Journal of Interprofessional Care

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ijic20

Structural competency in pre-health and health professional learning: A scoping review

Courtney Caiola, Taylor B. Nelson, Kristin Z. Black, Christie Calogero, Kaitlin Guard, Amanda Haberstroh & Irma Corral

To cite this article: Courtney Caiola, Taylor B. Nelson, Kristin Z. Black, Christie Calogero, Kaitlin Guard, Amanda Haberstroh & Irma Corral (2022): Structural competency in pre-health and health professional learning: A scoping review, Journal of Interprofessional Care, DOI: 10.1080/13561820.2022.2124238

To link to this article: https://doi.org/10.1080/13561820.2022.2124238

JOURNAL OF INTERPROFESSIONAL CARE
https://doi.org/10.1080/13561820.2022.2124238

Taylor & Francis
Taylor & Francis Group

REVIEW ARTICLES

Structural competency in pre-health and health professional learning: A scoping review

Courtney Caiola[a], Taylor B. Nelson[b], Kristin Z. Black[c], Christie Calogero[d], Kaitlin Guard[a], Amanda Haberstroh[e], and Irma Corral[f]

[a]Department of Nursing Science, College of Nursing, East Carolina University, Greenville, NC, USA; [b]School of Nursing, the University of North Carolina, Chapel Hill NC, USA; [c]Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University, Greenville, NC, USA; [d]Bachelor of Science in Nursing Student, College of Nursing, East Carolina University, Greenville, NC, USA; [e]Laupus Library, East Carolina University Greenville, NC, USA; [f]Department of Psychiatry and Behavioral Medicine, Brody School of Medicine, East Carolina University, Greenville, NC, USA

ABSTRACT

Structural competency training provides guidance to healthcare providers on recognizing and addressing structural factors leading to health inequities. To inform the evidence-based progression of structural competency curriculum development, this study was designed to map the current state of the literature on structural competency training with pre-health students, healthcare professional students, and/or healthcare professionals. We performed a scoping review and identified peer-reviewed, primary research articles assessing structural competency training interventions. The category of learners, timing of the structural competency training, types of teaching and learning activities used, instruments used to measure training outcomes, and evaluation criteria were examined. Eleven (n = 11) articles met inclusion criteria, addressing all training levels, and largely focused on medical education. Active learning strategies and researcher-developed instruments to measure training outcomes were most used. Evaluation criteria largely focused on trainees' affective reactions, utility assessments, and direct measure of the trainee learning. We suggest designing interprofessional structural competency education with an emphasis on active learning strategies and standardized training curricula. Evaluation instruments integrated at different points in the health professional learning trajectory are important for evidence-based progression in curriculum development focused on achieving structural competency.

ARTICLE HISTORY
Received 18 April 2022
Revised 7 September 2022
Accepted 7 September 2022

KEYWORDS
Scoping review methodology; interprofessional education; structural competency; healthcare; health professional students

Introduction

Long standing health inequities persist and, in some cases, are worsening despite global advances in medical care and health systems (National Academies of Sciences, Engineering and Medicine, 2017; Odlum et al., 2020). Health inequities are not just disparate health outcomes among certain populations, rather they are avoidable and unjust systemic differences in health outcomes based on the position people and communities occupy in a social hierarchy (Graham, 2004). The outcomes of the world's worst global health crisis in a century, the ongoing COVID-19 pandemic, serve as prime examples of how social and structural determinants contribute to health inequity. The virus indiscriminately infects anyone who is exposed, but social and structural factors such as structural racism (Garcia et al., 2021; Gemelas et al., 2021; Tan et al., 2021), poverty (Bargain & Aminjonov, 2021; Upshaw et al., 2021; World Health Organization, 2020), employment status (Chen et al., 2021; Gemelas et al., 2021), housing policy (Benfer et al., 2021; Nande et al., 2021), and health policy (Asundi et al., 2021; Grogan et al., 2021) are driving the inequitable physical and mental health outcomes experienced by certain populations. For example, research findings produced during the peak of the COVID-19 pandemic in the United States revealed that frontline workers such as those in the food industry, manufacturing, and transportation experienced disproportionate mortality (Chen et al., 2021).

Research findings also demonstrate health inequities in both preventable disease (e.g., obesity, diabetes, cancer) and high-risk health behaviors (e.g., smoking, physical inactivity). The result is a substantial group of people who face significant barriers to care and are vulnerable to negative health outcomes (National Academies of Sciences, Engineering and Medicine, 2017; World Health Organization, n.d.). Clearly, effective and sustainable interventions that aim to reduce health inequities are needed.

Background

Cultural competency frameworks are one of the standards for addressing health inequities in the United States healthcare systems and are a requisite component of the curricula in hospitals and healthcare organizations for accreditation through the Joint Commission on Accreditation of Healthcare Organizations (The Joint Commission, 2014). Cultural competency frameworks emphasize minimizing provider bias and improving patient-provider communication

CONTACT Courtney Caiola caiolac19@ecu.edu College of Nursing, East Carolina University, 4165M Health Sciences Building, 2205 W. 5th St, Greenville, NC 27858, USA

Supplemental data for this article can be accessed online at https://doi.org/10.1080/13561820.2022.2124238

through culturally appropriate tools and training; however, one critical gap is that these approaches fail to recognize how social and structural factors produce health inequities (Metzl & Hansen, 2018). Despite being well-intended, cultural competency curricula have been criticized for essentializing cultures, obscuring within group differences, and perpetuating stereotypes and biases (Salhi et al., 2020), while implicating individual provider behavior and failing to examine the salient structural factors known to contribute to health inequities (Braveman & Gottlieb, 2014; Hansen & Metzl, 2016; Salhi et al., 2020). Systematic examination of the literature also reveals that there is insufficient evidence to draw conclusions supporting cultural competency interventions actually improve patient health outcomes and health equity (Filmer & Herbig, 2018; Horvat et al., 2014; Lie et al., 2011).

