
Written by Kristin Harper, PhD, MPH (Harper Health & Science Communications, LLC)
The Robert Wood Johnson Foundation Health & Society Scholars (HSS) program was designed to train early career researchers to become interdisciplinary leaders in population health science. It accepted its first cohort in 2003 and ended in 2016, having trained 193 scholars at six sites: Columbia University, Harvard University, the University of California, San Francisco/Berkeley (UCSFB), the University of Michigan, the University of Pennsylvania (Penn), and the University of Wisconsin. Scholars came from a wide variety of disciplines, including sociology, epidemiology, psychology, economics, city planning, history, neuroscience, and anthropology. They were mentored by faculty from similarly diverse backgrounds, who helped them develop interdisciplinary research skills and establish research agendas that targeted important questions in population health. In addition, the program gave scholars the opportunity to hone their leadership skills and engage in knowledge exchange and transfer work, to ensure that the products of their research were used to improve health. Finally, while serving the scholars, the sites also worked to promote interdisciplinary scholarship and population health research across their host universities.

This report details the history of the HSS program. Program documents, interviews, and statements at meetings were used to assess the strengths and weaknesses of the program and to explore its perceived impact on the scholars, the faculty involved, the universities that hosted sites, and the field of population health. The goal was to draw lessons from the experiences of faculty, scholars, and program staff that may prove helpful for future training programs in population health. Audiences that may find this report useful include educators designing educational and research programs in population health, educational administrators interested in the challenge of changing organizational culture and practices to promote interdisciplinary scholarship, and population health researchers who mentor early career scholars.

Background

By 2001, public health leaders concerned with health disparities believed that it was essential to provide government agencies, universities, and public health organizations with experts that had knowledge and skills in population health [1]. An Institute of Medicine (IOM) report, for example, emphasized the importance of understanding the interconnections between the determinants of health, and of developing leaders who could use this knowledge to mobilize action to improve health [2].

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1 Although the term “field” is used throughout this document, it is not meant to indicate that population health is a discipline; many researchers consider it an approach that integrates the contributions of many disciplines.
In academia, that’s an unnatural act, to really work legitimately across departments and disciplines. We first had to look for universities that had that predisposition, that had that commitment at the very highest level, to drive training that was truly interdisciplinary, says McGinnis [3].

Given the success of other RWJF human capital programs, such as the Clinical Scholars and Scholars in Health Policy Research programs, in populating new fields with talented researchers, the Foundation decided to develop a fellowship program that focused on the science of population health. “One of the major leverage points for any philanthropy to make a difference over the long term is building human capital, developing the seed corn for future leadership,” explains the program’s founder, J. Michael McGinnis (Leonard D. Schaeffer Executive Officer, National Academy of Medicine) [3]. His vision was to “involve all the individuals, the best and the brightest in all fields, working together across disciplines to improve the capacity for society to be healthy.” One of the program’s major goals was to train leaders who could “design, implement, and evaluate population-wide interventions to improve health and reduce disparities in health” [1].

The six sites chosen to host the program were carefully selected; 21 institutions had been asked to apply to the program [4], and 10 finalists were chosen for site visits. Throughout the selection process, RWJF was looking for a broad conceptualization of health (vs. a focus on health care); a commitment to interdisciplinary research, as evidenced by representation from many disciplines; strong leadership; a strong plan for mentoring independent, interdisciplinary scholars; ties to the community; and a focus on intervention and practice, in addition to the following:

**The Population Health Focus at Each Site**

**Columbia:** This site’s joint home between the uptown School of Public Health and the downtown School of Arts and Sciences brought the two campuses together to collaborate at an unprecedented level. The least structured of the programs, its focus continually changed to reflect the interests of current faculty and scholars.

**Harvard:** This site’s exploration of population health initially focused on four core disciplines: social epidemiology, public policy, the history of science, and neuroscience. Later it also began to stress translational research.

