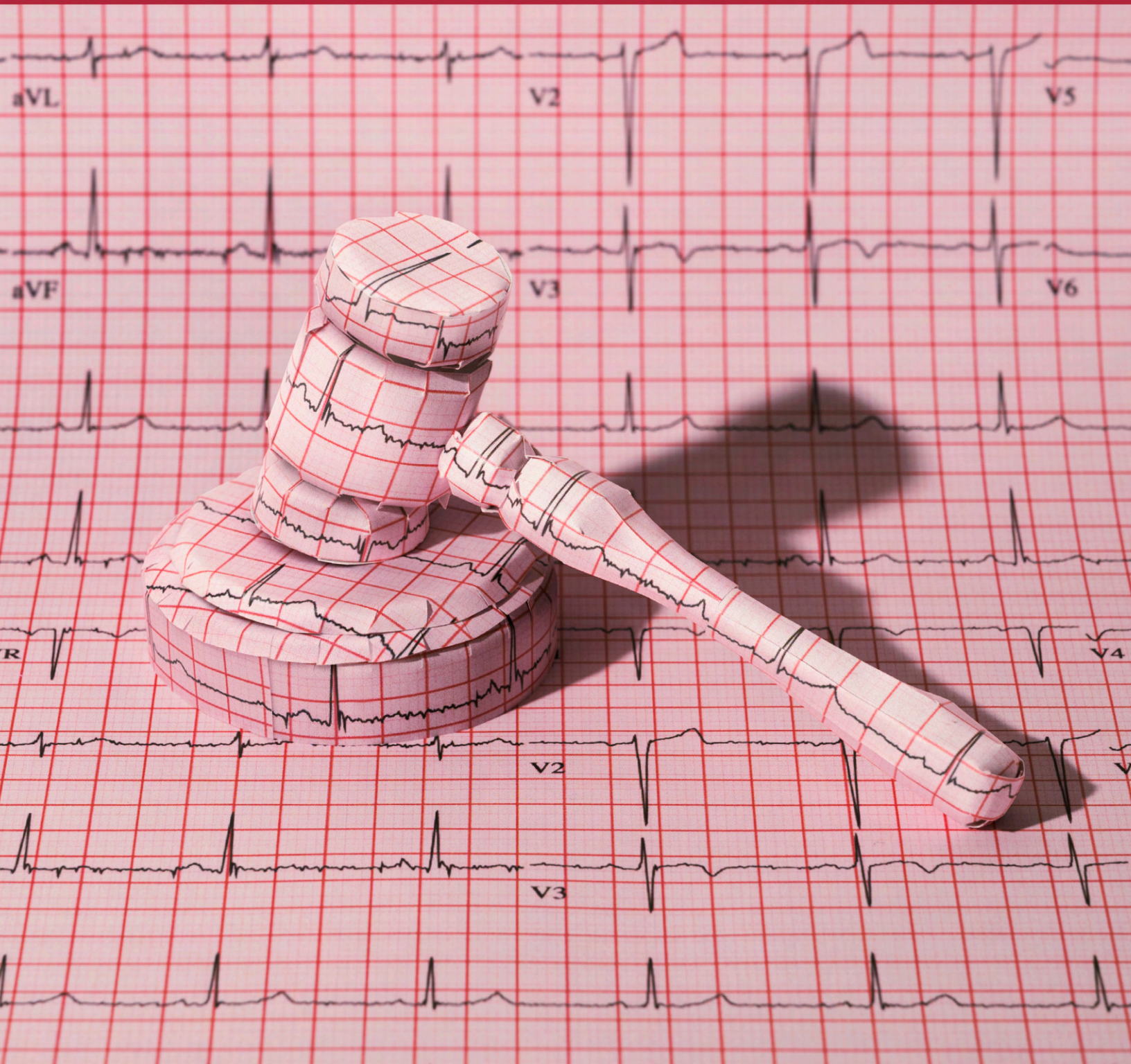


HMSR

AUG 2022

HARVARD MEDICAL STUDENT REVIEW ®

ISSUE 7



July 20th, 2022

Dear readers,

We are delighted to present the seventh issue of the Harvard Medical Review (HMSR), which is only possible with the dedication and collaboration of contributors, HMSR members, and readers like you. On the pages that follow, our authors have shared original viewpoints and scholarly research. We believe that these pieces highlight the importance of student contributions to the field of medicine and are honored to be able to hold spaces for these voices.

This year has been one fraught with challenges that range from gun violence to women's rights. These issues are ones that remain at the forefront of our minds as we consider the direction of HMSR in upcoming issues. Looking forward, we aim to continue broadening our reach and diversity of perspectives on such important issues while upholding the quality of our journal.

We would also like to thank our editorial team, including our Associate Editors, who ensure the scholarly excellence of our work. In addition, we extend our gratitude to the board of faculty, strategic, and alumni advisors, as well as Gina Vild and the Office of Communications and External Relations who continue to invest in the growth of HMSR.

We are honored to be able to share these works with you on the pages that follow. Enjoy!

Sincerely,



Ellen Zhang
Editor-in-Chief



Lily Offit
Executive Director



Maria Asdourian
Managing Editor



Sophia Yin
Managing Editor



Defne Altan
Production Director

Executive Board

Ellen Zhang, Editor-in-Chief
Lily Offit, Executive Director
Maria Asdourian, Managing Editor
Sophia Yin, Managing Editor
Defne Altan, Production Director

Associate Editors

Brian Chang	Suchita Nety
Jovany Franco	Sigurast Olafsson
Malini Gandhi	Priya Shah
Suhas Gondi	Sanjana Srinivasan
Nicholos Joseph	Rebecca Tsai
Ethan Katznelson	David Velasquez
Zhi Lindsey Lin	Amanda West
Stefan Lukianov	Samantha Wong

About HMSR

The Harvard Medical Student Review (HMSR) is student-founded, student-managed, and student-administered under the guidance of faculty and staff. Its mission is to provide a platform for students to contribute to important issues facing health and medicine through a variety of formats, including scholarly articles, editorials, and original artwork. Contributions are invited from the Harvard medical, dental, and public health schools, the rest of Harvard University, and other medical schools.

The articles represent the views and opinions of the original authors and does not necessarily represent the views or opinions of the Harvard Medical Student Review or Harvard Medical School.

Table of Contents

August 2022: Issue 7

VIEWPOINT

Medical Student Perspective on Resident Maternity Leave Policy May M. Kyaw, Angela Pham, Gaia Linfield, Zoe Burger, Sara Toulouie, Olivia Yang	4-8
About Time: Making Space in the Classroom for Students' Experiences of Trauma Christine Xu, David A. Hirsh, Jennifer C. Kesselheim,	9-12
Vibration-based Microphones as a Solution for Non-invasive Ventilation Related Communication Impairment James Lee	13-16

REVIEW

Colorectal Cancer Screening During COVID-19: FIT testing as the Suggested Solution Aleeza J. Leder Macek	17-20
A Look at South Korean Plastic Surgery Annie Jin, Ian Whittall	21-25
How the Texas Heartbeat Bill Will Affect Low-Income Women of Color Across the U.S.: A Commentary Natalia Eugene, Anna Khefets, Mackenzie Bennett	26-30

ORIGINAL RESEARCH

Completing the results of a pan-Canadian survey on the state of oncology education in family practice residency programs: A comparison of one province to the rest of Canada Alanna Janz, Lisa Wang, Svetlana Bortnik, Jaspreet Garcha, Vincent Tam, Steven Yip, Paris Ann Ingledew	31-38
Integrating a Smoking Cessation Initiative for the Uninsured at a Student-Run Free Clinic Cynthia Y Tang, Lauren E. Flowers, Emra Bosnjak, Tricia Haynes, Jamie B. Smith, Laura E. Morris	39-45



Clay illustration by Lily Offit; Photographed by Ben Denzer

Medical Student Perspective on Resident Maternity Leave Policy

May M. Kyaw¹, Angela Pham¹, Gaia Linfield², Zoe Burger², Sara Toulouie³, Olivia Yang⁴

¹ David Geffen School of Medicine at UCLA ² University of California, San Francisco School of Medicine ³ California Northstate University College of Medicine ⁴ California University of Science and Medicine, School of Medicine

Correspondence should be addressed to mmkyaw@mednet.ucla.edu; angelapham@mednet.ucla.edu; gaia.linfield@ucsf.edu; zcburger@health.ucsd.edu; sara.toulouie6181@cnsu.edu; yango@calmedu.org

BACKGROUND

Since 2017, women have comprised the majority of enrolled U.S. medical students, marking a milestone in the gradual diversification of America's next generation of physicians.¹ We represent six of these female medical students from schools across California. As members of the American College of Physicians California Council of Student Members Women in Medicine Committee, we aim to identify and address unique challenges female physicians and trainees face in the career of medicine while advocating for their

equity in well-being, compensation, and career advancements.

As the number of women in medicine increases, so does the number of women starting families during their graduate medical education (GME) years. Approximately 40% of women plan to have a child during their GME training.² However, there is a concerning absence of consistent, standardized parental leave policies across GME programs.

By reviewing the importance of parental leave policies for the health and well-being of residents, we offer our unique perspectives and

recommendations as female medical students to members of the Accreditation Council for Graduate Medical Education (ACGME). We challenge fellow medical students and physicians-in-training to strongly consider parental leave policies as influential components in one's decision-making process for residency programs. Although we focus on maternity leave policies, we believe that all new parents be afforded the same protection. Family leave policies should be inclusive of all parents and primary caretakers, including gender non-binary and transgender individuals as well as non-biological parents.

FEDERAL, AMA, and ABMS Policies

The United States is the only industrialized country that does not mandate paid parental leave for all employees.^{3,4} The Family and Medical Leave Act (FMLA) of 1993 is the legal framework for understanding federal parental leave requirements. The FMLA entitles individuals who have worked at least 1250 hours in the past 12 months to take up to 12 weeks of unpaid, job-protected leave for family and medical reasons—including the birth of a child. In the 2011 Supreme Court ruling of *Mayo Foundation v. the United States*, the Court recognized medical residents as full-time employees, officially recognizing that residents should be allowed the same benefits as others who work more than forty hours a week.⁵ However, medical residents in their first year of training who have less than 12 months of full-time work are not protected under FMLA.

There have been recent efforts to advocate for more flexible parental leave policies for physicians-in-training. Following a report by the ACGME Council of Review Committee Residents in June 2019, the American Board of Medical Specialties (ABMS) convened a task force composed of a multidisciplinary team of physicians to reform the policy on parental leave for residents. The new “ABMS Policy on Parental, Caregiver and Family Leave,” effective July 2021, requires all ABMS Member Boards with training

programs of two or more years to offer a minimum of six weeks off, at least once, during training for parental, caregiver, and medical leave, without exhausting vacation time or sick leave and without requiring an extension in training.⁶ The policy does not supersede existing institution or program policies that meet the minimum requirements set forth by ABMS; for example, the American Board of Obstetrics and Gynecology allows for residents to take up to 24 weeks of leave over their entire residency duration. However, one potential shortcoming of the ABMS policy is that it only applies to physicians in training programs of two or more years and does not cover subspecialty programs that may last only one year, such as those in addiction medicine, hospice and palliative medicine, and geriatric medicine. Additionally, because the policy only applies to those who are working toward an initial certification in a specialty or subspecialty, it does not cover physicians who have completed their residency or fellowship training.

This progressive new policy is a promising and encouraging step in the right direction. However, new parents may continue to face barriers rooted in the culture of an institution and competing interests of different stakeholders. For instance, funding incentives may stand at odds with providing paid leave time to residents. Similarly, program directors concerned with ensuring that education goals are met may be reluctant to allow for time off without extension of training. Additional barriers include ensuring there is adequate coverage of services while a resident is on leave.

RESEARCH FINDINGS & SIGNIFICANCE

A 2019 study surveying 844 physician mothers found that only half were offered paid maternity leave, with the other half using sick leave or accrued paid time off. Most respondents reported wanting a longer time off, closer to the 12 weeks stipulated by the FMLA. Many of those surveyed limited their maternity leave due to

facing discrimination for taking time off, being verbally pressured to return, feeling compelled to resume their clinical duties, and feeling threatened to make up time lost through extra call or clinic time.⁷

The average length of maternity leave across 15 residency programs was found to be 6.6 weeks.⁸ Policies on maternity leave vary across specialties: 90% of pediatric residencies, 88% of radiology residencies, and only 67% of general surgery programs have specified, formal family leave policies.⁹ One post-partum study found that about 75% of surveyed surgical residents perceived the duration of their leave to be inadequate, and one-third of respondents reported strongly considering leaving residency altogether.¹⁰

The adverse effects of inadequate protected leave time are far-reaching. Residents have higher rates of adverse pregnancy-related conditions, including preeclampsia, preterm labor, and intrauterine growth restriction.^{11,12} Many physician mothers stop breastfeeding earlier than desired because of limited time to breast pump, poor access to lactation facilities, and workplace discrimination.⁷ Additionally, decreased skin-to-skin contact time between a mother and her newborn may negatively impact baby bonding and hinder the baby's social development, while increasing the risk of postpartum depression for the mother.¹³

Maternity leave also financially impacts the employer. Although economic research specific to maternity leave in health systems is limited, research in other industries suggests that paid parental leave generates cost savings for businesses due to reduced turnover of the workforce.¹⁴ Given that highly skilled workers, such as physicians and residents, are not readily renewable resources, they are costly to replace.¹⁴ A transparent, comprehensive maternity leave policy that allows for safe and healthy parenthood will not only increase savings for hospital systems

decreasing recruiting efforts but also reduce burnout.

OPINION

As female students on the cusps of our medical careers, it is disheartening to see the lack of consistency among residencies' parental leave programs. It is nothing short of distressing to think that a profession built on the protection and preservation of life, health, and well-being has still not adequately addressed the fundamental challenges that women face as mothers in medicine. The "ABMS Policy on Parental, Caregiver, and Family Leave" is certainly an exciting, progressive step in the right direction, but it does not adequately address the financial burden that women face when taking unpaid time off. Additional improvements can be made to add comprehensive protection for women who are planning to have children during their training.

Amidst the numerous challenges that we face in our medical training, many female medical students may feel that a lack of universal support for maternity leave limits their career ambitions and influences the choices made throughout the course of their medical training. In a 2019 survey conducted at Harvard Medical School, there was no significant gender difference in intention to pursue surgery, with both men and women reporting high rates of verbal discouragement from pursuing a surgical career. However, there was a statistically significant difference between how men and women perceived reasons of verbal discouragement: women were significantly more likely to perceive that it was based on their gender, age, and family aspirations.¹⁵ Female medical students were also significantly more likely to report concerns about finding time for maternity leave and for being too old after residency to have children when considering a career in surgery.¹⁵ Additionally, five different surgeon mothers in a 2019 New York Times article carefully laid out the struggles and barriers of choosing a career that they loved with discouragement from the people

around them, while having to maintain a balance act in their roles as mothers and doctors.¹⁶

As medical students, we are taught to care for the physical, mental, and emotional well-being of our patients. When we become medical trainees and providers, it will be our honor and privilege to use those teachings to care for the sick with utmost empathy and compassion. However, not providing female residents who have aspirations for both their career and family the basic support they need compromises the three facets of healthcare that we are charged with upholding—put simply, not providing compassionate and comprehensive maternity leave policies is antithetical to the core tenets of medicine. Physicians sacrifice much of their time caring for their patients yet are often disregarded when taking paid time off to care for their own loved ones.¹⁷ A profession built on the protection and preservation of life, health, and well-being should adequately address the fundamental challenges residents face as new mothers. As advocates for gender equality in medical education, we ask for recognition by the medical community. We all deserve an equitable stance in our future career, unhampered by the stress of not receiving the support we need.

RECOMMENDATIONS and CONCLUSION

We would like to strongly encourage the ACGME and program directors of residencies and fellowships to accomplish six feasible goals for birthing parents and primary caregivers. We hope attending and resident physicians understand that physicians in training should be allotted the following for the mental, emotional, and physical health of themselves and their families. Some of these goals are our own and some have been partially adapted from others.^{9,18,19}

We recommend:

- All graduate medical institutions adopt a standard, paid 6-week minimum maternity leave for both birthing and non-birthing parents, as per the guidelines of the American Academy of Pediatrics as well as the American College of Obstetrics and Gynecology^{20,21}, that is separate from vacation or sick leave and that would not require extension of training.
 - Following the 6 weeks of paid leave, residents have flexibility in choosing options that best suit their mental and physical health and family needs. Residents may choose to:
 1. Add up to 6 weeks of unpaid leave time with discussion to make up training hours lost during this additional unpaid leave
 2. Start paid work from home with flexible research, electives, and/or telehealth visits
 3. Return to full-time, in-person paid work
- Maternity leave policies are inclusive of all trainees, including interns, regardless of their time spent at the institution.
- 24-hour calls are prohibited during the 3rd trimester for pregnant residents.
- Program directors engage in monthly wellness check-ins with physicians-in-training and invite conversations regarding family life, to dismantle stigma regarding parental leave.
- Institutions support trainees in childcare options, such as daycares on hospital campuses and established parental support groups amongst residency cohorts.