There has been a recent shift in healthcare provider education toward structural competency that provides training in both recognizing and addressing structural factors leading to health inequities (Metzl & Hansen, 2014). Structural competency, a term coined by Jonathon Metzl and Helena Hansen, is the trained ability to discern and address the pathologies of social, political, and economic systems generating health inequities; it requires both health professional training and the humility to recognize the structural constraints of patients and clinicians alike (Metzl & Hansen, 2014). In their landmark article, Metzl and Hansen (2014) identified and elaborated on five core competencies leading to structural competence: (a) recognizing the structures that shape clinical interactions, (b) developing an extra-clinical language of structure, (c) rearticulating "cultural" formulations in structural terms, (d) observing and imagining structural interventions, and (e) developing structural humility. Recent findings suggest that structural competency training assists healthcare providers with identifying and analyzing relationships between structural factors and health outcomes (Bromage et al., 2019; Metzl et al., 2018; Neff et al., 2017; Petty et al., 2017). Structural competency training may also help to increase providers' ability to assess for structural barriers to care (Mathis et al., 2019). Although these findings are promising, effective structural competency training will require evidence-based progression in curriculum development, and to our knowledge, no review of the evidence about a structural competency-based approach to healthcare education has been conducted.

To address this key gap and inform the development and integration of structural competency into pre-health and healthcare curricula, this study was designed to map the current state of the literature on structural competency training in pre-health and health professional learning. To inform the development and integration of structural competency into pre-health and healthcare curricula, the following research questions were asked:

(1) What is known about the implementation of structural competency training in the education of pre-health students, healthcare professional students, and healthcare professionals as represented in primary research studies to date?

(2) What are the key priorities and gaps in structural competency training research?

Methods

Given that structural competency is a relatively new concept and emerging area of healthcare professional education research that is lacking best practices for application, our team chose to perform a scoping review of the literature (Arksey & O'Malley, 2005; Peters et al., 2020). This scoping review was guided by the methodology outlined by the Joanna Briggs Institute (JBI) and JBI Collaboration working group that includes nine stages: (a) defining and aligning the objective(s) and question(s), (b) developing and aligning the inclusion criteria with the objective(s) and question(s), (c) describing the planned approach, (d) searching for the evidence, (e) selecting the evidence, (f) extracting the evidence, (g) analyzing the evidence, (h) presenting the results, and (i) summarizing the evidence in relation to the purpose of the review, making conclusions, and noting any implications (Peters et al., 2020). All reporting is in accordance with the Preferred Reporting Items for Systematic Reviews Statement for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018). This research does not involve human subjects, and Institutional Review Board approval was not required.

Study inclusion criteria

Inclusion criteria were developed *a priori* and aligned with the previously stated study purpose and research questions. Inclusion criteria were primary research studies (quantitative, qualitative, and mixed methods) and assessing structural competency training interventions with pre-health students, healthcare professional students, and/or healthcare professionals (inclusive of all health disciplines). Exclusion criteria were process and program evaluation articles, quality improvement papers, conceptual or theoretical papers, commentaries, opinion papers, reviews of other studies, interventions that did not focus on structural competency as described by Metzl and Hansen (2014), or manuscripts not obtainable via inter-library loan.

Describing the planned approach

Our interprofessional team developed a planned approach to the scoping review and publicly registered our protocol with Open Science Framework (OSF) Registries (https://archive.org/details/osf-registrations-n5cpb-v1) prior to data analysis (Caiola et al., 2021). Registering protocols assists with increasing transparency in the review process, ensuring duplication does not occur, and potentially reducing bias as reviewers can compare the completed review with the protocol (Stewart et al., 2012).

Searching for the evidence

A review of the literature was conducted by a medical librarian (A.H.) on September 3, 2021, using the following keywords: structural competency, place health, structural factor, structural determinants of health, structural violence, structural vulnerability, program evaluation, benchmarking, and training related to pre-health students, healthcare professional students,

and/or healthcare professionals. Related subject terms were selected and applied to the search, based on each selected database. The primary search strategy (MEDLINE) was peer-reviewed by the medical librarian in accordance with PRESS recommendations (McGowan et al., 2016). The peer-reviewed search was translated using database-specific field codes and Boolean operators (AND, OR) as appropriate across the following seven databases: MEDLINE (PubMed interface), CINAHL (EBSCO interface), ERIC (ProQuest interface), PsycINFO (EBSCO interface), Sociological abstracts (ProQuest interface), SocINDEX (EBSCO interface), and Scopus. Complete search strategies are available on East Carolina University's institutional repository, The ScholarShip, at the following URI: http://hdl.handle.net/10342/9529. The medical librarian (A.H.) used EndNote 2.0 to collect and deduplicate search results.

Selecting the evidence

A systematic review software management program, Covidence (Veritas Health Innovation Ltd, 2021), was used by all reviewers to assist the evidence selection process. Such programs help ensure the integrity of the review process by blinding reviewers' decisions in the screening process, locking citation import functions once the review has commenced, and moving reviewers through the process in a specified sequence mirroring the review protocol (Kellermeyer et al., 2018).

The search identified 3,900 articles from seven databases. Once duplicates (n = 986) were removed, the remaining articles (n = 2,914) were uploaded into the Covidence systematic review software management program. Two authors (T.N. & K.G.) conducted an initial review of all (n = 2,914) titles and abstracts using the identified inclusion and exclusion criteria. The first author (C.C.) then reviewed all the titles and abstracts where conflicts occurred, and the three authors met to make the final decision by consensus before moving manuscripts onto the full-text review (n = 67). The first author (C.C.) then reviewed all the full-text articles while two other authors (T.N. & K.G.) each independently reviewed half of the articles. The three authors met when this process was complete and resolved any conflicts in the full-text reviews. Of the full-text articles screened, 46 were excluded because they were not primary

