

## Social Disparities in the Thoracic Surgery Workforce

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Diversity fosters innovation, advances the work environment, and enriches patient care. Despite that, only 17%, 5%, and 3% of cardiothoracic (CT) surgeons in academia were women, Hispanic, and Black, respectively. Diversity, equity, and inclusion goals and deliberate initiatives are necessary to eradicate disparities in the CT workforce. Leading organizational changes from the top down is paramount and above all else, changes and improvements should be based on a meritocracy.

### Key points

Diversity fosters innovation, advances the work environment, and enriches patient care.

Only 17%, 5%, and 3% of CT surgeons in academia were women, Hispanic, and Black, respectively. (In comparison, the US population is 51%, 18%, and 13% women, Hispanic, and Black, respectively.)

70% of women (compared to 25% men), 83% of Black, and 39% of Asian CT surgeons (compared to 27% White/Caucasian CT surgeons) felt they had been unfairly treated based on their gender or race.

Diversity, equity, and inclusion goals and deliberate initiatives are necessary to eradicate disparities in the CT workforce. Leading organizational changes from the top down is paramount for the sustainability of DEI initiatives.

Proponents of diversity insist on changes and improvements being based on merit and accomplishments.

### Introduction

The argument for diversity in health care is clear. Diversity fosters innovation, improves the quality of patient care, and decreases health care disparities. The surgical workforce, however, lacks in diversity and, more specifically, cardiothoracic (CT) surgery is one of the least diverse medical subspecialties. Recognition of the importance of fostering an inclusive environment has been announced among CT surgery leadership and several diversity, equity, and inclusion (DEI) initiatives are ongoing in our field. However, CT surgery remains behind in these issues and obstacles remain before true equity can be achieved.

### History

#### Women in CT

In 1961, the American Board of Thoracic Surgery (ABTS) certified 3 women in CT surgery.

Nina Starr Braunwald (1928–1992) was born in Brooklyn, New York and obtained bachelor and medical degrees from New York University. She was the first woman to train in general surgery at Bellevue and

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her career led to success at the National Institutes of Health, the University of California San Diego, and Harvard University. Despite her accomplishments (the first successful prosthetic mitral valve replacement in 1960, the development of the Braunwald-Cutter valve and stented aortic homografts, 150 peer-reviewed publications, the first female member of the AATS), however, Dr Braunwald spent 24 years as an associate professor and was never promoted to full professor. Ann McKiel, the first woman to complete a thoracic surgery residency, and Nermin Tutunju joined Dr Braunwald in the first class of ABTS-certified women.

The influx of women in CT surgery, thereafter, remained minimal as the number of ABTS-certified women only reach 10 almost 20 years later. In 1984, Dr Leslie Kohman started to invite all women CT surgeons to an informal breakfast during Society of Thoracic Surgeons (STS) and American Association for Thoracic Surgeons (AATS) meetings. These breakfasts provided an environment whereupon attendees could share news, socialize, and network with a focus to mentor young women within the specialty.

The Women in Cardiothoracic Surgery (now Women in Thoracic Surgery [WTS]) was officially formed in 1986 with Dr Kohman serving as the first president. The number of women entering our discipline remained low, with the total number of ABTS diplomats reaching only 56 by 1990. In the 1990s and early 2000s, the number of women certifying in thoracic surgery remained below 10 per year, with the average increasing to above 10 per year only after 2005. To date, women in CT surgery average 16 diplomats per year, with 2018 peaking at 27 women passing the certifying examination that year. Three articles on the experiences and status of women in CT surgery have been published, approximately 10 years apart. In 1996, Dresler and colleagues noted that while women and men had similar training backgrounds, women were less likely to be full professors (13.6% vs 27%), earned a lower income, and perceived discrimination as hindering their careers more than men. Donington and colleagues presented an update on women in CT surgery at the 48th annual meeting of the STS. It was reported that more than 50% of women in CT surgery had entered the profession within the prior 10 years, suggesting optimism for continued recruitment of women. In addition, 18% of respondents reported being a full professor, suggesting professional advancement. Most recently, Ceppa and colleagues reported that while the number of women entering the discipline continued to increase at the same rate as in the 2012 update, the percentage of women who were full professors remained similar and women continue to earn lower salaries than men even after accounting for age, years in practice, subspecialty, practice location, and setting.

