

Roadmap for Trauma-Informed Medical Education: Introducing an Essential Competency Set

Sarah Berman, MD, Taylor Brown, MD, Cecelia Mizelle, Thang Diep, Megan R. Gerber, MD, Martina Jelley, MD, Laura A. Potter, Patricia Rush, MD, MBA, Andres Sciolla, MD, Audrey Stillerman, MD, Christopher Trennepohl, MD, MPH, Amy Weil, MD, and Jennifer Potter, MD

Abstract

Research has established that trauma is nearly universal and a root cause of numerous health and social problems, including 6 of the 10 leading causes of death, with devastating consequences across the life course. Scientific evidence now recognizes the complex injurious nature of structural and historical trauma (i.e., racism, discrimination, sexism, poverty, and community violence). Meanwhile, many physicians and trainees grapple with their own trauma histories and face direct and secondary traumatization on the job. These findings substantiate the profound impact of trauma on the brain and body and why trauma training is critical to the education and practice of physicians. However,

a critical lag remains in translating essential research insights into clinical teaching and care. Recognizing this gap, the National Collaborative on Trauma-Informed Health Care Education and Research (TIHCER) formed a task force charged with developing and validating a summary of core trauma-related knowledge and skills for physicians. In 2022, TIHCER released the first-ever validated set of trauma-informed care competencies for undergraduate medical education. The task force focused on undergraduate medical education so that all physicians would be taught these foundational concepts and skills from the outset of training, recognizing that faculty development is needed to achieve

this goal. In this Scholarly Perspective, the authors offer a roadmap for implementation of trauma-informed care competencies starting with medical school leadership, a faculty–student advisory committee, and sample resources. Medical schools can use the trauma-informed care competencies as a scaffold to customize integration of curricular content (what is taught) and efforts to transform the learning and clinical environments (how it is taught). Using the lens of trauma will ground undergraduate medical training in the latest science about the pathophysiology of disease and provide a framework to address many of our greatest challenges, including health disparities and professional burnout.

Trauma is “an event, series of events, or set of circumstances that is experienced as threatening or harmful

and that has lasting adverse effects.”¹ Extensive research has established that trauma exposure is nearly universal²; is a root cause of numerous health and social problems, including 6 of the 10 leading causes of death³; and may have devastating lifelong consequences.⁴ Initial research focused on the impact of adversity on the individual and interpersonal levels (i.e., child maltreatment, interpersonal violence, family stressors, and combat exposure). Experts now recognize that structural and historical trauma (i.e., racism, discrimination, sexism, poverty, community violence, and more)⁵ are equally consequential. At the same time, humans, individually and collectively, have the potential for resilience (the ability to bounce back from adversity). The scope and depth of research on these topics have increased exponentially, including identification of the mechanisms through which trauma can derail child development and dysregulate physiology and behavior throughout the life course.^{6,7} In addition, an increasing body of research

is developing strategies to effectively prevent, mitigate, and heal the adverse effects of trauma.⁸

In 2022, the National Collaborative on Trauma-Informed Health Care Education and Research (TIHCER) released the first-ever validated set of trauma-informed care (TIC) competencies for undergraduate medical education (UME).⁹ The Association of American Medical Colleges (AAMC) has recognized these TIC competencies as a new and emerging area for curricular development.¹⁰ Previously, there has been little if any guidance for medical educators on how to teach and assess knowledge and skills surrounding the identification, clinical care, and prevention of trauma. Using the lens of trauma will ground undergraduate medical training in the latest neurobiology and other key research to provide a framework for academic medicine to address many of our greatest challenges, including health disparities and professional burnout.¹¹

Please see the end of this article for information about the authors.

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Correspondence should be addressed to Jennifer Potter, Beth Israel Deaconess Medical Center, 330 Brookline Ave., Boston, MA 02215; telephone: (617) 416-0986; email: jpotter@bidmc.harvard.edu; Twitter: @JennPottMD.

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Given the high prevalence of trauma and its role in the pathogenesis of disease, disability, and early death, it is vital that every physician across the education and practice continuum, in all medical specialties and health care settings, be prepared to provide care for patients with trauma-related conditions. Many physicians and physician trainees also grapple with their own trauma histories¹² and face direct and secondary traumatization on the job. Therefore, physicians are key leaders in the advancement of the foundational science of trauma and healing and its application to clinical care and education. Ensuring that all physicians have core knowledge about trauma and its impact will enhance diagnosis, improve treatment outcomes, and optimize both the patient and clinician experience. The American Medical Association, the AAMC, and other leading academic and professional medical associations have adopted policy statements calling for the inclusion of TIC instruction across the medical education continuum (Table 1). Aims of this Scholarly Perspective are to (1) introduce the first-ever TIC competency set for UME; (2) trace the evolution of research about the diverse health impacts of trauma and the use of trauma principles in clinical practice during the past 50 years; and (3) provide a framework for implementation, including recently developed trauma-informed medical curricular materials and a call for academic leadership to embrace the potential of trauma-informed approaches.