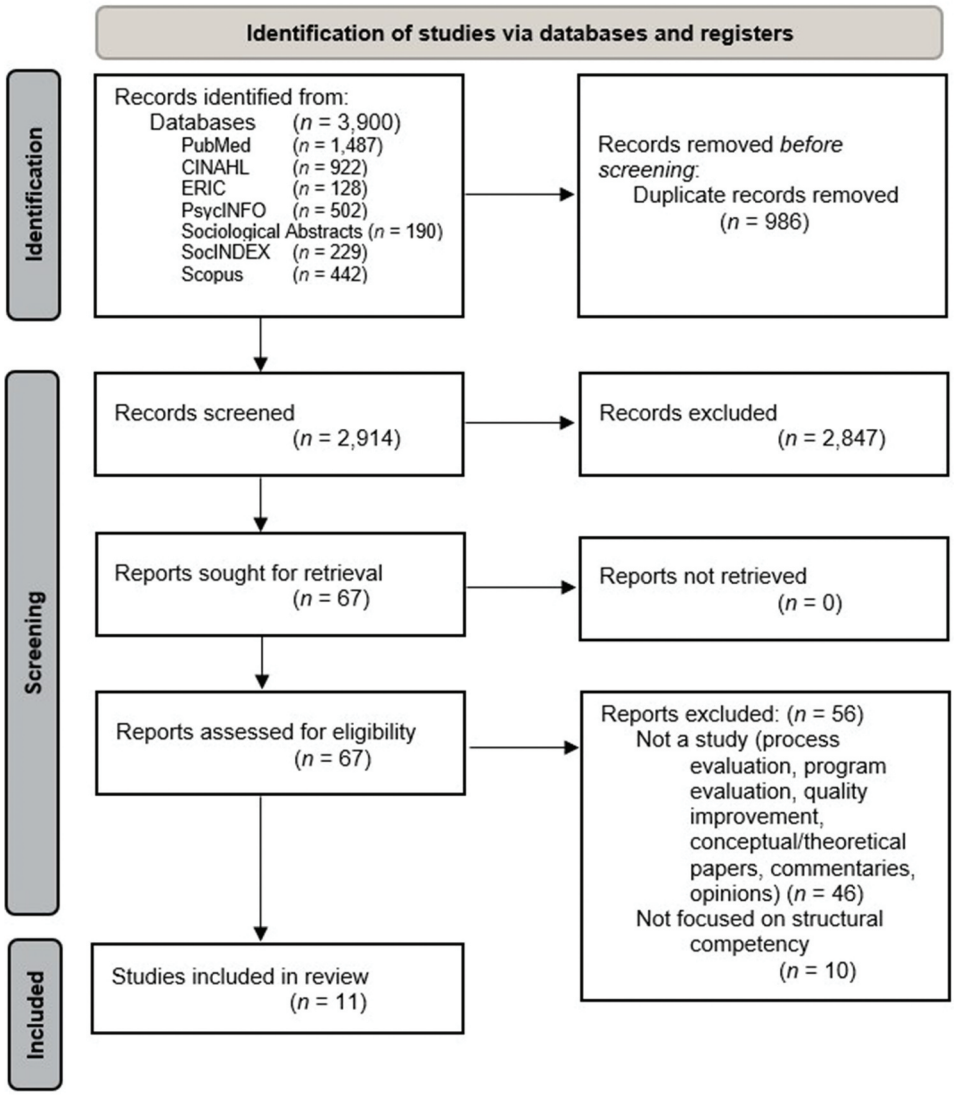

Figure 1. PRISMA Diagram for Search Results (Page et al., 2021)

research studies. An additional ten (n = 10) articles were excluded because they were not focused on structural competency. Eleven (n = 11) studies remained for further analysis (Figure 1).

Extracting the evidence

A draft extraction table and data extraction processes were independently piloted by two authors (C.C. & T.N.) who met to resolve any inconsistencies in extraction. The first author (C. C.) subsequently extracted the data for the remaining articles and the table was verified by the second author (T.N.). Data extracted included the study citation, origin, purpose, sample, measures, methods, intervention description, key findings, teaching strategies, and level of training evaluation using criteria adapted from Kirkpatrick's Model (Kirkpatrick & Kirkpatrick, 2006). Of note, the latter two data extraction categories were added in the data analysis phase, and the table updated accordingly. The extracted data have been summarized into a uniform matrix (Online, Supplementary Materials).

Analysis of the evidence

The analysis plan developed for the published review protocol was to descriptively map the results of the data extraction and organize the findings in the following categories: category of learners in the structural competency training, timing of the structural competency training, types of teaching and learning activities used, instruments used to measure training outcomes, and the levels of proficiency achieved by learners based on the Structural Competency Levels of Proficiency proposed by Andress et al. (2020). The mapping of each of these categories was accomplished except for the assessment of the levels of proficiency as conceptualized by Andress and Purtill, although it is a novel and potentially useful schema for future use. The data analysis was an iterative team process and after becoming familiar with the data, it became apparent that determining the proficiency levels of the learners would require extensive interpretation and was not explicitly stated in the articles. As a result, our team shifted our focus to mapping the educational outcomes according to Kirkpatrick's Model (Kirkpatrick & Kirkpatrick, 2006), a well-known and practical model for evaluating training results (Jain et al., 2021).

Kirkpatrick's Model includes four levels for evaluating educational outcomes: (a) Level 1 – Reaction, (b) Level 2 – Learning, (c) Level 3 – Behavior/Transfer, and (d) Level 4 – Results (Kirkpatrick & Kirkpatrick, 2006). The first author (C. C.) made the initial assessment of the Kirkpatrick levels obtained in each article and it was then verified by the second author (T.N.). The two authors met when this process was complete and resolved any conflicts in their initial assessments by consensus. Table 1 summarizes the 4-level model adapted to structural competency training and provides examples of linking specific indicators and instruments to the corresponding levels, as well as if the criteria are assessed at the level of the individual learner or at a structural/population level.

Results

Eleven (n = 11) studies were included in this review. All the trainings and training evaluations occurred in the United States. All of the studies were descriptive; five had qualitative descriptive designs (Bromage et al., 2019; Khazanchi et al., 2021; Mathis et al., 2019; Neff et al., 2020, 2017), three had cross-sectional mixed methods designs (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017), and three had single-arm pre- and post-intervention designs (Rabinowitz et al., 2017; Ruth et al., 2020; Woolsey & Narruhn, 2020). The online supplement summarizes each of the studies. Following are the categories our team used to descriptively map the results of our analysis.

Category of learners and placement in the learning trajectory

The health profession specialties of the structural competency trainees included medicine, nursing, and pre-health students (Figure 2). The medical professionals included Psychiatry and Family Medicine residents and fellows, as well as graduate medical students (Bromage et al., 2019; Khazanchi et al., 2021; Mathis et al., 2019; Neff et al., 2020, 2017; Rabinowitz et al., 2017). A single study included nurses in their second year of a graduate Doctor of Nursing Practice (DNP) program (Woolsey & Narruhn, 2020), and the remaining studies were focused on training pre-health undergraduate students planning to attend graduate health professional programs (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017; Ruth et al., 2020).

The placement of the structural competency trainings in the health professional trainees learning trajectory ranged from undergraduate or pre-health programs to post graduate continuing education for practicing clinicians (Figure 3). One study (Neff et al., 2017) included both graduate students and post graduate professionals, thus, the twelve (n = 12) placements in the learning trajectory reflected in Figure 3 for the 11 studies. The pre-health students were majoring in a specific major focused on developing structural competency at Vanderbilt University called Medicine, Society and Health, pre-med, or any number of other undergraduate health programs such as nursing and social work (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017; Ruth et al., 2020). The graduate student trainees included medical students and graduate nursing students (Khazanchi et al., 2021; Neff et al., 2020; Rabinowitz et al., 2017; Woolsey & Narruhn, 2020); the post graduate continuing education involved both medical residents and fellows (Bromage et al., 2019; Mathis et al., 2019; Neff et al., 2020, 2017).

