ISSN 0008-3194 (p)/ISSN 1715-6181 (e)/2023/19–37/$2.00/©JCCA 2023

A narrative review of social determinants of health education in health professional programs and potential pathways for integration into Doctor of Chiropractic programs

Jevinne A. Khan, DC[1]
Patrick J. Battaglia, DC[1]
Jordan A. Gliedt, DC[2]

Objectives: *To conduct a narrative review of the literature pertaining to strategies employed by health professional programs to teach social determinants of health (SDOH) and use the results to describe pathways for integrating SDOH education into Doctor of Chiropractic programs (DCPs).*

Methods: *A narrative review of peer-reviewed literature describing SDOH education in health professional programs within the United States was performed. The results were used to inform potential pathways of integrating SDOH education into all aspects of DCPs.*

Results: *Twenty-eight papers demonstrated health professional programs' incorporation of SDOH*

Un examen narratif des déterminants sociaux de la santé dans les programmes de formation des professionnels de la santé et des possibilités d'intégration dans les programmes de doctorat en chiropratique

Objectifs : *Réaliser une analyse narrative de la littérature relative aux stratégies employées par les programmes de professionnels de la santé pour enseigner les déterminants sociaux de la santé (DSS) et utiliser les résultats pour décrire les voies d'intégration de l'enseignement des DSS dans les programmes de doctorat en chiropratique (PDC).*

Méthodes : *Une analyse narrative de la documentation évaluée par les pairs décrivant l'enseignement des déterminants sociaux de la santé dans les programmes de formation des professionnels de la santé aux États-Unis a été réalisée. Les résultats ont été utilisés pour éclairer les voies potentielles d'intégration de l'enseignement des DSS dans tous les aspects des PDC.*

Résultats : *Vingt-huit articles ont fait état de l'intégration, par les programmes de professionnels*

[1] Logan University, Chesterfield, MO, USA
[2] Medical College of Wisconsin, Department of Neurosurgery, Milwaukee, WI, USA

Corresponding author: Jevinne A. Khan, Logan University, 1851 Schoettler Rd. Chesterfield, MO 63017, USA
Tel: 636-227-2100
E-mail: jevinne.khan@logan.edu

The authors have no disclaimers, competing interests, or sources of support or funding to report in the preparation of this manuscript.

education and assessment into didactic and experiential learning opportunities. Educational interventions resulted in positive changes in knowledge and attitudes toward SDOH.

Conclusion: *This review demonstrates existing methods for integrating SDOH in health professional programs. Methods may be adopted and assimilated into an existing DCP. Further research is needed to understand barriers and facilitators to the implementation of SDOH education into DCPs.*

(JCCA. 2023;67(1):19-37)

KEY WORDS: chiropractic, curriculum, education, health professional education, social determinants of health

de la santé, de l'enseignement et de l'évaluation des DSS dans les possibilités d'apprentissage didactique et expérientiel. Les interventions éducatives ont entraîné des changements positifs dans les connaissances et les attitudes à l'égard des DSS.

Conclusion : *Cette étude présente les méthodes existantes d'intégration des DSS dans les programmes de formation des professionnels de la santé. Ces méthodes peuvent être adoptées et assimilées dans un PDC existant. D'autres recherches sont nécessaires pour comprendre les obstacles et les facilitateurs de la mise en œuvre de l'enseignement des DSS dans les PDC.*

(JCCA. 2023;67(1):19-37)

MOTS CLÉS : chiropratique, curriculum, éducation, éducation des professionnels de la santé, déterminants sociaux de la santé

Introduction

Social determinants of health (SDOH) are "the conditions in which individuals are born, live, learn, work, and age, and the wider set of forces and systems shaping the conditions of daily life."[1] SDOH include factors such as employment status, level of income, level of education, food and housing security, and access to health care throughout the lifespan.[1] SDOH account for between 30-55% of health outcomes[1], therefore it is critical for health professionals to identify and address these factors in patient encounters. As such, there have been calls to action for health professionals, including a recent educational framework proposed for health professionals to address SDOH that was developed by the National Academy of Sciences, Engineering, and Medicine (NASEM), and other collaborating organizations.[2]

The call to elicit changes within health professional education to recognize and address SDOH is relevant across all health professions, including chiropractic. A 2020 study of United States Doctor of Chiropractic degree program (DCP) curricula revealed that language inclusive of psychosocial factors related to health and health care were inadequately represented.[3] Thus, consistent with the Committee on Educating Health Professionals to Address the Social Determinants of Health,[2] to best prepare future chiropractors, expansion of SDOH training into didactic and experiential learning within DCPs is needed.

To better expose this idea, we conducted a narrative review of the literature pertaining to current strategies employed by health professional programs to integrate SDOH into their programs. We then used the results from this narrative review to describe potential pathways for integrating SDOH education into existing DCPs.

Methods

A narrative review of peer-reviewed literature describing SDOH education in health professional programs was conducted. We selected a narrative review methodology because it is the most inclusive review format and thus would permit the most latitude in studying this topic. The literature search was modeled after "A Framework for Educating Health Professionals to Address the Social Determinants of Health",[2] which identified current trends, gaps, and recommendations for exposing students to SDOH in health professional programs.

PubMed and MedEd PORTAL databases were used in the literature search (Table 1). Articles returned in the search were reviewed by one author (JK). Articles

were included if they (1) described SDOH educational interventions (pedagogies, curricular design, assessment methods) in health professional programs, with no limits on date of publication; (2) were based on programs in the United States; (3) were written in English; and (4) were original work. Narrative reviews, scoping reviews, and systematic reviews were excluded. Returned articles were also reviewed for additional relevant referenced articles that met the inclusion criteria and were not returned in the initial literature search.

Table 1.
Search terms used in the narrative review.

("Health Occupations/education"[Mesh]) AND "Social Determinants of Health"[Mesh]; Undergraduate"[Mesh] OR "Education, Medical, Graduate"[Mesh] OR "Education, Medical, Continuing"[Mesh]) AND "Social Determinants of Health"[Mesh]; (("Chiropractic"[Mesh]) AND "Public Health"[Mesh]); (("Health Occupations/ education"[Mesh]) OR "Education, Medical"[Mesh]) AND "Cultural Competency/education"[Mesh]; ("education" [Subheading] AND "Teaching"[Mesh]) AND "Social Determinants of Health"[Mesh]; "Social determinants of health"[All Fields] AND "Experiential learning"; "Medical Education" AND "Trauma-informed Care" OR "Adverse Childhood Experiences"; "Service Learning" AND "Social Determinants of Health"

Data extracted from the articles were chosen by consensus among the three authors (JG, JK, PB). Specific data extracted from the articles included institution name, health professional program discipline (i.e., medicine, chiropractic, etc.), educational methods employed, educational level, educational themes, assessment methods, learner outcomes, and reported institutional facilitators and barriers for SDOH integration. One reviewer (JK) manually performed the data extraction. Articles were reviewed, and data obtained were recorded (Table 2).

We used the information learned in our narrative review, along with the recommended framework put forth by the Committee on Educating Health Professionals to Address the Social Determinants of Health,[2] to inform potential SDOH infusion into all aspects of the student experience. The following elements of the DCP were chosen by consensus amongst the authors to represent the total educational experience and provide maximum SDOH exposure throughout the chiropractic student journey: admissions, financial aid, student orientation, curriculum, clinical opportunities, scholarly activities, extracurricular activities, postgraduation education, student assessments, student affairs, and leadership. These elements were chosen based on the authors' knowledge of the DCP and broadly reflect recommendations highlighted in the document "A Framework for Educating Health Professionals to Address the Social Determinants of Health".[2]

Results

A total of 28 papers were included in this narrative review. Some articles described SDOH curricular interventions, whereas others only described assessment of various SDOH elements in health professional programs. Healthcare disciplines included chiropractic, medicine, nursing, osteopathy, pharmacy, and pre-med/pre-health.