Evolution of Scientific Understanding of the Medical Impact of Trauma

Our understanding of trauma, its relevance to medical practice, and how to prevent and mitigate its impact have significantly changed since the recognition of posttraumatic stress disorder (PTSD) in the 1970s.¹³ Understanding the evolution of medical thinking about traumatic experience provides a crucial perspective on why training about trauma has been omitted from medical education until now.

Long before the identification of PTSD, French physician and psychologist Pierre Janet observed that early life trauma was a significant factor in the occurrence of mental and physical illness.¹⁴ In the

Table 1

Timeline of Trauma-Informed Care in Medicine and Medical Education

Year	Action
2000	• SAMHSA publishes first protocol for treatment of persons with child abuse and neglect ^{58,59}
2001	• U.S. Congress establishes National Child Traumatic Stress Network to improve access and services for children and adolescents exposed to trauma ^{60,61}
2013	• World Health Organization issues trauma guidelines ⁶²
2014	• SAMHSA publishes first guidelines for trauma-informed care ⁶³
2016	• National Academy of Science and SAMHSA publish guidelines for national data collection about trauma ⁶³ • <i>American Journal of Public Health</i> publishes "Trauma-Informed Social Policy: A Conceptual Framework for Policy Analysis and Advocacy" ⁶⁴
2018	• Federal law mandates broad implementation of trauma-informed principles across all federal agencies, including the NIH and Medicare-Medicaid ^{65,66} • <i>Proceedings of the National Academy of Science</i> publication on neurocognitive and psychosocial impacts of violence and trauma ⁶⁷
2019	• Association of American Medical Colleges publishes guidance on trauma-informed care in medical education ⁶⁸ • American Academy of Pediatrics policy statement on the impact of racism on child and adolescent health ⁶⁹
2021	• American Medical Association policy statement on adverse childhood experiences and trauma-informed care with inclusion of trauma-informed care in UME and graduate medical education ⁷⁰ • American Academy of Pediatrics policy statement on trauma-informed care in child health systems calling for physician training, medical research, and advocacy ⁷¹ • American College of Obstetrics and Gynecology clinical guidance on caring for patients who have experienced trauma, including physician training ⁷² • American Academy of Family Physicians policy statement on trauma-informed care, including training in medical schools and residencies ⁷³
2022	• National Collaborative on Trauma-Informed Health Care, Education and Research publishes validated trauma-informed care competencies for UME ⁹ • American College of Preventive Medicine position statement calling for all health care teams to be trained about trauma-informed, healing-centered care ⁷⁴

Abbreviations: NIH, National Institutes of Health; SAMHSA, Substance Abuse and Mental Health Services Administration; UME, undergraduate medical education.

mid-20th century, new laws codified the expectation that physicians would identify and address trauma with mandatory reporting of abuse and neglect of children.¹⁵ In the 1980s, research revealed that neglect during childhood is actually more common than overt abuse and that deprivation of care, touch, and parental coregulation lead to impaired growth and development with a lifelong impact on brain network function (developmental trauma).¹⁶

Creation of the PTSD diagnosis led to 2 unexpected problems for medical science: the diagnostic structure of PTSD conceptualized trauma as a single event, and trauma became pigeonholed as a psychiatric issue. Since then, robust research has revealed that most trauma is complex and the result of multiple, recurrent traumas rather than a single event,¹⁷ often has origins

in childhood, and occurs not only in interpersonal but also in community and systemic contexts. Most importantly, trauma has profound and devastating physical health as well as psychological consequences.¹⁸

Understanding of the neurobiology of trauma has been expanded through advanced medical technology. Neuroimaging demonstrated that childhood deprivation and maltreatment impair development of brain structure and functional connectivity.¹⁹ For decades, scientists conceptualized the immune system as isolated from the brain. Researchers now recognize that psychological distress (trauma) is a common and significant inflammatory trigger for many chronic illnesses.^{20,21} Through these insights, longstanding physiologic principles, such as regulation, the stress response,

sympathetic-parasympathetic balance, and homeostasis, have moved back to the forefront in understanding the origins of disease.

Epidemiologic studies have quantified the negative impact of traumatic interpersonal experiences as well as the insidious violence of systemic racism. Two examples are the landmark 1998 Adverse Childhood Experiences study³ and studies using the Everyday Discrimination Scale.²² The Adverse Childhood Experiences study demonstrated a strong, graded relationship between the level of exposure to childhood maltreatment and household stressors and subsequent development of severe illness. Simultaneous research into the roots of health disparities led to validated assessment tools of individual- and structural-level discrimination²³ and demonstrated the close relationship between the level of long-term exposure to unfair treatment and the occurrence and severity of many chronic illnesses. This research demonstrates that the medical consequences of individual- and family-level adversity overlap extensively with the injurious effects of structural trauma. Collectively, this body of research substantiates the profound impact of trauma on the brain and body and why trauma training is critical to the education and practice of physicians. However, despite all this evidence, there is a critical lag in translating essential research insights into clinical teaching and practice.