Timing of the structural competency training

We found broad variation in the timing or duration of the trainings ranging from 3-hour health professional continuing education sessions to dedicated undergraduate courses for pre-health students. Several of the trainings that focused on the Metzl and Hansen (2014) five core structural competencies were half or full day (3–7.5 hours) trainings delivered in a single offering (Neff et al., 2020, 2017; Rabinowitz et al., 2017; Woolsey & Narruhn, 2020) or over nonconsecutive training days (Bromage

Table 1. Adaptation of Kirkpatrick's model of evaluation of training for structural competency (Kirkpatrick & Kirkpatrick, 2006).

Kirkpatrick Criteria	Learning in Training Program	Sample Indicators	Instrument Timing	Level of Assessment
Level 1 – Reaction	Trainees' affective reactions and utility assessments of training and trainers	Student satisfaction surveys; process evaluations; self-report of learning; reported usefulness surveys	Post training	Individual learner
Level 2 – Learning	Direct measures of trainees' learning based on the 5 core competencies of structural competency	Knowledge test, skill performance/simulation, presentations, writing samples (care plans, SOAP notes); classroom-appropriate assignments	Pre-/post-training	Individual learner
Level 3 – Behavior/Transfer	Evidence of trainees' use of knowledge and skills; job performance indicators	Performance evaluation and/or clinical observation; evidence of workplace or civic engagement (policy/regulation advocacy); health equity and/or structural intervention research	Post-training	Individual learner
Level 4 – Results	Reduction in health disparities/inequities; improved patient outcomes; decreased provider burnout and mental health concerns	Health outcome data; service hours/activities; decreased provider burnout/increased morale; provider retention and satisfaction; patient satisfaction; electronic health record evaluation of structural interventions	Post-training	Population or structural level

et al., 2019; Khazanchi et al., 2021; Mathis et al., 2019). Others opted to use structural competency as a central unifying component of a curriculum delivered over an entire semester (Ruth et al., 2020) or 36 credit hour major for undergraduate students (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017)

Types of teaching and learning activities

The teaching strategies and learning activities varied widely across trainings and are summarized in Table 2. Passive learning was categorized by instruction involving the passive transfer of information with minimal interaction or opportunities for student feedback (e.g., lecture, course readings); active learning was categorized as methods (e.g., peer-based learning, small group discussions) designed to stimulate independent learning while instructors took on more of a facilitator or coaching role (Harris & Bacon, 2019). About three quarters (35/46) of the teaching strategies and learning activities actively engaged learners in the training materials; a smaller number (11/46) of more passive strategies, such as lecture and course readings were also included.

Instruments used to measure training outcomes

Most of the studies (n = 9) used researcher-designed survey instruments to measure the training outcomes (Khazanchi et al., 2021; Mathis et al., 2019; Metzl & Petty, 2017; Metzl et al., 2018; Neff et al., 2020, 2017; Petty et al., 2017; Ruth et al., 2020; Woolsey & Narruhn, 2020), and many of those instruments also included open-ended questions for the participants to provide feedback on how the teaching and activities could be more effective. For example, 3 of the 11 studies used the researcher-developed Structural Foundations of Health (SFH) survey@2016 instrument, which includes both closed and open-ended questions and case-based scenarios to assess the core structural competencies (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017). The investigators for another study adapted the Clinical Cultural Competency Questionnaire to include structural competency questions (Rabinowitz et al., 2017); others (Petty et al., 2017) used adjunct instruments, such as the Attributional Complexity Scale (Fletcher et al., 1986), or qualitative data collection techniques such as focus groups (Bromage et al., 2019; Neff et al., 2017).

Kirkpatrick's level of evaluation of structural competency training

The level of evaluation varied among the 11 studies with most (n = 9) assessing Kirkpatrick Level 1 (Reaction) criteria like self-reported learning, training utility assessments, and satisfaction surveys (Bromage et al., 2019; Khazanchi et al., 2021; Mathis et al., 2019; Metzl & Petty, 2017; Metzl et al., 2018; Neff et al., 2020, 2017; Petty et al., 2017; Woolsey & Narruhn, 2020). Several studies (n = 7) also met Level 2 (Learning) criteria by including direct measures of the trainees' learning such as pre- and posttests, classroom writing assignments, and classroom presentations (Metzl & Petty, 2017; Metzl et al., 2018; Neff et al., 2020; Petty et al., 2017; Rabinowitz et al., 2017; Ruth et al., 2020; Woolsey & Narruhn, 2020). One study (n = 1) with

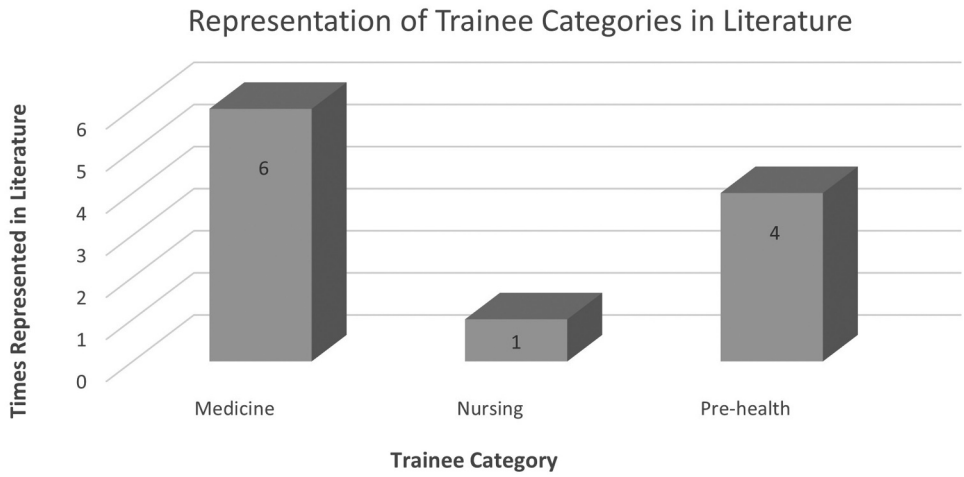

Figure 2. Representation of Trainee Categories in Literature.