Programs demonstrated incorporation of SDOH education into lectures, clinical training, and experiential learning opportunities in undergraduate[4,5], graduate[6-20], and residency programs (Table 2)[21-25]. Educational methodologies employed included interprofessional education[9,15] and service learning[6,10,19]. Educational topics included SDOH[7,22,26], cultural competency[4,15], public health8, community health18, and health disparities[6,7,21].

Assessment methods were used to evaluate students' attitudes, knowledge gained, skills, and recognition of SDOH (Table 3). They varied to include pre-existing assessment instruments, and novel quantitative and qualitative assessments. Qualitative methods included reflection exercises[5-7,9,10,12,17-19,22,24,26], group discussions[5,16,27], open-ended questionnaires[8,16], and electronic health record (EHR) documentation of ICD codes representing SDOH[16]. Quantitative assessment methods included multiple-choice questions[8,18], clinical vignettes[18], and surveys[7,12,13,20,21,24-26]. Pre-existing assessment instruments included Attitude Toward Poverty Short Form Scale[11], Medical Students' Attitude Toward the Underserved[14], Implicit Bias Assessment Tool[28], Clinical Cultural Competency Questionnaire[29], the Caring with Compassion Domain I and II assessments[30], Structural Foundations of Health Survey[4], Caffrey Cultural Competence in Healthcare Scale (CCCHS)[15], and Global Worldview Cultural Competence Survey (GWCCS)[31].

Learner outcomes for SDOH education within health professional programs were positive overall. George Washington University required incoming medical stu-

Table 3.
Summary of methods used to assess students' knowledge, skills, attitudes, and clinical integration of social determinants of health training.

Qualitative Assessment Methods	Quantitative Assessment Methods
Reflection exercises	Written Examinations —Multiple-choice questions —Clinical Vignettes
EHR documentation of ICD codes reflecting SDH	Assessment Instruments —Attitude Toward Poverty Short form scale 46 —Medical Students Attitude Toward the Underserved 47 —Implicit Bias Assessment Tool 28 —Clinical Cultural Competency Questionnaire 29 —Caring with Compassion: Domain I & II 30 —Structural Foundations of Health Survey 4 —Caffrey Cultural Competence in Healthcare Scale (CCCHS) 48 —Global (Worldview) Cultural Competence Survey (GWCCS) 49
Case presentations	Surveys
Focus groups	
Open ended questionnaires	

dents to participate in a bus field trip of Washington, DC, guided by community partners.[7] This intervention aimed to expose students to the challenges faced by low-income minority neighborhoods.[7] Students demonstrated an increase in knowledge of local health disparities and comfort in addressing SDOH.[7] Another study described a service learning program at the Herbert Wertheim College of Medicine where medical students were assigned to a household in a medically underserved community.[9] Medical students provided clinical services, alongside learners from other professional schools for three years.[9] Participation in the program resulted in these graduates having the highest ratings in communication skills, cultural sensitivity and teamwork when surveyed by their residency directors.[9]

At Life Chiropractic College West, one study investigated chiropractic students' knowledge and confidence in serving diverse populations after completion of a public health course within the curriculum.[19] Qualitative analysis demonstrated competency in public health concepts such as organizational systems, levels of prevention, and the social-ecological model.[19] Another study assessed chiropractic students' pre- and post-training knowledge and confidence to serve diverse populations following six hours of cultural competency training. The results demonstrated an increased knowledge but no change in confidence.[20]

Cambridge Health Alliance internal medicine residency at Harvard Medical School implemented a year-long social medicine and research-based health advocacy curriculum.[25] Residents were required to participate in patient care within community health centers.[25] They attended curricular instruction focused on health equity, SDOH, health policy, and health services research methods.[25] They were also required to partake in a research-based health advocacy project centered on social systemic barriers to health equity.[25] Between 2012 and 2015, 32 residents participated in the course. The most

notable outcomes of the course were the scholarly projects.[25] Over the four years, all scholarly projects were accepted for presentation at regional and national internal medicine conferences.[25]

Morehouse School of Medicine implemented a two-semester community health course (CHC) into the first-year curriculum.[18] In addition to didactic instruction on community health topics, students were required to participate in a service learning program. Students along with faculty facilitators were assigned to community sites serving low-income and underserved populations.[18] There they performed health needs assessments and interventions in collaboration with community liaisons.[18] Over the course of the first 11 years (1999-2010) of the CHC, 500 students conducted 56 community interventions within the metropolitan Atlanta, Georgia area.[18] The two leading health problems students identified were violence and substance abuse.[18] Examples of interventions implemented included dental, physical fitness, parent education workshops, tutoring sessions, and sexual health education.[18]

At Columbia Vagelos College of Physicians and Surgeons, a novel online media-based public health curriculum was developed for students rotating through community hospitals.[8] The 5-week course included topics such as health systems, SDOH, race and health, injury and violence, and substance misuse and harm reduction.[8] Of the 59 students that completed the course between April and December 2017, thirty-two (54%) significantly improved their scores on a knowledge-based assessment.[8] Students were then asked which public health topic should be taught in medical school. The most frequently suggested topics post-course completion included SDOH, health systems, race, and substance misuse.[8] When asked how public health will impact their medical career post-course completion, students acknowledged a greater impact on clinical practice, clinical outcomes, and choice of residency program or employment site.[8]

Penn State College of Medicine implemented a health systems navigation curriculum to facilitate the alignment of medical education with health systems needs.[17] The course included didactic instruction on insurance, cost, care coordination, population and public health, SDOH, high-value care, and teamwork.[17] Additionally, the course required students to participate as learners in a patient navigator role.[17] Learner outcomes were based on a thematic analysis of students' written experience. The health systems course provided students with an enhanced understanding and appreciation for barriers to health and SDOH, patients' perception of health care, health care systems and delivery, patient communication, interprofessional collaboration, and clinical medicine.[17]

A.T. Still University School of Osteopathic Medicine implemented a novel approach to demonstrate the value of SDOH to medical students.[16] They assessed students' voluntary documentation of proprietary and ICD-10 codes reflecting SDOH during clinical encounters.[16] Students were also surveyed on their familiarity with concepts of SDOH twice throughout the study.[16] At the end of a two-year period, students showed a modest increase in positive perceptions about the role of SDOH in patient health.[16]

The University of Arkansas for Medical Sciences Northwest developed an interprofessional education program consisting of teams of medical, nursing, and pharmacy students participating in clinical care at a student-led clinic.[15] Outcomes demonstrated improved scores on two of the three subscales of the Caffrey Cultural Competence in Healthcare Scale.[15] Qualitative assessments demonstrated positive changes in students' knowledge, attitudes, and behavior toward interprofessional collaboration and working with underserved populations.[15]

Fourth-year students from Rutgers New Jersey Medical School/University Hospital participating in an emergency medicine clerkship underwent a SDOH curriculum.[26] Students were required to interview patients and discuss social influences affecting their health.[26] They were then required to complete written reflections, discuss individual cases in small groups, and select one patient case to review the literature pertaining to strategies to fit the patient's needs.[26] Students reported being able to recognize barriers to health faced by patients from diverse socio-economic backgrounds and recognize the importance of addressing SDOH as part of patient care.[26]

At the University of Alabama at Birmingham, educators developed a health disparities curriculum to prepare medical residents to care for vulnerable patients.[21] Preliminary data showed that students reported increased preparedness and skill in caring for vulnerable patients.[21]