Trauma-Informed Care

TIC is the systematic application of trauma principles and research findings to clinical practice, organizational function, and cultural challenges. TIC emphasizes patient, staff, and learner “strengths and is grounded in an understanding of and responsiveness to the impact of trauma.”¹ In 2014, the U.S. Substance Abuse and Mental Health Services Administration developed a TIC framework to help clinicians and health systems meet the health care needs of individuals and communities experiencing trauma. The framework is built on 6 principles: (1) safety; (2) trustworthiness and transparency; (3) peer support; (4) collaboration and mutuality; (5) empowerment, voice, and choice; and (6) acknowledgment of cultural, historical, and gender issues.

Importantly, TIC highlights the use of “universal trauma precautions” (i.e., care that assumes that any patient, regardless of diagnosis and clinical setting, may be a trauma survivor).²⁴ This practice stems not only from the recognition of nearly universal lifetime prevalence of trauma exposure but also from clinical awareness that trauma can manifest in many ways, with or without psychological symptoms. Emphasizing safety, TIC recognizes the importance of acknowledging and minimizing the power differential between patients and clinicians. TIC also appreciates that traditional care models may inadvertently distress, silence, or disempower those who have experienced trauma, which can lead to disengagement from care or work and exacerbate poor outcomes for patients and clinicians. Essential components of TIC include patient-centered communication, opportunities for patients to voice preferences and interact with peers, as well as deliberate elimination of institutional and clinical processes that risk retraumatization.

Trauma-informed approaches are deeply congruent with the long-standing recognition of the importance of humanism²⁵ and patient-centeredness²⁶ in medical school curricula. The trauma-informed values of respect and fairness also advance the essential work of social justice, equity, and antiracism.²⁷ Recent social challenges (including but not limited to the COVID-19 pandemic, gun violence, and worsening of health disparities) have underlined increasing awareness of the deep structural problems within health care and their impact on patients, trainees, and clinicians. Just as learners across the continuum deserve the opportunity to master the basics of trauma science, trainees and faculty deserve to learn and practice in safe, trauma-informed educational and clinical environments. Several health professions, notably nursing,²⁸ social work,²⁹ and clinical psychology,³⁰ have developed TIC competencies and are beginning to incorporate TIC content into their educational programs.

Development of TIC Competencies for UME

Recognizing the gap between trauma research and application and galvanized by medical student advocacy for TIC education, the TIHCER⁹ developed and

validated a TIC competency set for UME. The work was conducted by a 13-member task force composed of practicing clinicians, medical educators, medical students, and behavioral and social scientists.

The goal of competency-based approaches in education is to ensure that all learners achieve the desired outcomes during training. During the past decade, consensus groups have established UME competencies in several areas considered critical for 21st-century physicians. These areas include geriatrics,³¹ quality improvement and patient safety,³² sexual and gender minority health,³³ sexual health,³⁴ and substance use disorder.³⁵ In addition, in 2022, the AAMC released a new set of diversity, equity, and inclusion competencies for implementation across the learning continuum.³⁶

The task force drafted competencies focused on student acquisition of the knowledge, skills, attitudes, and values to engage in trauma-informed, healing-centered, equitable interactions, as well as self- and collective care. The competencies also address the need to transform learning and practice environments, including their implicit elements or hidden curriculum, such as institutional policies and resource allocation as well as the modeling of expected physician behavior.³⁷ Congruence between curricular content and context is essential to catalyze the transformation of medical education and clinical care environments into spaces that use trauma-informed practices that promote health, resilience, equity, and cost-effectiveness.³⁸ The task force focused on UME so that all physicians would be taught these foundational concepts and skills from the outset of training, recognizing that faculty development is needed to achieve this goal. Given its unifying list of common learner expectations used in training physicians, the task force selected the Physician Competency Reference Set³⁹ as the overarching framework and followed the process delineated by the AAMC Advisory Committee on Sexual Orientation, Gender Identity, and Sex Development.⁴⁰

After reaching consensus on the content of the competencies, a modified Delphi

process was used as a systematic means to develop, synthesize, and measure additional expert opinions about key aspects of this relatively new field.⁴¹ Institutional review board determination of exempt status occurred at each of the 4 participating institutions, which were chosen to provide geographic diversity and enhance the generalizability of the results.

Eighty-one reviewers were recruited, including TIC experts, medical educators, medical students, and community members self-identifying as having lived experience with trauma. In keeping with community-engaged medical education principles,⁴² the task force prioritized inclusion of the ultimate recipients of medical education efforts (i.e., students and patients). Each reviewer received a companion guide that explained key terms and the competency domains, including how to assess testability. If participants did not feel they could assess a particular domain, they could pass on evaluation by selecting “N/A” (not applicable).

The final validated TIC competency set contains 43 competencies across the 8 Physician Competency Reference Set domains. Highlights are summarized in List 1. The complete TIC competency set, full methods, and reviewer companion guide can be found in Supplemental Digital Appendixes 1, 2, and 3 at <http://links.lww.com/ACADMED/B394>.

