni, has studied clinical, administrative, and population-based data to distill the evidence to inform clinical practice and to describe many of the system- and patient-level characteristics that are associated with variation in access and outcomes of health care—what the National Institutes of Health (NIH) Roadmap Initiative now calls types 3 and 4 translational science (5). The sophisticated multidisciplinary skills needed to perform this work at the highest level require “team” scientists, a critical skill recently emphasized by the Institute of Medicine (6).

Early on, Bergner and coworkers (7), Stewart and associates (8), and others recognized the importance of not only measuring clinical outcomes but also incorporating patients' views of them. The RAND Health Insurance Experiment (9) and the work of Pauker and colleagues incorporated decision analysis (10, 11) and encouraged the inclusion of health economics in clinical research training programs. The groundbreaking work of Wennberg and Gittelsohn describing small area variation in practice and costs of care (12) raised important questions about practice variation and pointed to the value of learning how to analyze administrative claims data. For example, the report in this supplement by Horwitz and coworkers (13) uses claims data to measure and profile hospital-wide performance on 30-day unplanned readmissions.

Questions raised by research on variation in care stimulated the development of an array of innovative approaches to identify which patients needed and would benefit from which treatments, as well as how to measure and define the appropriateness of care (14), the role of shared decision making with patients (15), the development of prediction rules to identify clinical factors that were associated with outcomes (16), and the use of simulation models to understand how changes in clinical practice would affect population-wide outcomes (17). Early studies of access to care (18) foreshadowed the creation of the National Institute on Minority Health and Health Disparities and stimulated training programs to teach the fundamentals of sociology, econometric modeling, and community-partnered interventions.

The growing emphasis on “outcomes research” required expanding from outcomes routinely captured in

routine clinical care to the need to understand patients' perceptions of functional status and quality of life—and to include these perceptions in the evaluation process. A good example in this supplement is the report by Jubelt and associates (19), which measures the association of patient perception of case manager performance with overall satisfaction with care.

Since the late 1980s, researchers have also recognized the importance of considering comorbidity (20) in virtually all clinical studies. The report by Venkatesh and colleagues (21) acknowledges the persistent challenges of measuring quality among patients with multiple chronic conditions.

Congressional funding of the Agency for Health Care Policy and Research (the predecessor to the Agency for Healthcare Research and Quality) and the inception of the Patient Outcomes Research Teams, which funded research that integrated rigorously collected clinical, economic, and patient-reported data, fueled the need for a larger, more multidimensional research workforce. As statistical packages have become more comprehensive and easier to use, multivariable modeling has become easier to perform yet still requires careful training and supervision to do it well. The increasing availability of rich clinical information from electronic health records has led to the need to teach new methods that can leverage these “big data” assets for clinical research; under the stewardship of the NIH National Center for Advancing Translational Sciences, clinical research training is quickly moving in this direction.

Clinical research has also moved beyond the description of health disparities to the need to conduct and evaluate interventions and natural experiments (22), grounded in behavioral science, sociology, and community partnership methods, to accelerate the translation of the most promising discoveries into the communities with the greatest need for these treatments. The 2013 Patient-Centered Outcomes Research Institute methodology standards (23) outline the broad array of skills that need to be mastered by contemporary clinical researchers to achieve the goal of this newly articulated research field, and many training programs have embraced and adopted this content. Twelve years ago, the radical reorientation of the CSP to teach and cultivate the skills and cultural sensitivity needed to engage in partnered research with communities anticipated this transition of the national research agenda to a strong emphasis on patient-centered research.

Armed with a wide array of skills, current clinical scholars and alumni have partnered with health systems and communities to develop, implement, and evaluate various approaches to achieving the value proposition of higher-quality care that is less costly (24). In this supplement, the randomized trials by Laing (25) and Heisler (26) and their respective coworkers test information technology tools in primary care settings. Chung and associates (27) use a cluster randomized trial design to test an intervention that partners and mobilizes the social services sector to treat

depression in an underserved urban community. Kullgren and colleagues (28) report a pragmatic cluster randomized trial that tests how financial incentives can improve colon cancer screening rates. Patel and coworkers (29) describe a low-cost quasi-experiment to increase cost-effective prescribing in outpatient settings. Lee and associates (30) describe the effect of an antibiotic self-stewardship program using an interrupted time-series design.

The traditional role of foundations is to provide seed funding and academic “venture capital” for cutting-edge, avant-garde, and frankly risky scientific endeavors that are unlikely to be priorities for traditional governmental funds. At some point, however, foundations switch priorities, hopefully declaring victory but sometimes admitting defeat. In this environment, RWJF's tenacity and vision to continue the CSP for more than 40 years is highly unusual and the positive impact of the more than 1200 scholars is immeasurable. In 2017, RWJF will end the CSP as part of its effort to mobilize its resources toward training the next generation of leaders needed for a national transition to a Culture of Health (31). As a research community, we must express our gratitude for this transformative investment. However, given the implementation of the Patient Protection and Affordable Care Act, the critical need to meet the value proposition, and the state of persistent and unacceptable health disparities today, the need to continue to attract and train the clinical research workforce has never been greater. We hope that NIH, NRSA, HRSA, and other organizations will fill this gap to ensure that we continue to train scholars whose high-quality work will inform and improve best clinical practices for patients and communities.

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