**UCSF:** This site spanned the Health Sciences campus at UCSF and the Arts and Sciences campus at Berkeley, bringing together the two in a way that had never been done before. Throughout the program, a life course approach to interactions between context, behavior, and biology defined this site’s approach to population health.

**Michigan:** This site sought to build bridges between causal factors (cells to society) to understand and improve population health and eliminate health disparities. It tended to use large databases to address population health questions.

**Penn:** Two site directors who were also former site directors of the RWJF Clinical Scholars program and the absence of a school of public health ensured a unique focus at this site, which had close ties to the medical, business, and communication schools. Health economics was one particularly strong area.

**Wisconsin:** A strong focus on translating knowledge into policy and practice defined this site, which had a strong relationship with the nearby state government. This site was particularly strong in health economics and the social sciences.
Excellence in working across departments and disciplines was especially important.

Each site was managed by the small team of site directors who had created a compelling vision of the training program during the application process. During most years, 18 new scholars were selected—3 per site—through a process that combined an application, on-site interviews, and the preferences of the National Advisory Committee (NAC), the sites directors (and core faculty), and scholars. Over the course of the HSS program, a total of 2,683 applications were received for the 193 available scholar positions. In addition, by 2013, approximately 470 faculty members were involved with the six sites [1]. Faculty involvement was essential, as scholars needed mentors to help them navigate a new and potentially risky career path in interdisciplinary science.

The sites used multiple strategies to support population health training and research. Scholars spent most of their 2 years in the program performing interdisciplinary research, but each site also developed approaches to expose scholars to population health and cross-discipline communication; two program-wide areas of emphasis included leadership development and knowledge exchange and translation. In addition, the sites each received a pool of research and training (R&T) funds that could be used to support interdisciplinary scholar and faculty research and raise the visibility of the HSS program around the university. This funding was often used to advance research and education in population health.

Although the sites shared elements, such as weekly population health seminars and financial support for population health research, they also operated as independent experiments; when a practice at one site proved successful, it could be adopted by the others and tweaked if need be. Transdisciplinary working groups—which, for example, produced pilot research for successful individual and center grant proposals, organized conferences and seminar series, and published journal special issues—ended up spreading to almost every site [5].

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A Sampling of Scholar Research Topics

- The spread of violence through high-risk social networks in Chicago (Andrew Papachristos, Cohort 8, Harvard)
- Epigenetic effects of early-life stress (Amy Non, Cohort 8, Harvard)
- Methods for analyzing corporate document “data dumps” for environmental health lawsuits (Merlin Chowkwanyun, Cohort 11, Wisconsin)
- All of Us: a documentary on HIV research (Mehret Mandefro, Cohort 5, Penn)
- The addictiveness of slot machines (Natasha Dow Schüll, Cohort 1, Columbia)

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2 In 2011 and 2012, only two scholars were selected per site. In addition, because of the 2008 economic downturn, HSS was forced to eliminate two sites, the University of Michigan and the University of Pennsylvania, after the 2012–2014 cohort scholars completed their tenure.
Two lines of oversight and support for the sites existed: the National Program Office (NPO), based at The New York Academy of Medicine starting in 2007, and the NAC. The NPO, led most recently by Jo Ivey Boufford (President, The New York Academy of Medicine) and Christine Bachrach (Research Professor, University of Maryland), managed the national recruitment and selection process for scholars, organized the annual meetings, and carried out site visits and annual evaluations. During site visits, evaluation teams consisting of NPO and NAC members would interview site directors, scholars, and key university representatives to determine what was working and what was not working at each site. These visits helped promote cross-site learning, connections between NPO and NAC members, scholars, and faculty, and the identification of areas in which the NPO could play a greater role. In addition, one session in each site visit included only the evaluation team and the scholars, to ensure that the scholars’ ideas about the program were heard. In the later years of the program, the NPO also convened site directors and faculty to develop frameworks on leadership development [6] and translating research evidence to policy and practice [7] that were used to promote increased attention to these training topics across the sites. Finally, the NPO provided support for the development of both the field and the alumni network, which included managing the program’s websites and social media accounts, including a Facebook, LinkedIn, and Twitter presence [5,8].

