

CARDIOVASCULAR MEDICINE AND SOCIETY

Landscape of U.S. Cardiovascular Training Programs



Julie B. Damp, MD,^a Alex J. Auseon, DO,^b Mary Norine Walsh, MD,^c Paul Theriot, BSBA,^d Marty C. Tam, MD,^e Gaby Weissman, MD^f

Limited data is available on U.S. cardiovascular disease (CVD) training programs' characteristics. Available resources focus on fellowship recruitment (1,2). There has been no systematic method of acquiring and tracking training information. Therefore, the American College of Cardiology (ACC) Cardiovascular Training Section (CVTS) developed the Cardiovascular Program Directors' Survey (CVPoDS) to be an annual collection of information on program characteristics, trainees, program directors (PDs), and educational strategies.

METHODS

Survey questions were developed through an iterative process (3) by members of the CVTS leadership council with expertise in medical education and ACC staff. Forty multiple choice and short answer questions were administered to PDs of all U.S. CVD programs in the American Medical Association FREIDA Database of Accreditation Council for Graduate Medical Education (ACGME)-accredited programs (4). Program-specific links and 4 reminders were e-mailed from April 6, 2018, to May 12, 2018. Deidentified data was collected and analyzed using Verint EFM version 15.1 (Melville, New York) and SPSS version 23 (Armonk, New York). The Medstar Health Institutional Review Board approved the research.

RESULTS

PROGRAMS. Of 229 eligible programs (97% [222] of which participated in the 2018 NRMP), 130 (57%)

responded. Responding programs were 50% university hospital based, 39% community hospital-university affiliated, 9% community hospital based, and 2% military. A total of 23% of nonresponding programs were community based versus 7% of responding. Geographic distribution of respondents was 33% Northeast, 31% South, 25% Midwest, and 12% West (regions defined by U.S. Census Bureau) and closely reflected that of the total programs. Program size was 35% small (1 to 10 fellows), 33% medium (11 to 17 fellows), and 32% large (18 or more fellows).

A total of 56% of programs used a 4-week block schedule, whereas 32% used calendar month blocks and 12% utilized a variety of other formats. Home-call for their primary hospital was used in 73%, which was more likely for smaller programs (87% vs. 60% for medium and 71% for large). Smaller programs were less likely to use night float (7%) and in-house call systems (9%) compared with medium (30%/23%) and large programs (31%/24%). A total of 85% of programs allowed fellow moonlighting.

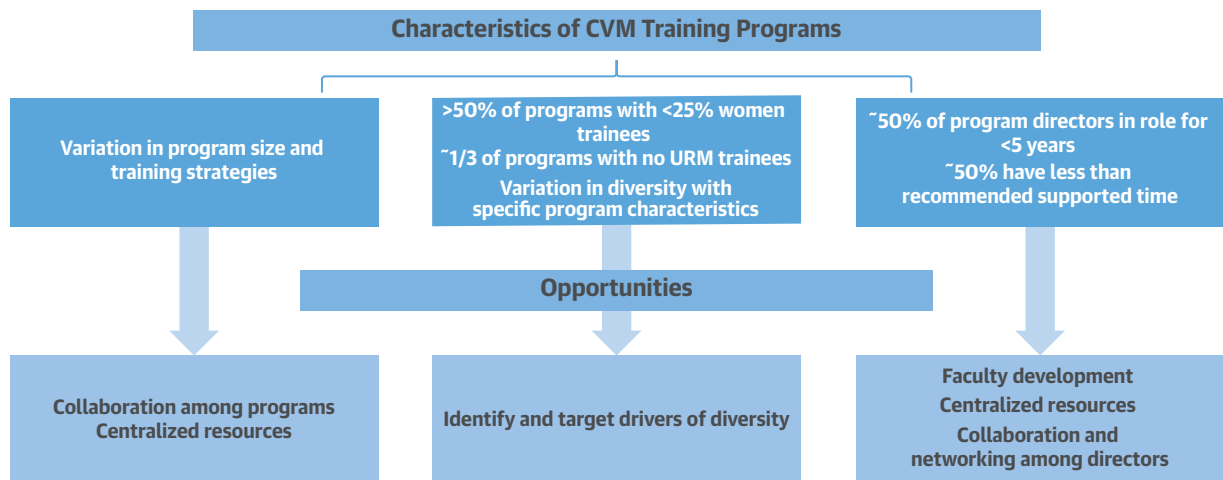
PROGRAM DIRECTORS. PDs were 80% male. Age was relatively evenly distributed between 36 to 65 years, with few (9%) >65 years. Self-identified race was 62% white, 20% Asian, 7% Hispanic, and 2% African American. A total of 86% had not been PD elsewhere. Median time since training completion was 18 years, and at the current institution was 14 years. Median time as PD was 4 years, and 52% had been PD for <5 years.

