JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
PUBLISHED BY ELSEVIER ON BEHALF OF THE AMERICAN
COLLEGE OF CARDIOLOGY FOUNDATION

VOL. 69, NO. 21, 2017
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2017.04.027

FELLOWS-IN-TRAINING & EARLY CAREER PAGE

Breaking the Catheterization Laboratory Ceiling

Celina M. Yong, MD, MBA, MSc

At my first Transcatheter Cardiovascular Therapeutics (TCT) conference a few years ago, I came upon a shocking discovery, which had nothing to do with novel stents or valves. Upon exiting the 1,000-seat main auditorium, I bumped into a massive line for the *men's* bathroom—and there was *no one* in line for the women's bathroom. I skipped with glee into a stall, but then started to wonder, do all female interventionalists have bladders of steel? Why are there no other women here? What I designate as the "reverse bathroom sign" was a blatant red flag that the challenges to gender equity in the field that I had chosen to dedicate my life's work were far from resolved.

It is well known that in academic medicine and general cardiology, gender gaps are slowly improving, with equal numbers of women now entering medical school and achieving faculty instructor levels. Still, very few women are reaching full professor and dean levels (1). Recent efforts to reduce barriers to gender equity in cardiology have met some success (2). However, large hurdles persist for women who wish to pursue a career in interventional cardiology. Although women represent >40% of third-year internal medicine residents and 22% of cardiology fellows, by the time fellows reach the interventional cardiology training level, only 9% of them are female (3). Female interventionalists perform only 3% of percutaneous coronary interventions in the United States (4).

Why the persistent disparities? Can it really be that women are just not interested in having the ability to save someone's life in 90 min during an ST-segment elevation myocardial infarction (STEMI)? Or, are there other-perhaps institutional, cultural, or biological-barriers that are still getting in the way (5,6)?

From the Division of Cardiology, Stanford University, Stanford, California.

We can start by examining the stage at which gender differences start to prominently emerge on the 11+ year training path to becoming an interventionalist. By the time an average medical trainee reaches the point in her career at which she must decide whether to pursue interventional cardiology, she is typically 33 to 35 years old. At the age of 35, women are officially termed "AMA" (which in this case stands for "advanced maternal age"). For many, who initially postpone childbearing to focus on their lengthy medical training, the harsh reality hits that if they want to have children at all, the window is quickly closing. Not only does the chance of becoming pregnant begin to diminish rapidly, but the risks of pregnancy begin to exponentially increase as well (7).

Informal interviews I have conducted with female cardiology trainees reveal that wearing heavy lead and getting exposed to radiation, even during family planning stages—much less while pregnant—pose significant barriers to pursuing subspecialty training at this stage of their career. Personally, I was grateful to my program director for allowing me to purchase specialty "pregnancy lead," which is substantially heavier than regular lead, but increases protection. However, during the last trimester, it can be a huge challenge just to lift one's own bodyweight across the room, much less don 30 lbs of additional weight to stand for lengthy cardiac catheterization cases.

Although confidentiality is promised to female trainees who are encouraged to report if they are pregnant while in the catheterization laboratory, sometimes it is hard to keep a secret. In the earliest stage of my pregnancy during interventional fellowship, I recall asking my co-fellow if he would step in for a chronic total occlusion case, but I did not want to tell him why I was asking. As much as I loved chronic total occlusion cases, I was worried about the extended radiation time during the delicate first trimester, when

organs form and miscarriage rates are high. As the milligrays added up in that case, I felt guilty not knowing if I was doing the right thing. Despite scouring PubMed for substantive studies about radiation exposure during pregnancy and talking with the hospital radiation safety officer, I still felt that much is unknown. Some data exist, but there are no randomized trials of pregnant women getting variable exposure to radiation in the catheterization laboratory.