- Further research to address the parental leave protections and benefits of non-birthing and non-primary caregiver parents.

Female trainees and providers overcome many obstacles to become the healthcare providers that they are today. They should not have to sacrifice their own health and that of their family to abide by policies that do not protect those who are welcoming new lives into their family. There should be more regulations that protect our mental and physical health, from the beginning of our training to when we ourselves become the next generation's physicians and educators. In the meantime, we encourage conversations via committee and advocacy groups to amplify the current conversation, help raise awareness, and push for comprehensive maternity leave policies during residency.

POTENTIAL CONFLICTS OF INTEREST:

None.

REFERENCES

1. AAMC. Table A-7.2: Applicants, First-Time Applicants, Acceptees, and Matriculants to U.S. Medical Schools by Sex, 2011-2012 through 2020-2021. Published online October 26, 2020. <https://www.aamc.org/media/9576/download>
2. Blair JE, Mayer AP, Caubet SL, Norby SM, O'Connor MI, Hayes SN. Pregnancy and Parental Leave During Graduate Medical Education. *Acad Med*. 2016;91(7):972-978.
3. Paid Family and Sick Leave in the U.S. Published December 14, 2020. Accessed December 27, 2020. <https://www.kff.org/womens-health-policy/fact-sheet/paid-family-leave-and-sick-days-in-the-u-s/>
4. Daniel H, Erickson SM, Bornstein SS, Health and Public Policy Committee of the American College of Physicians. Women's Health Policy in the United States: An American College of Physicians Position Paper. *Ann Intern Med*. 2018;168(12):874-875.
5. Mayo Foundation v. United States. Accessed December 30, 2020. <https://www.law.cornell.edu/supct/cert/09-837>
6. Parental, Caregiver and Medical Leave During Training. Accessed December 26, 2020. <https://www.abms.org/policies/parental-leave/>
7. Juengst SB, Royston A, Huang I, Wright B. Family Leave and Return-to-Work Experiences of Physician Mothers. *JAMA Netw Open*. 2019;2(10):e1913054.
8. Magudia K, Bick A, Cohen J, et al. Childbearing and Family Leave Policies for Resident Physicians at Top Training Institutions. *JAMA*. 2018;320(22):2372-2374.
9. Vassallo P, Jeremiah J, Forman L, et al. Parental Leave in Graduate Medical Education: Recommendations for Reform. *Am J Med*. 2019;132(3):385-389.
10. Rangel EL, Smink DS, Castillo-Angeles M, et al. Pregnancy and Motherhood During Surgical Training. *JAMA Surg*. 2018;153(7):644-652.
11. Takeuchi M, Rahman M, Ishiguro A, Nomura K. Long working hours and pregnancy complications: women physicians survey in Japan. *BMC Pregnancy Childbirth*. 2014;14:245.
12. Hamilton AR, Tyson MD, Braga JA, Lerner LB. Childbearing and pregnancy characteristics of female orthopaedic surgeons. *J Bone Joint Surg Am*. 2012;94(11):e77.
13. Winston R, Chicot R. The importance of early bonding on the long-term mental health and resilience of children. *London J Prim Care (Abingdon)*. 2016;8(1):12-14.
14. Barron D. The Economics of Paid Parental Leave. Published November 29, 2017. Accessed December 5, 2020. <https://blogs.scientificamerican.com/observations/the-economics-of-paid-parental-leave/>
15. Giantini Larsen AM, Pories S, Parangi S, Robertson FC. Barriers to Pursuing a Career in Surgery: An Institutional Survey of Harvard Medical School Students. *Ann Surg*. Published online October 9, 2019. doi:10.1097/SLA.0000000000003618
16. Goldberg E. When the Surgeon Is a Mom. *The New York Times*. <https://www.nytimes.com/2019/12/20/science/doctors-surgery-motherhood-medical-school.html>. Published December 20, 2019. Accessed March 13, 2021.
17. Wendling A, Paladine HL, Hustedde C, Kovar-Gough I, Tarn DM, Phillips JP. Parental Leave Policies and Practices of US Family Medicine Residency Programs. *Fam Med*. 2019;51(9):742-749.
18. Bressman E. Insights on Residency Training. Published January 22, 2020. Accessed December 27, 2020. <https://blogs.jwatch.org/general-medicine/index.php/2020/01/the-acgme-needs-to-mandate-parental-leave/>
19. McAuliffe CG, Rialon KL, Hipp DM, Krucoff KB. Multispecialty Resident Perspectives on Parental Leave Policies. *J Grad Med Educ*. 2019;11(3):362-364.
20. Section on Medical Students, Residents, and Fellowship Trainees, Committee on Early Childhood. Parental leave for residents and pediatric training programs. *Pediatrics*. 2013;131(2):387-390.
21. Paid Parental Leave. Accessed March 13, 2021. <https://www.acog.org/clinical-information/policy-and-position-statements/statements-of-policy/2019/paid-parental-leave>



Clay illustration by Lily Offit; Photographed by Ben Denzer

About Time: Making Space in the Classroom for Students' Experiences of Trauma

Christine Xu, David A. Hirsh, MD, Jennifer C. Kesselheim, MD

C. Xu is a fourth-year medical student at Harvard Medical School, Boston, MA.

D.A. Hirsh is Associate Professor of Medicine, Harvard Medical School/Cambridge Health Alliance, Boston and Cambridge, Massachusetts.

J.C. Kesselheim is the Director of the Master of Medical Sciences (MMSc) in Medical Education program at Harvard Medical School, the Director of the Fellowship in Pediatric Hematology-Oncology at Dana-Farber/Boston Children's Cancer and Blood Disorders Center, and an Associate Professor of Pediatrics at Harvard Medical School.

Correspondence should be addressed to christine_xu@hms.harvard.edu (925) 922-4502

Abstract

Many medical students have experienced trauma and conditions affecting their mental health. Throughout medical school, especially during psychiatry portions of the curriculum, students and educators may face challenges navigating course material. Adverse classroom and patient interactions can lead to further traumatization, isolation from course content, and lapses in professionalism. Contemporary educational environments have become increasingly sensitive to the prevalence of trauma among students, but debate remains over how to simultaneously respect student needs and ensure engagement with important course

content. In medical education, a major challenge is to create learning environments that are attentive to students' well-being, while preparing students to encounter clinical scenarios they may find distressing. Principles of trauma-informed medical education (TIME) support medical educators and medical students to work together to create curricula and learning environments that are psychologically safe and appropriately challenging. As students engage with difficult course content at a suitable pace with support, they build resilience, embrace growth and learning, and become better able to manage challenging clinical scenarios as future physicians.

It was the end of our first year at medical school. We had dedicated ourselves to mastering nearly every organ system, with a final hurdle remaining: the mind. As we delved into the psychiatry curriculum, it became clear that the mind involved dilemmas that had not been as relevant to our consideration of the lungs and kidneys.

The patient being presented was a graduate student in his 20's with symptoms of anxiety and depression. As details of the case unfolded, students shifted uncomfortably in their seats. I wondered, how many of our classmates had experienced this same situation? Sensing the uneasy atmosphere of the room, I looked down at my desk; others around me seemed similarly discomfited.

As the weeks progressed, our class continued to struggle with the content of the course. Several times, students packed up and left in the middle of class, heads down, appearing on the verge of tears. Could the discussions of mental illness, self-harm, and emotional distress have brought forth experiences they had lived through themselves or experienced through close friends and family? In one session in a large, dimly lit auditorium, as a survivor of childhood trauma described a violent assault, students in the front row walked out. Later, we engaged in tense dialogue about the students who had left and about others whose heads were immersed in phones and laptops during the session. Under pressure, one student reluctantly disclosed that looking at his phone quelled his sadness and fear, at least enough to allow him to remain in his seat.

Medical professionals have increasingly incorporated into their practice the principles of trauma-informed care.¹ A major societal theme of

our medical school curriculum, trauma-informed care acknowledges that the majority of patients have experienced trauma, defined as physically or emotionally distressing events leading to long-term adverse effects.² Students learn to assess patients for trauma, and to adjust medical history-taking, exams, and procedures to facilitate patients' comfort and trust when trauma affects their experience of care. Medical providers, whether physicians or medical students, have also experienced trauma.³ Trauma related to mental illness is prevalent among medical students; almost one third of medical students experience depressive symptoms and 11% have had suicidal ideation.⁴ How do we educate future physicians to be empathetic providers while acknowledging their own experiences of trauma—in other words, provide not just trauma-informed care but also effective trauma-informed medical education (TIME)?⁵

Students and faculty at our medical school have discussed whether and how the learning environment and curriculum should be modified when the course content is potentially distressing. Nationwide, media and cultural commentators have brought attention to university policies allowing students to isolate themselves and choose not to participate when confronted with difficult subjects in the classroom.⁶ From trigger and content warnings to subjects being dropped from the curriculum altogether to avoid controversy or distress, contemporary educational environments are increasingly attentive to the history of trauma within the student body, leading to new questions both for students and educators.

Students are entitled to protect themselves from feeling overwhelmed by painful recollections during learning sessions. At the same time, in clinical settings, medical students will inevitably

encounter situations reminiscent of their struggles. Clinicians arguably must assume the responsibility of tackling difficult topics with their patients. If we cannot, then who will?

Educators must strike a balance between these seemingly disparate concerns. While respecting the safety and well-being of students, educators must still prepare students to encounter and competently manage clinical scenarios they find personally distressing. A learning environment best equipped to do so fosters psychological safety, an atmosphere where beliefs and thoughts can be shared without fear of social or academic repercussions.⁷ Educators can achieve psychological safety in the classroom by clearly setting goals and expectations, and facilitating open, nonjudgmental communication.

Faculty play a critical role in determining whether the atmosphere of the classroom feels uncomfortable and closed to conversation versus safe for communication and learning. When teaching about mental illness, faculty should open with an acknowledgment of the prevalence of these experiences in medical students and a reminder to show consideration for fellow classmates who may have experienced trauma.⁵ These portions of the curriculum should be the subject of frequent student feedback, ideally in advance through volunteer student representatives, with the option to express any concerns about the learning environment.

Opportunities for open and nonjudgmental conversations must be available for students. Unlike the discourse that occurred among our classmates, students should never feel directly or indirectly pressured to disclose their traumas, even in charged conversations. Instead, students and educators should create spaces founded on empathy and begin with the assumption that all are putting forth their best efforts. Together, educators and students can facilitate compassionate communication by offering students more opportunities for reflection. Faculty may offer students opportunities to discuss or write about the links between what they are learning and their own experiences or reflect together through optional and confidential discussion groups.

A compassionate approach using TIME does not necessarily mean giving students complete

discretion to avoid all uncomfortable topics. As part of their careers, physicians will encounter traumatic and painful emotional experiences, as inevitably as seeing blood in a surgery. While students who feel unable to learn in the moment may step aside to engage in self-care, they should also try to re-engage with the topic at an appropriate time, seeking the support of trusted advisors or others in the community.⁵ Gradual, informed, and self-compassionate engagement with difficult topics builds emotional strength and resilience.⁸

The ability to practice self-care is an important skill for learners throughout the course of their education. Students can build self-care habits by learning new techniques, reflecting on processes of healing, learning, and growing, and discussing experiences with peers and mentors. Self-care includes exercise, creative expression, reflection and meditation, social connection, and more. However, while these practices offer many benefits, self-care alone is not sufficient. Medical schools must strive continually to examine their systems and promote supportive and psychologically safe learning environments, to prevent student re-traumatization and disengagement⁵ and professionalism issues in the future.³

The impacts of trauma are widespread in patients, providers, and students. Teachers and students can leverage principles of TIME for training future physicians to prevent and address alienation, isolation, and re-traumatization from course content.⁵ Medical schools should implement policies that recognize the prevalence of trauma in medical students and promote learning environments that are both psychologically safe and effectively challenging. The purpose of an education, after all, is growth. These principles encourage medical students to build resilience through self-compassion and a growth mindset.^{9,10} With time, they can become able to engage with their future work safely and wholly.

ACKNOWLEDGMENT

The authors would like to thank Dr. Todd Griswold for his dedication to creating effective and psychologically safe learning environments in the psychiatry curriculum, and Dr. Richard Schwartzstein for his input on this article. The authors would also like to thank the students at Harvard Medical School (HMS) for sharing their experiences in the classroom, and the student Educational Representatives at HMS for communicating with classmates and faculty to design curricular content and learning environments together.

REFERENCES

1. Raja S, Hasnain M, Hoersch M, Gove-Yin S, Rajagopalan C. Trauma informed care in medicine: Current knowledge and future research directions. *Fam Community Health*. 2015;38(3):216-26.
2. Substance Abuse and Mental Health Services Administration. SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach. HHS Publication No. (SMA)14-4884. 2014:1-27.
3. Williams BW et al. Adverse Childhood Experiences in Trainees and Physicians with Professional Lapses. *Acad Med*. 2020.
4. Rotenstein LS et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. *JAMA*. 2016;316(21):2214-2236.
5. Brown T, Berman S, McDaniel K, Radford C, Mehta P, Potter J, Hirsh DA. Trauma-Informed Medical Education (TIME): Advancing Curricular Content and Educational Context. *Acad Med*. 2020.
6. Lukianoff G, Haidt J. The coddling of the American mind. *The Atlantic*. 2015 Sep 30;316(2):42-52.
7. Edmonson A. Psychological Safety and Learning Behavior in Work Teams. *Adm Sci Q*. 1999;44(2):350-383.
8. Cusack K et al. Psychological Treatments for Adults with Post-traumatic Stress Disorder: A Systematic Review and Meta-Analysis. *Clin Psychol Rev*. 2016;43:128-141.
9. Clark A and Sousa B. Definitely Unfinished: Why the Growth Mindset is Vital for Educators and Academic Workplaces. *Nurse Educ Today*. 2018;69: 26-29.
10. Osman NY, Sloane DE, Hirsh DA. When I say...growth mindset. *Med Educ*. 2020 Apr 3.



Clay illustration by Lily Offit; Photographed by Ben Denzer

Vibration-based Microphones as a Solution for Non-invasive Ventilation Related Communication Impairment

James Lee¹

¹Carle Illinois College of Medicine

Correspondence should be addressed to Jamesdl3@illinois.edu

Abstract

The incidence of acute respiratory failure (ARF) has dramatically increased in the past few decades in the United States. From 2002 to 2017, there was a 197% increase in the annual incidence of ARF, and in response, a 437% increase in the use of noninvasive mechanical ventilation (NIV). Multiple studies have demonstrated that use of NIV frequently causes communication impairment (CI), which is strongly associated with anxiety and can in turn contribute to NIV intolerance and failure, and ultimately, mortality.⁸⁻¹⁰ CI also prevents accurate evaluation of patients by providers, which can contribute to worse clinical outcomes¹¹. Recently, Lee et al at Pohang University, South Korea, published their development of a flexible, wearable vibration sensor that can amplify speech while minimizing ambient noise. Although this device is intended for use in portable devices such as cell phones, it also poses as a viable solution for NIV-related communication impairment. Use of this vibration-based microphone can help address NIV-related CI and significantly improve clinical outcomes in patients with acute respiratory failure.

Acute respiratory failure (ARF) is an increasingly common and pressing issue in the United States, especially in the hospital setting. From 2002-2017, there was a 197% increase in annual incidence of ARF, from 429 to 1,275 cases per 100,000 adults, with a 57% decrease in hospital mortality from 28% to 12%. In the same period, there was a 437% increase in use of noninvasive mechanical ventilation (NIV), from 41 to 220 cases per 100,000 adults, with a 38% decrease in hospital mortality from 16% to 10%.¹ Respiratory failure arises not only from a primary respiratory insult such as pneumonia, COPD exacerbation, or anaphylaxis, but also secondary to anesthesia in hospital procedures or as sequelae to another primary health issue. Stefan et. al. state that ARF related hospitalization rates increased across all age groups from 2001 to 2009 and can only partially be explained by the growth and aging of the US population. They demonstrate that the increased in ARF incidence is “mainly driven by a surge in cases of sepsis and pneumonia”, as well as acute renal failure, conditions that predispose patients to development of ARF.²

NIV modalities, such as BIPAP and CPAP, have gradually replaced more invasive methods, such as mechanical ventilation via intubation, as first-line treatment. In France, Demoule et al showed the rate of first-line NIV use for ARF increased from 16% in 1997 to 37% in 2011.³ Similarly, Toft-Petersen et al in Denmark found that NIV made up just 36% of assisted ventilation in 2004 compared to 67% in 2011.⁴ This is most likely due to the less invasive nature of NIV; intubation bypasses the vocal cords to directly supply air to the lungs, therefore impairing speech production, whereas NIV provides air flow across the vocal cords and allows for phonation. Furthermore, NIV masks can be intermittently removed, allowing for more effective communication.⁵

In most patients, NIV is implemented using an oronasal (full-face) mask, which covers the mouth and nose. Obstructing the mouth, coupled with the ambient noise produced by BIPAP/CPAP devices, contributes to the difficulty in communication for patients. Although NIV masks can be temporarily removed for communication, many patients are unable

to tolerate removal due to rapid reduction in oxygenation and possibly lung derecruitment. Furthermore, many patients with respiratory dysfunction have, at baseline, decreased speech volume and thus cannot be heard over the ambient noise. This poses a need for maintenance of communication in patients on NIV without removal of respiratory support and potential respiratory decompensation.

