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VIEWPOINT

Enhancing the Clinical Research Workforce

Lessons From the ACC-CTR Bootcamp

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The American College of Cardiology's (ACC) *Upping Your Game* Clinical Trials Research Bootcamp[1] (ACC-CTR) was launched in 2019 and has since become a model for addressing unmet needs in the clinical research workforce. The program's success is attributable to several key factors.

1. A highly competitive applicant pool seeking advanced clinical research training, supported by their institutions.
2. Enrollment of a diverse group of learners, many of whom lack local access to specialized research training and mentorship.
3. A curriculum aligned with prospectively determined clinical research competencies and learner needs.
4. Inclusion of professional development topics and exercises tailored to career advancement in clinical trial leadership.
5. Interactive instructional design optimized for adult learners.
6. A growing network of program alumni who contribute by mentoring and teaching future trainees.
7. Completion of a capstone research project that applies learned skills to real-world clinical research challenges.

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RATIONALE AND GOALS OF THE ACC-CTR PROGRAM

The increasing complexity of cardiovascular clinical research poses challenges for early-career investigators, who must balance research responsibilities with demanding clinical duties. Many training programs offer limited hands-on research education and seldom include nonclinical or leadership development. The ACC-CTR program bridges these gaps by improving the clinical research competency of early- and mid-career cardiovascular investigators across the spectrum—from site-based research leaders to those aspiring to become principal investigators of large multicenter randomized trials.

An additional objective of the program is to align with the ACC's diversity initiative aim of "engaging and leveraging talent." The underrepresentation of women, racial and ethnic minorities, and investigators from smaller community-based programs in clinical research is well-documented.[2,3] These disparities contribute to the underenrollment of these same populations in clinical trials, limiting the applicability of trial data and hindering regulatory and clinical decision-making.[4,5] By providing structured training and mentorship, ACC-CTR fosters a more inclusive research environment and enhances the diversity of clinical trial leadership.

LEARNER PROFILE AND SELECTION PROCESS

Admission to the ACC-CTR program is highly competitive, with selection based on a personal statement, anticipated benefit, and evidence of institutional support. The program is designed to accommodate participants with diverse prior research experience and career aspirations. To date, 192

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ABBREVIATIONS AND ACRONYMS

ACC = American College of Cardiology

CTR = Clinical Trials Research

individuals have completed the program across 4 cohorts.[6] (Figure 1) All participants had completed their clinical training prior to enrollment, with most within the preceding 5 years. On average, learners dedicate approximately two-thirds of their efforts to clinical care, with 20% to 25% allocated to research. Half (51%) had experience as a PI for a multicenter or single-site trial, and 14% practiced in community settings without an affiliated cardiovascular fellowship program. Prior research experience ranged from minimal to having secured NIH R01 funding.

CURRICULUM AND INSTRUCTIONAL DESIGN

The ACC-CTR program curriculum is structured around 8 core competency domains recommended by the Joint Task Force for Clinical Trial Competency. (Figure 1) A robust presession assessment helps shape the content to meet the specific needs of each cohort. The program employs an interactive instructional design that emphasizes faculty and peer interaction, including case-based learning, guided discussions, and applied exercises.

