Circulation

PATHS TO DISCOVERY

A Rocky Road to Research and Self-Discovery: A Conversation With Emelia J. Benjamin

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Emelia J. Benjamin, MD, ScM, DrHC, is a cardiovascular epidemiologist with specific expertise in atrial fibrillation (AF). She is the Jay and Louise Coffman Professor in Vascular Medicine, Professor of Cardiovascular Medicine, and Interim Associate Dean for Faculty Development, Boston University (BU) Chobanian and Avedisian School of Medicine, and Professor of Epidemiology, BU School of Public Health. She is also a long-time Framingham Heart Study (FHS) investigator. Dr Benjamin was raised on a sheep farm in Oregon to parents who met at the University of Chicago when they were 15 and 16 years of age. Dr Benjamin graduated from Harvard University, majoring in psychology and social relations, *Phi Beta Kappa*, and from Case Western Reserve School of Medicine. She trained in internal medicine and cardiovascular diseases at the Boston City Hospital (BCH), followed by advanced echocardiography training at the Brigham & Women's Hospital, and a research fellowship with the FHS. She completed a master's degree in epidemiology at the Harvard School of Public Health. She served as a clinical cardiologist at BCH/Boston Medical Center (BMC) for almost 4 decades.

Dr Benjamin's lifelong work has been investigating the epidemiology of AF; she has mentored, comentored, and sponsored multiple leaders and trainees in cardiovascular medicine, and has published >900 articles. She has received numerous awards for research, teaching, mentoring, and championing equity and inclusion and women in academic health sciences. She is an elected member and past president of the Association of University Cardiologists (now emerita), and an elected member of the Association of American Physicians. She received the Paul Dudley White Award from the American Heart Association in 2015, an honorary doctorate in medical sciences from Aalborg University in Denmark, and the 2025 Eugene Braunwald Academic Mentorship Award, among many other recognitions for her tremendous career and impact on the careers of others.

Emelia J. Benjamin, MD, ScM, DrHC

Dr Farr asks: Please describe how growing up on a sheep farm with unconventional parents shaped your future.

Dr Benjamin replies: My parents raised us on a sheep farm outside Eugene, Oregon. They were brilliant and

quirky. My father (I suspect trying to reassure me) informed me when I was young that my modest intelligence was because of "regression to the mean." It was many years before I understood what that meant. Perhaps the silver lining is that my own insecurities have helped me understand that there are multiple forms of intelligence; I value all members of the team for the unique talents they bring to our work.

In grade school, I announced I that was not going to be a housewife, secretary, or nurse, which girls were expected to become. After winning a science prize in middle school, I declared that I wanted to become a scientist who worked with people—a doctor. I matriculated at Radcliffe and received my AB from Harvard (they merged), majoring in psychology and social relations, *Phi Beta Kappa*. I was not brilliant at science or test taking—essential skills for medical school—and got through the premedical courses by employing my lifelong strategy of working extremely hard. I received just one acceptance to medical school—to Case Western Reserve in Cleveland, Ohio—so that's where I went.

How did you fare in medical school?

I struggled with the male-dominated culture and the emphasis on memorization typical of medical school in the early 1980s. After I flunked my first exam in medical school, I suffered my first major depression—something I intermittently struggled with throughout my career. Being prone to depression is something that I have learned to be open about, because it reflects the reality that many physicians struggle with mental health issues but never disclose them. The hazing, competition, endless training, and unrestricted work hours that were typical at that time—these are the stresses that can sometimes threaten to break us. But I got through it and decided to train in Medicine at BCH. I returned to the East Coast and found my people and my architect husband, David Pollak.

What do you mean by "found your people"?

At BCH, I found people who were intensely committed to the mission to serve the underserved at New England's largest safety-net hospital. I wasn't a superstar who could recite clinical trial data or memorize differential diagnoses, but for the first time I felt comfortable in my own skin and in my medical practice. After residency and cardiology fellowship, I had advanced echo training at the Brigham with Martin St John Sutton, received a research fellowship with the FHS, and earned a master's degree in epidemiology from the Harvard School of Public Health. Toward the end of my fellowship, I had my first child, and in retrospect had undiagnosed postpartum depression, a not unusual condition that is stigmatized and underdiagnosed to this day. Because of this experience, I am open about my struggles with faculty members I know are pregnant, to ensure they get help if needed.

My first and only jobs have been with BCH—now BMC—and the FHS. It has always been a joyful experience to be a clinical cardiologist at BMC/BMC, where my clinical colleagues are generous, collaborative, and driven to provide "exceptional care without exception." After returning from my fellowships, University Hospital and BCH merged into BMC, which, in retrospect, was a very good thing. Remarkably, the culture of BCH prevails to this day. There is a deep commitment to caring for people who have been structurally disadvantaged—a commitment to health equity and to framing health, disease, and the provision of care in the context of social determinants of health.