PDs were 55% general cardiologists, while 37%, 15%, 15%, and 5% specialized in imaging,

From the ^aDivision of Cardiovascular Medicine, Vanderbilt University Medical Center, Nashville, Tennessee; ^bDivision of Cardiology, University of Illinois College of Medicine, Chicago, Illinois; ^cSt. Vincent Heart Center, Indianapolis, Indiana; ^dAmerican College of Cardiology, Washington, DC; ^eDivision of Cardiovascular Medicine, University of Michigan, Ann Arbor, Michigan; and the ^fDepartment of Cardiology, Medstar Heart and Vascular Institute and Georgetown University, Washington, DC. Dr. Weissman has served as a consultant (academic Corelab) for Medtronic, Ancora Heart, and LivaNova. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received March 14, 2019; accepted March 24, 2019.

FIGURE 1 Cardiovascular Disease Training Program Characteristics and Opportunities



Important characteristics of training programs are identified, which highlight opportunities for our specialty to collaborate, share resources, and improve diversity. CVM = cardiovascular medicine; URM = under-represented minority.

electrophysiology, interventional, and advanced heart failure/transplant, respectively (10% in other sub-specialties). At university programs, PD academic rank was 22% assistant, 38% associate, and 32% full professor. A total of 48% of PDs had 15% to 20% protected time for this role, 34% had 21% to 30%, and 15% had >30%. A total of 18% of PDs planned to step down in the next 2 years, and 20% were unsure.

TRAINEES. The median number of fellows per program was 13.5 (range 2 to 39 fellows). Most (75%) programs expected 2 to 6 graduating fellows in 2018. The percentage of PDs reporting at least 1 graduating fellow going to subspecialty training, community-based practice, academic-based clinical practice, a research-focused academic career, a government job, or a nonclinical job were 89%, 60%, 35%, 18%, 5%, and 2%, respectively.

The median number of female fellows per program was 3; 5% of programs had none and 20% had 1. In 54% of programs, $\leq 25\%$ of fellows were women, and only 3% of programs had >50% women. In the Northeast, 53% of programs had 26% to 50% female fellows (compared with 28% to 34% of programs in other regions). A total of 16% of small programs had no women, while all medium and large programs had at least 1 female fellow. There were no female fellows in 7% of programs with male PDs and in none of the programs with women PDs. There was no notable variation of sex distribution of fellows based on PD age.

A total of 30% of programs had no fellows identified as an under-represented minority (URM) (defined

by the Association of American Medical Colleges [5]), 26% had 1 URM fellow, and 38% had 2 to 5 URM fellows. Fewer programs in the South had no URM fellows (20% vs. 31% to 37% in other regions), and more programs in the South had 26% to 50% URM fellows (20% vs. 5% to 13% in other regions). A larger percentage of small programs (40%) had no URM fellows compared with medium (30%) and large (19%) programs. There were no URM fellows in 32% of programs with male PDs (compared with 23% of those with women PDs) and in 38% of programs with late-career PDs (compared with those with early [28%] and mid-career [23%] PDs).

Most (82%) programs had at least 1 international medical graduate (IMG) fellow. A larger percentage of programs in the Northeast had at least 1 IMG fellow, and 27% of small programs had >75% IMG fellows compared with medium (9%) and large programs (0%).

DISCUSSION

We report results from the first CVPoDS, which will allow the CVD community to follow characteristics of CVD training programs, identify trends, and assess the impact of training changes. It will also provide PDs with national norms to which they can compare their programs. CVPoDS has helped identify important characteristics of training programs, which highlight opportunities for our specialty to collaborate and improve diversity (Figure 1).

There is a significant variation in program size. This appears to correlate with some program

characteristics, including more flexible coverage systems. Program size may correlate with other aspects of training, including access to highly specialized resources. Learning about these will create opportunities for innovation and collaboration among programs and initiatives to better utilize resources regionally and nationally (6). The majority of programs have transitioned to a schedule strategy with 13 rotations a year, allowing a greater number of the time-dependent COCATS (Core Cardiovascular Training Statement) (7) guidelines to be met. Being open to this type of innovation and flexibility in training, locally and nationally, will become ever more important as the number of skills and requirements for CVD trainees continues to expand. The ACC and CVTS should encourage successful innovations to be adopted by programs broadly.

Most senior fellows are planning subspecialty training or community-based practice, which has important implications for the future CVD workforce. The ACC should lead in evaluation of the workforce and can provide guidance as we work to ensure that our training opportunities appropriately fill its needs. Given the length of CVD training, fellows may encounter additional financial obligations as they enter new stages of life. Although it is unknown how many fellows moonlight, the large number of programs that allow it suggests that many do. Lifestyle and economic factors have been identified as drivers of career choice for medical trainees (8). How these factors influence career decisions of potential and current CVD trainees warrants investigation and should be considered as CVD training evolves.