First-year medical students at Tulane University School of Medicine participated in a patient-centered curriculum, where they were required to attend seminar series on SDOH and later matched with a patient to complete home

visits.[14] Outcomes demonstrated these students developed more positive attitudes toward the underserved compared to peers completing traditional clinic-based preceptorships.[14]

At the Perelman School of Medicine, fourth-year medical students participated in an elective rotation where they served as apprentices to community health workers.[10] This educational intervention enhanced students' cultural humility and confidence in addressing social determinants of health.[10]

Second-year internal medicine residents at Emory University School of Medicine completed a month-long experiential learning module focused on SDOH.[22] Residents' reflections suggested they gained an enhanced appreciation for SDOH and patent advocacy.[22]

Baylor College of Medicine required first-year medical students to participate in the Social Determinants of Health Orientation Program during their first week of school orientation.[13] The program served as an introductory course on the SDOH. Students demonstrated an increase in knowledge and confidence in discussing SDOH terms and discussing SDOH topics with patients.[13]

Second-year medical students at the George Washington University School of Medicine participated in a four-hour trauma-informed care (TIC) symposium.[12] Students reported an increase in their knowledge between adverse childhood experiences and health outcomes, an increased understanding of TIC, and a better understanding of how to incorporate TIC practices during patient encounters.[12]

Nursing students at the University of Arkansas for Medical Sciences participated in a service learning project to expose them to SDOH and health disparities.[6] Students were required to participate in long bus rides similar to those taken by children in communities affected by school consolidation.[6] Informal evaluation of post-project reflections demonstrated that the service learning project broadened the nursing students' perspectives on SDOH.[6]

Drake University College of Pharmacy investigated the impact of the Missouri Association for Community Action Poverty Simulation on second-year pharmacy students' attitudes toward poverty.[11] Upon completion of the simulation, students demonstrated a significant improvement in the stigma and structural domains on the Attitude toward Poverty (ATP) Short Form scale.[11]

Vanderbilt University offers a pre-health major titled Medicine, Health, and Society (MHS).[4] The major introduces topics such as health disparities and politics of health to undergraduate students. MHS students demonstrated a higher understanding of structural and cultural competency in health disparities and more frequently identified relationships between structural factors and health outcomes, when compared to those graduating from traditional pre-health or pre-med majors.[4]

Programs documenting SDOH education did not specifically detail broader institutional measures supporting implementation and sustainability. Institutions describing their SDOH educational intervention and assessment also did not discuss barriers encountered in the development and implementation of their programs.

Discussion

This narrative review describes implementing SDOH education in a variety of health professional programs, including methods of assessment and learner outcomes. Programs that implemented SDOH education did not describe mechanisms for sustainability or barriers encountered, but other literature does provide recommendations for these issues (Table 4).[2,32] Consistent with prior literature,[3] findings from this review suggest a lack of published peer-reviewed literature describing integration of SDOH education in DCP curricula, particularly as it compares to medical curricula. For discussion, we organized the findings of this review into the various domains that were established *a priori* (admissions, financial aid, student orientation, curriculum, clinical opportunities, scholarly activities, extracurricular activities, postgraduation education, student assessments, student affairs, and leadership), and present them as a roadmap to SDOH integration throughout the chiropractic student's journey at DCPs (Figure 1). Our discussion expands on the concept of integrating SDOH into a DCP that follows this roadmap. Table 5 and Table 6 expand on the examples described in our discussion, that are broadly based on strategies used in studies included in this review.

Table 4.
Recommendations for sustainability and potential barriers to teaching social determinants of health.

Sustainability recommendations	**Potential barriers**
Faculty development[2]	Resistance to curricular change[32]
Increase workforce diversity[2]	Low prioritization of SDOH[32]
Expand community partnerships[2]	Lack of resources[32]
Provide interprofessional workplace training[2]	Lack of clinical opportunities for experiential learning[32]
	Lack of expertise in SDOH among faculty[32]

Figure 1.
Conceptual roadmap depicting areas for social determinants of health integration and the underlying foundations of assessment and institutional support.

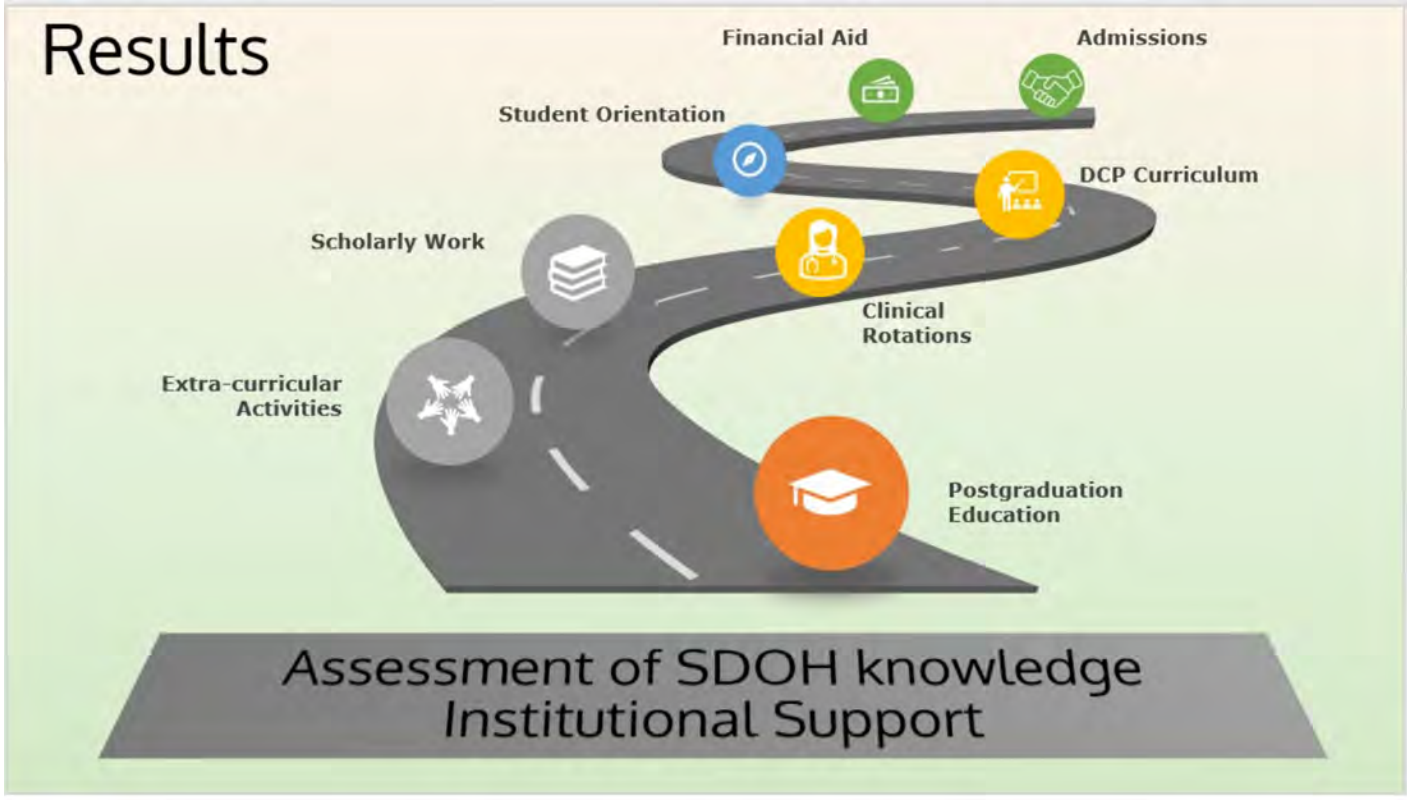

Table 5.
Methods to integrate social determinants of health training into didactic coursework.