Although it has been 60 years since the first women were certified in CT surgery in the United States and the number of ABTS-certified women is more than 350, women have yet to achieve equity or equality within the discipline of CT surgery.

### **Underrepresented Minorities in CT**

Unfortunately, the history of underrepresented minority (URM) surgeons is not as well documented. Dr Daniel Hale Williams was a general surgeon who founded the first interracial hospital in the United States. In 1893, he repaired a pericardial wound, constituting the first successful open-heart surgery performed by a Black surgeon.

It goes without saying that the legacy of Vivien Thomas (1910–1985) cannot be forgotten. As Dr Alfred Blalock's right hand and laboratory supervisor, despite no formal education, he developed the first

surgical treatment for Tetralogy of Fallot and is recognized as having trained generations of cardiac surgeons. His contributions to cardiac surgery are now widely accepted and in honor of his accomplishments, the STS has dedicated an entire symposium on diversity and inclusion during each annual meeting to him. Dr Myra Adele Logan (1908–1977) graduated from medical school in 1933. She completed a residency in surgery at the Harlem Hospital and while she did not formally undergo training in CT surgery, she was the first woman to perform open-heart surgery in 1943 and forged a career in congenital heart surgery. Dr Rosalyn P Scott is the first Black woman to have trained in thoracic surgery and certified in 1986. As of 2017, however, there were only 6 female African American CT surgeons practicing in the United States. The history of Latin American CT surgeons was presented at the 2017 STS/European Association for Cardiothoracic Surgery Latin America Cardiovascular Surgery Conference.

Highlights included recognizing Dr Manuel Carbonell Salazar as the first surgeon to perform patent ductus arteriosus closures in Cuba in 1941; Drs Pedro Uribe and Svante Tornvall performing a mitral commissurotomy in Chile in 1950; and Dr Marino performing a mitral valvotomy in 1963 as well as the first heart transplant in Peru in 1972. It was also noted that following the development of cardiopulmonary bypass (CPB), the first open-heart surgery in Mexico was performed on an 8-year-old child with an atrial septal defect by Drs Raul Baz Iglesias, Jose Roberto Monroy, and Marcel Garcia Cornejo; and Dr Hugo Fellipozzi performed the first cardiac surgery on CPB in Brazil in 1956.

Latin surgeons who came to and left a lasting impression in the United States include Drs Favalaro, Castaneda, Bastista, Del Nido, among others. Dr Rene Geronimo Favalaro (1923–2000) was born in Argentina and upon completion of medical school traveled to the Cleveland Clinic to work with Drs Donald B Effner and F Mason Sones. He is known for exploring the possibility of using saphenous vein to bypass diseased segments of a coronary artery circa 1967 and standardized the use of this technique.

Dr Aldo R Castaneda (1920–2020) was born in Italy, and after surviving World War II finished college and left Europe for Guatemala to study medicine. His graduation thesis was entitled “Open Heart Surgery: an Experimental Study” and his laboratory research represented the first attempts at open heart surgery in Central America. After completing residency and staying on as faculty at the University of Minnesota, Dr Castaneda was recruited to be the chief of the congenital heart surgery program at Boston Children’s Hospital. He is the father of the collaborative and multidisciplinary congenital heart surgery unit and pioneered neonatal and early corrective surgery for complex congenital heart disease. He also developed a fully functioning and independent congenital heart surgery program in Guatemala and was the first Latin president of the AATS. Jose Felix Patino Restrepo (1927–2020) was a Yale School of Medicine graduate (1952), where he also completed his general and CT surgery training. On completing surgical training, Dr Patino returned to Columbia where he was the head of the Department of Surgery at University Hospital of La Samaritana, was the National Minister of Health, and founded Universidad de los Andes School of Medicine, which he modeled after Yale. Dr Randas J Vilela Batista (1947-) from Brazil trained in the United States, Canada, England, and France before returning home in 1983. He is known for several cardiac surgical techniques, including the “Batista procedure,” or ventricular remodeling for heart failure. Dr Ivan F Gonzalez-Cancel was the first surgeon to perform a heart transplant in Puerto Rico in 1999. Dr Pedro J del Nido (born in Chile), who trained in CT surgery at the University of Toronto and at the Hospital for Sick Children as a congenital heart surgeon, is known for his work on myocardial energetics and cardioplegia and extracorporeal life support in children.