However, I would argue that the aforementioned challenges are not insurmountable. I am now a clinical assistant professor and interventional cardiologist at Stanford University and the Palo Alto VA, California, married to another interventional cardiologist who recently finished his training at Stanford. We have 2 children, 1 who arrived prior to the start of my interventional fellowship during a research year (when my husband was a general fellow), and 1 who arrived immediately following (when my husband was an interventional fellow). It has taken some planning and a substantial bit of luck, but more than anything, it has taken multiple villages of support (both professional and personal). When I lamented 1 day "there's never a good time to have kids," a mentor responded, "It's *always* a good time to have kids"—a mantra that I now pass on to my own mentees when asked. My husband and I have had to plan our STEMI call very carefully. There are some short windows of time, however, that if I were unlucky enough to get called for a STEMI, I frankly would not know what to do with my kids. Our 3-year-old could probably fend for himself in the control room with an iPhone movie, but we joke about getting baby lead for my 1-year-old to strap her to my back during a STEMI.

However, all the planning and support does not replace having role models who have succeeded at these feats (8). As a cardiology fellow, I agonized about whether to pursue interventional cardiology—even though I had already self-declared my interest during residency—and I struggled to find even a single female interventionalist with children in the entire country with whom I could have a frank discussion. A few years later, I met one such pioneer at a national conference but clearly there are still not enough. If our young trainees cannot readily identify *anyone* who has succeeded at what they hope to achieve, they will continue to question whether it is possible at all.

We all—male and female—need to be invested in solving these challenges together. If we hope to make our field truly great, then we cannot limit one-half of our opportunity to do so. To start, I propose we focus on 3 major areas:

1. *Changing professional expectations to accommodate young families.* We need to integrate family responsibilities into revised expectations about how a normative interventional cardiologist's career trajectory is expected to progress. It should be the norm to adjust a woman's catheterization schedule when pregnant according to her individual situation. Women already feel tremendous guilt about putting the burden of clinical care on others during the time of pregnancy, and this should be assuaged by supervisors and peers. We should try not to schedule important meetings or conferences during non-day care hours. For young parents-both men and women-who do not have the luxury of having a spouse to provide childcare at flexible hours or the finances to hire multiple nannies, they could be excluded from these important meetings. Furthermore, women may not feel comfortable speaking up about their inability to attend due to fears about the "motherhood penalty" (9). Instead, they just stop attending, which in turn, affects their professional visibility, educational growth, and promotion potential.
2. *Providing resources for young mothers in the cardiac catheterization laboratory.* For a mother who is trying to abide by American Academy of Pediatrics recommendations to breastfeed for an entire year (10), how will she maneuver a busy cardiac catheterization laboratory schedule of back-to-back cases, while pumping 2 to 3 times a day at a pump room in a different wing of the hospital? We need to make pumping rooms available, close to where the clinical work happens, and accommodate schedules to enable new mothers to pump. We need to provide appropriately sized lead for young women trainees in the cardiac catheterization laboratory; oversized men's lead does not adequately cover the left breast area that is in close proximity to the radiation source. As a community that drives research and development investments in the interventional field, we need to encourage the development of novel, improved technology for reducing radiation exposure. We need to banish the trend of being "macho" about radiation exposure, regardless of sex.
3. *Equalizing opportunity for promotion.* The American College of Cardiology Professional Life Survey showed that women currently report experiencing 3× as much discrimination as men (11). Although it may seem that these findings are unlikely to represent your own progressive institution, remember that gender discrimination can take many easily overlooked forms. For example, we need to create informal networking opportunities

that do not perpetually revolve around traditionally male-oriented activities (12). We need to rewrite professional search criteria with terminology that research evidence shows equivalent gender competence (13,14), and make the criteria for promotion transparent. We need to focus on ensuring that women receive equal pay for equal work. A recent national sample of 2,679 cardiologists from 161 U.S. practices showed that based on measured job and productivity characteristics, the women sampled should have had a mean salary >$30,000 higher than that actually observed (15). Even if the mix of work is different, we must prioritize compensation that matches what a male in the same situation would make (16). We need to prioritize gender diversity *at the very top* as a matter of policy, whether it takes quotas or institutional oversight in the beginning, so younger women can find mentors with whom they identify in leadership.