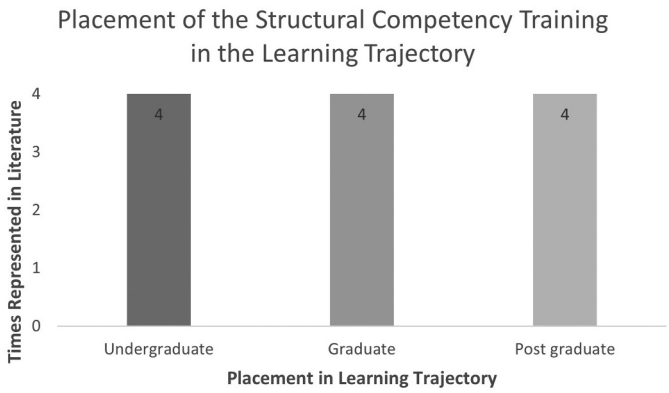

Figure 3. Placement of the Structural Competency Training in the Learning Trajectory

two post-intervention timepoints met Level 3 (Behavior/Transfer) by requesting participants to self-assess the impact of the training on their work performance in the post-intervention time points (Mathis et al., 2019); however, none of the studies achieved Kirkpatrick Level 4 (Results). See, Figure 4 for a summary of the Kirkpatrick Levels of Evaluation.

Table 2. Summary of teaching strategies and learning activities.

Teaching strategy/ Learning activity	Curricula explicitly stating strategy/activity Number (percentage). *N*= 46	Passive or active approach
Lecture	7 (15%)	Passive
Clinical vignettes/case study	7 (15%)	Active
Reflection exercises (written/verbal)	7 (15%)	Active
Community immersion/ Service learning	6 (13%)	Active
Small group discussions	5 (11%)	Active
Readings/Multimedia	4 (9%)	Passive
Drawing/Art	1 (2%)	Active
Clinical Interview of patient about structures	1 (2%)	Active
Health policy immersion experiences	1 (2%)	Active
Community health needs assessments	1 (2%)	Active
Small group team building exercise	1 (2%)	Active
Written class assignments	1 (2%)	Active
Peer teaching	1 (2%)	Active
Spectrum exercise – to identify why people are homeless	1 (2%)	Active
Literature search	1 (2%)	Active
Community member interviews	1 (2%)	Active

Discussion

The purpose of this scoping review was to map the current state of the literature on structural competency training in pre-health and health professional learning, while also identifying the key gaps and priorities in structural competency training curricula development and research. We identified 11 peer-reviewed articles (through September 3, 2021) describing structural competency training interventions meeting the study inclusion criteria. Although this review includes relatively few studies, it represents a growing body of evidence evaluating the outcomes of structural competency training with varying levels of training results. Our primary finding was that none of the trainings achieved Level 4 (Results) outcomes as assessed by the Kirkpatrick Model; the level at which the training is evaluated for its impact on health outcomes and health equity metrics (Kirkpatrick & Kirkpatrick, 2006). Moving toward such population level evaluation metrics, however, will require substantial advancement in both training design and evaluation.

Our findings reveal several necessary areas for advancement in both structural competency training design and evaluation. For example, we found that all the structural competency interventions reviewed were targeted to a single healthcare profession such as medicine or nursing, and none focused on interprofessional education. Clearly, a single health profession cannot address all the structural issues affecting patient health outcomes because patients interact with a variety of healthcare providers from across complex healthcare systems and beyond. Therefore, structural competency would be well-situated in interprofessional education (IPE) curricula, as the purpose of IPE is to improve health outcomes and quality of care by creating opportunities for health professionals or health professional students to learn with, from, and about each other in

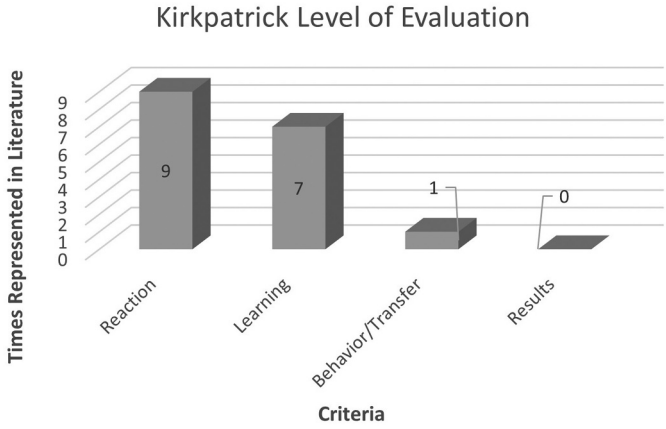

Figure 4. Kirkpatrick Level of Evaluation.

a collaborative environment (Centre for the Advancement of Interprofessional Education, 2016). Integration of structural competency into well-designed interprofessional, systems-based learning programs and the subsequent evaluation of these trainings across professions will be critical moving forward. This aligns well with recommendations by both Neff et al. (2020) and Khazanchi et al. (2021) who recommend scaling up structural competency training for interprofessional learning.

The structural competency trainings were all broadly focused on the five core structural competencies as outlined by Metzl and Hansen (2014), although our findings reveal disparate training strategies and learning activities (Table 2) across the trainings. Most of the trainings included some form of active learning strategy, however the passive strategies of lecture and readings were quite common. In a recent systematic review comparing the efficacy of active and passive learning at producing cognitive skills in health professional students, Harris and Bacon (2019) found that active learning strategies produce gains in cognitive skills at or greater than those of passive strategies (Harris & Bacon, 2019). Therefore, aligning with these findings, we suggest a continued emphasis on active learning strategies in structural competency curricula.

Our finding that the structural competency training placement varied widely along the learning trajectory is also of note. The trainings ranged from 3-hour health professional continuing education sessions to dedicated undergraduate courses for pre-health students. Trainings need to meet the needs of the learners where they are; however, some standardization of the interprofessional training curricula is warranted at the varied placements in the learners' trajectories so that the population health outcomes may be assessed in relationship to the collaborative practice and competency-based learning (Pechacek et al., 2015). For example, Vanderbilt University systematically developed an undergraduate major called Medicine, Health and Society (MHS) designed to enhance the structural competency of pre-health majors and successfully evaluating those students' learning outcomes in comparison to traditional pre-med/pre-health majors as they relate to structural competency (Metzl & Petty, 2017; Metzl et al., 2018; Petty et al., 2017). Neff et al. (2020) offered another example of standardization of curricula at a different place in the learning trajectory by proposing and publishing an open-access, structural competency curricula for the continuing education of medical students, residents, and interprofessional teams (Neff et al., 2020). Both examples can serve as models for standardizing structural competency training at the varied placements in the learners' learning trajectory. Although the standardization may look different at various placements in the learning trajectory, we suggest that integrating structural competency throughout the learning trajectory (undergraduate, graduate, and continuing education) is critical. Competency is built over time and structural humility is a life-long process which evolves over the course of a health professional's career (Metzl & Hansen, 2014).