Next Steps: Roadmap for TIC Implementation

Curricular change in medical education can be a daunting challenge.⁴³ We offer the TIC competency set with a proposed roadmap as a curricular framework for medical educators to translate essential trauma science and best practices into standards of education and care (Figure 1). Designed specifically for UME, the TIC competencies delineate the foundational knowledge and assessable skills that are developmentally appropriate for and attainable by medical school graduates. This work offers a scaffold that medical schools can customize to guide integration of curricular content (what is taught) and institutional efforts to transform the learning and clinical environments (how it is taught).

Engaging medical school leadership, faculty, and trainees at all levels is

List 1

Validated Trauma-Informed Competencies for Undergraduate Medical Education^a

Knowledge for practice

- Define concepts such as trauma, resilience, and universal trauma precautions.
- Describe the epidemiology, vulnerabilities, impact, and manifestations of trauma and how structural and social context, including oppression, stigma, and discrimination, can be traumatic.
- Describe evidence-based strategies for prevention and therapeutics.

Patient care

- Demonstrate the ability to apply trauma-informed principles in history gathering, physical exam, decision making, counseling, treatment, and referral.
- Develop care plans with patients that enable patient autonomy, mutual respect, safety, and ongoing engagement.

Practice-based learning and improvement

- Describe trauma and resilience literature and potential impact on patient care.

Interpersonal and communication skills

- Apply principles of trauma-informed care in communication with patients and documentation.
- Respond to patient disclosure of trauma with empathy, acceptance, validation of patient experience, and compassion.

Professionalism

- Describe interpersonal and systemic bias and how they might traumatize patients, colleagues, and staff.
- Describe strategies to mitigate bias.

Systems-based practice

- Identify aspects of the health care system that may not be trauma-informed and identify potential areas of improvement.

Interprofessional collaboration

- Demonstrate words and actions that incorporate trauma-informed principles during team-based care.

Personal and professional development

- Describe strategies to prevent and mitigate compassion fatigue, moral injury, vicarious and secondary trauma, and burnout.
- Describe how to access trauma-informed supervision, mentoring, and/or coaching.

^aThis list contains highlights from a larger document, which can be found in Supplemental Digital Appendix 1 at <http://links.lww.com/ACADMED/B394>.

a pivotal component of successful implementation.^{44,45} We recommend each medical school create a senior-level faculty–student advisory committee to coordinate, evaluate, and refine the TIC project. Although often unrecognized, many internal resources at academic medical centers are already engaged in trauma-related basic science and clinical work, including neuroscience, immunology, sleep studies, pediatrics, developmental psychology, psychiatry, pain management, and public health, and these resources can be mobilized to enrich the project. Alongside UME TIC curriculum development, creating a parallel initiative-building faculty capacity to teach and coach trainees in

TIC is crucial. TIC-inspired curricular innovation and learning environment interventions can and should work synergistically with other initiatives, such as education about the social determinants of health,⁴⁶ antiracism,⁴⁷ and structural competency.⁴⁸

TIHCER has embarked on the first step of implementation: dissemination of the competency set to all U.S. medical schools. Release of the TIC competencies has catalyzed numerous requests from U.S. and international colleagues for presentations (e.g., grand rounds, conferences, podcasts, virtual media) about how to integrate trauma-informed instruction into UME and beyond.

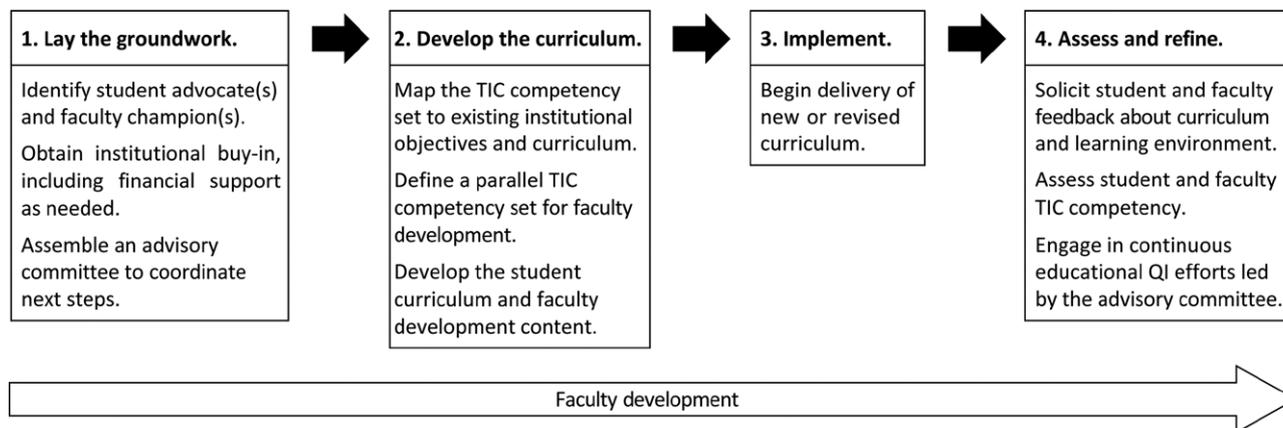


Figure 1 Example roadmap for implementation of the trauma-informed care (TIC) competency set. Abbreviation: QI, quality improvement.