My advice for young women who are considering a career in interventional cardiology is to stop worrying about what everyone else thinks or how your master plan will unveil; if you love it, pursue it. Sit at the front table, not at the back; no one will see or hear you in the back. Go to national conferences; take advantage of the tremendous resources and opportunities through the women's groups at these conferences. Find mentors who believe in you and advocate for you; they do not have to be women. Be a mentor to others; you may be junior in your career, but there are always younger women who look up to you. Do not be afraid to ask for equal compensation to your male colleagues. Outsource any duties you can. If you have a spouse, discuss the concept of "team goals" (a.k.a., family goals) that include finding equity in child-rearing over a lifetime; this may mean tolerating periods of time that are uneven in either direction.

Let us find a way for women to succeed in this currently male-dominated but uniquely rewarding profession. One day when I attend TCT, I hope to scan the crowded auditorium and see as many women as men. For once, I will not mind waiting in line for the bathroom.

ACKNOWLEDGMENTS Special thanks to my mentors and family, especially my husband Freddy Abnousi, with whom I travel on this interventional cardiology journey.

ADDRESS FOR CORRESPONDENCE: Dr. Celina M. Yong, Stanford University Medical Center, Division of Cardiovascular Medicine, Falk CVRB, 870 Quarry Road, Stanford, California 94305. E-mail: cyong@stanford.edu.

REFERENCES

1. Lautenberger DM, Dandar VM, Raezer CL, Sloane RA. 2013–2014 The State of Women in Academic Medicine: The Pipeline and Pathways to Leadership. Washington, DC: Association of American Medical Colleges, 2014.

2. Prasad M. Gender in cardiology: work yet to be done. J Am Coll Cardiol 2016;67:3016–9.

3. American Board of Internal Medicine (ABIM). Resident & fellow workforce data. Available at: http://www.abim.org/about/statistics-data/resident-fellow-workforce-data.aspx. Accessed April 20, 2017.

4. Wang TY, Grines C, Ortega R, et al. Women in interventional cardiology: update in percutaneous coronary intervention practice patterns and outcomes of female operators from the National Cardiovascular Data Registry. Catheter Cardiovasc Interv 2016;87:663–8.

5. Carr PL, Gunn CM, Kaplan SA, Raj A, Freund KM. Inadequate progress for women in academic medicine: findings from the National Faculty Study. J Womens Health 2015;24:190–9.

6. Shollen SL, Bland CJ, Finstad DA, Taylor AL. Organizational climate and family life: how these factors affect the status of women faculty at one medical school. Acad Med 2009;84:87–94.

7. Morris JK, Mutton DE, Alberman E. Revised estimates of the maternal age specific live birth prevalence of Down's syndrome. J Med Screening 2002;9:2–6.

8. Carapinha R, Ortiz-Walters R, McCracken CM, Hill EV, Reede JY. Variability in women faculty's preferences regarding mentor similarity: a multi-institution study in academic medicine. Acad Med 2016;9:1108–18.

9. Miller CC. The motherhood penalty vs. the fatherhood bonus. The New York Times. September 6, 2104. Available at: http://www.nytimes.com/2014/09/07/upshot/a-child-helps-your-career-if-youre-a-man.html?_r=0. Accessed October 31, 2016.

10. Johnston M, Landers S, Noble L, Szucs K, Viehmann L. Breastfeeding and the use of human milk. Pediatrics 2012;129:e827–41.

11. Lewis SJ, Mehta LS, Douglas PS, et al., for the American College of Cardiology Women in Cardiology Leadership Council. Changes in the professional lives of cardiologists over 2 decades. J Am Coll Cardiol 2017;69:452–62.

12. Bates C, Gordon L, Travis E, et al. Striving for gender equity in academic medicine careers. Acad Med 2016;91:1050–2.

13. Marchant A, Bhattacharya A, Carnes M. Can the language of tenure criteria influence women's academic advancement? J Womens Health (Larchmt) 2007;16:998–1003.

14. Isaac C, Lee B, Carnes M. Interventions that affect gender bias in hiring: a systematic review. Acad Med 2009;84:1440–6.

15. Jagsi R, Biga C, Poppas A, et al. Work activities and compensation of male and female cardiologists. J Am Coll Cardiol 2016;67:529–41.