Communication impairment (CI) can be severely detrimental to patient care. Multiple studies have demonstrated that CI contributes to fear, anger, and distress in patients and is the most remembered experience associated with NIV.^{6,7} Patients are often apologetic for their inability to communicate with their providers or refrain from even attempting to communicate due to their inability to be understood. Studies have also shown that CI is strongly associated with anxiety, which can in turn contribute to NIV intolerance and failure, and ultimately mortality.^{8,9,10} CI also prevents accurate evaluation of patients by providers, which can contribute to worse clinical outcomes.¹¹

Several teams have been looking for ways to improve communication for patients on NIV. A clinical trial started in 2019 at Emory University is testing the efficacy of the F2S Communication System, a communication aid that lets patients choose words or phrases to be read aloud.¹² A review paper by Wong et al. discusses further solutions for NIV associated communication deficits inspired by similar circumstances, such as in astronauts, scuba divers, and fighter jet pilots.⁶ Although communication tools such as communication boards (devices that display photos, symbols, or illustrations to which users can gesture or point), have been utilized historically, they are limited in vocabulary and lack the ability to fully express users' thoughts. Writing or typing are also viable options but are more time-consuming and less fluent than speech, limiting the rate of communication. Furthermore, many patients receiving NIV treatment tend to be physically constrained, limiting their ability to write or type. Wong et al identified three major categories of microphone solutions: intraoral, peri-pharyngeal, and within the mask. One such device is the SPEAX by Atia Medical, which

imbeds a microphone directly into the CPAP mask.¹³ However, intraoral and intra-mask microphones require sterilization between uses, are exposed to moisture, and are vulnerable to ambient noise. Therefore, microphones placed peripherally around the neck area pose the most viable option for communication enhancement in NIV.

Also in 2019, Lee et al at Pohang University of Science and Technology (POSTECH), South Korea, announced that they have developed a flexible, wearable vibration sensor that can be applied to the throat and amplify speech while minimizing ambient noise.¹⁴ The project's primary goal was to replace cellphone microphones, which are often inaccurate and pick up ambient sound from the environment. However, their device has also great potential to be applied in the setting of communication enhancement in noninvasive ventilation. Since their device directly measures vibrations produced by the patient and does not depend on acoustic transmission of sounds through air, their microphone can be used to minimize the noise produced by NIV equipment.

Notably, there have been previous implementations of vibration sensor-based microphones used in other applications. Tanaka et al in 2015, for example, have previously developed wearable tactile sensors incorporating vibration sensors¹⁵ Zhou et al in 2017 also discussed the use of vibration sensors in documentation of seismic data in unattended ground sensors (UGS).¹⁶ However, the POSTECH team is the first to utilize vibration sensors to record speech.

The cost of producing electronics such as microphones has dramatically decreased in recent years, primarily with the advent of micro-electrical mechanical systems (MEMS). The implementation of MEMS, in which the functionality of electronic systems such as microphones can be scaled down to micron-scale sizes, as well as the development of novel materials, have greatly reduced the cost of producing these devices.¹⁷ Soon, it will be possible to mass produce wearable and disposable vibration-based microphones, similar to electrodes placed for cardiac telemetry, greatly increasing viability of this technology for use in healthcare.

The ever-increasing prevalence of ARF globally, along with a gradual shift away from invasive

mechanical ventilation towards NIV modalities, have made it exceedingly critical that CI associated with NIV use be addressed. Multiple studies have demonstrated that the masks used in NIV such as CPAP or BiPAP severely limit the users' abilities to communicate, and the resulting detriment in patient satisfaction and clinical outcomes. Vibration-based wearable microphone technology demonstrates a clear advantage over current communication tools for NIV-associated CI and can be implemented in the hospital setting in order to address this increasingly pressing healthcare pitfall. Further work should be done to develop vibration-based microphones for the purpose of communication-impairment in the hospital setting, as well as implementation and evaluation in the hospital setting to gauge feasibility of widespread use.

POTENTIAL CONFLICTS OF INTEREST:

None.

REFERENCES

1. Kempker J, Abril M, Chen Y, Kramer M, Waller L, Martin G. The Epidemiology of Respiratory Failure in the United States 2002–2017: A Serial Cross-Sectional Study. *Critical Care Explorations* 2020;2(6):e0128
2. Stefan M, Shieh M, Pekow P, et al. Epidemiology and outcomes of acute respiratory failure in the United States, 2001 to 2009: A national survey. *Journal of Hospital Medicine* 2013;8(2):76-82.
3. Demoule A, Chevret S, Carlucci A et al. Changing use of noninvasive ventilation in critically ill patients: trends over 15 years in francophone countries. *Intensive Care Medicine* 2015;42(1):82-92.
4. Toft-Petersen A, Torp-Pedersen C, Weinreich U, Rasmussen B. Trends in assisted ventilation and outcome for obstructive pulmonary disease exacerbations. A nationwide study. *PLOS ONE* 2017;12(2):e0171713
5. Mehta S, Hill N. Noninvasive Ventilation. *American Journal of Respiratory and Critical Care Medicine* 2001;163(2):540-577.
6. Wong A, Cheung P, Happ M, Gay P, Collop N. Consequences and Solutions for the Impact of Communication Impairment on Noninvasive Ventilation Therapy for Acute Respiratory Failure: A Focused Review. *Critical Care Explorations* 2020;2(6):e0121.
7. Khalaila R, Zbidat W, Anwar K, Bayya A, Linton D, Sviri S. Communication Difficulties and Psychoemotional Distress in Patients Receiving Mechanical Ventilation. *American Journal of Critical Care* 2011;20(6):470-479.

8. Schmidt M, Boutmy-Deslandes E, Perbet S, et al. Differential Perceptions of Noninvasive Ventilation in Intensive Care among Medical Caregivers, Patients, and Their Relatives. *Anesthesiology* 2016;124(6):1347-1359.
9. Antonelli M, Conti G, Moro M, et al. Predictors of failure of noninvasive positive pressure ventilation in patients with acute hypoxemic respiratory failure: a multi-center study. *Intensive Care Medicine* 2001;27(11):1718-1728.
10. Demoule A, Dangers L, Laforet J, et al. Anxiety in Patients Receiving Non-Invasive Ventilation for Acute Respiratory Failure: Prevalence, Risk Factors and Prognostic Impact. In: American Thoracic Society International Conference. San Diego: American Thoracic Society; 2018.
11. Stransky M, Jensen K, Morris M. Adults with Communication Disabilities Experience Poorer Health and Healthcare Outcomes Compared to Persons Without Communication Disabilities. *Journal of General Internal Medicine* 2018;33(12):2147-2155
12. Collop, N. (2019, March 22 – 2019, July 8). *Determining the Benefits of Improving Communication in BPAP/CPAP Users*. Identifier NCT03795753. <https://clinicaltrials.gov/ct2/show/NCT03795753>
13. Wong A-KI, Cheung PC, Zhang J, et al. Randomized Controlled Trial of a Novel Communication Device Assessed During Noninvasive Ventilation Therapy. *Chest* 2021;159(4):1531–9.
14. Lee S, Kim J, Yun I, et al. An ultrathin conformable vibration-responsive electronic skin for quantitative vocal recognition. *Nature Communications* 2019;10(1).
15. Tanaka Y, Nguyen DP, Fukuda T, Sano A. Wearable skin vibration sensor using a PVDF film. 2015 IEEE World Haptics Conference (WHC) [Internet] 2015 [cited 2021 Sep 11]; Available from: <https://ieeexplore.ieee.org/document/7177705>
16. Zhou Q, Li B, Liu H, Chen S, Huang J. Microphone-Based Vibration Sensor for UGS Applications. *IEEE Transactions on Industrial Electronics* 2017;64(8):6565–72.
17. Mallik S, Chowdhury D, Chhtopadhyay M. Development and performance analysis of a low-cost MEMS microphone-based hearing aid with three different audio amplifiers. *Innovations in Systems and Software Engineering* 2019;15(1):17-25.



Clay illustration by Lily Offit; Photographed by Ben Denzer

Colorectal Cancer Screening During COVID-19: FIT testing as the Suggested Solution

Aleeza J. Leder Macek B.Sc.¹

¹New York University Grossman School of Medicine

Correspondence should be addressed to aleeza.ledermacek@nyulangone.org

Abstract

In March 2020, healthcare in the United States changed, with primary care and preventative care, particularly colorectal cancer screening, grinding to a halt. COVID-19 brought to the forefront the racial healthcare disparities in the United States with the pandemic disproportionately affecting minority communities, reflecting the well-established disparities in colorectal cancer outcomes which are expected to be exacerbated by the lack of screening. This article aims to promote the use of FIT testing for colorectal cancer screening during this pandemic particularly for minority communities. Studies have shown that FIT tests have a high sensitivity and specificity, are inexpensive, and have better adherence than colonoscopies. Given the cancellation of many screening colonoscopies and the potential risk of leaving the house for a procedure, implementation of a FIT screening program appears to be the best intervention for maintaining colorectal cancer screening during COVID-19 and preventing the cancer disparities from worsening.

In March 2020, the American Cancer Society issued guidance which cancelled or delayed most screening colonoscopies, leaving both

physicians and patients to balance the dangers of COVID-19 against missing this important cancer screening appointment.^{1,2} At the same time,

COVID-19 began sweeping across the country, bringing racial disparities in healthcare in the United States to the forefront. African Americans make up only 13% of the population but over 20% of the COVID-19 cases, while Latinx individuals make up only 17% of the population but 32% of COVID-19 cases.³ These disparities also resulted in increased mortality from COVID-19 as compared to White Americans, with African Americans having more than two times the mortality rate than White Americans and both Latinx and Native American populations having higher mortality rates as well.^{2,3} Interestingly, this pattern mimicked the well-established disparities in cancer outcomes between Black and White Americans, particularly with colorectal cancer^{3,4}. African Americans have a 23% higher incidence and 47% higher mortality of colorectal cancer despite many of the successes in colorectal cancer screening^{3,4}. Therefore, it is of utmost priority to continue cancer screening in these populations during this pandemic to curtail this disparity.

Colorectal cancer screening has had a profound impact on the incidence, morbidity and mortality associated with colorectal cancer.^{5,6} One study completed by the Kaiser Permanente Northern California healthcare system demonstrated a 25.5% reduction in colon cancer incidence and 52.4% reduction in mortality from 2000 to 2015 after the implementation of a colorectal cancer screening program.⁶ Despite the screening's success, colorectal cancer still kills approximately 50,000 people a year as the second leading cause of cancer in the United States, with the mortality rate of White Americans being only 2/3 of that of Black Americans.⁵ One of the contributing factors to this continuing high mortality rate and disparity is the lack of adherence to colorectal cancer screening, only exacerbated by the COVID-19 pandemic restrictions.^{2,7} This article aims to promote a specific alternative to the use of colonoscopy for colorectal cancer screening and the importance in maintaining cancer screening rates during the COVID-19 pandemic particularly for minority communities.

The United States Preventive Services Task Force provides comprehensive recommendations for colorectal cancer screening.⁸ In their recommendations, they list the many options for CRC screening: guaiac-based fecal occult blood test (gFOBT); fecal immunochemical test (FIT); computed topography colonography (CTC); flexible sigmoidoscopy and colonoscopy. FIT and gFOBT are both chemical tests which test for the presence of blood in the stool because cancers and polyps of the lower intestines often bleed as stool is passed by them.^{5,8} As one of the first colorectal cancer screening tests created, gFOBT is simple, inexpensive and widely accessible; importantly, randomized controlled trials have demonstrated a 32% reduction in mortality with the use of annual screening.⁵ Despite these many promising results, gFOBT has been moving out of favor due to its low one-test sensitivity (~50%) and positive predictive value (~3-10%), with many opting instead for the similar FIT screening.⁵ FIT is able to measure specifically colonic blood, can be performed at home, requires only one fecal sample, and has a greater sensitivity and specificity than gFOBT (79% and 94%, respectively).⁵ In one study, FIT testing was shown to reduce colorectal cancer incidence by 22% over a period of 11 years, and a recent pooled meta-analysis demonstrated its 95% accuracy of detecting colorectal cancer along with a 59% reduction in mortality.⁵ Colonoscopy is the most invasive method of screening for colorectal cancer, it is the gold standard due to its ability to detect and prevent colorectal cancer, decreasing the incidence of cancer up to 90%⁸. Lastly, CT colonography (CTC) and flexibly sigmoidoscopy are both methods used to actually "see" the colon but are less widely available or utilized than stool tests or colonoscopies due to their cost and comparable sensitivities and specificities.^{5,8}

Thus, it is not surprising that many healthcare systems are increasingly offering FIT/gFOBT as their first line colorectal cancer screening modality because of the cost-effectiveness, value and willingness of patients to adhere.⁹⁻¹¹ Many systems have also seen increased

adherence to colorectal cancer screening by mailing FIT envelopes directly to patients, so they can take the test without leaving their home^{10,11}. Importantly, a randomized control trial has shown that patients who are recommended for gFOBT, or are given a choice between gFOBT or colonoscopy, are almost twice as likely to adhere to the screening recommendation than those who have been recommended only the colonoscopy.¹² Other studies have similarly identified that at least 10% more participants were adherent to screening when they were offered FIT as opposed to colonoscopy.^{9,13} Given the differing adherence rates, some models have indicated that public health programs offering FIT could save four times as many lives as those offering colonoscopy⁸. Unfortunately, the universal recommendation of colonoscopy could reduce adherence to colorectal cancer screening especially in minority groups who disproportionately bear the burden of colorectal cancer incidence and mortality.

Although these results have demonstrated the real utility and promise of FIT testing, colonoscopy is currently the preferred method for colorectal screening by medical professionals in the United States because of its proven results, efficacy and treatment utility.^{8,12,13} Despite its effectiveness, colonoscopy screening adherence is not as high as it needs to be¹². Studies have shown that both patient, provider and system-wide factors influence this lag^{14,15}. Patients often cite concerns about the invasiveness of the procedure, the discomfort/time of bowel prep and embarrassment about the procedure, while providers are more concerned with cost and insurance status. African American patients in particular were less likely to undergo colonoscopy than White Americans.^{14,15} During the COVID-19 pandemic the reasons to avoid colonoscopy grew: just leaving the house conferred a risk of contracting COVID-19, entering the hospital or interacting with healthcare providers, and receiving an invasive procedure were even scarier.

Many things have changed, especially in regard to primary and preventive medical care, since March of 2020 when the COVID-19

pandemic began in earnest in the United States. There has been a significant decrease in all colorectal cancer screening during this time period, largely due to a reduction in colonoscopies—up to 86% decrease according to one estimate.^{2,7} This year-long disruption alone could result in an estimated 10,000 excess deaths due to colon and breast cancer due to the lapse in preventive screenings¹. Concurrently, many federally-qualified health programs, which serve many of the underserved and uninsured, halted in-person procedures or pick up/drop off of FIT/gFOBT tests to stop the spread of COVID-19; these same and similar programs did not have the resources to implement the mailing programs that have proven effective as a substitute.² Many minority patients have also been disproportionately financially-affected by COVID-19, which in turn made seeking out healthcare and expensive screening procedures farther down the list of priorities.⁴

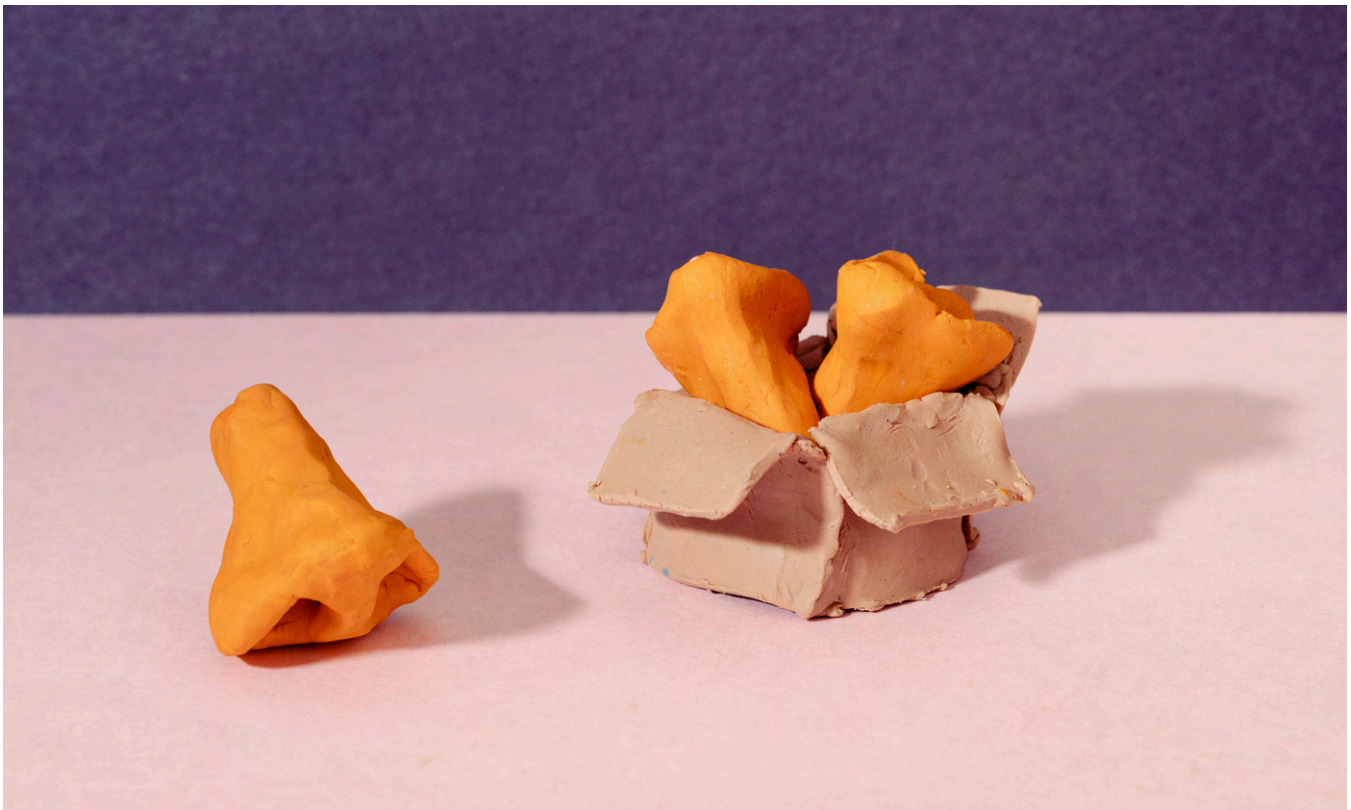
The past year has taught us that we need to implement evidence-based and value-based methods for colorectal cancer screening with high patient adherence so that a 1-year lapse of in-person visits will not result in the projected excess deaths and have such a profound impact on cancer incidence and mortality. During COVID-19, the FIT test seems to be what our patients want and need as a test that meets their tolerance for comfort and cost, especially now when they feel unsafe leaving their homes. It is important that health centers create the necessary infrastructure now to allow patients to have safe and affordable options for colorectal cancer screening; for most this is not a colonoscopy, but rather the FIT.