The NAC was composed of leaders in the field, including founding chair Harvey V. Fineberg (President, Gordon and Betty Moore Foundation; Former President, Institute of Medicine) and more recent chair Jonathan Samet (Chair of the Department of Preventive Medicine, University of Southern California). NAC members aided in scholar recruitment and selection, attended the program’s annual meeting, and visited sites as part of the evaluation teams. Their most important function was to advise the NPO and RWJF on how to make the program effective. However, the presence of NAC members at the program’s annual meetings provided a variety of opportunities for them to meet the scholars, get acquainted, and—if both were interested and able—develop one-on-one mentoring relationships.

Annual meetings also provided an opportunity for scholars, site directors, alumni, and NPO members to interact. The purpose was to create cross-site connections and give scholars a forum to showcase their work [9]. Each year, the first-year scholars shared ongoing or planned research and received constructive criticism about how to improve their projects, and the second-year scholars made more formal presentations of developed work. In addition, programming on topics such as negotiation and communicating with the media was sometimes offered. Finally, the annual meeting served as an orientation for newly selected scholars, who attended several months before entering the program. An annual Scholars-Only meeting, conceived of and planned by the scholars themselves, provided more opportunities for networking and mentoring.
Lessons Learned
As it grew from a mere idea to an established program that included hundreds of researchers, the HSS program accumulated knowledge that may prove helpful to individuals planning future training programs. A few factors were consistently mentioned as being essential to the HSS program’s success. These factors included the following:

Cohorts of Scholars. The opportunity to interact with other scholars who had similar interests but different backgrounds was brought up again and again as being one of the program’s greatest strengths. Such interaction changed the way that many scholars and faculty approached familiar problems. The everyday proximity “was important for cross-fertilization, for mutual support and growth,” says David Vlahov (Former Co-Director, NPO) [10]. The size and composition of these cohorts warrants careful thought. Fineberg explains:

>There is a critical mass at a given site. Although you gain a lot by having a variety of sites, because each site brings distinctive strengths, you also need to ensure that there are enough fellows at each site. So I would have said that at a time when there was a thought of maybe going down to two per site, that four is a lot better than two. Three is kind of at the minimus, and five, if it could be managed by the site, would be even better and certainly more economical, because there is expense associated with a full site as well [11].

Mentorship. Although universities are slowly changing, the decision to pursue an interdisciplinary career is still a risky one. Intensive mentorship from senior researchers who have successfully navigated this path is invaluable for young scholars. This type of intense mentorship requires financial support. Bachrach explains:

>What happens in a lot of training programs is the faculty, who have their own agendas, get their benefit by acquiring research assistants. Whereas in this program, we were not just duplicating the strengths of the mentors, we were creating new strengths by helping trainees achieve much broader interdisciplinary reach, helping them take risks, helping them achieve their own career trajectories in ways that probably can’t happen unless you invest in that faculty mentoring [12].

If programs are to avoid the model in which trainees are groomed to become their mentors, identifying a source of funds to incentivize older scholars to shepherd younger scholars through the process of becoming interdisciplinary researchers will be an important challenge.
Curriculum. The program recognized the need to provide scholars with a common grounding in population health and interdisciplinary research, but it decided to let each site develop its own curriculum. There were common elements across sites: All agreed to keep didactic classroom work to a minimum to avoid distracting scholars from research, and each site organized a population health seminar that allowed scholars and core faculty to explore key topics in the field from multiple disciplinary perspectives. In addition to the seminar, each site mixed and matched additional components, such as short, workshop-style courses and working groups, to meet the needs of its scholars. Tailoring the curriculum to scholars’ interests proved an effective way to develop population health knowledge and interdisciplinary communication skills.