Please describe your early years with the FHS and how you obtained your first research grant.

The FHS has been amazing, and for many years also very challenging. Many people can tell fairytale origin stories of their career, but that was not my experience. I started in the echo lab at the FHS, ultimately running it, but it took me 2 years on faculty to write my first paper, and much longer to obtain my first National Institutes of Health grant. I was unclear how to ask for the mentorship that I wasn't getting. I had terrible writer's block. One of the senior researchers even yelled at me that I was a freeloader because I hadn't gotten a grant. Shocking as this was, it sparked a flame in me, because I was then determined to get a grant funded. It was one of my peers—Joseph Vita, who died of cancer—who taught me how to write grants. What a person he was: tall, taciturn, brilliant, and highly accomplished at such a young age. Aside from us both being cardiologist investigators, we had nothing in common. Joe just decided to help me. He taught me how to write and struggle through the grant-writing process. And then one day I was funded and have been so continuously since 1998. I remain profoundly grateful to Joe. Mentorship can come from anywhere—you never know who will end up being your most important mentors. They do not have to look like you, and they may even be your peers.

My mentoring experiences—omission and commission, good and bad—have transformed my career, creating an intense motivation to create mentoring teams for my mentees and BU faculty. I choose to be grateful to my (tor)mentors because they provided important reverse role modeling, and taught me to write manuscripts, think critically as a scientist, and appreciate that feedback (even harsh) is a gift. I learned that we have the choice to see setbacks as growth opportunities.

What was your first publication?

My first paper as a first author was on the association between mitral annular calcification and stroke risk.[1] It was published in the *New England Journal of Medicine* in 1992. We reported that in the original FHS cohort of 1159 patients with an average age of 70 years and followed for a median of 8 years, the relative risk of stroke was 2.1 in patients with any mitral annular calcification, after adjusting for other risk factors, including heart failure (HF) and AF. Furthermore, for each 1 mm of mitral annular calcification, the stroke risk increased by 1.24. It was one of the first reports that cardiovascular calcification was associated with poor prognosis.

How did AF become your primary topic at the FHS?

AF became the center of my research because I found all aspects of the epidemiology of AF fascinating; risk factors, comorbid conditions such as HF, and prognosis. I also focused on AF partly because it was an area few researchers were studying in the 1990s, and AF was not "claimed" by others at the FHS. Although internally driven, I came to understand that I do not thrive with intense competition.

The first paper I published on AF was on associated risk factors, which appeared in *JAMA* in 1994.[2] We analyzed the original FHS cohort with up to 38 years of follow-up. We observed that incident AF was 1.5 times higher in men than women, and that advancing age, diabetes, hypertension, HF, and valve disease were risk factors. In men, myocardial infarction was also a risk factor, and for women, valvular heart disease was a greater risk factor (odds ratio 3.4 in women, compared with 1.8 in men).

In 1998, we published in *Circulation* that AF was associated with an odds ratio for death of 1.5 in men and 1.9 in women.[3] We demonstrated a significant interaction such that the development of AF in women largely eliminated their typical survival advantage compared with men (interaction). The *Circulation* article is my most-cited original research paper. Previously, some had considered AF a risk marker mostly associated with stroke; this paper provided important support for the concept that AF was a risk factor for death.

Another paper that I am especially proud of[4] was coauthored, among others, with Thomas Wang, now Dean of the University of Michigan Medical School, who at the time was a young FHS researcher just securing his K23 grant. We established that development of AF or HF frequently predisposed to, and complicated, the other condition. In a cohort of 1470 individuals >50 years of age, we analyzed incident AF or HF. Some patients were diagnosed with AF (38%) or HF (41%) first, and some at the same time. In patients with AF, there was increased mortality in those who developed subsequent HF, and vice versa.

Can you provide a summary of the increasing lifetime risk of AF?

The first report of the lifetime risk of AF of 24% was published by Donald Lloyd-Jones, myself, and colleagues.[5] From 2011 through 2022, the lifetime risk jumped to 30.9%, resulting in a risk difference of roughly 7%. Part of the increased incidence, prevalence, and lifetime risk of AF is due to enhanced detection, population aging, and increased survival in AF and the comorbidities predisposing to AF, such as HF. My interest was ultimately in AF prevention; I hoped illuminating the epidemiology in FHS and other databases would catalyze such an interest.

In 2009, you had the opportunity to lead a report from the National Heart, Lung, and Blood Institute workshop on prevention of AF. What were some of the conclusions and research questions that emerged from this expert panel?