POTENTIAL CONFLICTS OF INTEREST:

None.

REFERENCES

1. Sharpless NE. COVID-19 and Cancer. *Science*. 2020;368(6497):1290
2. Balzora S, Issaka RB, Anyane-Yeboah A, Gray DM, May FP. Impact of COVID-19 on colorectal cancer disparities and the way forward. *Gastrointestinal Endoscopy*. 2020; 92(4): 946-950
3. Carethers JM, Sengupta R, Blakey R, Ribas A, D'Souza G. Disparities in Cancer Prevention in the COVID-19 Era. *Cancer Prev Res*. 2020; 13(11): 893-896
4. Tsai MH, Xirasagar S, de Groen, PC. Persisting Racial Disparities in Colonoscopy Screening of Persons with a Family History of Colorectal Cancer. *J Racial and Ethnic Health Disparities*. 2018; 5: 737–746
5. Issa IA, Noureddine M. Colorectal cancer screening: An updated review of the available options. *World journal of gastroenterology*. 2017;23(28): 5086-5096.
6. Levin TR, Corley DA, Jensen CD, et al. Effects of Organized Colorectal Cancer Screening on Cancer Incidence and Mortality in a Large Community-Based Population. *Gastroenterology*. 2018;155(5): 1383-1391.e5.
7. Myint A, Hilda O, Lee S, et al. Impact of the COVID-19 Pandemic on Colorectal Cancer Screening Rates and Modalities in a Large Integrated Health System *Am J Gastroenterol*. 2020;115: S154-S155
8. Bibbins-Domingo K, Grossman DC, Curry SJ, et al. Screening for Colorectal Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2016;315(23):2564-75.
9. Singal AG, Gupta S, Tiro JA, et al. Outreach invitations for FIT and colonoscopy improve colorectal cancer screening rates: A randomized controlled trial in a safety-net health system. *Cancer*. 2016;122:456-463.
10. Coronado GD, Petrik AF, Vollmer WM et al. Effectiveness of a Mailed Colorectal Cancer Screening Outreach Program in Community Health Clinics: The STOP CRC Cluster Randomized Clinical Trial. *JAMA Intern Med*. 2018;178(9):1174–1181.
11. Charlton ME, Mengeling MA, Halfdanarson TR, et al. Evaluation of a Home-Based Colorectal Cancer Screening Intervention in a Rural State. *J Rural Health*. 2014;30(3): 322-332.
12. Inadomi JM, Vijan S, Janz NK, et al. Adherence to colorectal cancer screening: a randomized clinical trial of competing strategies. *Arch Intern Med*. 2012;172(7):575-82.
13. Quintero E, Castells A, Bujanda L, et al. Colonoscopy versus Fecal Immunochemical Testing in Colorectal-Cancer Screening. *NEJM* 2012;366: 697-706
14. Coleman Wallace DA, Baltrus PT, Wallace TC, Blumenthal DS, Rust GS. Black white disparities in receiving a physician recommendation for colorectal cancer screening and reasons for not undergoing screening. *J Healthcare Poor Underserved*. 2013;24(3): 1115-24.
15. Harewood GC, Wiersema MJ, Melton LJ. A prospective, controlled assessment of factors influencing acceptance of screening colonoscopy. *Am J Gastroenterol*. 2002;97(12): 3186-3194,



Clay illustration by Lily Offit; Photographed by Ben Denzer

A Look at South Korean Plastic Surgery

Annie Jin ¹, Ian Whittall ¹

¹ University of Connecticut School of Medicine, Farmington, CT, 06032

Correspondence should be addressed to whittall@uchc.edu; ajin@uchc.edu

Abstract

With increasing globalization in communication, travel, economics, and innovation, medicine and plastic surgery have also made great advancements. The following essay looks at plastic surgery in South Korea, and the innovations South Korean plastic surgeons have made in the field. We explore the cultural, societal, and economic influences that may have impacted the development and popularity of plastic surgery in South Korea, and the rise of South Korean medical tourism. We also compare South Korean plastic surgery versus American plastic surgery, showing differences and similarities in procedures performed, costs, and in patient demographics. Additionally, we look at the possible impacts of plastic surgery on mental health. Finally, we conclude with a discussion that highlights the importance and incredible potential of cross-cultural communication and collaboration for the prospective advancements that we, in America, could learn, adopt, and create.

A LOOK AT SOUTH KOREAN PLASTIC SURGERY

Sometimes called the “Cosmetic Surgery Capital of the World,” South Korea currently performs 24% of all cosmetic surgeries.¹ South Korea’s ethno-historical context, societal pressures, economic opportunities, and cultural beliefs have all contributed to the popularity and growth in this field.

Historical and Cultural Context of Plastic Surgery in South Korea

The historical pretext within which medicine developed across the world is diverse and unique for each nation. One concept pertinent to aesthetics and contours that predates modern medical practices is facial physiognomy: the belief that a person’s facial features can determine his or her personality, fortune, past, present and future. Although this belief has become less influential in more recent generations, it is still widely recognized by older people of several cultures, including South Korea, where there are still physiognomy specialists who practice this craft.¹ It is through this cultural context that some South Korean plastic surgeons report the plastic surgery boom was born, as even the most subtle changes can change a person’s life according to physiognomy². Additionally, it may explain why 20% of South Koreans have cited parental influence as the reason why they went under the knife.³ In 2020, Reuters estimated the South Korean plastic surgery industry to be worth \$10.7 billion.⁴

During the Asian Financial Crisis of 1997, the unemployment rate rose from 2.61% to 6.8%. Approximately 1 million technicians and unskilled workers lost their jobs and were the most severely affected groups of individuals.⁵ In South Korea, job applicants have traditionally been required to include a photo of themselves in applications; one study found that 80% of job recruiters in South Korea cited that physical appearance was an important factor in screening candidates.¹ In another study, the majority of male and female applicants both indicated that they believed attractiveness was a crucial factor in seeking various job

opportunities³. Consequently, the Asian Financial Crisis resulted in many patients flocking to plastic surgery as job opportunities became scarce and workplace competition increased¹. Thus, despite its cost, plastic surgery was and is still seen as a potential way out of unemployment that pays for itself.³

As the number of plastic surgeries performed in South Korea increased due to the economic instability, an interesting trend in the demographic of people seeking plastic surgery emerged. Currently, the majority of South Koreans receiving plastic surgery are 20 to 40 years-old.⁶ The average age of first plastic surgery procedure is 21.8 years-old⁷, and up to 46% of female college students in South Korea have had experience with cosmetic procedures.⁶ Plastic surgery has even become a common graduation gift for many individuals.^{1,8} This is in contrast to the US, where the largest age demographic receiving plastic surgery is 35 to 50 years-old.⁹

Comparison of Plastic Surgery Procedures in the United States vs. South Korea

Although the United States and South Korea have different historical and cultural contexts for plastic surgery, both countries show similar patterns in the most frequently performed plastic surgery procedures. Noninvasive procedures such as botulinum toxin and hyaluronic acid chemical peels are the most common procedures that are performed, overall. Breast augmentation, lipoplasty, blepharoplasty and rhinoplasty are the most common invasive procedures. However, breast augmentation is more common in the United States, while lipoplasty and blepharoplasty are more common in South Korea. It has been suggested that these differences may be the manifestation of differences in cultural beauty standards.¹⁰⁻¹¹

New and Popular Innovations in South Korean Plastic Surgery

Since plastic surgery’s rise in popularity, South Korea has become a leader in new cutting edge innovations in the field. These innovations

have largely been driven by the demand for certain qualities that are ascribed to beauty and success in South Korea. While not surprising, restoration and maintenance of youthful-appearing skin is one such feature. Innovative, noninvasive modalities include stem cell treatments, which aid with collagen remodeling and architecture to improve skin elasticity, and machines, such as the Ultraformer 3 HIFU and Ulthera, which thermodynamically induce collagen fiber contraction via high-intensity, focused ultrasonography to achieve skin tightening.¹² Aegyo sal, translated as “eye smiles,” is a widely popular surgery that is rather unique to South Korea in which fat grafting and injection under the eyes is performed to give a more youthful appearance.¹³

Another desirable feature in South Korea is a small face and jaw, which has led to the popularity of previously less-practiced facial contouring techniques, as well as advancements. A popular surgery that achieves this small face-and-jaw look is called the V line surgery, a type of mandibuloplasty that originated from surgeries used to treat severe congenital deformities. The procedure involves the use of oscillating saws that shave the mandible and may involve the intentional breaking and realignment of the bone¹³. Zygoma reduction is another common approach to narrowing the face in South Korea that is not routinely performed in the US outside of transgender facial feminization procedures. In order to reduce operative time and postoperative edema, South Korean plastic surgeons have developed a new minimally invasive technique for this procedure in which the surgery is performed through a single 5 mm intraoral stab incision on each side. This approach has also been shown to reduce complications such as cheek drooping, facial nerve injury, temporomandibular joint injury and malunion. Results are also more drastic in comparison to traditional methods, and patients can resume daily life within 3 days of the operation.¹⁴

Finally, large eyes with double eyelids are also seen as desirable. The minimally invasive 3-point subcutaneous tunneling method for blepharoplasty has become popularized in several Asian

countries including South Korea, which has been shown to reduce complications such as swelling, congestion, post-operative pain in comparison to the traditional methods of upper blepharoplasty with tarsal fixation. Further benefits include a reduced rate of reversion of double eyelids back into monolids.¹⁵ Another uniquely South Korean technique for double-lid blepharoplasties that has been recently developed is septoaponeurosis junctional thickening, which has been reported to create a more dynamic and natural double eyelid fold. One high-volume study of the technique followed over 900 patients and found that 95% of patients reported satisfaction 2 to 8 years following the surgery.¹⁶

The Costs and Rise of Medical Tourism in South Korea

In addition to improved cosmesis and decreased complications, some procedures that have been popularized or pioneered in South Korea may be more affordable in comparison to similar procedures in the US. For example, a reconstructive rhinoplasty in the United States usually uses a cartilage autograft and would often cost an average of \$8,000. However, in South Korea, reconstructive rhinoplasties typically use silicone allografts instead of autografts and only cost \$5,000. The most apparent benefit of silicone allografts over autografts is decreased donor site morbidity, as the cartilage autografts are taken from the patient’s own ribs or auricular tissue, in addition to quicker recovery. Decades of experience with silicone allografts have also demonstrated that they may also have a better long-term safety profile and reduced risk of infection and displacement in comparison to traditional allografts.¹⁷⁻¹⁸

The large supply and ease of access to plastic surgery in South Korea may also be partially responsible for the affordable pricing of many plastic surgery procedures. There is a higher percentage of plastic surgeons among South Korean doctors than any other country. In fact, according to 2018-2019 data, the proportion of plastic surgeons to all doctors in South Korea was 2.6%, while in the US it was 0.7%.¹⁹ Notably, one district in Seoul, Gangnam, has even been termed the “Beauty Belt”

as it has between 400 and 500 clinics and hospitals that offer cosmetic procedures and surgeries²⁰. Such a high saturation of supply in the market may drive prices down. The price of a rhinoplasty at 1 of the top 5 hospitals in South Korea can cost between \$2000-3520, while a facelift ranges between \$7000-11,500, and an upper blepharoplasty can cost as little as \$2000. In comparison, a rhinoplasty in Beverly Hills would cost on average \$7,475, a facelift would cost on average \$12,125, and upper blepharoplasty would cost between \$4,000-\$6,000.²¹⁻²²

This affordable pricing for high-quality procedures is thought to be one of the primary causes of growth in South Korea's medical tourism industry. In 2009, South Korean medical tourism was only attracting 60,000 foreign patients every year, but by 2017, 320,000 patients were foreigners. Currently, foreign patients make up 40 to 50% of all plastic surgeries performed in South Korea²³. Most of these patients come from countries such as Japan and China, which is thought to be attributed to the high quality and affordable pricing associated with South Korean plastic surgery.⁷ Based on the number and types of procedures performed per 1000 population, one study in *The Economist* reports that the South Korean plastic surgery industry has a 1.7 times higher procedure per capita rate than that in Taiwan, 6.9 times higher than in Thailand, and 17 times higher than that in mainland China.²⁰

Critics on Plastic Surgery

While so far this article has described the accomplishments and features of South Korean plastic surgery that other countries should borrow from or model after, some critics may argue that the normalization of plastic surgery and ease-of-access may contribute to and perpetuate increasingly higher beauty standards that may ultimately be detrimental for mental health.²⁴⁻²⁵ Additionally, there could be other underlying reasons motivating people to have plastic aesthetic or cosmetic procedures that may be perpetually left unaddressed. As one BBC article stated, "according to seven epidemiological studies, women who

undergo breast enlargement have a suicide rate at two or three times that of the general population. Presumably there is an underlying dissatisfaction which makes some people resort to breast surgery and which the surgery does not solve... [such as] body dysmorphia disorder.²⁶" However, our appearances, the subtle contours, wrinkles, scars, and tattoos, all carry our history. They tell each of our stories at just a glance to even the most distant of strangers. For some people, there are outward-facing aspects of their story that hinder them, mentally or physically. Ultimately, plastic surgeons are uniquely responsible for allowing people to change these stories that people wear for the better. So, whether these changes manifest through form or function, they often re-affirm patients' identities and self-concept in ways that improve their well-being.²⁷

CONCLUSION

It is evident that plastic surgery in South Korea may possess several techniques and other features that plastic surgeons in the US may benefit from adopting. This scenario exemplifies the great potential for sharing and collaborating with physicians across the world on new treatment methods, surgical techniques, and other medical advancements. Doing so could lead to new innovations and improvements in medicine at home and abroad. By creating global partnerships and networks, such as through international rotations during residency, we would facilitate the spread of knowledge and resources and achieve more than what an independent institution or country could achieve alone. Such collaboration could vastly improve health care equity and help speed research advancements by making the most up-to-date medical knowledge and care more easily accessible. By doing so, we can ensure that we provide our future patients with the best treatment options and outcomes in the world, even if they do not travel to South Korea for their blepharoplasties.

POTENTIAL CONFLICTS OF INTERESTS:

None.