He is currently the Chief of Cardiac Surgery at Boston Children's Hospital and was the 94th president of the AATS.

### **Current assessment of the CT workforce**

Although data on the entire CT surgery workforce are not available, in their study Ortmeyer and colleagues

used data from the Association of American Medical Colleges (AAMC) and reported that 17%, 3%, and 5% of CT surgeons in academia were women, Black, and Hispanic, respectively. In the 2020 WTS update, of 176 female respondents, 19% were Asian, 6% Black, and 4% Hispanic. These data on women in CT surgery trended toward increased diversity as compared to the 2012 report. In comparison, 43%, 20%, 4%, and 6% of all clinical faculty in academic medicine are women, Asian, Black, and Hispanic, respectively. In addition, 51%, 18%, 13%, and 6% of the US population are women, Hispanic, Black, and Asian, respectively. In recognition of the fact that women and URM CT surgeons have experiences and needs unique from nonminoritized CT surgeons, the STS sponsored diversity and gender bias surveys in collaboration with the STS Diversity Task Force and WTS. The results of both surveys were reported in several articles published by both entities. Gender bias was noted as being pervasive in the discipline and being subjected to sexual harassment was reported by 80% of female attendings and 90% of female trainees. Although the authors acknowledge that the response rate to their survey was low, Erhunmwunsee and colleagues reported that 70% of women (compared to 25% men), 83% of Black, and 39% of Asian CT surgeons (compared to 27% White/Caucasian) felt they had been unfairly treated based on their gender or race. More disconcerting were quotes noted in Diversity Task Force's report on myths, barriers, and strategies on improving diversity:

[The STS] doesn't need to [address diversity] and this should not even be on the radar of things to be done.

I do not believe barriers exist. This myth of the necessity of diversity and inclusiveness is political correctness on steroids.

There are no barriers. None of the above are important!

These quotes from survey respondents indicated that members of our discipline did not see a need for focusing on diversity and inclusion. Similarly, with regards to gender bias, responses from male CT surgeons diverged vastly from responses from female CT surgeons, indicating that most of the (male) surgeons did not even recognize the existence of the biased work environment.

These reports confirmed that women, Asian, Black, and Hispanic CT surgeons were in the minority but also that these underrepresented surgeons perceived a hostile work environment.

### **Representation and Leadership**

The racial diversity and progression of minorities to leadership in academic surgery was recently studied, whereupon AAMC census data over a 6-year period were examined.

Of more than 15,000 surgical faculty diversity was similar at the instructor level but noted to have increased among associate professors over the study period (26.9% in 2013 to 31.9% in 2019). Representation from Asians increased and was the driver of this increase in diversity at the associate

professor level (16.9% in 2013 to 20.5% in 2019). Black surgical faculty remain underrepresented at all levels with a slight improvement at the instructor (2.9% in 2013 to 4.5% in 2019) and associate professor (2.7% in 2013 to 3.7% in 2019) levels. Hispanic faculty remain underrepresented at all levels and remained stable (5.6% instructors, 6.8% assistant professors, and 5.1% associate professors in 2019). There was a more favorable trend with regards to growth for Black and Hispanic women compared with Black and Hispanic men, whereas among Asian surgical faculty, the trend was more favorable for men than women. At the full professor level, Asian faculty had the greatest increase (9.2% in 2013 to 13.3% in 2019) with minimal change among Black (2.3% vs 2.7%) and Hispanic (4.0% vs 4.4%) faculty. There was an increase in diversity among surgical department Chairs (19.0% in 2013–22.6% in 2019), with 12.4%, 5.3%, and 3.4% of Chairs being Asian, Hispanic, and Black, respectively. By 2019, only one Black woman and one Hispanic woman had ascended to Chair.