Women and URMs remain under-represented in CVD, making up 20% and 13% of CVD trainees, respectively (9). More than one-half of programs have $\leq 25\%$ women fellows, and nearly one-third have no URM fellows. More programs in the Northeast had a greater percent of women, and programs in the South were more likely to have URM fellows. The meaning of this geographic variation is not clear, but investigation of these types of signals may allow us to identify and impact underlying drivers of diversity. Program size also appears to correlate with diversity. In this survey, smaller programs were more likely to have no women or URM fellows. The interpretation of this is complicated by the fact that overall diversity of small programs, by nature of their size, is more susceptible to year to year variation compared with larger programs. This should affect how we track and report diversity in individual training programs.

There was a trend for more programs with male PDs to have no women or URM fellows and more

programs with late career-stage PDs to have no URM fellows. The reasons for these variations are also not clear, but this knowledge may allow PDs to assess and address the intrinsic advantages and disadvantages that their programs may have in recruitment (e.g., ensuring that women and URM faculty participate in recruitment). Recent data have suggested that the perception of the field of cardiology, including work-life balance and available role models, may affect the choice of career specialty (10). Learning more about our training environment may help identify ways to affect these perceptions and improve diversity.

PDs are predominantly male, and few are URMs. These demographics are consistent with those of the specialty as a whole. PDs span career stages and academic rank and predominantly serve as PD at only 1 institution, suggesting variable amounts of experience and expertise. In fact, $>50\%$ of PDs have <5 years of experience. In addition, many PDs may not have had formal training in education skills, suggesting a need for robust faculty development resources. Centralized resources on topics such as training regulation, program administration, and teaching skills would help fill gaps in necessary knowledge and skills. Opportunities to network and collaborate would allow PDs to gain from the experiences of one another. This information should guide the ACC, CVTS, and others in planning educational opportunities for PDs.

A significant number of PDs have less than the 25% to 50% of supported time required by the ACGME. This has significant implications, given the complexity and expansion of PD duties. Insufficient protected time may create deficits in the local training environment and result in ACGME program citation. Alleviating the discrepancy between required and actual PD support should be a priority for division, department, and GME leadership. A significant percentage of PDs plan to or are unsure if they will step down in the next 2 years. This speaks to the importance of the challenges facing PDs and highlights the need of adequate PD support and training. Ensuring that we address these issues from an institutional and specialty standpoint will be important in continuing to recruit talented faculty into these positions.

Our study does have limitations. The survey has not been validated, although a development process to ensure clarity was used (3). Not all programs responded; however, the high response rate and the respondents' geographic distribution (closely reflecting that of all programs) increase the likelihood that our data is representative of programs nationally. Importantly, fewer community-based programs responded,

which may result in bias toward university-affiliated programs.

CVPoDS was successfully implemented, and future versions will allow the CVD community to continue to assess the national training environment. A better understanding of training programs will help us find and address gaps in education and improve diversity in the field.

ACKNOWLEDGMENT The authors are grateful to Chris Driver for his contributions.

ADDRESS FOR CORRESPONDENCE: Dr. Julie Damp, 1215 21st Avenue South, MCE 5th Floor South Tower, Nashville, Tennessee 37232. E-mail: Julie.boyd@vumc.org. Twitter: [@BoydDamp](https://twitter.com/BoydDamp).

REFERENCES

1. National Resident Matching Program, Data Release and Research Committee. Results of the 2016 NRMP Program Director Survey, Specialties Matching Service. Washington, DC: National Resident Matching Program, 2016.
2. Association of American Medical Colleges. Applicant data in cardiovascular medicine. Available at: <https://www.aamc.org/download/360368/data/cardiovascularmedicine.pdf>. Accessed January 17, 2019.
3. Artino AR, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. *Med Teach* 2014;36:463-74.
4. American Medical Association. FREIDA program director resources. Available at: [ama-assn.org/life-career/freida](https://www.ama-assn.org/life-career/freida). Accessed January 17, 2019.
5. Association of American Medical Colleges. Strategic initiatives: underrepresented in medicine. Available at: <https://www.aamc.org/initiatives/urm>. Accessed January 17, 2019.
6. Sivagnanam K, Mendes LA, Schlendorf KH, et al. Bridge to transplantation: advanced heart failure and transplant cardiology training for cardiovascular disease fellows. *J Am Coll Cardiol* 2017;70:1413-6.
7. Halperin JL, Williams ES, Fuster V, et al. ACC 2015 core cardiovascular training statement 4 (COCATS 4) (revision of COCATS 3). *J Am Coll Cardiol* 2015;65:1721-3.
8. Dorsey ER, Jarjoura D, Rutecki GW. The influence of controllable lifestyle and sex on the specialty choices of graduating US medical students, 1996-2003. *Acad Med* 2005;80:791-6.
9. Douglas PS, Williams KA Sr., Walsh MN. Diversity matters. *J Am Coll Cardiol* 2017;70:1525-9.
10. Douglas PS, Rzeszut AK, Bairey Merz CN, et al. Career preferences and perceptions of cardiology among US Internal Medicine trainees: factors influencing cardiology career choice. *JAMA Cardiol* 2018;3:682-91.

KEY WORDS diversity, fellowship, medical education, training