REFERENCES

1. Davis, Chelsea. "Stanford Scholar Traces the Roots of South Korea's Cosmetic Surgery Surge." Stanford School of Humanities and Sciences, Stanford University, 8 Oct. 2018, humsci.stanford.edu/feature/stanford-scholar-traces-roots-south-koreas-cosmetic-surgery-surge-0.
2. Lee, Su Hyun. "For Love and Money, Koreans Turn to Facial Tucks - Asia - Pacific - International Herald Tribune." *The New York Times*, The New York Times, 14 May 2006, <https://www.nytimes.com/2006/05/14/world/asia/14iht-face.1734557.html>.
3. Park, Rachel H., et al. "Beliefs and Trends of Aesthetic Surgery in South Korean Young Adults." *Archives of Plastic Surgery*, vol. 46, no. 6, 2019, pp. 612-616., <https://doi.org/10.5999/aps.2018.01172>.
4. Roh, Joori. "As End to Pandemic Mask-Wearing Nears, South Koreans Scramble to Arrange Cosmetic Surgery." *Reuters*, Reuters, 4 Jan. 2021, <https://www.reuters.com/article/us-health-coronavirus-southkorea-cosmeti-idUKKBN2980RL>.
5. Park, Se-Il. "The Labor Market Policy and Social Safety Net in KOREA: After the 1997 CRISIS." *Brookings*, Brookings, 10 May 2017, <https://www.brookings.edu/research/the-labor-market-policy-and-social-safety-net-in-korea-after-the-1997-crisis/>.
6. Kim, Young A, and Hyang-In Cho Chung. "Side effect experiences of South Korean women in their twenties and thirties after facial plastic surgery." *International journal of women's health* vol. 10 309-316. 14 Jun. 2018, doi:10.2147/IJWH.S163991
7. Seo, Yun Am, et al. "Experience and Acceptance of Cosmetic Procedures among South Korean Women in Their 20s." *Aesthetic Plastic Surgery*, vol. 43, no. 2, 2018, pp. 531-538., <https://doi.org/10.1007/s00266-018-1257-0>.
8. Stone, Zara. "South Korean High Schoolers Get Plastic Surgery for Graduation." *The Atlantic*, Atlantic Media Company, 26 June 2013, <https://www.theatlantic.com/international/archive/2013/06/south-korean-high-schoolers-get-plastic-surgery-for-graduation/277255/>.
9. "Plastic Surgery Statistics." American Society of Plastic Surgeons, American Society of Plastic Surgeons, www.plasticsurgery.org/news/plastic-surgery-statistics.
10. Vorisek, Rebecca. "Cross-Cultural Comparison of Cosmetic Procedures in Latin America and East Asia ." University of Mississippi, Sally McDonnell Barksdale Honors College, 2017.
11. "Procedural Statistics." The Aesthetic Society, 13 Aug. 2019, <https://www.surgery.org/media/statistics>.
12. Pak, Chang Sik et al. "Safety and efficacy of ulthera in the rejuvenation of aging lower eyelids: a pivotal clinical trial." *Aesthetic plastic surgery* vol. 38,5 (2014): 861-8. doi:10.1007/s00266-014-0383-6
13. Marx, Patricia, et al. "About Face: Why Is South Korea the World's Plastic-Surgery Capital?" *The New Yorker*, The New Yorker, 16 Mar. 2015, <https://www.newyorker.com/magazine/2015/03/23/about-face>.
14. Lee, Hee Young, et al. "Minimally Invasive Zygoma Reduction." *Plastic and Reconstructive Surgery*, vol. 117, no. 6, 2006, pp. 1972-1979., <https://doi.org/10.1097/01.prs.0000210066.51480.3f>.
15. Yang, E., and Zhang Hengshu. "Clinical Comparison of 3 Different Double Eyelid Surgeries—An Improved Double Eyelid Surgical Technique." *Annals of Plastic Surgery*, Publish Ahead of Print, 2021, <https://doi.org/10.1097/sap.0000000000002991>.
16. Kim, Hong Seok, et al. "Double-Eyelid Surgery Using Septoaponeurosis Junctional Thickening Results in Dynamic Fold in Asians." *Plastic and Reconstructive Surgery Global Open*, vol. 1, no. 2, 2013, pp. 1-9., <https://doi.org/10.1097/gox.0b013e318293dc69>.
17. Fakhro, Abdulla et al. "Milestones of Asian Rhinoplasty." *Seminars in plastic surgery* vol. 29,4 (2015): 213-8. doi:10.1055/s-0035-1564821
18. Ishii, Clyde H. "Current Update in Asian Rhinoplasty." *Plastic and Reconstructive Surgery Global Open*, vol. 2, no. 4, 2014, <https://doi.org/10.1097/gox.0000000000000081>.
19. Kim, Min Joo, and Simon Denyer. "Some South Koreans Prepare For Post-Pandemic Days with a Facelift." *The Washington Post*, WP Company, 28 Apr. 2021, https://www.washingtonpost.com/world/asia_pacific/korea-pandemic-plastic-surgery-boom/2021/04/23/117b0556-a0e4-11eb-b314-2e993bd83e31_story.html.
20. Wang, Yuqing. "BEHIND SOUTH KOREAN COSMETIC SURGERY: ITS HISTORICAL CAUSES AND ITS INTERTWINED RELATIONSHIP WITH KOREAN POP CULTURE." *University of Delaware*, ProQuest, 2015, pp. 1-85.
21. Maina, Martin. "How Much DOES Plastic Surgery Cost? * Beverly Hills Magazine." *Beverly Hills Magazine*, 5 Mar. 2021, <https://www.beverlyhillsmagazine.com/how-much-does-plastic-surgery-cost/>.
22. Hangad, Mark Anthony. "How Much Does Plastic Surgery Cost in Korea? 2021 Best Read." *IDEalMedHealth*, 5 Sept. 2021, https://idealmedhealth.com/how-much-does-plastic-surgery-cost-in-korea/#How_much_does_plastic_surgery_cost_in_Korea.
23. Kim, Soojung, et al. "Critical Success Factors of Medical Tourism: The Case of South Korea." *International Journal of Environmental Research and Public Health*, vol. 16, no. 24, 2019, p. 4964., doi:10.3390/ijerph16244964.
24. Stampfer, Laura. "Perfect Body According to Men and Women Bluebella Lingerie Survey." *Time*, Time, 17 Apr. 2014, <https://time.com/65901/how-men-and-women-differ-when-drawing-up-the-perfect-body/>.
25. He, Sophie. "5 Beauty Trends That Are Causing Tons of People to Get Plastic Surgery." *ATTN*, ATTN: 24 May 2016, <https://archive.attn.com/stories/8377/how-beauty-ideals-change-with-plastic-surgery-trends>.
26. "A Point of View: Does Cosmetic Surgery Really Make People Feel Better about Their Bodies?" *BBC News*, BBC, 22 Jan. 2016, <https://www.bbc.com/news/magazine-35380469>.
27. Dittmann, Melissa. "Plastic Surgery: Beauty or Beast?" *PsycEXTRA Dataset of the American Psychological Association*, 2005, <https://doi.org/10.1037/e416172005-020>



Clay illustration by Lily Offit; Photographed by Ben Denzer

How the Texas Heartbeat Bill Will Affect Low-Income Women of Color Across the US: A Commentary

Natalia Eugene¹, Anna Kheifets², Mackenzie Bennett³

¹Howard University College of Medicine ²Tufts University School of Medicine

³Emory University School of Medicine

Correspondence should be addressed to natalia.eugene@bison.howard.edu

Abstract

Governor Greg Abbott of Texas signed a law in May 2021 that will prohibit healthcare providers from performing abortion services after the detection of a fetal heartbeat. With this, Texas has joined several other states, mostly concentrated in the South and Midwest, that ban abortions after approximately six weeks. The subtleties of the Texas law are slightly different from the other states, but the detrimental repercussions will be the same: penalizing providers for attempting to benefit the health and wellbeing of their patients, resulting in less access to safe and legal abortion care. In this commentary, we discuss how the loss of access to abortion in the heavily populated, diverse state of Texas will overwhelmingly affect low-income individuals and women of color. We also seek to explain how this law is part of a larger agenda that will have a greater impact on all fifty states, especially if the precedent set by *Roe v. Wade* is overturned by a new Mississippi case recently taken up by the Supreme Court of the United States to be heard later this year.

recently taken up by the Supreme Court of the United States to be heard later this year. Ultimately, we aim to demonstrate how laws aimed at restricting access to abortion will disproportionately affect Black, Hispanic, and low-income women, exacerbating racial health disparities already faced by marginalized groups. We conclude with steps physicians, medical students, and legislators can take to ensure safe and equitable access to abortion care, ensuring one's bodily autonomy.

Note from the Editor: This piece was written before the US Supreme Court officially reversed 1973 Roe v. Wade ruling in June 2022.

BACKGROUND: THE TEXAS HEARTBEAT BILL

On May 19, 2021, Texas Governor Greg Abbott signed a law that would ban abortions after six weeks of pregnancy.¹ The bill went into effect on September 1, 2021, when Texas joined over a dozen states that ban abortion after the presence of a fetal heartbeat.² Texas has put its own twist on the law by calling on its citizens to act as whistleblowers and prosecutors. Citizens may sue individuals, healthcare professionals, or anyone helping an individual obtain abortion care after six weeks.¹ Citizens are offered a bounty for reporting and prosecuting anyone who aids in accessing or provides an abortion after six weeks. Rather than large organizations, smaller groups and individual providers, who cannot financially sustain being involved in lawsuits, will be targeted.

This attempt to ban abortion is not scientifically founded. The basis of this law purports that if a fetal heartbeat is detected, it is too late for an abortion. However, the “heartbeat” that they are referring to at six weeks is just the electrical activity of cardiac myocytes — not a fully developed heart.^{3,4} The “heartbeat” that is detected is secondary to myocytes firing energy as they learn how to work. This does not equate to a pumping, functional heart. At six weeks, the heart is in a primitive state, the brain has not fully developed, the lungs are not mature, and the embryo is not able to feel pain because the neural network is not complete.⁵ Viability is a medical, not legal term, and it is not the role of the government to enforce religious definitions of viability onto medical practice.

One study found that women became aware of their pregnancies on average at 5.5 weeks of gestation; however, there is a sizable number of women who do not realize that they are pregnant until two menstrual cycles (i.e. approximately eight

weeks) have passed.⁶ This is because many women deal with irregular menstrual cycles, such that their periods will occasionally not happen within four weeks.⁷ For the 3-10% of American women with Polycystic Ovary Syndrome, going multiple months without a period is normal.⁸

Laws like this are particularly frustrating, because they are written and approved by people without medical expertise and who look nothing like the population most affected. The bill was endorsed by 19 Texan state senators, including all 18 of the white Republican senators (12 men, 6 women) and a Hispanic male Democratic senator.⁹ This law was not made with women, especially women of color, in mind. In 2020, 37% of women who sought a termination of pregnancy in Texas identified as Hispanic, 29% Black, and 84% unmarried.¹⁰ Women who are non-white or non-adherent to the traditional nuclear family structure are largely targeted by this ban, which covertly discriminates against these demographics.

WHO WILL BE MOST AFFECTED

The repercussions of this law will impact far beyond Texas. A recent Mississippi law aiming to entirely ban abortions after 15 weeks has been approved to be heard by the Supreme Court on December 1, 2021 [11]. Despite being struck down by lower courts for being unconstitutional — as it contradicts the precedent set by *Roe v. Wade* and *Planned Parenthood v. Casey*—the majority conservative Supreme Court has decided to take it on. The threat that this case brings to women's reproductive health is exactly what healthcare professionals feared when Justice Amy Coney Barrett was rushed to appointment. If the precedent of *Roe v. Wade* is overturned in this case, abortion would likely become illegal in 22 states, mostly clustered in the South and the Midwest, and 41% of women of

childbearing age across the country would have to travel on average 279 miles to reach their closest abortion provider.¹²

Obtaining an abortion will become impossible for people who cannot financially afford the cost of travel and the procedure. In other words, *this will make receiving a safe and legal abortion unattainable specifically for low-income women, immigrants, and women of color.* Meanwhile, wealthy women will likely still be able to attain safe and legal abortions.

Abortion care is increasingly concentrated amongst women below the poverty level.¹³ While the abortion rate amongst white women in the United States is 10/1000, it is 27.1/1000 amongst Black women and 18.1/1000 amongst Hispanic women.¹³ This demonstrates that socioeconomic status, access to healthcare, racism and discrimination play a role in *requiring* an abortion. Furthermore, Black women are over three times more likely than white women to experience a pregnancy-related death or severely morbid event during their pregnancy and postpartum period.^{14,15} Forcing pregnancy and birth onto women will not only increase these disparities but also prevent them from receiving quality care from trained clinicians due to legal limitations placed on training to perform abortions. By financially draining and legally penalizing abortion providers and non-profit organizations such as Planned Parenthood, the number of unsafe abortions and maternal mortality rates will increase. We have seen this happen globally and will likely see it happen domestically through bills such as these.¹⁶

WHAT LEGISLATION CAN DO

There are many ways legislators could decrease the incidence of abortion, instead of spending their resources fighting to restrict *access* to abortions. One of these measures includes funding initiatives aimed at destigmatizing birth control in low-income communities. Black and low-income women have been historically abused by the medical system, including through forced long-term birth control and sterilizations.¹⁷ There is reasonable medical mistrust in these communities,¹⁸ hence there is a need to assuage perceptions surrounding birth

control in minority communities through public service announcements, culturally sensitive health education grassroots work, and anti-racism and implicit bias training for physicians.

Countries with the most restrictive abortion laws also have the highest rates of abortion.¹⁹ Therefore legislators who want to reduce the number of abortions in their communities should endorse other measures, including 1) investing funding into comprehensive, medically accurate sexual education in public schools across the country, particularly in communities of color; 2) investing in social support, such as public education, healthcare, subsidized childcare on a national scale; 3) raising the federal minimum wage; 4) investing more resources into the foster care system; and 5) increasing access to high-quality prenatal care aimed at reducing racial disparities in maternal health outcomes. Essentially, legislative efforts aimed at reducing unwanted pregnancies, coupled with measures increasing support for people who choose to have children, reduce the incidence of abortion more than legislative efforts to restrict abortion access.²⁰

DISCUSSION

As one can see, “pro-life” legislators are not fighting for quality of life. They are simply *pro-birth*. Often, these legislators push for women to give birth to a child, and then absolve themselves of any responsibility to assist the parents or child afterward. Abortion is not a first-line method for family planning, and many people who need abortion services only get there after multiple systemic failures. Legislators who truly wanted to reduce the number of abortions would be working upstream, funding equitable access to healthcare and health education to prevent unplanned pregnancy. Instead, the political debate around abortion access is centered around controlling and colonizing bodies.

Reproductive justice is defined as the human right to maintain personal bodily autonomy, have children, not have children, and parent the children we have in safe and sustainable communities.¹⁷ The impact of current proposed legislative interference like the Texas Heartbeat Bill will be far reaching. In

2011, nearly half of the 6.1 million pregnancies in the United States were unintended.²¹ Over 60% of unintended pregnancies from 2015-2019 ended in abortion.¹⁹ This is a decision made by millions yearly. Restricting and limiting abortion access would violate the principles of reproductive justice and of bodily autonomy.

While it may take time to effect large-scale change in the U.S. legislature, the medical community possesses the capability to defend the rights of patients every day until then. The World Health Organization defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”²² To promote, support, and create the opportunity for people to optimize all facets of their health, physicians must be more than just physicians: they must be physician-advocates for the health and safety of their patients, their communities, and beyond.

It is the right of the birthing person, not the government, to make choices about when, how, and if they want to carry a pregnancy. It is a medical decision to be discussed between patient and physician, not legislated by predominantly white men, who will never have to make such decisions. Destroying the legal precedent that protects this right will have devastating consequences on the health and safety of entire communities, not only birthing people. Criminalizing abortion only succeeds in making abortions more dangerous. We have seen this fail time and time again to lower rates of abortion all over the world, while disproportionately endangering marginalized groups, particularly women of color.¹⁹

CONCLUSION

As future clinicians, we need to be advocates for the health and wellbeing of diverse patient populations. Medical students and physicians must advocate to their legislators for the passage of policies to ensure complete access to abortion care. It is vital to encourage state and federal legislators to pass legislation that will protect women’s reproductive rights unwaveringly. Currently, the legislature to support at a federal level includes the Women’s Health Protection Act, a congressional act

that seeks to create legal protection for abortion providers and their patients and to protect against medically unnecessary restrictions on abortion, which impact accessing health care.²³

With the ultimate goal of protecting the right to safe, legal, and accessible abortions on the federal level, states can take action now by passing internal legislation to protect these rights, should the precedent set by *Roe v. Wade* be overturned by the Supreme Court. Massachusetts passed the ROE Act in December 2020 and New York passed the Reproductive Health Act in 2019 to codify provisions from *Roe v. Wade* into state law and remove unnecessary barriers.^{24,25} Several other states are also passing similar laws, but many more need to follow in their footsteps. Healthcare practitioners, as constituents, need to step up to demand these provisions be set in place for the safety of ourselves and our patients.