With the increase in awareness of the importance of diversity, studies on the representation of women at national CT surgery organization meetings have ensued. Olive and colleagues reported that in 2018, 12.9% and 7.9% of presenting and senior authors were women, and that these numbers were similar compared to 3 years prior.

In their study, Shemanski and colleagues found that of 3662 session leaders (moderators, panelists, invited discussants) across 20 different CT surgery professional organization annual meetings from 2015 to 2019, 13.1% were women. The proportion of women session leaders trended positively over time from 9.6% in 2015 to 15.9% in 2019 ( $P = .001$ ). However, the increase in female session leaders over time was significant only in General Thoracic sessions and not in Adult Cardiac or Congenital sessions. Lastly, 57.4% of the sessions consisted of all-male session leadership. The Annals of Thoracic Surgery editorial board has had an increase in female members (15.7% in 2018) and more women are holding nominated STS leadership positions (12.3% in 2018). In the 2021 to 2022 academic year, the STS board of directors consists of 4 (18.2%) women, 3 (13.6%) Asian, and 1 (4.5%) Black CT surgeon. The STS has had one Black past president (Dr Robert SD Higgins) and one female past president (Dr Carolyn E Reed) who was elected posthumously. On the AATS board of directors reside 2 women (12.5%), 3 Asian (18.8%), and 1 Black (6.2%) CT surgeon. The first female president (Dr Yolanda L Colson) will be residing this upcoming year and 2 Latin CT surgeons (Drs Aldo R Castaneda and Pedro J del Nido) have been past presidents. Studies suggest that for a minority group to have influence in the decisions of a committee, a presence of at least 25% is required.

CT surgery has yet to reach the 25% threshold in diversity in representation or leadership.

## **Considerations and future directions**

### **Barriers to Increasing Diversity in CT**

Several barriers remain as obstacles to achieving increased diversity and equity. First and foremost, there are myths revolving around the goal of diversity. In their study, Backhus and colleagues

reported that 21% of respondents to the STS Diversity Task Force survey expressed concerns that diversity was about exclusivity and reverse discrimination. Respondents also expressed concerns that diversity was about lowering standards (12%) and that it does not support meritocracy (18%). Most concerning was that 15% of responses reflected beliefs that disparities did not exist. Until we, as a profession and culture, acknowledge that inequities based on race and gender among us exist, we

cannot move forward toward correcting the imbalance within our discipline. Moreover, it cannot be emphasized enough that proponents of diversity, above all else, insist on changes and improvements being based on merit and accomplishments. Advancing those who are ill-equipped and unprepared would only be to the demise of our profession and hinder the goal of increasing diversity.

The pipeline is often cited as a barrier toward increased diversity. In reality, women have been matriculating into medical school regularly and in 2017, more women matriculated into medical school than men. Despite this fact, however, only 24% of current CT surgical trainees, 17% of CT surgeons in academia, and 7% of CT surgeons in the United States are women. Similarly, even though 7.3% and 6.5% of current medical graduates are Black and Hispanic, these racial groups only represent 3% and 5% of CT surgical faculty, respectively. The diversity in medical school remains greater than the diversity in CT surgery, suggesting that there are cultural barriers within our profession that stunts the successful recruitment of diverse candidates to our field. These cultural barriers include implicit biases as well as the lack of an inclusive environment. Moreover, studies suggest that for an individual to succeed in their careers having mentors and sponsors is crucial. Although having same-gender or same-race mentors is not required, trainees have expressed a preference for and increased comfort with same-gender mentors.

