



Case Report

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Transition of a Community Outreach Program to Virtual Learning during the COVID-19 Pandemic

Michael G Fitzsimons, MD¹, Ana Acosta, MD², Kelly Tankard, MD³, Michael Onwugbufor, MD⁴ and Asishana Osho, MD⁴



¹Department of Anesthesia, Critical Care, and Pain Medicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

²Memorial Hermann Hospital, McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, TX, USA

³Fellow in Cardiac Anesthesia and Critical Care Medicine, Department of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital, Boston, MA, USA

⁴Fellow in Cardiothoracic Surgery, Cardiac Surgery Division, Department of Surgery, Massachusetts General Hospital, Boston, MA, USA

Abstract

The COVID-19 pandemic curtailed nearly all in-person educational activities and forced institutions to transition to hybrid or full virtual learning via on-line venues. Our Division of Cardiac Anesthesia has participated in a community outreach initiative through the Youth Scholars Program since 2013. The cardiac anesthesia component has involved an in-person cadaveric dissection of porcine heart and lungs led by faculty anesthesiologists and fellows in adult cardiothoracic anesthesiology. The pandemic comes at a time where programs focusing on inclusion are more critical than ever. We describe our transition from in-person learning to on-line education while preserving a “hands-on” and enhancing personal interaction.

Keywords

Community outreach, COVID-19, Education, Inequality, Racism

Introduction

Society has become more cognizant of the impact that systemic racism has contributed to inequalities including those within healthcare. Inequalities within healthcare have historical roots in biased “scientific” teachings that often persist today [1]. These teachings resulted in unequal treatment of segments of the American population including Black, American Indian, Alaska Native, and Pacific Islanders [1]. A consequence of these inequalities is distrust in the American healthcare system. Anesthesiology is further challenged by a lack of understanding of the specialty including our roles in hemodynamics monitoring and safety, especially among Hispanic/Latinx communities [2].

Our Division of Cardiac Anesthesia has participated in a community outreach program through the MGH Youth Scholars Program since 2013 [3]. The cardiac anesthesia component has involved an in-person cadaveric dissection of porcine hearts and lungs led by faculty anesthesiologists and fellows in adult cardiothoracic anesthesiology. The COVID-19 pandemic curtailed nearly all in-person educational activities

and forced institutions to transition to hybrid or full virtual learning via on-line venues.

We describe our experience transitioning a community outreach experience to virtual education while preserving a “hands-on” component and enhancing personal interaction with surgeons and anesthesiologists from diverse backgrounds.

***Corresponding author:** Michael G Fitzsimons, MD, Division of Cardiac Anesthesia, Department of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital, Boston, MA 02114, USA, Tel: 617-726-8980, Fax: 617-726-5985

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Program

The Youth Scholars Program through the Center for Community Health Improvement is a 4-year program designed for students in the Boston area public school systems interested in careers in the health sciences. The program focuses on career exploration, research, and college readiness. The Division of Cardiac Anesthesia has participated through the delivery of a cadaveric porcine heart and lung dissection experience. The Scholars have been led through a in-person, hands-on dissection with faculty anesthesiologists, residents and fellows in anesthesia as well as cardiac surgical fellows.

Program modification during the COVID-19 pandemic focused on three goals: (1) Enhance understanding of cardiac surgery and anesthesia, (2) Maintain a hands-on “dissection” experience, and (3) Increase exposure to women and physicians from underrepresented communities.

Thirty-one Scholars participated in 2021. Most Scholars were female (67.4%) (Table 1) and Hispanic/Latinx (61.29%)

Table 1: Gender.

Category	Number of scholars	Percentage
Female	21	67.40%
Male	10	32.26%
	31	100%

Table 2: Race/Ethnicity.

Race/Ethnicity	Number of Scholars	Percentage
Asian	3	9.68%
Black/African American	6	19.35%
Hispanic/Latinx	19	61.29%
Other	2	6.45%
White	1	3.23%
Total	31	100%

Table 3: Schools.

School	City	Number of Scholars	Percentage
Burh High School	Dorchester, MA	2	6.45%
Chelsea High School	Chelsea, MA	3	9.68%
Dearborn STEM Academy	Roxbury, MA	3	9.68%
East Boston High School	East Boston, MA	4	12.90%
Edward M. Kennedy Academy for Health	Boston, MA	7	22.58%
Revere High School	Revere, MA	6	19.35%
Tech Boston Academy	Boston, MA	1	3.23%
English High School	Jamaica Plain, MA	2	6.45%
John O’Bryant High School	Roxbury, MA	1	3.23%
METCO-Westwood High School	Westwood, MA	1	3.23%
Snowden International School	Boston, MA	1	3.23%
	11 schools	31	100%

followed by Black/African American (19.35%) and Asian American (9.68%) (Table 2). Scholars came from 11 public high schools in Boston or the immediate surrounding communities (Table 3).