We found that AF was common, with an increasing incidence and prevalence, and examined its known association with stroke, dementia, and HF, and its mortality burden.[6] We reviewed the risk factors already discussed and also ventured to describe what was known at the time about AF genetics—that AF sometimes had a familial component and was associated with specific genes, such as ion channel variations in *KCNQ1* and *GJA5*, but the genotype–phenotype penetration was variable, even in well-studied cohorts. We arrived at specific recommendations to improve knowledge of symptomatic and asymptomatic AF, and AF detection, including improved diagnostic and procedural codes and noninvasive devices, which we now call "wearables." We also recommended improvements in imaging to measure left atrial remodeling and fibrosis, and research and clinical studies to better understand atrial remodeling, with an eye toward improved therapies. We also strongly recommended including AF as a secondary end point in clinical trials. AF is easy to diagnose on ECG and with International Classification of Diseases codes, and therefore is very easy to measure in large studies.

However valuable the FHS has been, and will continue to be, its population lacks diversity. Can we talk about your collaborative work with Alvaro Alonso and Susan Heckbert studying other large cohorts?

Because of my commitment to diversity, I have a longstanding collaboration with the Jackson Heart Study. In

addition, in recognition of Framingham's growing diversity, George O'Connor recruited a multiethnic Omni FHS cohort in the 1990s, and I recruited the second multiethnic cohort in the early 2000s.

When challenge grants were issued, I reached out to Susan Heckbert and Alvaro Alonso—epidemiologists who were working with more diverse cohorts. We performed an analysis of 3 cohorts—the Atherosclerosis Risk in Communities study, the Cardiovascular Health Study, and the FHS—pooling a total of 18 556 individuals, ages 46 to 94 years, 19% Black, to derive a predictive model for AF development. We then validated the score with investigators from the Age, Gene/Environment Susceptibility Reykjavik Study and the Rotterdam Study. The 5-year predictive model was based on simple variables that are obtainable at primary care visits, with a C-statistic of 0.765 (95% CI, 0.748–0.781). Addition of electrocardiographic findings (PR interval and left ventricular hypertrophy) did not improve the model. We called this pooled analysis the CHARGE-AF study (Cohorts for Heart and Aging Research in Genomic Epidemiology–Atrial Fibrillation) and published the findings in the *Journal of the American Heart Association* in 2013.[7]

I've also had the honor of sharing my expertise gained as a co–principal investigator on several FHS renewals with investigators around the world, including consulting on heart studies in Beijing, Brazil, and Europe.

You also worked with Sana Al-Khatib, Kevin Thomas, Alan Go, and others to draft the findings of a 2021 National Heart, Lung, and Blood Institute expert panel on integrating social determinants of health into AF research.

This was a critically important National Heart, Lung, and Blood Institute expert panel. As an academic electrophysiologist and leader in her field, Sana was the perfect person to serve as the manuscript's last author. Before convening this expert panel and publishing our recommendations in *JAMA Cardiology* in 2023,[8] there was no consensus statement or call to action regarding the impact of social determinants of health on AF incidence, detection, management, or outcomes. We summarized what was known: that AF was associated with lower socioeconomic status and that death and AF-associated morbidity also tracked with lower socioeconomic status. Black individuals, people from other underrepresented racial or ethnic groups, individuals with lower health literacy, and people with lower access to health care were less likely to be diagnosed, more likely to present with stroke, less likely to receive direct oral anticoagulant medications, more likely to have subtherapeutic or supratherapeutic international normalized ratio on warfarin, and less likely to be offered (and sometimes, to accept) invasive rhythm restoration therapy. We established research goals to develop evidence-based strategies through pragmatic intervention and implementation science–based trials to address social determinants of health in AF and to mitigate inequities by sex, race, socioeconomic status, location (rural versus urban), and cumulative disadvantage across the life course. We called for an increase in representation and reporting of outcomes for women, people from underrepresented racial or ethnic groups, and those affected by social determinants of health in AF clinical research.

Can you talk about your midcareer road bump and how you got through it?

I was on the R01 track and was the head of the echo lab at FHS, but midcareer, I hit the wall again. It was difficult to keep everything afloat, and I frankly faced both implicit and explicit biases with colleagues and leadership. I am grateful that through coaching and peer mentoring I found my way through it. My leadership coach taught me many lessons that I impart to my mentees to this day. Rather than focus on negativity, she had me shift my focus to what was within my sphere of influence: to honor my reaction and then be strategic in my actions. Life is unfair—the patients I have had the honor to care for >4 decades have provided profound perspective. By focusing on working with wonderful collaborators, supporting my mentees, and avoiding working closely with challenging people, I have been much more productive and fulfilled.