Medical school implementation will benefit from existing practical and easily accessible resources. For example, TIHCER's TIC Competency Toolkit⁹ includes a glossary and extensive bibliography designed to accompany the competencies and provides essential vocabulary and readings for competency-based lessons. The Center for Collaborative Study of Trauma, Health Equity, and Neurobiology hosts a website of succinct text and video lessons exploring the foundational science of trauma and healing and its application; the connection between TIC and health equity; and a proposal for a new model of care.⁴⁹ Faculty can find detailed guidance for conventional and simulation laboratory-based teaching⁵⁰ of trauma-informed history gathering^{51,52} and physical examination,⁵³ including faculty-student conversation guides, sample presentations,^{54,55} tip sheets, assessment materials, and sample cases. MedEdPORTAL offers comprehensive curricular modules addressing childhood adversity, trauma, TIC, and resilience for in-person and virtual instruction for UME and graduate medical education across multiple specialties.⁵⁶ Finally, learning collaboratives (e.g., TIHCER) and communities of practice (e.g., PACEs Connection)⁵⁷ provide exposure to current and in-progress research and curricula as well as connection to both experts and peers.

Conclusions

Exposure to trauma is undeniably part of the human condition. With increased awareness of its impact on disease states and equity, medical education has a societal responsibility to prepare future physicians to recognize and address trauma skillfully and compassionately.

Embedding TIC as a foundational practice from the very start of physician training has the potential to not only enhance and improve patient care but also create more inclusive and compassionate learning and clinical practice environments.

The TIC UME competencies serve as a roadmap for medical schools to use when refining their existing curricula and implementing transformational new content. Further research is essential to evaluate the impact of these competencies on both learner outcomes (e.g., acquisition of TIC knowledge and development of clinical skills) and patient outcomes (e.g., clinical improvement as well as engagement in and satisfaction with care). Although these competencies are specific to UME, they can easily be adapted for graduate medical education, faculty development, and continuing medical education.

Crafting TIC competencies for UME began with our aspiration to advance medical education and practice, as well as to reconnect medicine to its origins: to first do no harm, to protect and foster health, and to facilitate healing. To reach these goals, we commit to continuing this work and hope to inspire others around the world to further develop TIC competencies and educational materials across the medical education continuum. Ultimately, physician mastery of TIC knowledge and skills will help create a health care system that is healing for us all.

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S. Berman is a third-year psychiatry resident, Cambridge Health Alliance, Cambridge, Massachusetts; ORCID: <https://orcid.org/0000-0003-1037-8798>.

T. Brown is a second-year emergency medicine resident, Beth Israel Deaconess Medical Center, Boston, Massachusetts; ORCID: <http://orcid.org/0000-0002-1893-9142>.

C. Mizelle is a third-year medical student, University of North Carolina, Chapel Hill, North Carolina; ORCID: <http://orcid.org/0000-0003-4401-1927>.

T. Diep is a youth engagement specialist, Center for the Pacific Asian Family, Los Angeles, California; ORCID: <https://orcid.org/0000-0002-5256-0320>.

M.R. Gerber is professor of medicine, Albany Medical College, Albany, New York; ORCID: <https://orcid.org/0000-0002-8444-5554>.

M. Jelley is professor of medicine, University of Oklahoma School of Community Medicine, Tulsa, Oklahoma; ORCID: <https://orcid.org/0000-0002-7816-2865>.

L.A. Potter is a third-year medical student, University of California, Davis, Sacramento, California; ORCID: <https://orcid.org/0000-0001-6912-9214>.

P. Rush is codirector, Center for Collaborative Study of Trauma, Health Equity, and Neurobiology (THEN), Chicago, Illinois; ORCID: <https://orcid.org/0000-0001-9775-7541>.

A. Sciolla is professor of psychiatry, University of California, Davis, Sacramento, California; ORCID: <https://orcid.org/0000-0002-0713-2183>.

A. Stillerman is assistant professor of family medicine, University of Illinois, Chicago, Illinois; ORCID: <https://orcid.org/0000-0002-0713-2183>.

C. Trennepohl is a second-year psychiatry resident, University of Illinois, Chicago, Illinois; ORCID: <https://orcid.org/0000-0003-1745-0908>.

A. Weil is professor of medicine and social medicine, University of North Carolina, Chapel Hill, North Carolina; ORCID: <https://orcid.org/0000-0002-7671-0397>.

J. Potter is professor of medicine, Harvard Medical School, Boston, Massachusetts; ORCID: <https://orcid.org/0000-0002-6221-8895>.