Our findings also reveal a lack of standardization in the instruments used to measure training outcomes. Most of the studies used researcher-developed tools lacking formal measurement development and validation. One exception was the Structural Foundations of Health (SFH) survey@2016 instrument that was developed based on the core competencies found in the Vanderbilt University MHS major along with the existing frameworks such as the American Association of Medical Colleges Core Competencies for Entering Medical Students (Petty et al., 2017). Subsequently validated, this instrument offers an example of an evaluation tool that aligns with a standardized curriculum specifically placed at the undergraduate level in the learning trajectory (Metzl & Petty, 2017). Without adherence to best practices for developing and validating instruments, we can neither expect accurate research findings that adequately measure the latent constructs underlying the knowledge, behaviors, and attitudes associated with structural competency, nor compare findings across studies (Boateng et al., 2018).

Based on the findings of this review, interprofessional education design, an emphasis on active learning strategies, and standardized training curricula and evaluation instruments integrated at the different points in the health professional learning trajectory are all critical toward the advancement of evidence-based progression in curriculum development of structural competency training. We suggest that addressing these key gaps will move the research forward such that results-based assessments of structural competency training, as conceptualized by the Kirkpatrick Model, can ultimately occur. We also encourage the use of high quality, peer-reviewed, open access journals or open domain curriculum sharing tools, such as MedEdPORTAL, to accelerate dissemination and implementation of such validated teaching tools and methods. MedEdPORTAL is a collaboration between the Association of the American Medical Colleges and the American Dental Education Association to publish peer reviewed, open access teaching and learning modules that have been both implemented and evaluated. Collecting objective data to support whether structural competency training-based interventions improve patient health outcomes is imperative, lest we repeat the mistakes of cultural competency and be four decades into competency-based instruction that has failed to demonstrate high quality evidence of efficacy in reducing health inequities (Filmer & Herbig, 2018; Horvat et al., 2014; Lie et al., 2011). Achieving validated assessments and measurements of Kirkpatrick Level 4 structural competency outcomes requires

attention and would meaningfully advance this area of practice and research.

Limitations

The study limitations include the possibility that not all published structural competency trainings/curricula were captured in our search. To mitigate this limitation, we conducted a broad search using seven databases and comprehensive search terms as designed and peer-reviewed by two medical librarians. Another limitation is the exclusive focus on primary research articles, as the volume of conceptual articles exploring structural competency across professions is vast. That said, our goal was to map the evidence related to structural competency training in pre-health and health professional learning given its relatively newcomer status as a competency-based approach.

Conclusions

The findings from this scoping review give insight into the original research conducted to evaluate structural competency training. Future research should focus on development and evaluation of interprofessional education curricula, assessment of the most effective teaching strategies and learning activities, standardization of training curricula integrated at the different points in the health professional learning trajectory, use of open domain curriculum sharing tools, and the development and validation of instruments used to measure structural competency outcomes. Each of these priorities will be critical toward the advancement of evidence-based progression in interprofessional curriculum development of structural competency training with the ultimate goal of improving health outcomes and eliminating health inequities.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

Dr. Taylor B. Nelson's work is supported by the National Institutes of Health (NIH) National Institute of Nursing Research (NINR) under Award Number T32NR007091. The content of this manuscript is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Notes on contributors

Courtney Caiola, PhD, MPH, RN, CNE is an Assistant Professor in the Department of Nursing Science at the East Carolina University College of Nursing, Greenville, NC, USA. Dr. Caiola's research is aimed at improving the health outcomes of women at risk for or living with chronic illness by examining and addressing the social and economic determinants of their health.

Taylor Nelson, PhD, RN is a T32 postdoctoral trainee at the University of North Carolina-Chapel Hill School of Nursing, Chapel Hill, NC, USA. Her primary research interest is in early childhood obesity prevention, with a focus on responsive feeding in infancy.

Kristin Z. Black, PhD, MPH is an Assistant Professor in the Department of Health Education and Promotion at East Carolina University in Greenville, North Carolina, USA. Dr. Black is committed to utilizing community-based participatory research, mixed methods, and racial equity approaches to understand and address individual-level and systemic inequities in reproductive health and chronic disease outcomes.

Christie Calogero, BSN, RN is a recent graduate from the East Carolina University Honors College and College of Nursing in Greenville, NC, USA and now works at WakeMed as a Clinical II in the Cardiovascular Intensive Care Unit in Raleigh, NC, USA.

Kaitlin Guard, BSN, RN is a PhD in Nursing student at East Carolina University College of Nursing, Greenville, NC, USA. Her research examines how social factors influence pain management decision making among birthing people.

Amanda Haberstroh, PhD, MLIS, Library Assistant Professor at Laupus Health Sciences Library, East Carolina University, Greenville, NC, USA. Her research interests include health sciences librarianship, health information literacy, and review methodologies for integrative, mapping, scoping, and systematic reviews.

Irma Corral, PhD, MPH is the Assistant Dean for Diversity and Inclusion at the Brody School of Medicine at East Carolina University, Greenville, NC, USA where she is also an associate professor in the Department of Psychiatry and Behavioral Medicine. Her research interests include behavioral health disparities, sociocultural and structural factors in health behavior, and diversity, equity, and inclusion (DEI) in higher education.

ORCID

Courtney Caiola http://orcid.org/0000-0001-5267-2245
Taylor B. Nelson http://orcid.org/0000-0002-5124-0501
Kristin Z. Black http://orcid.org/0000-0002-1152-1069
Kaitlin Guard http://orcid.org/0000-0003-3866-7970
Amanda Haberstroh http://orcid.org/0000-0003-3718-781X
Irma Corral http://orcid.org/0000-0003-3840-9269

References

Andress, L., Purtill, M. P. (2020). Shifting the gaze of the physician from the body to the body in a place: A qualitative analysis of a community-based photovoice approach to teaching place-health concepts to medical students. *PLOS ONE*, *15*(2), e0228640. https://doi.org/10.1371/journal.pone.0228640

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Asundi, A., O'Leary, C., & Bhadelia, N. (2021). Global COVID-19 vaccine inequity: The scope, the impact, and the challenges. *Cell Host & Microbe*, *29*(7), 1036–1039. https://doi.org/10.1016/j.chom.2021.06.007

Bargain, O., & Aminjonov, U. (2021). Poverty and COVID-19 in Africa and Latin America. *World Development*, *142*, 105422. https://doi.org/10.1016/j.worlddev.2021.105422

Benfer, E. A., Vlahov, D., Long, M. Y., Walker-Wells, E., Pottenger, J. L., Gonsalves, G., & Keene, D. E. (2021). Eviction, health inequity, and the spread of COVID-19: Housing policy as a primary pandemic mitigation strategy. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *98*(1), 1–12. https://doi.org/10.1007/s11524-020-00502-1

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, *6*(149), 1–18. https://doi.org/10.3389/fpubh.2018.00149

Braveman, P., & Gottlieb, L. (2014). The social determinants of health: It's time to consider the causes of the causes. *Public Health Reports (1974)*, *129*(Suppl 2), 19–31. https://doi.org/10.1177/00333549141291S206.