REFERENCES

1. Weber P. Texas governor signs law banning abortions early as 6 weeks. AP NEWS. Published May 19, 2021. Accessed June 10, 2021. <https://apnews.com/article/texas-health-abortion-government-and-politics-ba02cd7c3f02b1eb5c87094257ee4db2>
2. Liptak A, Goodman JD, Tavernise S. Supreme Court, Breaking Silence, Won’t Block Texas Abortion Law. *The New York Times*. <https://www.nytimes.com/2021/09/01/us/supreme-court-texas-abortion.html>. Published September 1, 2021. Accessed September 12, 2021.
3. Rogers A. “Heartbeat” Bills Get the Science of Fetal Heartbeats All Wrong. *Wired*. Accessed June 10, 2021. <https://www.wired.com/story/heartbeat-bills-get-the-science-of-fetal-heartbeats-all-wrong/>
4. Cadkin AV, McAlpin J. Detection of fetal cardiac activity between 41 and 43 days of gestation. *J Ultrasound Med*. 1984;3(11):499-503. doi:10.7863/jum.1984.3.11.499
5. Bhattacharya N, Stubblefield P. *Human Fetal Growth and Development*. Springer Berlin Heidelberg; 2016.
6. Branum AM, Ahrens KA. Trends in Timing of Pregnancy Awareness Among US Women. *Matern Child Health J*. 2017;21(4):715-726. doi:10.1007/s10995-016-2155-1
7. Sweet MG, Schmidt-Dalton TA, Weiss PM, Madsen KP. Evaluation and Management of Abnormal Uterine Bleeding in Premenopausal Women. *Am Fam Physician*. 2012;85(1):35-43.
8. Wolf W, Wattick R, Kinkade O, Olfert M. Geographical Prevalence of Polycystic Ovary Syndrome as Determined by Region and Race/Ethnicity. *Int J Environ Res Public Health*. 2018;15(11):2589. doi:10.3390/ijerph15112589

9. Texas SB8 | 2021-2022 | 87th Legislature. LegiScan. Accessed September 18, 2021. <https://legiscan.com/TX/rollcall/SB8/id/1039526>
10. Texas Health and Human Services; 2020. <https://www.hhs.texas.gov/sites/default/files/documents/about-hhs/records-statistics/research-statistics/itop/2020/2020-itop-selected-characteristics.xlsx>
11. Liptak A. Supreme Court to Hear Abortion Case Challenging Roe v. Wade. *The New York Times*. <https://www.nytimes.com/2021/05/17/us/politics/supreme-court-to-hear-abortion-case-challenging-roe-v-wade.html>. Published May 17, 2021. Accessed June 10, 2021.
12. Bui Q, Miller CC, Sanger-Katz M. Where Abortion Access Would Decline if Roe v. Wade Were Overturned. *The New York Times*. <https://www.nytimes.com/interactive/2021/05/18/upshot/abortion-laws-roe-wade-states.html>. Published May 18, 2021. Accessed June 10, 2021.
13. Jones RK, Jerman J. Population Group Abortion Rates and Lifetime Incidence of Abortion: United States, 2008–2014. *Am J Public Health*. 2017;107(12):1904-1909. doi:10.2105/AJPH.2017.304042
14. Chinn JJ, Eisenberg E, Artis Dickerson S, et al. Maternal mortality in the United States: research gaps, opportunities, and priorities. *Am J Obstet Gynecol*. 2020;223(4):486-492.e6. doi:10.1016/j.ajog.2020.07.021
15. Creanga AA, Bateman BT, Kuklina EV, Callaghan WM. Racial and ethnic disparities in severe maternal morbidity: a multistate analysis, 2008-2010. *Am J Obstet Gynecol*. 2014;210(5):435.e1-435.e8. doi:10.1016/j.ajog.2013.11.039
16. Cage M. Trump's Global Gag Rule Increases Maternal Mortality. Population Connection Action Fund. Published May 22, 2018. Accessed June 10, 2021. <https://www.populationconnectionaction.org/2018/05/22/trumps-global-gag-rule-increases-maternal-mortality/>
17. Ross L, Solinger R. *Reproductive Justice: An Introduction*. University of California Press; 2017.
18. Bazargan M, Cobb S, Assari S. Discrimination and Medical Mistrust in a Racially and Ethnically Diverse Sample of California Adults. *Ann Fam Med*. 2021;19(1):4-15. doi:10.1370/afm.2632
19. Bearak J, Popinchalk A, Ganatra B, et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. *Lancet Glob Health*. 2020;8(9):e1152-e1161. doi:10.1016/S2214-109X(20)30315-6
20. Fox M. Abortion rates go down when countries make it legal: report. NBC News. Published March 20, 2018. Accessed September 18, 2021. <https://www.nbcnews.com/health/health-care/abortion-rates-go-down-when-countries-make-it-legal-report-n858476>
21. Finer LB, Zolna MR. Declines in Unintended Pregnancy in the United States, 2008–2011. *N Engl J Med*. 2016;374(9):843-852. doi:10.1056/NEJMsa1506575
22. World Health Organization (WHO). Constitution of the World Health Organization. Published 1946. Accessed June 14, 2021. <https://www.who.int/about/who-we-are/constitution>
23. Chu J. *Women's Health Protection Act of 2021*.; 2021.
24. *Abortion Is Health Care: How the ROE Act Will Break down Entrenched, Unjust Barriers to Safe, Legal Abortion in Massachusetts*. Planned Parenthood Action; 2020. https://www.plannedparenthoodaction.org/uploads/filer_public/d9/34/d934a5a4-3ca3-4673-a498-2bf30bcffc53/the_roe_act.pdf
25. Krueger L. FAQs about the Reproductive Health Act. NY State Senate. Published February 12, 2019. Accessed June 10, 2021. <https://www.nysenate.gov/newsroom/articles/2019/liz-krueger/faqs-about-reproductive-health-act>



Clay illustration by Lily Offit; Photographed by Ben Denzer

Completing the Results of a Pan-Canadian Survey on the State of Oncology Education in Family Practice Residency Programs: Comparison of One Province to the Rest of Canada

Alanna Janz¹, Lisa Wang², Svetlana Bortnik², Jaspreet Garcha², Vincent Tam³, Steven Yip³, Paris Ann Ingledeu⁴

¹ Faculty of Medicine MD program, University of British Columbia

² Family Medicine Residency Program, University of British Columbia Surrey-South Fraser

³ Tom Baker Cancer Centre; Department of Oncology, Cumming School of Medicine, University of Calgary

⁴ Department of Surgery, Division of Radiation Oncology, Vancouver Cancer Center, BC Cancer Agency

Correspondence should be addressed to abjanz@student.ubc.ca

Abstract

Introduction: The incidence and prevalence of cancer in Canada is rising, and family physicians will increasingly provide care at all stages of a patient's cancer journey. This highlights the importance of adequate oncology education in family practice training programs. A survey study done in 2017 to assess the state of oncology education in Canadian family practice residency programs did not include the University of British

Columbia (UBC). The purpose of our study was to obtain this data for the UBC family practice residency program and to compare the results to those from the rest of Canada.

Methods: A web-based survey was emailed to UBC family practice residents and program directors. The survey assessed depth of the oncology curriculum, current teaching methods and perceived gaps. Results were compared to the non-UBC survey data and interpreted with descriptive statistics.

Results: 54/348 UBC family practice residents and 10/20 program directors completed the survey. 3% of UBC and 7% of non-UBC family practice residents felt their program adequately prepared them to care for oncology patients. There was uniformity among all participants in ratings of perceived importance of a list of oncology topics expected to be covered in training for residents. There was discordance in the perceived frequency of topics taught between all family practice residents and program directors.

Conclusion: This study can inform further development of oncology specific curriculum in family practice residency programs. Further study is required to understand areas of discordance between family practice residents and program directors.

INTRODUCTION

Cancer has now surpassed cardiovascular disease as the leading cause of death in Canada, with incidence and prevalence continuing to increase.¹ In light of this, survival rates of roughly 60% from all cancers translates to ongoing care needs for cancer survivors where responsibility falls heavily on family doctors as they follow patients longitudinally through this process. Despite this growth, undergraduate and postgraduate medical curriculums remain largely unchanged regarding oncology teaching, and oncology education in undergraduate and family practice residency training is limited.²⁻⁶ A Canadian study of oncology education in internal medicine and family practice residency programs found that oncology teaching comprised less than 10% of the curriculum, which focused largely on topics including cardiology, gastroenterology, respiratory, and nephrology.³ Only 12.5% of family practice residents reported more than one week of training in oncology, and 75% of the respondents reported that only 15% of their family practice curriculum focused on cancer.³ Another Canadian study that surveyed 677 medical educators and learners from internal medicine and family practice found that none of the 8 training programs had a mandatory oncology rotation or a formal oncology curriculum, and only 2

programs had oncology specific objectives for their residents.⁴

The pattern of medical training programs lacking oncology education is not unique to Canada. A US study found that 97% of the PGY-3 internal medicine and family practice residents acted as primary care physicians for adult cancer survivors at some point during their training, yet only 27% reported formal education in oncology care.⁶ The residents reported “rarely” feeling comfortable caring for oncology patients, despite being halfway through their postgraduate education.⁶ In the US, there is a declining number of physicians training in preventative medicine for oncology care despite an increasing need.⁷

A study done in 2017 aimed to evaluate the adequacy of oncology education across Canadian family practice residency programs by surveying family practice residents and program directors in 16 of 17 Canadian medical schools.² As the University of British Columbia (UBC) was not included in the initial survey due to a logistical issue, the goal of this study was to assess the current state of oncology education in the UBC family practice residency program and compare and contrast the results to those of the national survey. The results will help characterize gaps in training and opportunities to capitalize

on programs that are more successful in achieving these objectives.

METHODS

Survey and data collection

A survey tool (Qualtrics) was used as the platform for this self-administered, web-based survey. The research was approved by the UBC Cancer Research Ethics Board and targeted the UBC family practice residents (174 per year) and the 20 UBC family practice program directors. The survey was sent out by email from a UBC employee that was not involved with the research project. Data collection was completed between October 3 and November 15, 2019.

The framework for the survey used in this study was developed with best practices to educational survey development.^{8,9} A group of Canadian physicians including a family practice residency program director, a chair and sitting member of the Family Physician Cancer Care Committee of the College of Family Physicians of Canada, a general practitioner oncologist, five medical oncologists, two radiation oncologists and one surgical oncologist were involved in its development. The original survey was reviewed for face and content validity and pilot tested by another group of 5 family physicians prior to dissemination. It was distributed in 2017 to all Canadian medical schools, excluding UBC, due to the original electronic platform not being compatible with research ethics guidelines at that time.

The survey further subclassified participants into program director or resident, and residents into their respective year and location of residency training. The survey assessed clinical exposure to oncology care where residents and program directors reported their perceived optimal method of teaching given the choices of didactic, case-based and clinical exposure. Given a list of relevant oncology topics, residents and program directors reported whether or not a specific topic was taught, and they were asked to rate the perceived importance of each topic to oncology care on a 5-point Likert scale, where 1 is least important and 5 is most important.

The survey data was collected by the UBC Qualtrics survey tool and exported to Microsoft Excel. Descriptive statistics were used for analysis.

The data from the national study was released to the study group in order to compare and contrast the non-UBC and UBC data.

REFERRALS TO MENTAL HEALTH PROFESSIONALS

The states and the District of Columbia agree that if a mental health referral is made, the patient may not receive the prescription until the mental health professional confirms the patient's eligibility.^{18,19} However, there is interstate variability in the statutory constriction of these provisions, which may hold important implications for patient care and may contribute to health disparities.¹⁷ (Figure 2).

The four DWDA jurisdictions—Oregon, Washington, District of Columbia, and Maine—require a “counseling” referral to confirm that the patient is capable and not suffering from impaired judgment if, “in the opinion of the attending physician or the consulting physician, a patient may be suffering from a psychiatric or psychological disorder or depression causing impaired judgement[.]”^{6,18} It has been reported that Oregon wrote this safeguard into the law to ensure that an individual is competent and their request for PAD is not stemming from a treatable mental illness.⁽¹⁹⁾ California uses a similar protocol for confirming a patient's capacity; however, the ELOA revises the statutory language to instead require referrals if “there are indications of a mental disorder[.]”¹⁰

Vermont, Colorado, and New Jersey also require referrals on a case-by-case basis. However, these states simply require referrals if either the attending physician or the consulting physician believes the patient may not be capable of making an informed decision.^{9,11,14} Their statutes omit any explicit reference used by other jurisdictions related to a “mental disorder” or a “psychiatric or psychological disorder or depression.” Some have argued that these less-specific referral requirements are superior because they allow physicians to observe the

patient's functioning relative to the capacity standards without searching for a specific mental disorder.¹⁸

Notably, the legislative history of Vermont's Patient Choice at End of Life Act reflects that when the bill was introduced in 2013, it required referrals if, in either physician's opinion, the individual "may be suffering from a mental disorder or disease, including depression, causing impaired judgment."²⁰ However, this language was removed from the bill during legislative deliberation.^{9,20}

Unlike the other eight physician aid in dying statutes, Hawaii's OCOCA makes referrals mandatory for *every* patient that makes a request for the medication—not just when there are indications of a mental disorder or psychiatric or psychological disorder or depression causing impaired judgment.¹³ This decision came after a long, ongoing debate over whether states should require a referral for every patient.^{18,19} Some argue that a mandatory referral requirement may create an unnecessary burden—both on the patient and the mental health professionals—and delay the process.^{21,22} Some also worry that the mental health professionals' ethical and moral views on PAD may influence their assessments.¹⁹ Others argue it is necessary to ensure that each individual is properly assessed to confirm that their request for medication is not rooted in a disorder or condition that can be treated.²³

Additionally, mental health professionals in Hawaii are required to confirm whether the patient is "suffering from undertreatment or nontreatment of depression or other conditions which may interfere with the patient's ability to make an informed decision[.]"¹³ The language "*undertreatment or nontreatment*" may be in response to historical concerns that some psychiatrists believed that the presence of a mood disorder should automatically result in a finding of incapacity to consent to PAD.²³ By focusing on the level of treatment of depression or other conditions, Hawaii seeks to avoid any presumptions that the mere presence of a condition precludes the evaluator from finding that the patient is capable and has the ability to make an informed decision.¹³

RESULTS

Demographics

The survey was completed by a total of 54 UBC family practice residents and 10 UBC program directors for a response rate of 15.5% (54/348) and 50% (10/20), respectively. This group will be termed UBC respondents. The national response rate was 17% (150/847) for residents and 89% (17/19) for program directors. This group will be termed non-UBC respondents. The demographic characteristics of all respondents are shown in **Table 1**.

Across all of Canada, second-year residents had a higher response rate compared to first-year residents, with this gap being more prominent in the non-UBC data. The majority of UBC residents (70%) were trained in urban sites, 15% in rural sites, and 15% in both.

Clinical Exposure

At UBC, 85% of residents and 90% of program directors stated that there was no mandatory oncology rotation/block (**Table 2**).

This was similar to the non-UBC data, with only 7% of residents stating a mandatory oncology block and no program directors reporting one. Only 3% of UBC residents believed there were oncology-specific learning objectives/competencies available to them, and all UBC program directors were unsure. At a slightly higher frequency, 11% of non-UBC residents and 29% of non-UBC program directors stated that these objectives exist in their programs. When asked if they felt their program adequately prepared them for caring for oncology patients, 3% of UBC residents and 20% of UBC program directors reported "yes" compared to 7% of non-UBC residents and 13% of non-UBC program directors. Clinical exposure was overwhelmingly chosen as the optimal method of teaching oncology compared to didactic teaching and small group/case based (**Table 3**).

Of the UBC respondents, 54% of residents and 80% of program directors chose this method, similar to non-UBC respondents, where 65% of non-UBC residents and 80% of program directors were also in agreement.

Mean Importance

To understand the perceived importance of specific oncology topics, each topic was rated on a 5-point Likert scale by residents and directors (**Table 4**).

The top two most important topics for all residents were performing pap smears and screening for common cancers, as represented by a mean importance of 4.9/5. Other relevant topics that scored 4.6 and higher included cancer prevention, breaking bad news, approach to patients with increased risk of cancer, appropriate cancer patient referrals, palliative care, approach to cancer diagnosis, and managing common complications. The majority of these high-yield topics were reported by UBC residents to be covered at a frequency of over 60%. However, managing common complications and appropriate referrals to cancer specialists were perceived by UBC residents to be taught at a low frequency of 24% and 37%, respectively, which differs from the UBC program directors' perception of 70% and 60%, respectively. Overall, out of 20 topics listed, 16 scored 4.0 or higher.

There was a relative uniformity among all groups, as shown by the linear trend, in perceived importance of each oncology topic (**Figure 1**).

There was minimal variation between the mean importance ratings, with the most and least important topics being rated as such by all UBC and non-UBC participants. This was in contrast to the difference between frequency of oncology topics taught between all residents and directors (**Figure 2**).

There was more discordance, however, amongst the topics UBC residents and UBC program directors perceived to be taught, compared to the non-UBC respondents. For 14 of the 20 topics, the difference was larger in the UBC data than the non-UBC data.

DISCUSSION

This study confirms the gaps identified in oncology education are consistent across all Canadian family practice programs. Low satisfaction reported with the overall level of oncology education and a low

proportion of UBC and non-UBC respondents feeling prepared to care for oncology patients highlights a growing need for further training. When comparing UBC residents' and program directors' perceptions of oncology topics taught, residents reported topics being covered less frequently than program directors for most topics. This difference was less pronounced amongst the non-UBC data which could be partly attributed to the UBC program being highly distributed, with 18 different sites, making developing a consistent, identical curriculum across all geographical areas challenging. It may be beneficial to compare the various Canadian family practice residency oncology curriculums and the intended learning outcomes to UBC to evaluate any obvious differences. This may also point to the need to ensure residents are aware of curricular maps including objectives and instructional methods.

The evaluation objectives from the College of Family Physicians of Canada list several oncology-related proficiencies that are expected to be met by the end of training, but the UBC curriculum is less well defined with a more broadly stated oncology domain. The lack of clear objectives may contribute to UBC residents reporting a low frequency of highly important topics being taught. These identified knowledge gaps emulate those reported in the national study and provide useful information for targeting topics that require more focused attention, and for creating a starting point for curriculum adjustments.