Similarly, data suggest that it is difficult for an underrepresented in medicine (UIM) medical student to envision themselves pursuing a career within a specialty in the paucity of same gender/race faculty in that field.

### **Programs/Efforts that Promote Diversity in the Workforce**

To effect sustainable change and to improve diversity in our specialty, a systematic, multidisciplinary, and programmatic approach is necessary. Realistic goals need to be established. However, first and foremost, unyielding endorsement and resources from leadership is mandatory. Efforts must be multilevel and result in change at every step of progression in a physician's career. Colleges and medical schools should be applauded for their recognition of the importance of DEI and their national efforts in recruitment, a topic that is beyond the scope of this article. As a discipline, we ought to follow suit with deliberate efforts toward increasing DEI in CT surgery residency and fellowship training. These efforts should continue through early and midcareer development through progression toward levels of leadership and late career.

Ortmeyer and colleagues outlined a checklist for increasing diversity in CT surgery training programs. In their literature review of articles on "diversity," "inclusion," "surgery," and "thoracic surgery," the authors identified themes that resulted in successful DEI initiatives and aptly developed an acronym checklist toward DEI—GOALS. The first letter identifies the first step toward change as the establishment of succinct and actionable goals—developing a mission statement, ascertaining the scope of existing disparities, setting metrics for monitoring progress. The second letter represents the need for leadership support for an organizational change led from the top down. In this, the creation of task forces and the empowerment of these task forces to act is necessary. In addition, leadership ought to provide resources (in the form of recognition, administrative and salary support, promotion) for these task forces to achieve named goals. Advocacy and support structures for UIM lend toward recruitment efforts as well as retention. These efforts include involvement in local and national UIM organizations, the establishment of formal mentorship programs, training faculty to recognize discrimination, harassment and bias, and creating safe spaces and support groups for UIM. Increasing resident and

faculty diversity literacy—implicit bias training, delineate the effects of discrimination and microaggression, teach use of inclusive language, emphasize the role and importance of diversity in health care—through educational programs should be mandatory for all. Lastly, and most importantly, sustainability of DEI initiatives with monitoring of progress, reassessment and revision of goals is paramount.

Similarly, these GOALS can be applied to DEI initiatives following CT surgery training. In their statement on diversity and inclusion in CT surgery, the STS Diversity Task Force categorized efforts into multiple spheres of influence.

Focusing on the CT surgery community level, several professional organizations have endorsed and enacted initiatives to advocate for increased diversity. WTS provides a social network to support women in the discipline and has been successful in developing several scholarships to facilitate student-faculty mentorship as well as early and midcareer development. The AATS has dedicated leadership development courses to women (2018) and UIM (2021) in CT surgery. The STS has named goals of diversity and with those goals has dedicated funding toward DEI initiatives, named an entire symposium focused on DEI during each annual meeting (the Vivien Thomas Lecture), and has mandates with respect to the representation of UIM as invited moderators, panelists, or discussants.

As a discipline and as individuals, we can further advocate for DEI and support our UIM colleagues by being deliberate in selecting faculty for invited lectureships, committee members, and chairs, and as guest editors for medical journals. These mentoring actions assist in faculty development and career progression. Although mentorship is important, studies have shown that sponsorship is the key ingredient to attaining leadership positions.

As such, we should be deliberate in sponsoring UIM and providing them with opportunities they would otherwise not be privy to. By being supportive and methodical in assuring representation from all minority groups, we foster inclusion and create an environment whereupon all can be successful.

### **Summary**

Although colleges and medical schools have made strides in increasing the diversity among student populations, CT surgery remains predominantly male and White with limited women, Black, and Hispanic surgeons. Fostering diversity benefits the work culture, fosters innovation, and most importantly, improves patient care. To increase the diversity of our discipline, CT surgery and its leaders ought to establish clear DEI goals, foster inclusion, and be deliberate in instituting plans to attain these goals.

### **Disclosure**

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