Bromage, B., Encandela, J. A., Cranford, M., Diaz, E., Williamson, B., Spell, V. T., & Rohrbaugh, R. M. (2019). Understanding health disparities through the eyes of community members: A structural

competency education intervention. *Academic Psychiatry*, *43*(2), 244–247. https://doi.org/10.1007/s40596-018-0937-z

Caiola, C., Nelson, T., Black, K., Calogero, C., Corral, I., Guard, K., & Haberstroh, A. (2021). Structural competency in pre-health and health professional learning: A scoping review. https://doi.org/10.17605/OSF.IO/N5CPB

Centre for the Advancement of Interprofessional Education. (2016). *Statement of purpose*. https://www.caipe.org/resource/CAIPE-Statement-of-Purpose-2016.pd

Chen, Y.-H., Glymour, M., Riley, A., Balmes, J., Duchowny, K., Harrison, R., Matthay, E., Bibbins-Domingo, K., & Devleesschauwer, B. (2021). Excess mortality associated with the COVID-19 pandemic among Californians 18–65 years of age, by occupational sector and occupation: March through November 2020. *PLOS ONE*, *16* (6), e0252454. https://doi.org/10.1371/journal.pone.0252454

Filmer, T., & Herbig, B. (2018). Effectiveness of interventions teaching cross-cultural competencies to health-related professionals with work experience: A systematic review. *The Journal of Continuing Education in the Health Professions*, *38*(3), 213–221. https://doi.org/10.1097/CEH.0000000000000212

Fletcher, G., Danilovics, P., Fernandez, G., Peterson, D., & Reeder, G. (1986). Attributional complexity. An individual differences measure. *Journal of Personality and Social Psychology*, *51*(4), 875–884. https://doi.org/10.1037/0022-3514.51.4.875.

Garcia, M. A., Homan, P. A., García, C., Brown, T. H., & Carr, D. S. (2021). The color of COVID-19: Structural racism and the disproportionate impact of the pandemic on older Black and Latinx adults. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *76*(3), e75–e80. https://doi.org/10.1093/geronb/gbaa114

Gemelas, J., Davison, J., Keltner, C., & Ing, S. (2021). Inequities in employment by race, ethnicity, and sector during COVID-19. *Journal of Racial and Ethnic Health Disparities*, *9*(1), 350–355. https://doi.org/10.1007/s40615-021-00963-3

Graham, H. (2004). Social determinants and their unequal distribution: Clarifying policy understandings. *The Milbank Quarterly*, *82*(1), 101–124. https://doi.org/10.1111/j.0887-378x.2004.00303.x

Grogan, C. M., Lin, Y.-A., & Gusmano, M. K. (2021). Unsanitized and unfair: How COVID-19 bailout funds refuel inequity in the US health care system. *Journal of Health Politics, Policy and Law*, *46*(5), 785–809. https://doi.org/10.1215/03616878-9155977

Hansen, H., & Metzl, J. (2016). Structural competency in the U.S. healthcare crisis: Putting social and policy interventions into clinical practice. *Journal of Bioethical Inquiry*, *13*(2), 179–183. https://doi.org/10.1007/s11673-016-9719-z

Harris, N., & Bacon, C. E. W. (2019). Developing cognitive skills through active learning: A systematic review of health care professions. *Athletic Training Education Journal*, *14*(2), 135–148. https://doi.org/10.4085/1402135

Horvat, L., Horey, D., Romios, P., & Kis-Rigo, J. (2014). Cultural competence education for health professionals. *The Cochrane Database of Systematic Reviews*, *5*, 1–86. https://doi.org/10.1002/14651858.CD009405.pub2

Jain, G., Sharma, N., & Shrivastava, A. (2021). Enhancing training effectiveness for organizations through blockchain-enabled training effectiveness measurement (BETEM). *Journal of Organizational Change Management*, *34*(2), 439–461. https://doi.org/10.1108/JOCM-10-2020-0303

The Joint Commission. (2014). *A crosswalk of the national standards for culturally and linguistically appropriate services (CLAS) in health and health care to The Joint Commission hospital accreditation standards*. https://lsaweb.com/ir-docs/Crosswalk_CLAS_AHC_20141110.pdf

Kellermeyer, L., Harnke, B., & Knight, S. (2018). Covidence and Rayyan. *Journal of the Medical Library Association*, *106*(4), 580–583. https://doi.org/10.5195/jmla.2018.513

Khazanchi, R., Keeler, H., Strong, S., Lyden, E. R., Davis, P., Grant, B. K., & Marcelin, J. R. (2021). Building structural competency through community engagement. *The Clinical Teacher*, *18*(5), 535–541. https://doi.org/10.1111/tct.13399

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs: The four levels* (3rd ed.). Berrett-Koehler.

Lie, D. A., Lee-Rey, E., Gomez, A., Bereknyei, S., & Braddock, C. H. (2011). Does cultural competency training of health professionals improve patient outcomes? A systematic review and proposed algorithm for future research. *Journal of General Internal Medicine*, *26*(3), 317–325. https://doi.org/10.1007/s11606-010-1529-0

Mathis, W., Cyrus, K., Jordan, A., & Rohrbaugh, R. (2019). Introducing a structural competency framework for psychiatry residents: Drawing your neighborhood. *Academic Psychiatry*, *43*(6), 635–638. https://doi.org/10.1007/s40596-019-01077-z

McGowan, J., Sampson, M., Salzwedel, D. M., Cogo, E., Foerster, V., & Lefebvre, C. (2016). PRESS peer review of electronic search strategies: 2015 guideline statement. *Journal of Clinical Epidemiology*, *75*, 40–46. https://doi.org/10.1016/j.jclinepi.2016.01.021.