Research and Training Funds. These R&T funds were used to support the research of current faculty, to incentivize their involvement in the program; to support the scholars, to make them more attractive research partners; and often to support the work of faculty outside the program, to increase their engagement with population health. In addition, creative uses of the funds—for working groups, curriculum support, and population health prizes—considerably raised the visibility of population health research at the host universities. Relative to the amount spent on other expenses, such as salaries, the R&T funds cost little and accomplished much.

Flexibility. In looking back at the program, James Knickman (Former Co-Director, NPO, and former NAC Member) cites flexibility in response to scholar and faculty input as one of its greatest strengths:

The people who are going to run programs and sort of live day in and day out implementing the ideas should be at the table in designing them, especially when they’re really smart people in a field. That was an important lesson: Design collaboratively rather than hierarchically. A second lesson is to give the scholars some flexibility and to give them a voice and some power. The fact that we let them do their own conference and shape some of the details about what the training would be, what the educational part of it would be, was a good lesson. They were very responsible, very creative, and I think designed things that a number of us were skeptical were good ideas, but we let them try them and they really worked [13].

Such a collaborative arrangement is extremely unusual, but the design ensured that all participants felt invested in the program.
University Culture and Structure. During the site selection process, the Foundation was careful to assess whether each university would provide a supportive environment for an interdisciplinary program such as HSS. Such support proved essential, as the sites’ work across departments and even campuses often required universities to create new financial and administrative systems. From ensuring that the scholars and site directors had offices that facilitated daily interaction, to providing the administrative support to keep the sites running smoothly, to encouraging faculty to participate in a program that might otherwise be viewed as unproven and risky, the cooperation and enthusiasm of senior university officials was vital. The NPO’s insistence on regular contact with these officials through site visits proved a good strategy for maintaining this support.

Interestingly, one factor was cited as a strength by some in the HSS program and a weakness by others:

Stipend. The stipend level of the HSS program (which started at $65,000 in 2003 and approached $90,000 in later years) was extraordinarily high by postdoc standards. This allowed the program to attract candidates who otherwise might not have applied, including junior faculty, physicians, lawyers, and applicants who were eligible for other RWJF fellowships. Some involved with the program thought that the high stipend level was indispensable for attracting highly qualified candidates. Peter Bearman (Site Director, Columbia) believes trying to replicate this program with National Institutes of Health (NIH)–level stipends ($34,200 for a first-year postdoctoral trainee in 2003) would not work, observing, “You need to pay for talent” [14]. However, Nancy Adler (Site Director, UCSFB) believes the high stipends may have been a liability:

> The stipends were almost unnaturally high, and I think that created problems, because for some people their first job was offering less than the stipend. I don’t think it was necessary to pay that high a level to get the scholars, and I think it did create problems. So I would have freed up that money for other things [15].

Thus, the subject of stipend levels in future programs deserves careful consideration.

One potential improvement was mentioned over and over, by every site in the program:
**Program Length.** Both site directors and scholars felt that creating interdisciplinary population health scholars in 2 years was a tall order. Says Adler:

> I think for some scholars, especially for those who are making a real shift in their field, 2 years is not long enough. Because they are basically on the job market a year after they get there. If you’re trying to do something new, you haven’t had time to show that you’re going to be able to do it. I think having the option of a third year would have been very beneficial [15].

Once the program realized the benefits of a third year, it attempted to make this option available to some scholars; however, funding was not sufficient to sustain the competitive third-year award for the life of the program. In the future, programs might be developed to build this extra time into their training plan from the beginning.