Basic science
Explain the role of social determinants in altering physiological processes • Embed discussions of chronic environmental stress exposure (low-income level, low education attainment, perceived discrimination) and its effects on neuroendocrine processes that may predispose individuals to health conditions.[50] • Explicitly demonstrate how constructs of allostatic load[40] and epigenetic inheritance may mediate the association between unfavorable social circumstances and poor health outcomes.[51] • Include online course modules that provide relevant literature on the influence of social structures in normal biological processes along with mandatory discussion and reflection posts in courses such as biochemistry, neurology, pathology, and physiology.
Clinical science
Cognitive biases and implicit biases • Incorporate questions that allow for the identification of cognitive biases and diagnostic errors within clinical case assignments given in clinical reasoning and clinical methods courses.[52] • Introduce and discuss implicit bias, the role it plays in clinical decision making, and how it may negatively impact various demographic groups.[53,54] • Administer the implicit association test (IAT) as an exercise to facilitate implicit bias awareness, discussion, and reflection through the lens of a healthcare provider.[28]
Race-based medicine and race correction in health care statistics • Avoid defining race as a biological or genetic risk factor for health conditions in lectures and exam questions.[55-57] • When discussing healthcare statistics among demographic groups, contextualize race as a social construct that has no biological or genetic basis.[57,58] • Avoid teaching race correction in clinical algorithms without context, e.g., different eGFR for Black patients versus white patients or the ineffectiveness of ACE inhibitors in black patients.[58]
Social science
Trauma-informed care and adverse childhood experiences • Develop and include modules that effectively teach students to identify common ACEs, describe the lasting impact ACEs have on the physical and mental health of individuals throughout their lifespan, and identify risk and protective factors for abuse and neglect in children.[59] Modules may include: o Lectures o mall group discussions o Cases-based learning o Assessments in the form of MCQ and written refection • Training in TIC can coincide with ACEs training. • Training can focus on the definition of trauma and its connection with adversity and health, the components of TIC, how to recognize and address trauma through the lens of a healthcare provider, and strategies to practice TIC within clinical encounters.[12] • Student training may be in the form of didactic lectures, reiterated in other courses with simulated clinical encounters, and implemented as a stand-alone training seminar. • Offer Mental Health First Aid training to students entering student clinic during their clinical training.
Mental health and substance abuse • Training can focus on exposing the bi-directional relationship between mental health and substance abuse with health conditions such as chronic pain while highlighting the role of SDOH. • Include didactic lectures and case-based exercises to train students to identify and address mental health disorders and substance abuse disorders.[60] • Training may emphasize tools such as motivational interviewing and SBIRT[61] to facilitate evidence-informed practices in clinical care.

Technique lectures
Biopsychosocial framework and patient-centered care • Contextualize how the role of social and cultural norms, social support, financial resources, and mental health play in patients' perception of treatment therapies. • Provide training on practicing patient-centered TIC in a clinical setting when administering various manual therapies.

Note: eGFR= estimated glomerular filtration rate; ACE= angiotensin-converting enzyme; ACEs= adverse childhood experiences; TIC= trauma-informed care; SBIRT= Screening, Brief Intervention and Referral to Treatment; WIC= Women, Infants and Children

Table 6.
Integrating social determinants of health into experiential learning

Service-learning
Integrate required service-learning modules into existing courses • Neurology courses can include service-learning opportunities at neuro rehabilitation facilities. • Physical Rehab courses can partner with local community health centers to host exercise classes for their patients under chiropractic care with chronic back pain. • Clinical methods courses can require rotations through organizations that provide services for the unhoused and shadow community health workers. • Clinical Nutrition courses can offer rotations with nutritionists at community health centers. • OBGYN courses can offer service-learning opportunities with women's health services at various community health centers. • Pediatrics and pregnancy elective courses can offer rotations through community health centers that provide WIC services and child development services. • Community health courses can require shadowing of community health workers and social workers and rotations through community outreach programs.
Simulated clinical labs
Social determinants of health themes in clinical encounters • Patient histories can include dynamic psychosocial factors such as being unhoused, ACEs, suicide attempts, affective disorders, alcohol abuse, opioid misuse. • Challenge students to identify and triage diagnoses e.g., a chronic low back pain case coupled with malignant hypertension, suicidal ideation, or intimate partner violence to integrate the knowledge of SDOH as well as simulate identifying and managing complex cases. • Post-encounter discussions can focus on how students elicit information and its relevance to the case. • Ensure faculty designing cases and those leading post encounters are knowledgeable and competent in teaching these concepts.
Student health-center
Apply SDOH knowledge into clinical care • Bedside learning may be used to teach clinical examinations through a trauma-informed lens.[62] • Encourage students to adopt a biopsychosocial approach to manual therapies and therapeutic exercises.[63,64] • Require weekly clinical debriefing sessions with students and their supervising clinician.[65] • Sessions can center on select patient cases and include a focus on social determinants of health elements that have been introduced in previous courses. • Debriefing should require students to actively engage in discussions and meaningful reflection.
Expert guest lecturers • Expert guests can be invited to lecture on relevant clinical topics such as: o Information literacy/navigating and interpreting healthcare literature o Evidence-informed practices for chronic pain management in multimorbid patients o Healthcare systems including Medicare and Medicaid o Public health o Behavioral health and social work

External clinical rotations
Interdisciplinary care • Require rotations in interdisciplinary care at local Community Health Centers, Veterans Affairs (VA) Hospitals, and other diverse institutional affiliated sites. • Rotations can involve other disciplines such as primary care, behavioral health, MAT clinics, physical therapy, and occupational therapy.

Note: ACEs= adverse childhood experiences

1. Admissions

Addressing SDOH often entails caring for a diverse patient population and therefore necessitates a diverse health professional workforce.[33,34] This need can potentially be addressed through the admissions department as they are often the first interface between prospective students and the DCP. The admissions department can play an important role in strengthening recruitment efforts among diverse individuals.[35-37]

For example, the institutions with DCPs can establish partnerships with local organizations and institutions such as Historically Black Colleges and Universities[35] and community colleges[36]. The DCPs could facilitate workshops and conferences to promote the chiropractic profession and create opportunities for College of Chiropractic faculty liaisons to provide mentorship to prospective DCP students at these external institutions. In addition, summer enrichment programs could be created to enhance healthcare-related undergraduates' understanding of the preparation needed for application and admission into the DCP.

Other undertakings could include expanding on the DCPs commitment to diversity and inclusion. For example, an enhanced focus on LGBTQ+ communities through the integration of gender-inclusive language on application forms and information packets could be established. In addition, highlighting resources and safe spaces available could be prioritized and highlighted.

Lastly, to support these recruitment efforts, it is important to consider further developing admissions coordinators in the areas of diversity and inclusion by providing implicit bias training, and training on barriers to graduate education attainment in minority groups.[38]

2. Financial Aid

The office of financial aid can support recruitment and retainment efforts by implementing programs to assist in removing financial barriers encountered by qualifying prospective students of low socioeconomic status (SES).[35] This consideration could be valuable as financial assistance is one of many barriers to attaining higher education among socially disenfranchised groups.[35] Efforts to achieve this include offering scholarships and other financial assistance programs for eligible prospective students and seeking donations and grants to fund and sustain financial assistance measures.[35]

3. Student orientation

Orientation is the bridge from admissions to the DCP. Orientation can calibrate incoming students to the health professions while emphasizing the social importance and obligations of a Doctor of Chiropractic. It also can demonstrate the DCPs commitment to providing care in underserved communities and addressing musculoskeletal pain through public health avenues. Lastly, opportunities for students to engage in rotations in multidisciplinary settings, volunteer in underserved communities, and work with vulnerable populations may be highlighted as well.