ZOOM (ZOOM Video Communications, San Jose, CA) was selected as the video conferencing system for delivery of the program. Faculty and fellow level trainees were recruited from the Division of Cardiac Anesthesia and Cardiac Surgery Division in the Department of Surgery. Two African American cardiac surgical fellows and two female cardiac anesthesia fellows, one of which represented the Latinx community volunteered to participate. Youth Scholars were each provided a welcome letter, educational primer, and a polyvinylchloride, hand-painted heart model approximately one-half life-size before the session. The educational primer included labeled images of the heart model for home study as well as descriptions of the functions of the anatomic structures.

The opening portion of the program included a brief review of cardiac history with highlights of two pioneers in heart surgery from underrepresented groups. Dr. Daniel Hale Williams repair of a stab wound within the mediastinum is often identified as the first surgical procedure performed on the heart [4]. The contributions of Vivien Thomas were discussed [5]. The Scholars were introduced via a PowerPoint (Microsoft Corporation, Redmond, WA) to the various roles and responsibilities of the many members of the cardiac surgical operating room care team including images of anesthesiologists and trainees, cardiac surgeons, cardiac scrub and circulating nurses, perfusionists, and anesthesia technicians. Scholars then explored images of many of the procedures that the cardiac surgical team is involved in including valve replacement and repair, coronary artery bypass grafting, clot removal, ventricular assist device placement, and repair of aortic dissections.

Cardiac surgeons, anesthesiologists, and fellow level trainees each led 45-minute breakout sessions each with 3-4 Scholars to undertake a hands-on “dissection” of the heart models and participate in discussions about heart care and health with the leaders.

Discussion

Healthcare must address three major challenges in its relationship to diverse communities: quality of care, trust, and opportunity. The Youth Scholars Program focuses on public school students grades 9-12 in Boston, Chelsea, and Revere, Massachusetts. The primary goal is to stimulate focus on science and healthcare, enhance interest in college, and facilitate academic success. The Division of Cardiac Anesthesia contributes through a yearly in-person exploration of the anatomy of the heart and lungs through a porcine cadaveric dissection that includes a PowerPoint presentation to guide Scholars through the anatomy [3]. The session is considered by many Scholars to be the highlight of the program. The COVID-19 pandemic eliminated the opportunity for Scholars to gather in-person. The Division of Cardiac Anesthesia appreciates the opportunity to address the three challenges and wished to maintain a high-quality, interactive, and hands-on experience for the Scholars.

Transition of education to online forums during COVID-19 challenged every corner of the planet but may have a far more negative impact on students in urban schools that are largely from communities of color [6]. Schools impacted the most by the COVID-19 pandemic are those that are more racially diverse, have higher rates of students that experience homelessness, are of limited English efficiency, or are eligible for free/reduced lunch [6]. The Boston public school system is not immune to these conditions as more than 70% of 10th grade students are considered economically disadvantaged [7].

Anatomy education may be challenged more than other areas as it primarily involves exploration of a physical structure [8]. Methods of teaching anatomy that can remain with virtual education include pre-recorded videos, augmented reality, and virtual reality [9,10]. Common criticisms of virtual instruction of anatomy include a loss of emotional, olfactory, and tactile learning common in human anatomy laboratories [11]. Challenges identified by anatomy educators in medical schools include reduced student engagement, difficulty with assessment, time constraints, loss of the teacher-student relationship, reduction in the quality of available resources, and lack of adequate technical support [11]. Virtual formats in anatomy education also sacrifice the co-learning which occurs when teams of learners explore anatomy during live dissections. Our desire to preserve the tactile aspect of learning resulted in a decision to purchase individual heart models for the Scholars. Our program was not without risk. Many students are reluctant to turn on videoconferencing during educational sessions. Castelli and Sarvary reported that some students are reluctant to turn on cameras due to concerns about their personal appearance or the background of their location [12].

Communities of color continue to suffer from lower access to employment, housing, quality healthcare, and quality education [13]. Access to quality healthcare has many different forms beyond merely passing through the doors of a hospital or physician's office. Black patients receive 34% fewer preventative services when treated by white physicians

than when treated by a member of their community [14]. The reasons are unclear, but communication is improved when physicians and patients are racially matched [15]. The perception is that treatment is more respectful when received a provider of the same racial identity [16].

African American and Hispanic/Latinx communities have lower levels of trust in the American healthcare system [17]. African Americans reporting lower trust have had fewer quality interactions with healthcare providers and are less likely to have obtained their healthcare from a facility with a physician [18]. Parents likewise distrust the healthcare system when obtaining care for their children and higher levels of distrust are reported among those with lower levels of education [19].

We recognized the impact that the lack of high-quality interactions may have on the care that patients receive as well as the trust they place within healthcare. We recruited faculty cardiac surgeons, a cardiac anesthesiologist, and fellow level trainees in cardiac anesthesia and cardiac surgery to expose Scholars to accomplished individuals from the communities of which they identify. We believe that our program however small could be identified as a positive interaction with the healthcare system.

Cardiac surgery and anesthesia are small, specialty practices within the larger healthcare system. We are fortunate to have daily exposure to frontiers and perspectives not seen by the general population. Community outreach programs such as ours can provide young individuals from diverse communities a positive interaction with the healthcare system that may ultimately increase trust, encourage entry into medicine as a career, and improve quality.

Conflicts of Interest

The authors of this manuscript report no conflicts of interest.

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