This survey was based on consensus opinion of oncology topics felt to be most important to primary care. Those topics identified by currently practicing family physicians were similar to many of those recognized by UBC and non-UBC respondents, thus clearly indicating a nation-wide agreement on what oncology-related objectives warrant a larger focus [10]. The challenge to implementing change to the curriculum in order to address these needs may include cost, time constraints for teaching other topics, and the ill-defined role of the family physician in providing oncology care.⁶ Utilizing the learning gaps identified in the Canadian studies may help guide

formal and defined oncology-specific learning objectives/competencies and may aid in improving learning through clinical experience or education sessions. The former idea was supported in 2014 and 2016 by Tam et al. who found that the majority of post-graduate learners favoured a standard set of oncology objectives, and subsequently developed a set of national oncology objectives for medical students.^{4,11} In 2020 Easley et al. suggested that joint education sessions with cancer specialists and tight collaboration between future family doctors and oncologists may help improve competency with a focus on the topics deemed of highest importance.¹⁰ The competency-based curriculum in the UBC program has focused on developing approaches to clinical presentations and utilizing resources rather than objective-based evaluation. As such, rather than evaluation of specific topic knowledge, further investigation into residents' perceived ability to find the necessary information and think critically through topics they are less familiar with is needed in order to assess the optimal avenue for oncology education translating to patient care.

Table 1: General characteristics of survey respondents

Characteristics	Surveyed groups			
	UBC Residents (N=54)	UBC Program Directors (PDs) (N=10)	Non-UBC Residents (N=150)	Non-UBC Program Directors (PDs) (N=17)
Gender				
Male	20 (37%)	6 (60%)	36 (24%)	5 (29%)
Female	33 (61%)	3 (30%)	111 (74%)	12 (71%)
Other	1 (2%)	1 (10%)	3 (2%)	0 (0%)
Program year				
PGY-1	22 (41%)	N/A	32 (21%)	N/A
PGY-2	31 (57%)	N/A	113 (75%)	N/A
PGY-3	1 (2%)	N/A	5 (3%)	N/A
Number of years in practice				
<10	N/A	3 (30%)	N/A	2 (12%)
10-20	N/A	1 (10%)	N/A	4 (24%)
>20	N/A	5 (50%)	N/A	11 (65%)
Area of current clinical practice*				
Comprehensive care	34 (63%)	8 (80%)	116 (77%)	12 (71%)
Focused in oncology	2 (3%)	1 (10%)	3 (2%)	1 (6%)
Focused in other area	18 (33%)	1 (10%)	31 (21%)	4 (24%)
Location of current practice/training				
Urban	38 (70%)	5 (5%)	103 (69%)	5 (29%)
Rural	8 (15%)	3 (30%)	25 (17%)	0 (0%)
Both	8 (15%)	2 (20%)	22 (15%)	12 (71%)

*Anticipated area of practice listed for residents

Table 2: Status of current oncology education in family practice training programs

Questions	Surveyed groups			
	UBC Residents (N=54)	UBC PDs (N=10)	Non-UBC Residents (N=150)	Non-UBC PDs (N=17)
Is there a mandatory oncology clinical rotation/block?				
Yes	3 (6%)	1 (10%)	10 (7%)	0 (0%)
No	46 (85%)	9 (90%)	118 (79%)	15 (88%)
Unsure	5 (9%)	0 (0%)	2 (1%)	0 (0%)
No Response	0 (0%)	0 (0%)	20 (13%)	2 (12%)
Are there oncology learning objectives/competencies?				
Yes	2 (3%)	0 (0%)	17 (11%)	5 (29%)
No	24 (44%)	0 (0%)	66 (44%)	9 (53%)
Unsure	28 (52%)	0 (0%)	47 (31%)	1 (6%)
No Response	0 (0%)	10 (100%)	20 (13%)	2 (12%)
Is the oncology education provided adequate?				
Yes	5 (9%)	2 (20%)	10 (7%)	3 (18%)
No	28 (52%)	8 (80%)	120 (80%)	12 (71%)
Unsure	20 (37%)	0 (0%)	0 (0%)	0 (0%)
No Response	1 (2%)	0 (0%)	20 (13%)	2 (12%)
Does your PGME adequately prepare you to care for cancer patients?				
Yes	2 (3%)	2 (20%)	11 (7%)	2 (13%)
No	17 (31%)	2 (20%)	74 (49%)	3 (18%)
Unsure	14 (26%)	6 (60%)	45 (30%)	10 (59%)
No Response	19 (35%)	0 (0%)	20 (13%)	2 (12%)

Table 3: Optimal method of teaching oncology to family practice residents

Optimal Method of Teaching	Surveyed groups*			
	UBC Residents (N=54)	UBC PDs (N=10)	Non-UBC Residents (N=150)	Non-UBC PDs (N=17)
Clinical Exposure	29 (54%)	8 (80%)	84 (65%)	12 (80%)
Didactic Teaching/Lectures from Specialists	15 (28%)	3 (30%)	37 (29%)	5 (33%)
Small Group/Case-Based Learning	6 (11%)	0 (0%)	32 (25%)	4 (27%)

*Survey respondents could list up to three responses, so responses do not add up to 100%.

Table 4: Oncology topic perceived importance and prevalence of current teaching

Topics	Surveyed groups							
	UBC Residents (N=54)		UBC PDs (N=10)		Non-UBC Residents (N=150)		Non-UBC PDs (N=17)	
	MI	CT	MI	CT	MI	CT	MI	CT
Performing pap smears	4.9	85%	4.9	100%	4.9	99%	5.0	100%
Screening for common cancers	4.9	89%	4.7	100%	4.9	100%	4.9	100%
Cancer prevention	4.8	78%	4.6	80%	4.7	95%	5.0	93%
Breaking bad news	4.7	93%	4.7	90%	4.8	96%	5.0	93%
Approach to patient with increased risk of cancer	4.7	72%	4.5	90%	4.7	92%	4.7	93%
Appropriate referrals to cancer specialists	4.7	37%	4.5	60%	4.2	52%	4.3	73%
Palliative care	4.6	85%	4.9	100%	4.6	89%	5.0	100%
Approach to diagnosis	4.6	61%	4.7	90%	4.5	89%	4.7	93%
Managing common complications	4.6	24%	4.3	70%	4.0	40%	3.6	40%
Providing psychosocial support	4.5	41%	4.6	50%	4.4	75%	4.8	87%
Performing skin biopsy	4.5	74%	4.3	90%	4.3	85%	4.9	100%
Post-treatment surveillance for recurrence	4.5	26%	4.5	40%	4.1	36%	4.0	47%
Managing common treatment side effects	4.5	28%	4.5	60%	4.0	39%	4.4	47%
Prognosis of common cancers	4.3	22%	4.1	20%	3.8	44%	3.6	20%
Management of long-term complications from treatment	4.2	11%	4	10%	3.7	18%	3.4	13%
Epidemiology of common cancers	4.0	54%	3.8	40%	3.9	80%	3.2	67%
Approach to cancer treatment	3.8	20%	3.9	50%	3.1	34%	3.7	64%
Performing fine needle biopsy	3.6	15%	3.5	0%	2.8	15%	2.9	21%
Approach to staging cancer	3.4	15%	3.2	20%	2.9	24%	2.5	20%
Performing bone marrow biopsy	2.4	0%	2.6	20%	1.8	3%	1.5	0%

MI: Mean importance; CT: Currently taught

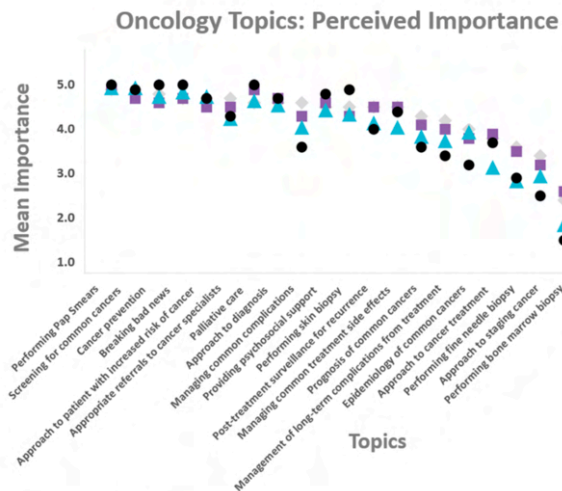


Figure 1: Perceived importance of oncology topics

◆ UBC Residents ■ BC PDs ▲ Non-UBC Residents ● Non-UBC PDs

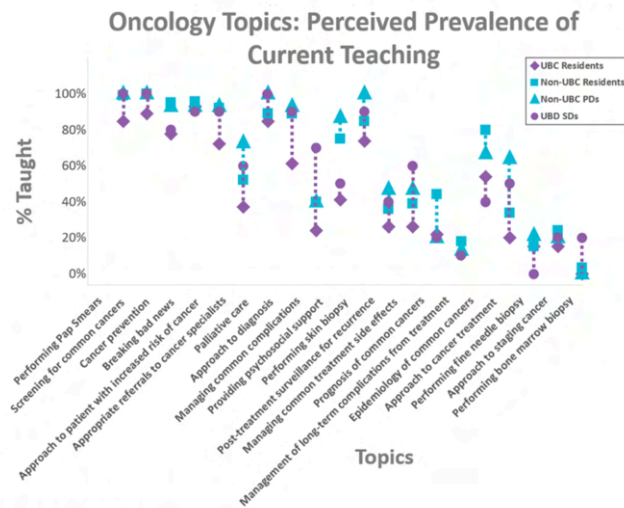


Figure 2: Perceived prevalence of teaching for each oncology topic

AUTHORSHIP STATEMENTS AND RESIDENT CONTRIBUTION

Alanna Janz, UBC medical student, led the data collection and assisted with the interpretation of the findings. She led the literature review and took a lead role in writing the manuscript and disseminating the final report.

Lisa Wang, family practice resident SMH site, assisted with the development of the research question and adapted the survey tool for the current study. She reviewed the Ethics Review application, assisted with the data collection and reviewed the report.

Svetlana Bortnik, family practice resident SMH site, assisted with development of the research question and conduction of the literature review. She took a lead role in data analysis and reviewing the written report.

Jaspreet Garcha, family practice resident SMH site, assisted with the literature review and in reviewing the written report.

Vincent Tam is one of the creators of the original national-wide survey. He conducted the nationwide survey across all the other residency programs in the country and performed the subsequent data analysis. He was an editor in the written report.

Steven Yip is one of the creators of the original national-wide survey. He conducted the nationwide survey across all the other residency programs in the country and performed the subsequent data analysis. He was an editor in the written report.

Paris-Ann Ingledew is the principal investigator who supervised the BC-wide portion of this study. She is also a contributor to the original nation-wide study. She was an editor in the written report.

ACKNOWLEDGMENT: We would like to thank the following people for their contribution: Dr. Paris-Ann Ingledew from the BC Cancer Agency and Dr. Vincent Tam and Dr. Steven Yip from the Tom Baker Cancer Centre for their guidance and mentorship. We would also like to thank both the UBC program directors and residents who participated in our survey, because without them this project would not have been possible.

POTENTIAL CONFLICTS OF INTEREST:

None.

REFERENCES

1. Canadian Cancer Society's Advisory Committee on Cancer Statistics. Canadian Cancer Statistics 2016. Toronto, Ontario: Canadian Cancer Society; 2016.
2. Yip S, Meyers D, Sisler J et al. Oncology education for family medicine residents: a national needs assessment survey. *BMC Med Educ.* 2020;20(1):283-92. doi:10.1186/s12909-020-02207-0
3. Cheung W, Fishman P, Verma S. Oncology education in Canadian undergraduate and postgraduate training programs. *J Cancer Educ.* 2009;24: 284-90. doi:10.1080/08858190902973143
4. Tam VC, Berry S, Hsu T, North S, Neville A, Chan K, Verma S. Oncology education in Canadian undergraduate and postgraduate medical programs: a survey of educators and learners. *Curr Oncol.* 2014;21:e75-88. doi:10.3747/co.21.1667
5. Cave J, Woolf K, Dacre J, Potts H, Jones A. Medical student teaching in the UK: how well are newly qualified doctors prepared for their role caring for patients with cancer in hospital?. *Br J Cancer.* 2007;97(4):472-478. doi:10.1038/sj.bjc.6603888
6. Susanibar S, Thrush CR, Khatri N, Hutchins L. Cancer survivorship training: a pilot study examining the educational gap in primary care medicine residency programs. *J Cancer Surviv.* 2014;8:565-70. doi:10.1007/s11764-014-0366-2
7. Moore MA, Goodman RA. Physician Training in Cancer Prevention and Control: A Population Health Imperative. *Am J Prev Med.* 2018 Mar 1;54(3):444-8. doi: 10.1016/j.amepre.2017.10.020
8. Fowler F. *Survey Research Methods.* Thousand Oaks, CA: SAGE Publications; 2013.
9. Artino AR, Rochelle JS La, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. 2014;36:463-74. doi: 10.3109/0142159X.2014.889814
10. Easley J, Miedema B, O'brien M, et al. The role of family physicians in cancer care: perspectives of primary and specialty care providers for the Canadian Team to Improve Community-Based Cancer Care Along the Continuum. *Curr Oncol.* 2020;24(2). <https://doi.org/10.3747/co.24.3447>
11. Tam VC, Ingledew P-A, Berry S, et al. Developing Canadian oncology education goals and objectives for medical students: a national modified Delphi study. *CMAJ Open.* 2016 Jul 14;4(3):e359-E364. doi: 10.9778/cmajo.20150127



Clay illustration by Lily Offit; Photographed by Ben Denzer

Integrating a Smoking Cessation Initiative for the Uninsured at a Student-Run Free Clinic

Cynthia Y Tang, BS^{1*}, Lauren E. Flowers, BS^{1*}, Emra Bosnjak, BS¹, Tricia Haynes, MS¹, Jamie B. Smith, MA², Laura E. Morris, MD, MSPH²

¹School of Medicine, University of Missouri ²Family and Community Medicine, University of Missouri

*These authors contributed equally to this study

Correspondence should be addressed to Laura E. Morris, MD, MSPH MorrisLau@health.missouri.edu

Abstract

Cigarette smoking is the leading cause of preventable deaths and diseases in the United States. Student-run clinics play an invaluable role in connecting underserved patients with preventative care. To reduce smoking in uninsured communities, the University of Missouri student-run free MedZou Community Health Clinic developed a Smoking Cessation initiative as part of a preventative health service in 2013. Patients utilizing the smoking cessation services receive a combination of motivational interviewing, patient education, and pharmacotherapy. There is currently limited literature on the structure and implementation of student-run preventative health clinics. The smoking cessation initiative described here can provide an example for other student-run clinics to successfully implement similar programs.

INTRODUCTION

Background

Cigarette smoking is the leading cause of preventable deaths in the United States, accounting for 20% of all deaths.^{1, 2} Tobacco use is a risk factor for pulmonary and cardiovascular diseases and has been linked to diabetes mellitus, rheumatoid arthritis, and various cancers including lung, liver, colorectal, prostate, and breast cancer.³⁻⁵ Additionally, secondhand smoke exposure is associated with pediatric respiratory and cardiovascular diseases and cancers.³⁻⁵

In the United States, the percentage of adults who use tobacco products has increased from 19.3% to 20.8% between 2017 and 2019.^{2,6} Adults living in the Midwest have the highest regional prevalence of tobacco use (23.5%), and Missouri has the tenth highest smoking rate amongst all states nationwide.^{2,7} Additionally, prevalence is higher among those who have an annual income of less than \$35,000 (26.0%) and those who are uninsured (31.0%) compared to those in higher income categories and those with health insurance.²

Preventative services, including routine screening and monitoring, can reduce mortality and morbidity in at-risk populations.⁸ However, uninsured populations are less likely to prioritize and regularly see primary care providers for preventative services, putting them at higher risk of adverse health outcomes.⁹ Many uninsured patients are cared for in free or reduced cost clinics, and thus, improving prevention measures in a free clinic could significantly impact patient outcomes.⁸ Therefore, implementation of comprehensive and evidence-based interventions in combination with barrier-free cessation coverage can reduce tobacco-related disease.⁶

The MedZou Clinic

The University of Missouri School of Medicine student-run free MedZou Community Health Clinic is an interdisciplinary, faculty-sponsored, weekly medical clinic for uninsured persons that is managed entirely by the University of Missouri's medical student volunteers. MedZou opened in

2008 as an initial response to a 2005 decrease in Missouri Medicaid funding, which resulted in an increase of 103,500 newly uninsured individuals across the state between 2004 and 2006.¹⁰ As of 2019, 877,591 adults (between ages 18 and 64) lack health insurance in Missouri, and the uninsured rate (14.3%) is higher than national average (12.9%).¹¹ In the MedZou clinic location of Boone County, 12% of adults (approximately 21,000 adults) are uninsured.¹²

To address this rise in the uninsured and underinsured populations, MedZou offers free primary healthcare and preventative services to uninsured residents of Central Missouri, including some medications, diagnostic testing and routine bloodwork. From its inception, over 800 medical students have volunteered at MedZou to serve a total of 1,902 unique patients. In 2013, MedZou expanded to include a Preventative Health Clinic described here, involving over 180 medical student volunteers, which provides uninsured and underinsured populations with access to smoking cessation tools.