4. Doctor of Chiropractic basic, clinical, and social sciences curriculum

Basic, clinical, and social science courses are amenable to laying the foundational concepts of SDOH early on in students' training. Basic and clinical sciences (e.g., physiology, neurology, pathology, and physical diagnoses) could be modified to provide the appropriate social and historical contexts mediating health outcomes.[39] Course content can demonstrate how social and structural determinants of health can disproportionately affect various demographic groups and become embodied as physiological and behavioral traits.[40] Information disseminated in these courses may aid in deconstructing the misrepresentation of race and ethnicity as genetic constructs responsible for ill health.[41] Lectures can instead serve to articulate

debiased health-related statistics that avoid pathologizing race and gender in addition to highlighting the shared social circumstances and experiences that may shape a population's wellbeing.

Social science courses (e.g., clinical psychology and community health) can include topics such as trauma-informed care, adverse childhood experiences (ACEs), mental health illness, and substance abuse disorders. These topics could aim to demonstrate how psychosocial factors may contribute to poor health outcomes. Social science courses can also highlight the social drivers that mediate substance use and affective disorders while underscoring their ability to transcend SES, race, ethnicity, and gender orientation. These courses can potentially assist students to shift away from the paradigm of health being the sole result of personal lifestyle choices, to one that encompasses the influence of the greater social and structural forces. These concepts can be taught didactically and could potentially be reinforced throughout the DCP via transformative learning.

Integrating topics such as mood disorders, ACEs, TIC, maladaptive beliefs, fear-avoidance, pain related self-efficacy, pain catastrophizing, health literacy, educational attainment, community and financial resources, and social support into manual therapy courses (e.g., diversified technique, physical rehabilitation, advanced biomechanics) can demonstrate how SDOH has the potential to influence clinical decision-making and treatment outcomes. While these topics may not be the primary learning aim of these courses, it is important they be contextualized as integral to the implementation of manual, rehabilitative, mind-body therapies, and external referrals.

Simulated clinical encounters are also possible targets to include SDOH themes. These themes could include substance use, intimate partner violence, mental health challenges, suicidal ideation, and suicide attempts. Post-encounter discussions could be led by course faculty or guest lecturers proficient in addressing these topics. Discussions may be used to facilitate building communication and interpersonal skills needed to identify and address sensitive topics in a clinical encounter.

5. Clinical rotations and experiential learning

Service-learning modules could be implemented into the syllabus of various didactic- and clinical-based courses in DCP curricula. These modules can include mandatory reflection exercises to understand one's positionality, solidify learning objectives, assess knowledge gained, and prepare students for more rigorous clinical training.

Many DCPs provide student health centers in which students gain introductory clinical training and application of previously acquired didactic knowledge. Students' initial clinical experience within the student health center could serve to provide a structured curriculum that reiterates previously taught SDOH concepts through a clinical lens. These topics can include information literacy, TIC, public health, insurance coverage, and healthcare system navigation. Student health center clinicians need not only be knowledgeable about such topics but also embrace and integrate them into patient care and clinical teaching. Expert guest lecturers could be invited, when appropriate, to supplement this learning.

External clinical rotation sites could be expanded to increase a DCPs capacity for student rotations in community health centers, Veteran's Affairs medical centers, and other teaching hospital systems. These site rotations could potentially include clinic rounds with other health professions. Further, alumni trained in integrated health care, and those practicing in integrative and hospital settings could be recruited to serve as clinical instructors for students.

6. Assessment of social determinants of health training

Approaches to assess students' understanding of SDOH concepts can include integration into pre-existing course examinations, clinical assessments, and meta-competencies. Validated instruments and ordinal questionnaires can be adapted and utilized throughout the student journey to assess knowledge and awareness of SDOH-related concepts. These assessments could include both pre- and post-SDOH training interventions. Other questionnaires can be developed to assess knowledge and attitudes on topics such as health literacy, TIC, and ACEs.

Qualitative assessment tools can be used to gauge students' experiences and assess their ability to implement SDOH awareness into clinical practice. These may include reflection exercises and focus groups. Clinical simulations such as Objective Structured Clinical Examinations (OSCEs) and standardized patient exercises, can be used as performance-based assessments in evaluating students' ability to identify, document, and address specif-

ic domains of SDOH within a clinical encounter. Assessments would need to align with program and course learning outcomes, therefore necessitating their revision to include SDOH elements.

7. Scholarly work

Research involving chiropractic, public health, and SDOH is currently limited. Faculty and students can be encouraged to contribute to the literature by expanding on clinical research on SDOH and include diversity and social justice concepts into research strategies and agendas.[37] Including research participation as a graduation pre-requisite could be used as an incentive to increase DCP scholarship. In addition, offering research-based scholarships for students could be used as an incentive for increased DCP scholarship.

Faculty may also be incentivized by DCPs offering opportunities for internal research grants or funding for continuing professional education seminars, courses, etc. To facilitate this goal, information literacy classes could provide cross-curriculum training in research methods and scientific writing. Support from the department of research would likely be essential. Given that most United States DCPs are housed within small, private institutions without an established research infrastructure, dedicating resources for collaboration with external research-intensive universities could be advantageous.

8. Extracurricular activities

Extracurricular campus activities such as student chapter organizations, sororities, fraternities, and special interest clubs serve as opportunities for students to engage in peer interaction and mentorship. They may play a significant role in developing a student's mindset, interests, and trajectory for clinical practice. Student mentors and faculty advisors could be required to meet competencies in SDOH training or related concepts (TIC, ACES, Race/ethnicity bias, LGBTQ+-related bias, and public health) prior to engaging in leadership in these extracurricular activities.

Health care mission trips sponsored by DCPs could also serve as elective experiential learning opportunities. Prospective attendees could obtain prerequisite training in cultural awareness, public health, and the socioeconomic factors unique to the region they are visiting. Specific learning objectives would need to be established before the trip, and outcomes in the form of questionnaires and reflections should be obtained. These trips ultimately function as opportunities for students to engage with medically underserved populations while they provide beneficial care. If implemented, mission trips could be developed in a manner to actively negate any contribution to the exploitation of visited communities,[42] and avoid further reinforcement of negative stereotypes of impoverished individuals. These proposed methods of embedding SDOH education into extracurricular activities could also be implemented in peer tutoring, student ambassador organizations, and class representative boards.

9. Postgraduation education

Postgraduation education plays a key role in a clinician's professional development. Postgraduation education may be in the form of clinical residencies, certificate courses, seminars, or modules. Offerings in SDOH education can provide training for practitioners that have not been previously exposed to these concepts to better address SDOH encountered in practice. Continuing education can also promote lifelong learning for those formally trained in SDOH and allow for greater consolidation of concepts learned.[2] In addition to practicing clinicians, continuing education can greatly benefit faculty and those involved in curriculum development at DCPs. SDOH related continuing education efforts can act to further reinforce the need to well-integrate SDOH education into DCP curricula.

10. Student affairs

Student affairs interfaces with a student throughout their journey. To align with the SDOH theme, student affairs could prioritize initiatives such as policies ensuring TIC[43] and LQBTQ+ affirmative practices on campus. Members of student affairs can be trained in implicit bias and cultural awareness, and the department can implement mandatory training in pre-existing programs/resources to ensure a welcoming and safe environment for students of underrepresented backgrounds. Hosting events that bring awareness of diverse cultures and sensitive topics to the forefront of the entire campus community can be helpful. These efforts could be done in collaboration with the diversity and compliance officer, faculty, and staff to align themes with preclinical and clinical SDOH education and improve their impact on the campus community.