References

- Substance Abuse and Mental Health Services Administration. SAMHSA's Concept of Trauma and Guidance for a Trauma-Informed Approach. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2014.
- Hamby S, Taylor E, Mitchell K, Jones L, Newlin C. Poly-victimization, trauma, and resilience: Exploring strengths that promote thriving after adversity. *J Trauma Dissociation*. 2020;21:376–395.
- Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14:245–258.
- Anda RF, Felitti VJ, Bremner JD, et al. The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci*. 2006;256:174–186.
- Cronholm PF, Forke CM, Wade R, et al. Adverse childhood experiences: Expanding the concept of adversity. *Am J Prev Med*. 2015;49:354–361.
- Hambrick EP, Brawner TW, Perry BD. Timing of early-life stress and the development of brain-related capacities. *Front Behav Neurosci*. 2019;13:183.
- Black MM, Walker SP, Fernald LCH, Grantham-McGregor S, et al; Lancet Early Childhood Development Series Steering Committee. Early childhood development coming of age: Science through the life course. *Lancet*. 2017;389:77–90.
- Boyd JE, Lanius RA, McKinnon MC. Mindfulness-based treatments for posttraumatic stress disorder: A review of the treatment literature and neurobiological evidence. *J Psychiatry Neurosci*. 2018;43:7–25.
- National Collaborative on Trauma-Informed Health Care, Education and Research. Trauma-informed care competencies for undergraduate medical education. <https://tic4meded.org/tic-ume-competencies>. Accessed June 1, 2023.
- Association of American Medical Colleges Competency-Based Medical Education. <https://www.aamc.org/about-us/mission-areas/medical-education/cbme>. Accessed December 1, 2022.
- The Harvard Macy Institute. Education as a Catalyst for Healthcare Transformation. <https://harvardmacy.org/blog/education-as-a-catalyst>. Accessed December 1, 2022.
- Sciolla AF, Wilkes MS, Griffin EJ. Adverse childhood experiences in medical students: Implications for wellness. *Acad Psychiatry*. 2019;43:369–374.
- Lasiuk GC, Hegadoren KM. Posttraumatic stress disorder part I: Historical development of the concept. *Perspect Psychiatr Care*. 2006;42:13–20.
- Bühler KE, Heim G. General introduction to the psychotherapy of Pierre Janet. *Am J Psychother*. 2001;55:74–91.
- Schilling S, Christian CW. Child physical abuse and neglect. *Child Adolesc Psychiatr Clin N Am*. 2014;23:309–319.
- Spinazzola J, van der Kolk B, Ford JD. When nowhere is safe: Interpersonal trauma attachment adversity as antecedents of posttraumatic stress disorder and developmental trauma disorder. *J Trauma Stress*. 2018;31:631–642.
- Lewis SJ, Koenen KC, Ambler A, et al. Unravelling the contribution of complex trauma to psychopathology and cognitive deficits: A cohort study. *Br J Psychiatry*. 2021;219:448–455.
- Hamby S, Elm JHL, Howell KH, Merrick MT. Recognizing the cumulative burden of childhood adversities transforms science and practice for trauma and resilience. *Am Psychol*. 2021;76:230–242.
- Teicher MH, Samson JA, Anderson CM, Ohashi K. The effects of childhood maltreatment on brain structure, function and connectivity. *Nat Rev Neurosci*. 2016;17:652–666.
- Liu W, Deng Y, Li Z, et al. Cancer Evo-Dev: A theory of inflammation-induced oncogenesis. *Front Immunol*. 2021;12:768098.
- Mohanta SK, Peng L, Li Y, et al. Neuroimmune cardiovascular interfaces control atherosclerosis. *Nature*. 2022;605:152–159.
- Lewis TT, Cogburn CD, Williams DR. Self-reported experiences of discrimination and health: Scientific advances, ongoing controversies, and emerging issues. *Ann Rev Clin Psychol*. 2015;11:407–440.
- Williams DR. Improving the measurement of self-reported racial discrimination: Challenges and opportunities. In: Alvarez AN, Liang CTH, Neville HA, eds. *The Cost of Racism for People of Color: Contextualizing Experiences of Discrimination*. Washington, DC: American Psychological Association; 2016:55–83.
- Owens L, Terrell S, Low LK, et al. Universal precautions: The case for consistently trauma-informed reproductive healthcare. *Am J Obstet Gynecol*. 2022;226:671–677.
- Thibault GE. Humanism in medicine: What does it mean and why is it more important than ever? *Acad Med*. 2019;94:1074–1077.
- Bokhour BG, Fix GM, Mueller NM, et al. How can healthcare organizations implement patient-centered care? Examining a large-scale cultural transformation. *BMC Health Serv Res*. 2018;18:168.
- Esaki N, Reddy M, Bishop CT. Next steps: Applying a trauma-informed model to create an anti-racist organizational culture. *Behav Sci (Basel)*. 2022;12:41.
- Wheeler K, Phillips KE. The development of trauma and resilience competencies for nursing education. *J Am Psychiatr Nurses Assoc*. 2021;27:322–333.
- Council on Social Work Education. Specialized practice curricular guide for trauma-informed social work practice. <https://www.cswe.org/products/specialized-practice-curricular-guide-for-trauma-informed-social-work-practice>. Published 2015. Accessed December 1, 2022.
- American Psychological Association. Guidelines on trauma competencies for education and training. <http://www.apa.org/ed/resources/trauma-competencies-training.pdf>. Published 2015. Accessed December 1, 2022.
- Leipzig RM, Granville L, Simpson D, Anderson MB, Sauvigné K, Soriano RP. Keeping granny safe on July 1: A consensus on minimum geriatrics competencies for graduating medical students. *Acad Med*. 2009;84:604–610.
- Association of American Medical Colleges. Quality Improvement and Patient Safety Competencies Across the Learning Continuum. Washington, DC: Association of American Medical Colleges; 2019.
- Association of American Medical Colleges Advisory Committee on Sexual Orientation, Gender Identity, and Differences of Sex Development. Professional competency objectives to improve health care for people who are or may be LGBT, gender nonconforming, and/or born with DSD. In: *Implementing Curricular and Institutional Climate Changes to Improve Health Care for Individuals Who Are LGBT, Gender Nonconforming, or Born with DSD: A Resource for Medical Educators*. Washington, DC: Association of American Medical Colleges; 2014.
- Bayer CR, Eckstrand KL, Knudson G, et al. Sexual health competencies for undergraduate medical education in North America. *J Sex Med*. 2017;14:535–540.
- Servis M, Fishman SM, Wallace MS, et al. Responding to the opioid epidemic: Educational competencies for pain and substance use disorder from the Medical Schools of the University of California. *Pain Med*. 2021;22:60–66.
- Association of American Medical Colleges. Diversity, Equity, and Inclusion Competencies Across the Learning