METHODS

Preventative Health Clinic

The Preventative Health Clinic at MedZou was created in 2013 to decrease the risk of adverse health events for the MedZou patient population. More than 180 medical students have since been trained to volunteer weekly as part of the physician-supervised Preventative Health Team (PHT) to provide community resources, substance counseling, diet and exercise counseling, HIV testing, influenza vaccination, vision care, safe sex education, and smoking cessation counseling. In Boone County, Missouri, 18% of adults smoke,¹³ and one of the most widely used preventative services offered at the MedZou clinic is the Smoking Cessation Program. The free weekly Smoking Cessation Program at MedZou clinic integrates patient education and motivational interviewing with pharmacotherapy to decrease the prevalence of smoking in the uninsured and underinsured populations. Preventative health initiatives at the

MedZou Community Health Clinic bring smoking cessation services directly to a population with difficulty accessing traditional healthcare.

Prevention, Intake, and Trauma Team Transition

Prior to 2019, nursing students completed the intake process and initial patient vitals. Afterwards, PHT students would perform preventative health questionnaires intake questions. However, PHT students responded only to those patients who indicated interest in tobacco cessation services on the routine intake questionnaire. Students recognized that this approach required patients to actively self-report a desire to quit smoking to engage with the preventative services of PHT, potentially resulting in underutilization of smoking cessation resources. In 2019, the role of the PHT expanded to include intake vitals and trauma screening, and was renamed the Prevention, Intake, and Trauma Team (PiT). PiT medical students now approach every MedZou patient to obtain vital signs, screen for mental health disorders and interpersonal trauma, evaluate needs for social work or dietetics assistance, and assess interest in preventative care, including smoking cessation. The transition from PHT to PiT has streamlined the intake process for MedZou patients, shortened the duration of their visit, and allowed preventative health screening for every MedZou patient.

Volunteer Training

MedZou leadership positions, including the PiT volunteer team, are passed from second-year medical students to first-year students through an application and interview process. Each student with a leadership position is required to complete a minimum of five volunteer shifts at the MedZou clinic prior to completion of medical school. Thus, students return to volunteer at MedZou clinic multiple times during their third and fourth years. To prepare for patient interactions, motivational interviewing is integrated into the pre-clerkship medical curriculum at the University of Missouri School of Medicine.¹⁴⁻¹⁸ PiT

volunteers are additionally trained to provide counseling for smoking cessation by Certified Tobacco Treatment Specialists from the Columbia/Boone County Public Health and Human Services Department and the Columbia Health and Wellness Resource Center. Drawing upon this training, students follow a general “5 A’s” outline for smoking intervention (Table 1). Students further develop cessation plans under physician supervision based on several questions (Table 2) asked during the visit. Smoking cessation conversations are inclusive of any tobacco or nicotine product, including electronic cigarettes, and offers patients pharmacotherapy, community resources, and brief counseling. Students are trained to understand the stages of behavioral change and can appropriately manage a patient’s resistance or ambivalence to change. The knowledge acquired through PiT trainings empowers medical students to establish a partnership with MedZou patients and become an active role in their health care journey. Table 3 highlights testimonies from five previous PiT volunteers to assess the value of the PiT volunteer experience on the student’s medical education. Students perceived their experiences to supplement early medical school training and support their knowledge of healthcare disparities in the MedZou community.

Table 1. The 5 A’s for Smoking Intervention
Ask: all patients if they smoke
Advise: all smokers to quit
Assess: the person’s readiness to quit
Assist: a person in decision making or help them make a quit plan
Arrange: a follow-up contact to evaluate progress

Table 2. Motivational Interviewing for Smoking Cessation
When do you typically smoke?
How many packs per day do you smoke?
How many years have you smoked?
Have you tried to stop smoking in the past?

Why are you interested in quitting now?
 On a scale from 0 to 10, how confident are you in your ability to quit now?
 On a scale from 0 to 10, how important is it for you to quit now?
 Could you tell me about your experiences with trying to quit smoking in the past?
 What are your triggers for smoking?
 What can you do to avoid temptation?
 What can you do instead of smoking?
 What have you seen others do to successfully quit smoking?
 Who is available to support you?
 When do you want to set your quit date?

“I gained experience presenting patients to colleagues and residents/attendings.”
 “Understanding of the major health problems seen in our patient population at MedZou [which] highlighted... opportunities to improve care coordination in our community.”
 “Truly understanding the implications of barriers to accessing healthcare and how different levels of privilege can affect engagement in one’s own healthcare.”

Clinic Flow

After patients are escorted into a clinic room, PiT volunteers take vital signs, identify any food and housing security needs, screen for mental health disorders and interpersonal trauma, and assess interest in preventative services. Students screen every patient for tobacco use and follow motivational interviewing techniques if a patient screens positive. Students then present this information to the attending physicians and develop a plan for patient care. After the PiT students provide smoking cessation education, patients may choose to use a pharmacologic smoking cessation agent with the approval from the attending physician. Smoking cessation pharmacotherapy includes nicotine patches and nicotine gum as well as physician-generated prescriptions for bupropion and varenicline. Following this initial visit, patients are encouraged to schedule a stand-alone 2-week follow-up visit with the PiT student volunteers for further counseling or behavioral changes toward smoking cessation. Subsequently, each patient is scheduled for routine follow-up visits with physicians at MedZou clinic. These standalone PiT visits in combination with follow-up clinic visits allow PiT to improve longitudinal care and continually assess smoking cessation progress.

Table 3. Medical Student Educational Experience

Why did you join PHT/PiT?
 “To supplement the academic portion of medical school with the more practical side.”
 “Help alleviate health disparities while improving the overall health of our community.”
 “The opportunity to be the first person to see the patient and act somewhat like a coordinator for their care.”
 “To serve a valuable function in society and give back to my community.”
 “For the unique opportunity as a pre-clinical student to participate in a patient’s medical care.”
 What did you learn from volunteering with the PHT/PiT team?
 “I had the opportunity to meet and work with a diverse population of patients while improving my clinical skills in screening, motivational interviewing, and counseling patients.”
 “I learned... to trust my assessment of patients and their level of acuity and illness.”

Telehealth

In 2020, MedZou temporarily transitioned to only telehealth appointments due to social distancing restrictions related to the global COVID-19 pandemic. The PiT volunteers continued to screen all patients for tobacco and nicotine habits, and student training protocols remained the same. Due to time constraints of telehealth visits, personalized counseling with motivational interviewing techniques was limited. Patients interested in smoking cessation scheduled pick up of cessation supplies at the MedZou clinic, which included nicotine replacement therapy (patches or gum), information for community cessation resources, and a personalized cessation plan. The cessation plan provided patients with a tangible outline of personalized motivations, possible triggers, and coping mechanisms for managing these behavioral changes. Patients also scheduled a two-week telehealth follow-up appointment to evaluate behavioral change progression. Although this temporary transition was not ideal, patients were still able to receive the benefits of PiT smoking cessation initiatives.

Community Reach

The Preventative Health Clinic at MedZou provided smoking cessation consults and treatment for 110 adult patients from 2016-2019, 40 of whom returned for the recommended two-week follow-up. Patient demographics, number of years smoking, and smoking classification of those patients are shown in Table 4. Our smoking cessation program patient population was comprised of 61% females, 39% males, 71.4% White, 25.3% Black, and 3.3% Other, and 68.8% Non-Hispanic. The average age at first visit for our study population was 41.4 years. In comparison, the Centers for Disease Control and Prevention reports that the demographics of smoking adults are highest among males, between ages 25-44 and 45-64, and non-Hispanic American Indians/Alaska Natives and people of non-Hispanic Other races.¹

Of the 57% of patients who chose to pursue pharmacotherapy during their first visit,

Nicotine Patch (22%) or Nicotine Gum (14%) were the most chosen pharmacological agents to aid smoking cessation. The smoking cessation agents chosen by the patients are noted in Figure 1. Nicotine patches and nicotine gum are supplied to MedZou by the Columbia-Boone County Health Department, bupropion is supplied by the University of Missouri Pharmacy, and varenicline is supplied by Pfizer Inc.

CHALLENGES

Because MedZou serves the uninsured, underinsured, and often homeless populations, our patients are frequently lost to follow-up. Contacting patients outside of the clinic proved to be especially difficult, as many patients do not have a consistent address or access to a phone or computer. This poses a challenge to continuation of care as well as a limitation to our ability to assess the success of the smoking cessation program. This challenge was especially heightened during the COVID-19 global pandemic, which forced the MedZou clinic to temporarily operate on a solely telehealth basis. To facilitate communication with patients who would otherwise be lost to follow-up, MedZou clinic volunteers and members of the PiT team continuously work with the MedZou Outreach Team to hold outreach events around the community. This has allowed clinic volunteers to continue reaching out to patients who might not be able to regularly attend clinic. We recommend further investigations to evaluate additional solutions to mitigate these challenges.

DISCUSSION

The goal of this project was three-fold: to assess the utilization of the Smoking Cessation initiative at MedZou, to provide a framework for other student-run clinics to implement a similar program, and to expand awareness of the services that MedZou offers. Smoking has diverse health implications that can be prevented through smoking cessation services provided directly to at-risk patients. Preventative health initiatives at the MedZou Community Health Clinic bring smoking

cessation services directly to a population with difficulty accessing traditional healthcare. While other student-run clinics have implemented similar preventative health programs with varying success, there is limited literature on the structure and implementation of these clinics.¹⁹⁻²² Another student-run clinic in Phoenix, Arizona, found that in the homeless population, smoking cessation education and motivational interviewing techniques combined with pharmacotherapy slightly increased the patient's confidence and willingness to quit.¹⁹ The researchers in this study also struggled maintaining follow-up appointments with a similar patient population and specific motivational interviewing techniques were not described.

Finally, MedZou provides medical students at the University of Missouri an early and immersive experience in the clinic setting prior to clerkship rotations. The MedZou clinic experience imparts a non-judgmental environment for students to develop patient interaction and oral case presentation skills. Additionally, participation in the PiT team provides a unique opportunity for medical students to practice and advance motivational interviewing skills throughout their entire medical school training while serving the community. Students directly invest in and improve the health of a marginalized patient population within their own community through provision of preventative health services and the Smoking Cessation Initiative.

CONCLUSION

This study provided insight into training protocols and specific motivational interviewing techniques used by medical students at the MedZou Community Health Clinic. The Smoking Cessation initiative allows students to bring preventative health services directly to patients with limited access to traditional healthcare and help alleviate the diverse negative health implications associated with tobacco use.

	N	%	M(SD)
Total # of patients	110	--	
Returned for follow-up	40	36.4	
Age at first visit, years	110	--	43.4 (11.3)
Gender			
Male	43	39.0	
Female	67	61.0	
Race			
(missing)	19	--	
White	65	71.4	
Black	23	25.3	
Other race	3	3.3	
Ethnicity			
(missing)	49	--	
Non-Hispanic	42	68.8	
Years smoked	64	--	23.2 (12.9)
Number of patients who are ...			
Light smokers (less than 10 cigarettes per day)	17	19.54	--
Heavy smokers (greater than 10 cigarettes per day)	70	80.56	--
M = mean SD = standard deviation			

FIGURE 1. SMOKING CESSATION AGENTS

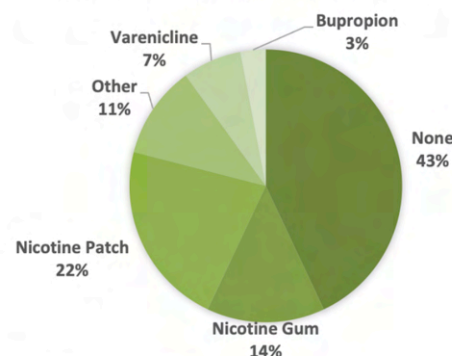


Figure 1. Smoking Cessation Agents. Pharmaceutical agents chosen and provided to patients at the conclusion of the first clinical visit to the Preventative Health Clinic.

ACKNOWLEDGMENTS

The authors would like to thank the PHT for their dedication and commitment to the Smoking Cessation Initiative, Samantha Unangst (Quality Improvement Chair), and Dr. Joseph Burclaff for his critical input.

CONFLICTS OF INTEREST

The authors have no competing interest to declare. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Current Cigarette Smoking Among Adults in the United States. Centers for Disease Control and Prevention. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm. Accessed January 22, 2022.
2. Wang TW, Asman K, Gentzke AS, et al. Tobacco Product Use Among Adults - United States, 2017. *MMWR Morb Mortal Wkly Rep.* 2018;67(44):1225-1232. doi: 10.15585/mmwr.mm6744a2.
3. Barta M. Health effects of tobacco use and exposure. *Monaldi Arch Chest Dis.* 2001;56(6):545-54. PMID: 11980288.
4. Mackenbach JP, Damhuis RA, Been JV. De gezondheidseffecten van roken [The effects of smoking on health: growth of knowledge reveals even grimmer picture]. *Ned Tijdschr Geneesk.* 2017;160:D869. PMID: 28098043.
5. National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General.* Atlanta (GA): Centers for Disease Control and Prevention (US); 2014. PMID: 24455788.
6. Cornelius ME, Wang TW, Jamal A, Loretan CG, Neff LJ. Tobacco Product Use Among Adults - United States, 2019. *MMWR Morb Mortal Wkly Rep.* 2020;69(46):1736-1742. doi: 10.15585/mmwr.mm6946a4.
7. Tobacco Use Prevention and Control. Missouri Department of Health and Senior Services. <https://health.mo.gov/living/wellness/tobacco/smokingandtobacco/tobaccocontrol.php>. Accessed May 17, 2021.
8. Burger M, Taddeo MS, Hushla D, Pasarica M. Interventions for Increasing the Quality of Preventive Care at a Free Clinic. *Cureus.* 2020;12(1):e6562. doi: 10.7759/cureus.6562.
9. Holden CD, Chen J, Dagher RK. Preventive care utilization among the uninsured by race/ethnicity and income. *Am J Prev Med.* 2015;48(1):13-21. doi: 10.1016/j.amepre.2014.08.029.
10. Zuckerman S, Miller DM, Pape ES. Missouri's 2005 Medicaid cuts: how did they affect enrollees and providers?. *Health Aff (Millwood).* 2009;28(2):w335-w345. doi:10.1377/hlthaff.28.2.w335.
11. Health Insurance Coverage of Adults 19-64. Kaiser Family Foundation. <https://www.kff.org/other/state-indicator/adults-19-64/>. Accessed January 3, 2022.
12. Boone County, Missouri. County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/app/missouri/2019/rankings/boone/county/outcomes/>. Accessed March 19, 2021.
13. Health Factors: Adult smoking, Missouri 2019. County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/app/missouri/2019/measure/factors/9/map>. Accessed October 14, 2019.
14. Le Houezec J, Säwe U. Réduction de consommation tabagique et abstinence temporaire: de nouvelles approches pour l'arrêt du tabac [Smoking reduction and temporary abstinence: new approaches for smoking cessation]. *J Mal Vasc.* 2003;28(5):293-300. PMID: 14978435.
15. Lee EJ. The Effect of Positive Group Psychotherapy and Motivational Interviewing on Smoking Cessation: A Qualitative Descriptive Study. *J Addict Nurs.* 2017;28(2):88-95. doi: 10.1097/JAN.000000000000169.
16. Lindson-Hawley N, Thompson TP, Begh R. Motivational interviewing for smoking cessation. *Cochrane Database Syst Rev.* 2015;(3):CD006936. Published 2015 Mar 2. doi:10.1002/14651858.CD006936.pub3.
17. Pócs D, Hamvai C, Kelemen O. Magartatás-változtatás az egészségügyben: a motivációs interjú [Health behavior change: motivational interviewing]. *Orv Hetil.* 2017;158(34):1331-1337. doi:10.1556/650.2017.30825.
18. Tuccero D, Railey K, Briggs M, Hull SK. Behavioral Health in Prevention and Chronic Illness Management: Motivational Interviewing. *Prim Care.* 2016;43(2):191-202. doi:10.1016/j.pop.2016.01.006.
19. Buckley K, Tsu L, Hormann S, et al. A health sciences student-run smoking cessation clinic experience within a homeless population. *J Am Pharm Assoc (2003).* 2017;57(1):109-115.e3. doi:10.1016/j.japh.2016.09.008.
20. Zucker J, Lee J, Khokhar M, Schroeder R, Keller S. Measuring and assessing preventive medicine services in a student-run free clinic. *J Health Care Poor Underserved.* 2013;24(1):344-358. doi:10.1353/hpu.2013.0009.
21. Lough LE, Ebbert JO, McLeod TG. Evaluation of a student-run smoking cessation clinic for a medically underserved population. *BMC Res Notes.* 2011;4:55. doi:10.1186/1756-0500-4-55.
22. Der DE, You YQ, Wolter TD, Bowen DA, Dale LC. A free smoking intervention clinic initiated by medical students. *Mayo Clin Proc.* 2001;76(2):144-151. doi:10.1016/S0025-6196(11)63120-0.