11. Leadership support

Support for the integration of SDOH requires support at all administrative levels.[44] Cultural practices must be observed throughout the institution to reflect diversity and inclusion, cultural competence and tolerance, and commitment to evidence-informed practices. Institutional collaboration, interprofessional collaboration, institutional partnerships, and research would need to be an ongoing priority to further support SDOH education within the DCP, and in the process, practice addressing SDOH at an institutional level.

Senior administration can leverage initiatives such as required cultural competence and TIC training at the faculty, administration, and student levels to ensure necessary practices and an optimal institutional culture. This is important to provide a culturally sensitive environment for a diverse student body to thrive in areas of academics, clinical skills, and leadership roles. Implicit bias training should not only be taught in the context of patient care but also can be included for all members of the campus community.

While discriminatory practices would likely not be tolerated by any institution, implicit biases could influence communication, students' grades, and opportunities. Results of these implicit biases could leave individuals or groups feeling alienated or marginalized. Teaching in an evidence-informed manner has the potential to reduce bias and anecdotes taught in the classroom and clinical settings. This provides room for teaching concepts of SDOH as it is increasingly commonplace in evidence-based care.

For Human Recourses, recruitment and retention of faculty and staff that represent racial and ethnic minorities,[2,45] LGBTQ+, and bi/multi-lingual individuals can be instrumental in this cause. If DCPs are to recruit a more diverse student population to care for a diverse patient population,[37] it is important that DCPs reflect those demographics.

Lastly, leadership can facilitate collaborations that serve this agenda. In addition to DCPs, collaboration with other local health professional programs can facilitate curricular design and increase research opportunities. Furthermore, these partnerships could expand educational resources and usher in an era of a well-integrated DCP. Partnerships can also emphasize contributing to the local community and gaining a comprehensive understanding of the community's health care needs. These partnerships could include community-based health centers and public health agencies.

Future research

Given the paucity of literature on SDOH in chiropractic education, future research is needed to identify educational gaps within the curriculum. Knowledge gaps on SDOH concepts among students and faculty members is needed. Lastly, understanding of barriers and facilitators to the implementation of SDOH education in DCPs is needed.

Limitations

Limitations of this review reflect those inherent to narrative reviews. The methods for article selection may be biased towards those supporting the inclusion of SDOH in health professions' education. Our search criteria did not include articles describing long-term outcomes of SDOH training in health professions beyond graduation and in clinical practice. Our search strategy could have been expanded to include specific professions in the search criteria (e.g., dentistry, nursing, osteopathy, acupuncture, pharmacy, physical therapy, and occupational therapy). This may have allowed us to better observe the breadth of SDOH educational interventions among a diverse group of health professional programs. Lastly, although our narrative review returned only two articles describing integration of SDOH training into a chiropractic program, this may not truly reflect the number of programs that have implemented SDOH into their DCP, as other efforts may not have been published.

Conclusions

SDOH training is becoming more common place in health professional education. Literature suggests it is possible to implement SDOH training into didactic and experiential learning within health professional education. Integration of SDOH into chiropractic education is of critical importance. This study demonstrates existing methods for integrating SDOH in health professional programs. Methods may be adopted and assimilated into an existing DCP's admissions practices, financial aid practices, student orientation, curriculum, clinical training, research initiatives, extracurricular activities, student affairs, and institutional policies and practices. Further research is needed to understand barriers and facilitators to the implementation of SDOH training into United States DCPs.

References

1. WHO. Social determinants of health. World Health Organization. Updated 2022. Accessed August 17, 2022. https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1
2. Committee on Educating Health Professionals to Address the Social Determinants of Health BoGH, Institute of Medicine, National Academies of Sciences, Engineering, and Medicine. A framework for educating health professionals to address the social determinants of health. National Academies Press (US); 2016.
3. Gliedt JA, Battaglia PJ, Holmes BD. The prevalence of psychosocial related terminology in chiropractic program courses, chiropractic accreditation standards, and chiropractic examining board testing content in the united states. Chiropr Man Therap. 2020;28(1): 43. doi:10.1186/s12998-020-00332-7
4. Petty J, Metzl JM, Keeys MR. Developing and evaluating an innovative structural competency curriculum for pre-health students. J Med Humanit. 2017;38(4): 459-471. doi:10.1007/s10912-017-9449-1
5. Breen H, Robinson M. Academic partnerships: Social determinants of health addressed though service learning. Int J Nurs Educ Scholarsh. 2019;16(1). doi:10.1515/ijnes-2019-0062
6. Bryant-Moore K, Bachelder A, Rainey L, Hayman K, Bessette A, Williams C. Use of service learning to increase master's-level nursing students' understanding of social determinants of health and health disparities. J Transcult Nurs. 2018;29(5): 473-479. doi:10.1177/1043659617753043
7. Chang AY, Bass TL, Duwell M, et al. The impact of "see the city you serve" field trip: an educational tool for teaching social determinants of health. J Grad Med Educ. 2017;9(1): 118-122. doi:10.4300/JGME-D-16-00212.1
8. Godfrey S, Nickerson K, Amiel J, Lebwohl B. Development of an online public health curriculum for medical students: the public health commute. BMC Med Educ. 2019;19(1): 298. doi:10.1186/s12909-019-1734-4
9. Greer PJ, Jr., Brown DR, Brewster LG, et al. Socially accountable medical education: an innovative approach at florida international university herbert wertheim college of medicine. Acad Med. 2018;93(1): 60-65. doi:10.1097/ACM.0000000000001811
10. Kangovi S, Carter T, Smith RA, DeLisser HM. A community health worker-led rotation to train medical students in the social determinants of health. J Health Care Poor Underserved. 2018;29(2): 581-590. doi:10.1353/hpu.2018.0042
11. Clarke C, Sedlacek RK, Watson SB. Impact of a simulation exercise on pharmacy student attitude toward poverty. Am J Pharm Educ. 2016;80(2): 21. doi:10.5688/ajpe80221
12. Chokshi B, Walsh K, Dooley D, Falusi O, Deyton L, Beers L. Teaching trauma-informed care: a symposium for medical students. MedEdPORTAL. 2020: 11061.
13. Song AY, Poythress EL, Bocchini CE, Kass JS. Reorienting orientation: introducing the social determinants of health to first-year medical students. MedEdPORTAL. 2018;14:10752. doi:10.15766/mep_2374-8265.10752
14. Drake C, Keeport M, Chapman A, Chakraborti C. Social contexts in medicine: a patient-centered curriculum empowering medical students to provide contextualized care. MedEdPORTAL. 2017: 10541.
15. McElfish PA, Moore R, Buron B, et al. Integrating interprofessional education and cultural competency training to address health disparities. Teach Learn Med. 2018;30(2): 213-222. doi:10.1080/10401334.2017.1365717
16. Lewis JH, Whelihan K, Roy D. Teaching students to identify and document social determinants of health. Adv Med Educ Pract. 2019;10: 653-665. doi:10.2147/AMEP.S206819
17. Gonzalo JD, Wolpaw D, Graaf D, Thompson BM. Educating patient-centered, systems-aware physicians: a qualitative analysis of medical student perceptions of value-added clinical systems learning roles. BMC Med Educ. 2018;18(1): 248. doi:10.1186/s12909-018-1345-5
18. Buckner AV, Ndjakani YD, Banks B, Blumenthal DS. Using service-learning to teach community health: the Morehouse School of Medicine community health course. Acad Med. 2010;85(10): 1645-1651. doi:10.1097/ACM.0b013e3181f08348
19. Ward KL, Odierna DH, Smith M. Evaluating a service-learning assignment in a doctor of chiropractic program public health course. J Chiropr Educ. 2021;35(1): 139-143. doi:10.7899/JCE-19-21
20. Khauv KB, Alcantara J. A retrospective analysis of the cultural competence of chiropractic students in a public health course. J Chiropr Educ. F2012;26(2): 169-74. doi:10.7899/JCE-11-027
21. Noriea AH, Redmond N, Weil RA, Curry WA, Peek ME, Willett LL. Development of a multifaceted health disparities curriculum for medical residents. Fam Med. 2017;49(10): 796-802.
22. Schmidt S, Higgins S, George M, Stone A, Bussey-Jones J, Dillard R. An experiential resident module for understanding social determinants of health at an academic safety-net hospital. MedEdPORTAL. 2017;13: 10647. doi:10.15766/mep_2374-8265.10647
23. McCalmont K, Norris J, Garzon A, et al. Community health workers and family medicine resident education: addressing the social determinants of health. Fam Med. 2016;48(4): 260-264.
24. Gregg J, Solotaroff R, Amann T, Michael Y, Bowen J. Health and disease in context: a community-based social medicine curriculum. Acad Med. 2008;83(1): 14-19.