- Continuum. Washington, DC: Association of American Medical Colleges; 2022.
- 37 Hafferty FW. Beyond curricular reform: Confronting medicine's hidden curriculum. *Acad Med*. 1994;69:861–871.
 - 38 Levy-Carrick NC, Lewis-O'Connor A, Rittenberg E, Manosalvas K, Stoklosa HM, Silbersweig DA. Promoting health equity through trauma-informed care: Critical role for physicians in policy and program development. *Fam Community Health*. 2019;42:104–108.
 - 39 Englander R, Cameron T, Ballard AJ, Dodge J, Bull J, Aschenbrener CA. Toward a common taxonomy of competency domains for the health professions and competencies for physicians. *Acad Med*. 2013;88:1088–1094.
 - 40 Eckstrand KL, Potter J, Bayer CR, Englander R. Giving context to the physician competency reference set: Adapting to the needs of diverse populations. *Acad Med*. 2016;91:930–935.
 - 41 McMillan SS, King M, Tully MP. How to use the nominal group and Delphi techniques. *Int J Clin Pharm*. 2016;38:655–662.
 - 42 Strasser R, Worley P, Cristobal F, et al. Putting communities in the driver's seat: The realities of community-engaged medical education. *Acad Med*. 2015;90:1466–1470.
 - 43 Burns CJ, Borah L, Terrell SM, James LN, Erkkinen E, Owens L. Trauma-informed care curricula for the health professions: A scoping review of best practices for design, implementation, and evaluation. *Acad Med*. 2023;98:401–409.
 - 44 Pock AR, Durning SJ, Gilliland WR, Pangaro LN. Post-Carnegie II curricular reform: A North American survey of emerging trends & challenges. *BMC Med Educ*. 2019;19:260.
 - 45 Sandhu D. Healthcare educational leadership in the twenty-first century. *Med Teach*. 2019;41:614–618.
 - 46 Hayman K, Wen M, Khan F, Mann T, Pinto AD, Ng SL. What knowledge is needed? Teaching undergraduate medical students to “go upstream” and advocate on social determinants of health. *Can Med Educ J*. 2020;11:e57–e61.
 - 47 Sotto-Santiago S, Poll-Hunter N, Trice T, et al. A framework for developing antiracist medical educators and practitioner-scholars. *Acad Med*. 2022;97:41–47.
 - 48 Metz J, Hansen H. Structural competency: Theorizing a new medical engagement with stigma and inequality. *Soc Sci Med*. 2014;103:126–133.
 - 49 The Center for Collaborative Study of Trauma, Health Equity, and Neurobiology. <https://www.thecenter.org>. Accessed December 1, 2022.
 - 50 Wen FK, Miller-Cribbs JE, Coon KA, Jelley MJ, Foulks-Rodriguez KA. A simulation and video-based training program to address adverse childhood experiences. *Int J Psychiatry Med*. 2017;52:255–264.
 - 51 Machtinger EL, Davis KB, Kimberg LS, et al. From treatment to healing: Inquiry and response to recent and past trauma in adult health care. *Womens Health Issues*. 2019;29:97–102.
 - 52 Brown T, Mehta PK, Berman S, et al. A trauma-informed approach to the medical history: Teaching trauma-informed communication skills to first-year medical and dental students. *MedEdPORTAL*. 2021;17:11160.
 - 53 Elisseou S, Puranam S, Nandi M. A novel, trauma-informed physical examination curriculum. *Med Educ*. 2018;52:555–556.
 - 54 Pletcher BA, O'Connor M, Swift-Taylor ME, DallaPiazza M. Adverse childhood experiences: A case-based workshop introducing medical students to trauma-informed care. *MedEdPORTAL*. 2019;15:10803.
 - 55 Chokshi B, Chen KLD, Beers L. Interactive case-based childhood adversity and trauma-informed care electronic modules for pediatric primary care. *MedEdPORTAL*. 2020;16:10990.
 - 56 MedEdPORTAL. <https://www.mededportal.org>. Accessed December 1, 2022.
 - 57 PACEs Connection. <https://www.pacesconnection.com>. Accessed December 1, 2022.
- ### References cited in Table 1 only