There are several other issues that surfaced over the years that may prove informative to future programs that promote interdisciplinary scholarship:

**Disciplinary Diversity.** The interdisciplinary reach of the HSS sites expanded rapidly every year, and the program was extremely successful at attracting faculty with many different backgrounds. However, integrating scholars and faculty from the biological sciences and mathematics remained a persistent challenge. McGinnis notes:

> There has to be an extra effort to involve those on the biological side or the physical folks. I would have loved to see more mathematicians. Fundamentally, population health dynamics are mathematical challenges. And the interface between genetics, for example, and behavioral or social issues are statistical [and] mathematical modeling challenges, so I think the potential is stunning [16].

The experience of HSS suggests that to ensure that a discipline is incorporated in a program, it is helpful to start with site directors/core faculty in that discipline. Sociology, social epidemiology, and psychology were well represented among the site directors and core faculty, and scholars from these disciplines flocked to the program. However, incorporating biological science faculty into an interdisciplinary training program presents a challenge, as a model in which a faculty member mentors a trainee doing his or her own work is dramatically opposed to the current biomedical training model, in which a trainee carries out the work specified in a mentor’s grants. Therefore, new models of incentivizing basic science faculty to mentor independent, interdisciplinary trainees must be explored and will likely need to include substantial financial support for mentoring. Given the importance of biology and mathematics in the interdisciplinary vision of population health, finding a way to ensure that these disciplines are represented is crucial.
The same goes for policy and careers outside of academia. One of the stated goals of the HSS program was to “develop, evaluate, and disseminate knowledge, interventions, and policies that integrate and act on these determinants to improve health” [1]. However, the level of faculty and scholar interest in pursuing this goal varied. One site, the University of Wisconsin, saw this activity as core to its recruitment and curriculum design. It invited policy experts, as well as government and community leaders, to engage with and, in some cases, mentor the scholars. At other sites, research translation occupied a less central role; such sites might expose scholars to policy or communication role models through workshops or seminars. Sherman James (NAC member and Former Site Director, Michigan) notes:

*We’re in the business of reproducing ourselves. You locate the HSS program in prestigious universities—that have very clear ideas about the kind of young people they want to work with, and the kind of academic credentials that are necessary in order to benefit from what the resident faculty have to offer—you’re going to end up producing a lot of academics. That’s just the nature of the beast [17].*

Toward the end of the program, the program leadership developed a competency framework for preparing scholars to understand and engage in translating their research evidence, which helped focus attention on this issue. However, engaging policy and practice mentors to support scholars whose primary interest is in research translation may take special effort for programs housed in universities.

**Domestic Focus.** Another idea that future programs may want to revisit is the domestic focus of the HSS program. For certain scholars, the Foundation’s preference for domestic work inhibited participation in programs that might otherwise have been beneficial [18-20]. Exploring ways to integrate international work with some funders’ domestic interests may be worthwhile.

**Sustainability and Spread.** Finally, many involved in HSS emphasized the importance of a lasting commitment to this type of training program. RWJF supported the HSS program for 13 years, far fewer than many of its signature human capital programs. Many in the HSS program felt that a longer period of support could have been useful in achieving a critical mass of trained scholars. Future training programs may need to think carefully about how to create sustainable models for funding.
In the end, the HSS program’s impact will depend on its ability to sustain alumni engagement. The program trained fewer than 200 scholars, but those scholars will go on to mentor other young researchers, and those researchers will go on to train still other researchers. By ensuring that HSS alumni maintain a connection to population health, the program can maximize its impact. In the final years of the program, the NPO has planned leadership development conferences to help alumni implement and disseminate the population health approach. Many alumni have also taken an active role in planning the Interdisciplinary Association for Population Health Science, which will provide a venue for former Health & Society Scholars to interact with one another, as well as with other scientists, clinicians, and policymakers interested in population health.