25. Basu G, Pels RJ, Stark RL, Jain P, Bor DH, McCormick D. Training internal medicine residents in social medicine and research-based health advocacy: a novel, in-depth curriculum. Acad Med. 2017;92(4): 515-520. doi:10.1097/ACM.0000000000001580
26. Moffett SE, Shahidi H, Sule H, Lamba S. Social determinants of health curriculum integrated into a core emergency medicine clerkship. MedEdPORTAL. 2019;15: 10789. doi:10.15766/mep_2374-8265.10789
27. Green AR, Miller E, Krupat E, et al. Designing and implementing a cultural competence osce: Lessons learned from interviews with medical students. Ethn Dis. 2007;17(2): 344-350.
28. Gill A, Thompson B, Teal C, et al. Best intentions: using the implicit associations test to promote reflection about personal bias. MedEdPORTAL. 2010;6: 7792. doi:doi:10.15766/mep_2374-8265.7792
29. Wetzel AP. Critical synthesis package: clinical cultural competency questionnaire (cccq). MedEdPORTAL. 2013;9: 9390. doi:doi:10.15766/mep_2374-8265.9390
30. Chick D, Bigelow A, Seagull FJ, Rye H, Williams B. Caring with compassion, domain 1: U.S. public healthcare systems. MedEdPORTAL. 2014: 9811.
31. Jones S, Pinto-Zipp G. Assessing health professional students' cultural competence using a global perspective. J Allied Health. 2017;46(2): 7.
32. Lewis JH, Lage OG, Grant BK, et al. Addressing the social determinants of health in undergraduate medical education curricula: a survey report. Adv Med Educ Pract. 2020;11: 369-377. doi:10.2147/amep.s243827
33. Wilbur K, Snyder C, Essary AC, Reddy S, Will KK, Mary S. Developing workforce diversity in the health professions: a social justice perspective. Health Prof Educ. 2020;6(2): 222-229. doi:10.1016/j.hpe.2020.01.002
34. Williams SD, Hansen K, Smithey M, et al. Using social determinants of health to link health workforce diversity, care quality and access, and health disparities to achieve health equity in nursing. Public Health Rep. 2014;129(suppl2): 32-36. doi:10.1177/00333549141291s207
35. Toretsky C, Mutha S, Coffman J. Breaking Barriers for Underrepresented Minorities in the Health Professions. Healthforce Center at UCSF; 2018.
36. Johnson C, Killinger LZ, Christensen MG, et al. Multiple views to address diversity issues: an initial dialog to advance the chiropractic profession. J Chiropr Humanit. 2012;19(1): 1-11. doi:10.1016/j.echu.2012.10.003
37. Johnson C, Green B. Diversity in the chiropractic profession: preparing for 2050. J Chiropr Educ. 2012;26(1): 1-13. doi:10.7899/1042-5055-26.1.1
38. Wilson MA, DePass A, Bean AJ. Institutional interventions that remove barriers to recruit and retain diverse biomedical phd students. CBE Life Sci Educ. 2018;17(2):ar27. doi:10.1187/cbe.17-09-0210
39. Martinez IL, Artze-Vega I, Wells AL, Mora JC, Gillis M. Twelve tips for teaching social determinants of health in medicine. Med Teach. 2015;37(7): 647-652. doi:10.3109/0142159X.2014.975191
40. Szanton SL, Gill JM, Allen JK. Allostatic load: a mechanism of socioeconomic health disparities? Biol Res Nurs. 2005;7(1): 7-15. doi:10.1177/1099800405278216
41. Amutah C, Greenidge K, Mante A, et al. Misrepresenting race - the role of medical schools in propagating physician bias. N Engl J Med. 2021;384(9): 872-878. doi:10.1056/NEJMms2025768
42. Jacobs J, Naro G. Who is served best by health professions service learning trips? AMA J Ethics. 2019;21(9): E715-721.
43. McClinton A, Laurencin CT. Just in time: trauma-informed medical education. J Racial Ethn Health Disparities. 2020;7(6): 1046-1052. doi:10.1007/s40615-020-00881-w
44. Vanderbilt AA, Baugh RF, Hogue PA, Brennan JA, Ali, II. Curricular integration of social medicine: a prospective for medical educators. Med Educ Online. 2016;21: 30586. doi:10.3402/meo.v21.30586
45. Johnson CD, Green BN. Diversity in the chiropractic profession: preparing for 2050. J Chiropr Educ. 2012;26(1): 1-13. doi:10.7899/1042-5055-26.1.1
46. Yun SH, Weaver RD. Development and validation of a short form of the attitude toward poverty scale. Adv Soc Work. 2010;11(2): 174-187. doi:10.18060/437
47. Crandall SJ, Volk RJ, Loemker V. Medical students' attitudes toward providing care for the underserved. Are we training socially responsible physicians? JAMA. 1993;269(19): 2519-2523.
48. Caffrey RA, Neander W, Markle D, Stewart B. Improving the cultural competence of nursing students: Results of integrating cultural content in the curriculum and an international immersion experience. J Nurs Educ. 2005;44(5):234-40. doi:10.3928/01484834-20050501-06
49. Jones S, Pinto-Zipp G. Assessing health professional students' cultural competence using a global perspective. J Allied Health. 2017;46(2): 88-93.
50. Seeman T, Epel E, Gruenewald T, Karlamangla A, McEwen BS. Socio-economic differentials in peripheral biology: Cumulative allostatic load. Ann N Y Acad Sci. 2010;1186: 223-239. doi:10.1111/j.1749-6632.2009.05341.x
51. McCrory C, Fiorito G, Ni Cheallaigh C, et al. How does socio-economic position (sep) get biologically embedded? A comparison of allostatic load and the epigenetic clock(s). Psychoneuroendocrinology. 2019;104: 64-73. doi:10.1016/j.psyneuen.2019.02.018
52. Chew KS, van Merrienboer J, Durning S. Teaching cognitive biases in clinical decision making: a case-based discussion. MedEdPORTAL. 2015: 10138.
53. Teal CR, Gill AC, Green AR, Crandall S. Helping medical learners recognise and manage unconscious bias toward