Metzl, J. M., & Hansen, H. (2014). Structural competency: Theorizing a new medical engagement with stigma and inequality. *Social Science & Medicine (1982)*, *103*, 126–133. https://doi.org/10.1016/j.socscimed.2013.06.032

Metzl, J. M., & Hansen, H. (2018). Structural competency and psychiatry. *JAMA Psychiatry*, *75*(2), 115–116. https://doi.org/10.1001/jamapsychiatry.2017.3891

Metzl, J. M., & Petty, J. (2017). Integrating and assessing structural competency in an innovative prehealth curriculum at Vanderbilt University. *Academic Medicine*, *92*(3), 354–359. https://doi.org/10.1097/ACM.0000000000001477

Metzl, J. M., Petty, J., & Olowojoba, O. V. (2018). Using a structural competency framework to teach structural racism in pre-health education. *Social Science & Medicine (1982)*, *199*, 189–201. https://doi.org/10.1016/j.socscimed.2017.06.029

Nande, A., Sheen, J., Walters, E. L., Klein, B., Chinazzi, M., Gheorghe, A. H., Adlam, B., Shinnick, J., Tejeda, M. F., Scarpino, S. V., Vespignani, A., Greenlee, A. J., Schneider, D., Levy, M. Z., & Hill, A. L. (2021). The effect of eviction moratoria on the transmission of SARS-CoV-2. *Nature Communications*, *12*(1), 1–13. https://doi.org/10.1038/s41467-021-22521-5

National Academies of Sciences, Engineering, and Medicine. 2017. The state of health disparities in the United States. A. Baciu, Y. Negussie, A. Geller, & J. N. Weinstein (Eds.), *Communities in action: Pathways to health equity* (57–98). National Academies Press. https://www.ncbi.nlm.nih.gov/books/NBK425844/

Neff, J., Holmes, S. M., Knight, K. R., Strong, S., Thompson-Lastad, A., McGuinness, C., Duncan, L., Saxena, N., Harvey, M. J., Langford, A., Carey-Simms, K. L., Minahan, S. N., Satterwhite, S., Ruppel, C., Lee, S., Walkover, L., De Avila, J., Lewis, B., Matthews, J., & Nelson, N. (2020). Structural competency: Curriculum for medical students, residents, and interprofessional teams on the structural factors that produce health disparities. *MedEdPORTAL*, *16*, 10888. https://doi.org/10.15766/mep_2374-8265.10888

Neff, J., Knight, K. R., Satterwhite, S., Nelson, N., Matthews, J., & Holmes, S. M. (2017). Teaching structure: A qualitative evaluation of a structural competency training for resident physicians. *Journal of General Internal Medicine*, *32*(4), 430–433. https://doi.org/10.1007/s11606-016-3924-7

Odlum, M., Moise, N., Kronish, I. M., Broadwell, P., Alcantara, C., Davis, N. J., Cheung, Y. K. K., Perotte, A., & Yoon, S. (2020). Trends in poor health indicators among Black and Hispanic middle-aged and older adults in the United States, 199-2018. JAMA Network Open, 3(11), 1–14. https://doi.org/10.1001/jamanetworkopen.2020.25134.

Pechacek, J., Shanedling, J., Lutfiyya, M. N., Brandt, B. F., Cerra, F. B., & Delaney, C. W. (2015). The national United States center data repository: Core essential interprofessional practice & education data enabling triple AIM analytics. *Journal of Interprofessional Care*, *29*(6), 587–591. https://doi.org/10.3109/13561820.2015.1075474.

Peters, M., Godfrey, C., McInerney, P., Munn, Z., Tricco, A., & Khalil, H. (2020). Scoping reviews. In E. Aromataris & Z. Munn (Eds.), *JBI manual for evidence synthesis*. JBI. pp. 406–451. https://synthesismanual.jbi.global

Petty, J., Metzl, J. M., & Keeys, M. R. (2017). Developing and evaluating an innovative structural competency curriculum for pre-health students. *The Journal of Medical Humanities*, *38*(4), 459–471. https://doi.org/10.1007/s10912-017-9449-1

Rabinowitz, M. R., Prestidge, M., Kautz, G., Bohnett, M. C., Racicot, M. J. A., Beam, M., Muller, B. M., & Zaman, A. (2017). Assessment of a peer-taught structural competency course for medical students using a novel survey tool. *Medical Science Educator*, *27*(4), 735–744. https://doi.org/10.1007/s40670-017-0486-1

Ruth, A., SturtzSreetharan, C., Brewis, A., & Wutich, A. (2020). Structural competency of pre-health students: Can a single course lead to meaningful change? *Medical Science Educator*, *30*(1), 331–337. https://doi.org/10.1007/s40670-019-00909-9

Salhi, B. A., Tsai, J. W., Druck, J., Ward-Gaines, J., White, M. H., Lopez, B. L., & Chen, E. H. (2020). Toward structural competency in emergency medical education. *AEM Education and Training*, *4*(Suppl 1), S88–S97. https://doi.org/10.1002/aet2.10416

Stewart, L., Moher, D., & Shekelle, P. (2012). Why prospective registration of systematic reviews makes sense. *Systematic Reviews*, *1*(1), 1–4. https://doi.org/10.1186/2046-4053-1-7

Tan, S. B., deSouza, P., & Raifman, M. (2021). Structural racism and COVID-19 in the USA: A county-level empirical analysis. *Journal of Racial and Ethnic Health Disparities*, *9*(1), 236–246. https://doi.org/10.1007/s40615-020-00948-8

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., … Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467–473. https://doi.org/10.7326/M18-0850

Upshaw, T. L., Brown, C., Smith, R., Perri, M., Ziegler, C., & Pinto, A. D. (2021). Social determinants of COVID-19 incidence and outcomes: A rapid review. *PloS One*, *16*(3), e0248336. https://doi.org/10.1371/journal.pone.0248336

Veritas Health Innovation Ltd. (2021). *Covidence* [*Computer software*]. https://www.covidence.org/

Woolsey, C., & Narruhn, R. (2020). Structural competency: A pilot study. *Public Health Nursing*, *37*(4), 602–613. https://doi.org/10.1111/phn.12756

World Health Organization. (2020). Health inequity and the effects of COVID-19: Assessing, responding to and mitigating the socioeconomic impact on health to build a better future. https://apps.who.int/iris/bitstream/handle/10665/338199/WHO-EURO-2020-1744-41495-56594-eng.pdf

World Health Organization. (n.d.). *Health inequality data repository*. WHO. https://www.who.int/data/gho/health-equity/health-equity-monitor-database