- 58 Center for Substance Abuse Treatment. Substance Abuse Treatment for Persons With Child Abuse and Neglect Issues. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2000. Report SMA 00-3357.
 - 59 Harris M, Fallot RD. Envisioning a trauma-informed service system: A vital paradigm shift. *New Dir Ment Health Serv*. 2001;89:3–22.
 - 60 The National Child Traumatic Stress Network. Who we are. <https://www.nctsn.org/about-us/who-we-are>. Accessed February 13, 2023.
 - 61 Congress.gov. H.R.4365—Children's Health Act of 2000. <https://www.congress.gov/bill/106th-congress/house-bill/4365>. Accessed February 11, 2023.
 - 62 World Health Organization. WHO releases guidance on mental health care after trauma [news release]. <https://www.who.int/news/item/06-08-2013-who-releases-guidance-on-mental-health-care-after-trauma>. Published August 6, 2013. Accessed February 11, 2023.
 - 63 Committee on National Statistics; Board on Behavioral, Cognitive, and Sensory Sciences; Division of Behavioral and Social Sciences and Education; Board on Health Sciences Policy; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine. *Measuring Trauma: Workshop Summary*. Washington, DC: National Academies Press; 2016.
 - 64 Bowen EA, Murshid NS. Trauma-informed social policy: A conceptual framework for policy analysis and advocacy. *Am J Public Health*. 2016;106:223–229.
 - 65 Substance Abuse and Mental Health Services Administration. The Interagency Task Force for Trauma-Informed Care. <https://www.samhsa.gov/trauma-informed-care>. Accessed February 11, 2023.
 - 66 Congress.gov. H.R.6—SUPPORT for Patients and Communities Act. <https://www.congress.gov/bill/115th-congress/house-bill/6>. Accessed February 11, 2023.
 - 67 National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Health and Medicine Division; Committee on Law and Justice; Board on Children, Youth, and Families; Board on Global Health; Forum on Global Violence Prevention. *The Neurocognitive and Psychosocial Impacts of Violence and Trauma: Proceedings of a Workshop—In Brief*. Washington, DC: National Academies Press; 2018.
 - 68 Association of American Medical Colleges. What if we treated every patient as though they had lived through a trauma? <https://www.aamc.org/news-insights/what-if-we-treated-every-patient-though-they-had-lived-through-trauma>. Accessed February 11, 2023.
 - 69 Trent M, Dooley DG, Dougé J. Section on Adolescent Health; Council on Community Pediatrics; Committee on Adolescence. The impact of racism on child and adolescent health. *Pediatrics*. 2019;144:e20191765.
 - 70 American Medical Association. Adverse childhood experiences and trauma-informed care. <https://policysearch.ama-assn.org/policyfinder/detail/Adverse%20Childhood%20Experiences%20and%20Trauma-Informed%20Care%20A0%20H-515.952?uri=%2FAMADoc%2FHOD.xml-H-515.952.xml>. Accessed February 11, 2023.
 - 71 Forkey H, Szilagyi M, Kelly ET, Duffee J. Council on Foster Care, Adoption, and Kinship Care, Council on Community Pediatrics, Council on Child Abuse and Neglect, Committee on Psychosocial Aspects of Child and Family Health. Trauma-informed care. *Pediatrics*. 2021;148:e2021052580.
 - 72 Caring for Patients Who Have Experienced Trauma: ACOG Committee Opinion Summary, Number 825. *Obstet Gynecol*. 2021;137:757–758.
 - 73 American Academy of Family Physicians. Trauma-informed care. <https://www.aafp.org/about/policies/all/trauma-informed-care.html>. Accessed February 11, 2023.
 - 74 Sherin KM, Stillerman AJ, Chandrasekar L, Went NS, Niebuhr DW. Recommendations for population-based applications of the Adverse Childhood Experiences Study: Position Statement by the American College of Preventive Medicine. *AJPM Focus*. 2022;1:100039.