certain patient groups: education to reduce unconscious bias in medical learners. Med Educ. 2012;46(1): 80-88.
54. Khazanchi R, Keeler H, Strong S, et al. Building structural competency through community engagement. Clin Teach. 2021;18(5):535-541. doi:10.1111/tct.13399
55. Reddick B. Fallacies and dangers of practicing race-based medicine. Am Fam Physician. 2021;104(2): 122-123.
56. Lim GHT, Sibanda Z, Erhabor J, Bandyopadhyay S. Students' perceptions on race in medical education and healthcare. Perspect Med Educ. 2021;10(2): 130-134.
57. Martinez IL, Artze-Vega I, Wells AL, Mora JC, Gillis M. Twelve tips for teaching social determinants of health in medicine. Med Teach. 2015;37(7): 647-652.
58. Cerdeña JP, Plaisime MV, Tsai J. From race-based to race-conscious medicine: How anti-racist uprisings call us to act. Lancet. 2020;396(10257): 1125-1128.
59. Onigu-Otite E, Idicula S. Introducing aces (adverse childhood experiences) and resilience to first-year medical students. MedEdPORTAL. 2020: 10964.
60. Smith RC, Laird-Fick H, D'Mello D, et al. Addressing mental health issues in primary care: An initial curriculum for medical residents. Patient Educ Couns. 2014;94(1): 33-42.
61. Azari S, Ratanawongsa N, Hettema J, et al. A skills-based curriculum for teaching motivational interviewing-enhanced screening, brief intervention, and referral to treatment (sbirt) to medical residents. MedEdPORTAL. 2015: 10080.
62. Elisseou S, Puranam S, Nandi M. A novel, trauma-informed physical examination curriculum for first-year medical students. MedEdPORTAL. 2019: 10799.
63. Booth J, Moseley GL, Schiltenwolf M, Cashin A, Davies M, Hübscher M. Exercise for chronic musculoskeletal pain: a biopsychosocial approach. Musculoskeletal Care. 2017;15(4): 413-421.
64. Overmeer T, Boersma K, Denison E, Linton SJ. Does teaching physical therapists to deliver a biopsychosocial treatment program result in better patient outcomes? A randomized controlled trial. Phys Ther. 2011;91(5): 804-819.
65. Farrington R, Collins L, Fisher P, Danquah A, Sergeant J. Clinical debrief: learning and well-being together. Clin Teach. 2019;16(4): 329-334.

Table 2.

List of Institutions and their associated disciplines, educational interventions, social determinants of health topics, assessment methods, and learner outcomes.

Institution	Discipline	Educational methods	Educational level	Educational theme	Assessment methods	Learner outcomes
Life Chiropractic College West[20]	Chiropractic	didactic learning	graduate	cultural competency	survey	Students demonstrated competency in public health concepts such as organizational systems, levels of prevention, and the social-ecological model.
Life Chiropractic College West[19]	Chiropractic	service learning	graduate	public health	reflections	Students demonstrated increased knowledge but no change in confidence in serving diverse populations.
Cambridge Health Alliance, Harvard Medical School[25]	Medicine	didactic lectures, research projects	residency	health equity, social determinants of health, and health policy	survey, scholarly papers	All participants' scholarly projects were accepted to internal medicine conferences.
Morehouse School of Medicine, Atlanta, Georgia[18]	Medicine	service learning	graduate	community health	multiple choice exams, class presentations, reflections	Students successfully implemented community interventions to promote and improve health outcomes.
The George Washington University School of Medicine and Health Sciences[7]	Medicine	interprofessional learning	graduate	health equity, social determinants of health	surveys, reflections	Students gained increased knowledge of local health disparities and increased comfort in addressing SDOH.
Columbia Vagelos College of Physicians and Surgeons[8]	Medicine	didactic learning	graduate	health systems, social determinants of health, race and health, substance abuse and harm reduction, injury and violence	multiple-choice questions, open-ended questions	Students identified SDOH, health systems, race, and substance abuse as important topics that should be taught in medical school.

Institution	Discipline	Educational methods	Educational level	Educational theme	Assessment methods	Learner outcomes
Penn State College of Medicine[17]	Medicine	experiential learning	graduate	health systems science	reflections, semi-structured interviews	Students gained an enhanced understanding and appreciation for SDOH, patients' perception of health care, health care systems and delivery, patient communication, interprofessional collaboration, and clinical medicine.
Florida International University Herbert Wertheim College of Medicine[9]	Medicine	service-learning, interprofessional learning, didactic learning,	graduate	social determinants of health	surveys	Graduates had the highest ratings in communication skills, cultural sensitivity and teamwork when surveyed by their residency directors.
Oregon Health and Science University[24]	Medicine	didactic learning, experiential learning	residency	health policy and health care safety net, addiction medicine	reflections, surveys	Not reported.
A.T. Still University School of Osteopathic Medicine[16]	Osteopathic medicine	EHR documentation	graduate	social determinants of health	Use of SDOH diagnostic codes, surveys	Students showed a modest increase in positive perceptions about the role of SDOH in patient health.
University of New Mexico[23]	Medicine	interprofessional learning	residency	social determinants of health	N/A	N/A
University of Arkansas for Medical Sciences Northwest[15]	Medicine	seminars, experiential learning, service learning, interprofessional learning	graduate	cultural competency	Cultural Competence in Healthcare Scale (CCCHS), focus groups	Students demonstrated positive changes in attitudes toward interprofessional collaboration and working with underserved populations.
Rutgers New Jersey Medical School/University Hospital[26]	Medicine	experiential learning	graduate	social determinants of health	surveys, reflections, presentations	Students increased their ability to recognize health barriers and the importance of addressing SDOH.

Institution	Discipline	Educational methods	Educational level	Educational theme	Assessment methods	Learner outcomes
University of Alabama at Birmingham[21]	Medicine	didactic learning, experiential learning	residency	health disparities	surveys	Students reported increased preparedness and skill in caring for vulnerable patients.
Tulane University School of Medicine[14]	Medicine	didactic learning, experiential learning	graduate	social determinants of health, implicit bias, cultural competence	Medical students' attitudes towards the underserved (MSATU), standardized patient encounters	Students developed more positive attitudes toward the underserved compared to peers completing traditional clinic-based preceptorships.
Perelman School of Medicine[10]	Medicine	didactic learning, group discussions, service learning, interprofessional learning	graduate	social determinants of health	interviews, discussions, reflections, skills assessments	Students demonstrated enhanced cultural humility and increased confidence in addressing SDOH.
Emory University School of Medicine[22]	Medicine	didactic learning, experiential learning	residency	social determinants of health	reflections	Students gained an enhanced appreciation for SDOH and patient advocacy.
Baylor College of Medicine[13]	Medicine	case based learning, group discussions	graduate	social determinants of health	surveys	Students demonstrated an increase in knowledge and confidence in discussing SDOH terms and discussing SDOH topics with patients.
George Washington University School of Medicine and Health Sciences[12]	Medicine	didactic learning, small group discussions	graduate	trauma informed care, adverse childhood experiences	surveys	Students reported an increase in knowledge and understanding of trauma-informed care.
University of Arkansas for Medical Sciences[6]	Nursing	service learning	graduate	social determinants of health	reflections	Students gained broadened perspectives on SDOH.
Drake University College of Pharmacy[11]	Pharmacy	simulation	graduate	poverty	Attitude toward Poverty (ATP) Short Form scale	Students demonstrated improved attitudes toward poverty.
Vanderbilt University[4]	Pre-med, Pre-health	didactic learning	undergraduate	health disparities	Structural Foundations of Health Survey	Students who received training in health disparities demonstrated better understanding of structural and cultural competency in health disparities.