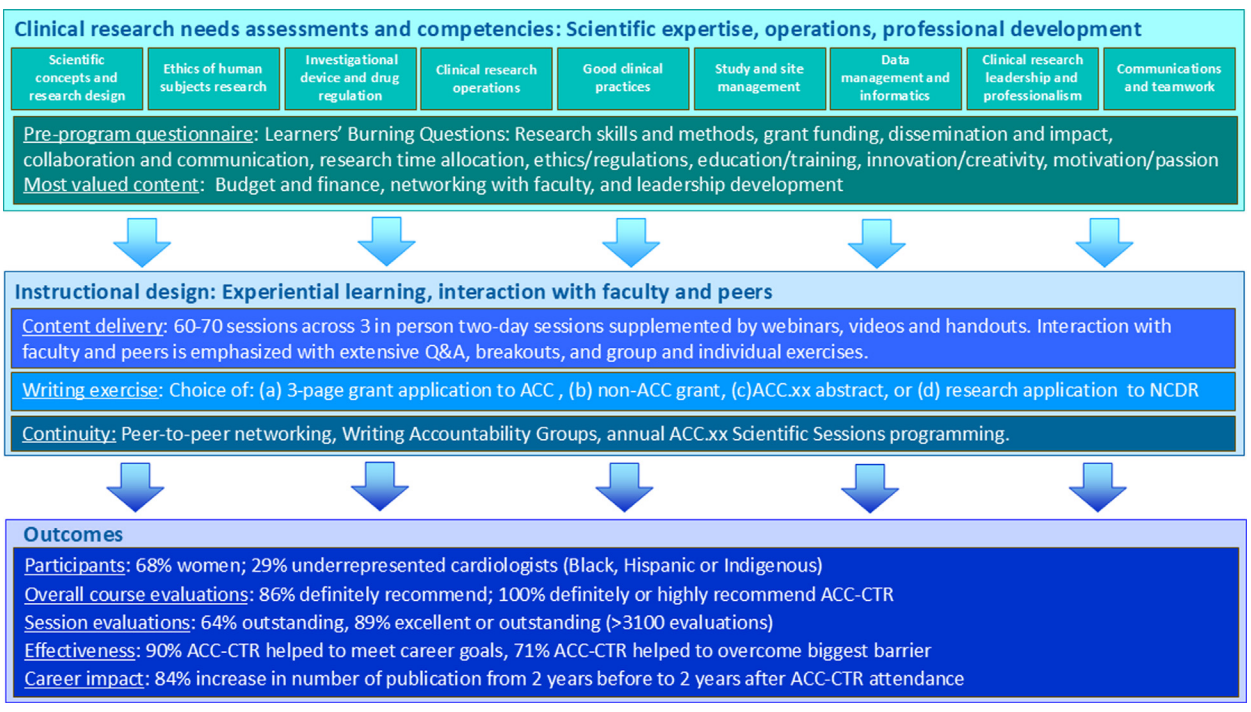
FACULTY COMPOSITION

The program's faculty includes 59 demographically diverse experts, ranging from former learners to internationally recognized leaders in cardiovascular research. Faculty representation spans all cardiology subspecialties, quantitative sciences, regulatory agencies, industry sponsors, federal research funders, patient advocates, and community organizers. Many faculty members have remained engaged since the program's inception, underscoring their commitment to developing the next generation of clinical trial leaders.

FUNDING MODEL

The ACC-CTR program is sustained through a diversified funding portfolio, including unrestricted educational grants from corporate sponsors and specifically designated charitable contributions from ACC members.

FIGURE 1 Designing and Executing a Robust Clinical Research Learning Experience



(Top) ACC CTR covers the 8 established competencies of clinical investigators and detailed need assessments of learners. (Middle) Instructional design emphasizes experiential learning and interaction with faculty and peers. (Bottom) ACC CTR outcomes include recruitment of 4 diverse, engaged cohorts to date, with very high course evaluations and demonstrated improvements in academic productivity. ACC = American College of Cardiology; CTR = Clinical Trials Research; NCDR = National Cardiovascular Data Registry.

PROGRAM OUTCOMES AND IMPACT

The ACC-CTR program has successfully recruited multiple diverse cohorts, with strong learner engagement and positive evaluations and increased academic productivity. (**Figure 1**) While it is challenging to directly attribute career achievements solely to program participation, anecdotal and survey data suggest that learners have advanced in research leadership roles and increased their participation in clinical trials. Ongoing tracking of career trajectories will further elucidate the program's long-term impact.

CHALLENGES AND OPPORTUNITIES

As with any educational initiative, ACC-CTR has faced challenges, including:

- Delivering meaningful content to a heterogeneous learner population within a 1-year intensive program while competing with professional and personal demands.
- Securing sustainable funding and faculty availability to maintain program quality and offer individualized mentorship.
- Ensuring continuity of engagement postprogram completion to support ongoing career advancement.

These challenges and others have been partially addressed through program design modifications, including enhanced asynchronous content, alumni engagement strategies, and targeted mentorship initiatives.

CALL TO ACTION

The need for a well-trained, diverse clinical investigator workforce is widely recognized.[7,8] The ACC-CTR experience demonstrates that talented but underrepresented cardiology investigators have a thirst for such career development opportunities, are eager to prioritize learning needs over other professional demands, and spontaneously form partnerships that contribute to clinical research. The program's interactive, competency-based curriculum provides a scalable model that could be adapted to both fellowship training programs and postgraduate research education.

However, research training alone is insufficient. Early- and mid-career investigators from underrepresented groups face systemic barriers that impede their professional advancement. Addressing these challenges requires sustained efforts to improve representation in clinical research leadership, facilitate mentorship, and expand funding opportunities. By diversifying the cardiovascular clinical research workforce, the ACC-CTR program lays the foundation for broader participant diversity, improved clinical trial outcomes, and enhanced health equity. The experience from this program provides a roadmap for similar initiatives seeking to cultivate the next generation of clinical trialists.

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Dr Douglas is a consultant to Amgen, Foresite Labs, Novo Nordisk, and UpToDate. Dr Batchelor is a consultant to Boston Scientific, Medtronic, and Abbott. Dr Echols is an employee of American College of Cardiology and a consultant to Medtronic. Ms Mitchell is an employee of American College of Cardiology and she has no relevant relationships with industry. Dr Wang is an employee of the Patient-Centered Outcomes Research Institute, but the perspective presented in this article is solely the responsibility of the authors and does not necessarily represent the views of PCORI. She has no relevant relationships with industry. Dr Walsh as reported that he/she has no relationships relevant to the contents of this paper to disclose.

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