16. Hlatky MA, Shaw LJ. Women in cardiology: very few, different work, different pay. J Am Coll Cardiol 2016;67:542–4.

RESPONSE: The Ceiling Has Cracked Already!

Roxana Mehran, MD
Zena and Michael A. Weiner Cardiovascular Institute at Mount Sinai School of Medicine, New York, New York
E-mail: Roxana.Mehran@mountsinai.org

> *"You may not control all the events that happen to you, but you can decide not to be reduced by them."*
>
> —Maya Angelou (1)

There is no question in my mind that the field of interventional cardiology is one of the most gratifying careers in medicine. As an interventional cardiologist, you make an important and profound difference in the health outcomes of patients with cardiovascular disease, the number 1 killer of men and women globally. You perform procedures to diagnose and treat disease, and make contributions to the development of cutting-edge technology, while participating in research and education to find answers to difficult questions and make important and innovative discoveries for the future.

Who does not want such a career? Yes, there is a formidable investment in time to get there. During this journey, you may face crossroads for important family decisions, but this is the case for both men and women. Attracting women to this traditionally male-dominated field has been a particularly significant challenge. When I started my fellowship as the first female interventional fellow at Mount Sinai Hospital in 1994, there were only a handful of women in the entire field. I looked up to these women who had struggled on winding, uphill, and unpaved roads to reach their goals, and I aspired to be like them. I promised that if I should succeed, I would make it easier for others to follow. This was one of the reasons that Dr. Alaide Chieffo (a young female interventional cardiologist from Italy) and I founded the Women in Innovation initiative at the Society for Cardiovascular Angiography and Interventions, with the help of Dr. Bonnie Weiner, who was the president of the society at the time.

As I read the excellent and compelling piece by Dr. Celina M. Yong, I was simultaneously smiling and wiping tears falling down my face. I, too, have noticed the empty ladies' rooms at the TCT (Transcatheter Cardiovascular Therapeutics) meeting, as well as the general cardiology meetings. More importantly, I recognized the lack of female lecturers, live case operators, moderators, and panelists. This disturbed me; surely, there are talented women hidden somewhere in the field. Why were they not present on stages and live case venues with their male colleagues?

Well, this past March at the American College of Cardiology Scientific Symposia, the tide took a different turn! Almost every session had talented, established, and excellent female speakers, moderators, and panelists. The press surely paid attention to the excellent remarks and thought-provoking comments by the women who were present at the press conferences, quoting their impressions on the science presented (2). The enhanced visibility was a conscious movement spearheaded by the American College of Cardiology leaders, who sought to ensure that women were fairly and equitably represented. It worked like a charm! Everyone noticed it, and the meeting was more fun and certainly more exciting than in the past. Young female fellows were excited, with Twitter and news feeds trending and buzzing about the presence of more women in cardiology. There is no question that this is a very small step forward; we are still far away from enjoying the blue skies above the glass ceiling. We must remain hopeful, determined, and engaged. To reach the goal of equal representation and equal pay—and to close the gap in promotions for women in interventional cardiology—we should remain united with our male colleagues while promoting and supporting women who make interventional cardiology their career choice. Although we need to be supportive of young families, especially in terms of providing resources for young mothers in the workplace, we should focus our vision on the true prize: the important societal change that needs to take place to bring more women to the forefront of not just interventional cardiology, but also the high pedestals of the worlds of finance, law, and government. I would say that I see a huge crack in the glass ceiling of catheterization laboratories around the world, with talented women performing high-risk and complex procedures. I believe that our progress in this arena is well under way, but let us not forget the underrepresented minorities who are also rarely found in interventional cardiology, and bring them forward on this ride.

This year, the theme for TCT 2017 is "diversity." This progressive theme—focused on acceptance of all cultures, races, and sexes—is certainly a welcome and appropriate way to mark this 40th anniversary of our subspecialty.

REFERENCES

1. Angelou M. Letter to My Daughter. New York, NY: Random House, 2008.

2. Wood S. My takeaways from ACC 2017: even with a sea change, the tide takes its time. Available at: https://www.tctmd.com/news/my-takeaways-acc-2017-even-sea-change-tide-takes-its-time. Accessed April 20, 2017.