**Conclusion**

HSS alumni are now employed at nearly 60 universities across the nation, including Ivy League schools such as Harvard, Yale, and Princeton; large state schools, such as University of California, San Francisco, University of Kansas, Ohio State University, University of Wisconsin, University of North Carolina, Chapel Hill, and Penn State; and small liberal arts schools, such as Smith College. They also work in the government, think tanks, contract research organizations, and foundations and nonprofits, and some have started their own businesses. They are producing research that is covered prominently in the news, chairing departments, providing testimony before Congress, producing award-winning films, and revolutionizing the treatment of diseases such as asthma. And as they succeed in these diverse endeavors, they act as “ambassadors of population health,” raising its profile in the greater community [21]. “I think HSS is just a spectacular program. It has exceeded certainly my expectations, and my impression is that the program has exceeded those of just about everyone who has been involved in it,” says James [17].

In addition to shaping the career trajectory of the scholars, the program has had profound effects on the faculty and the universities involved. It brought together site directors and other researchers passionate about population health, and many fruitful collaborations emerged as a result. With the program’s support, a number of site directors expanded their own interdisciplinary research agendas, and some who had previously focused on

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**Effects of the program**

*My entire career since has just been like a love song to the HSS program. To say that it’s been the foundation for everything that came afterward is a gross understatement. ... The program gave me an opportunity to interact with so many different types of scholars. I have been heavily influenced by the focus on upstream determinants, on the population perspective.*

–Dawn Alley, Cohort 4, Penn

*The population health focus changed my research much more dramatically to the social determinants of health and away from my medical background. I really now believe as a physician that the most critical long-term factor for health is education.*

–Doug Jutte, Cohort 1, UCSFB

*The whole experience of being a scholar for 2 years was eye-opening. It was an experience that I wouldn’t have had if I stayed at my institution. By that I mean access to so many resources allowed me to learn from people in different fields, take some ideas that I had that needed more work, be able to get constructive criticism on what I was doing, and being able to take those ideas to the next level.*

–José Pagán, Cohort 1, Penn
research entered the world of public policy. They have written books, such as *Beyond Obamacare: Life, Death, and Social Policy* [22]; performed groundbreaking research on subjects such as social influences on autism diagnoses [23] and the effects of stress and discrimination on telomeres [24,25]; and helped shape health policy through projects such as the County Health Rankings and Roadmaps [26]. The HSS program also strengthened support for interdisciplinary research and teaching at the universities that hosted sites. Seeing a successful model of cross-discipline collaboration proved to many university officials that this approach was a productive one, and new interdisciplinary programs are now benefiting from the financial and administrative systems that universities developed to support the sites.

Well, 13 years later and 193 scholars later, I think I can say, hand on heart, the Foundation is truly proud of what the Health & Society Scholars program has created. We have a cadre of researchers who have looked at these complex problems from many different angles and come up with solutions that are frankly innovative and are changing the health of populations.

–Risa Lavizzo-Mourey, President, RWJF

The experience of the HSS program highlights many practices that could be replicated in the future, as well as a few potential problems that similar programs are likely to encounter. Recently, a meeting entitled “Training in Interdisciplinary Population Health Science: A Vision for the Future” was hosted by the IOM Roundtable on Population Health Improvement. It drew representatives from the NIH, numerous universities, and also companies focused on population health; new ideas and best practices for producing a robust pipeline of interdisciplinary population health scientists were discussed [27]. However, training programs will not materialize unless funders consider population health training a priority. One way to convince funders of the utility of the population health approach may be to emphasize how it dovetails with the Institute for Healthcare Improvement’s Triple Aim, one aim of which is to “improve population health.” Under the Affordable Care Act (ACA), which is guided by the Triple Aim, clinicians that belong to accountable care organizations feel a new urgency to improve the health of their patient populations in a cost-effective manner, and the ACA also directs funds to organizations seeking to intervene on the nonclinical, community factors that determine health. By harnessing this new interest in population health and working hand-in-hand with clinicians to produce evidence that can be used to reduce health disparities and prevent disease, population health scientists have an unprecedented opportunity to raise the profile of their approach and justify funding for new training programs.
References

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