In 2014, I was struggling with my grant funding, my colleague Joseph Vita died, I was tried for medical research negligence (the world's only epidemiologist to be sued for her research; the jury found in my favor), and one of my children was having problems. I wouldn't wish that year on my worst enemy, but I discovered Brené Brown, faced the decades of internalized shame so rampant in academic medicine, embraced my vulnerability, leaned into being authentic, and gave the best talk of my career for medical grand rounds at BMC/BU. I combined lessons learned from my research career and from my setbacks. I had individuals turn to the people next to them to discuss committing to primordial prevention by developing and practicing resilience strategies.

Let's talk about mentorship, your foray into coaching, and your role in faculty development.

I have mentored countless individuals over the years and secured advanced coaching certification through Columbia University. I have been honored to support many

faculty members and trainees' careers by providing perspective, resources, sponsorship, coaching, and mentoring. In recent years, faculty development and coaching have taken the center stage of my career.

As the interim associate dean for faculty development, I am continuing my long-standing commitment to the academic community. Having experienced many setbacks in my career, I strive to ensure that those who come behind me have the support and resources they need. I founded faculty development on the BU Medical Campus and have developed and continually improved, through rigorous evaluation, 6 longitudinal faculty development programs for early- and mid-career clinician–educators, narrative writing, and individuals interested in understanding the complexities of leading as women or as members of underrepresented racial or ethnic groups. Over the past decade, I have also averaged >100 faculty career consultations annually on promotion and navigating challenges.

What has been most important to you?

My most important legacy is faculty development programs and the exceptional trainees and mentees I have had a small part in helping along their journey. My research mentees from the US, Canada, Brazil, the Netherlands, Denmark, Germany, and beyond tease me about my "Emeliation" of manuscripts—teaching them how to write rigorously. I tell them my mentees and collaborators are the drivers of my academic success.

I stopped practicing clinically in 2022 because I wanted to "go out on top" and to pursue coaching certification, faculty development, and research mentoring more fully. During my last 2 weeks on clinical service, I received an email from a trainee I worked with in the 2000s, which summarizes what I hope will be my clinical training legacy: "Over the years, I have thought of you often, and remember with awe and pride how you addressed each and every intubated and sedated patient in the CCU directly by name, with eye contact, with a gentle touch, and with a compassion that was truly unsurpassed. You instilled in me the importance of treating each patient with respect, individualized attention, and kindness, and I have carried that with me to this day. I work to impart that same lesson on the students and residents I work with and often share stories of our CCU days together."

In my research, I hope that I have advanced the AF research and clinical practice agenda to focus on primary and secondary prevention and ensure that health systems study and eliminate health inequities in AF.

Which awards or prizes do you most cherish?

My 3 most cherished awards have been given in the past few years. These represent my lifelong commitment to underserved people, having spent >40 years at BCH/BMC, my commitment to mentorship and equity, and my deep love of collaborative efforts.

- The 2020 Alliance for Academic Internal Medicine Diversity, Equity, & Inclusion Award
- The 2025 American Heart Association Eugene Braunwald Academic Mentorship Award
- Honorary Doctorate in Medical Science from Aalborg University in 2025

Tell me something about your family and what's next for you.

I am profoundly grateful to say my children and husband are thriving. My son, Noah Benjamin-Pollak, is a PhD student at Stanford's School of Engineering, conducting ethnographic research on power dynamics and authority in industry. He is married to Laura Murray, PhD, a clinical psychologist researcher at the National Institute on Drug Abuse of the National Institutes of Health. They just had our first grandson, Isaac Stephen Benjamin-Pollak. My daughter Rebekah Benjamin-Pollak, MSW, is a therapeutic social worker at a Boston public school, Melvin King South End Academy, which serves students with mental health, trauma, and socioeconomic challenges requiring high levels of academic or therapeutic support. My husband, David M. Pollak, is an architect who does public architecture and planning, including low-income housing. Early on, David was my first editor, and throughout my career he has enabled my success by his support and wisdom.

In terms of what's next, I am fond of saying that my next promotion is emeritus. Something we pay too little attention to in academia is succession planning. I am the contact multiple principal investigator on the BU Building Interdisciplinary Careers in Women's Health Research program, and am looking forward to coaching, sponsoring, and mentoring the scholars and transitioning the grant to my fellow multiple principal investigators for its renewal. I am also focusing on succession planning with faculty development programs by bringing on coleaders and documenting the logic models, curriculum, evaluation, talks, and administration of each program in process manuals and share drives with all materials. I envision providing coaching and mentoring for academic health science faculty on their research, grants, and life for as long as I can be of service.

Thank you for your time, for the opportunity to speak with you, and for sharing your story with *Circulation*.

I am humbled, honored, and honestly embarrassed to be featured in *Circulation.* In my years as a *Circulation* associate editor (2004–2016), mentored by Editor-in-Chief Joseph Loscalzo, I could not have imagined this. I have profound gratitude for my BCH/BMC and cardiovascular colleagues, mentees, and mentors.

ARTICLE INFORMATION

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None.

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