

# Effectiveness of alternative approaches to integrating the Social Determinants of Health into medical education: a systematic review

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## Research Article

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## Abstract

## Background

There is increasing recognition to include social determinants of health (SDOH) teaching for future doctors. However, the educational methods and the extent of integration into the curriculum vary considerably - this scoping review is aimed at how SDOH has been introduced into medical schools' curricula.

## Methods

A systematic search was performed of six electronic databases, including PubMed, EBSCO, Scopus, OVID (Medline), APA Psych Info, and ERIC. The initial search yielded 654 articles after removing duplicates. Articles were excluded if they did not cover the SDOH curriculum for medical students; were based on service-learning rather than didactic content; were pilot courses, or were not in English, leaving eight articles in the final study.

## Results

There was considerable heterogeneity in the content, structure and duration of SDOH curricula. Of the eight included studies, six were in the United States (U.S.), one in the United Kingdom (U.K.) and one in Israel. Four main conceptual frameworks were invoked: the U.S. Healthy People 2020, two World Health Organisation frameworks (The Life Course and the Michael Marmot's Social Determinants of Health), and the National Academic of Science, Engineering, and Medicine's (Framework For educating Health Professionals to Address the Social Determinants of Health). In general, programs that lasted longer appeared to perform better than shorter duration programs. Students favoured interactive, experiential-learning teaching methods over the traditional classroom-based teaching methods.

## Conclusion

The incorporation of well-structured SDOH curricula capturing both local specification and a global framework when combined with a combination of traditional and interactive teaching methods over more extended periods may be helpful to steps for creating lifelong learners and socially accountable medical school education.

## Introduction

There is a growing interest in teaching social determinants of health (SDOH) curricula in medical schools to provide future physicians with the appropriate skills to assess, recognise and manage non-health barriers to health care access. The World Health Organization (WHO) defines SDOH as the avoidable non-medical factors which influence health outcomes, including where people are born, age, live, work and play. Poverty, for example, is linked to poorer access to health care services, unaffordability of medications, unhealthy nutritional choices, and unhealthy environmental living conditions – all of which negatively impact health status.(1) The WHO website states that the SDOH account for over 55% of variations in health outcomes.(2)

Although the impact of SDOH on health outcomes is tremendous, physicians currently receive little training about how they can impact their patients and clinical practices. One recent survey conducted in 12 European Union (E.U.) medical institutes, representing 20,000 enrolled medical students, found that only one-third of the surveyed medical institutes provided SDOH curriculum to improve physicians' cultural competencies and their interaction and understanding of patients' diverse needs cultural backgrounds. Few medical schools had any evaluation or monitoring of SDOH curricula, making it difficult to ascertain which were effective or not. (3, 4). Hence there is a growing interest in teaching social determinants of health (SDOH) in medical schools to provide future physicians with the appropriate skills to assess, recognise and manage non-health barriers to health care access.

There can be said to be a lack of research covering the actual integration of SDOH into medical school curricula and which of the alternative types of didactic methods could be used for more holistic teaching approaches. Various frameworks to deliver SDOH training exist; for example, the WHO Conceptual Framework for teaching SDOH is based on three components; education, community and organisation. This calls for doctors to engage during the learning process to formulate abstract concepts and reflect on the acquired knowledge (so-called 'experiential learning') in a supportive organisational environment to complement traditional desk-based education. (5–7)

To address this gap, a systematic scoping review was performed investigating how SDOH is taught at medical schools worldwide. We charted the main characteristics of the existing SDOH curricula: specifically, The conceptual frameworks applied, the extent to which programmes integrate experiential learning and alternative didactic methods, and evaluation/outcomes of curricula in improving physician competencies on SDOH. This review creates a guide of the various method for SDOH teaching at medical schools and the curriculum content applied by these institutes.

## Methods

### *Search Strategy*

A systematic scoping search of published literature covering social determinants of health coursework integrated into medical school curricula worldwide was performed. A scoping review strategy was adopted to provide a comprehensive and transparent review. All steps of the review conducted adhered to the

PRISMA guidelines. (8) Following the PCC framework of Peters and colleagues(9), the population was medical school students, including graduates and postgraduates; the concept was the curriculum content presented for teaching SDOH, and the context was the medical schools worldwide.

We searched six databases on May 20, 2021; (PubMed, EBSCO, Scopus, OVID (Medline), APA Psych Info, and ERIC) covering December 2010 to May 2021. The keywords selected were; social determinants of health, teaching, and medical school. Box 1 describes the permutations of each search term to ensure broad coverage. Where applicable, such as in PubMed and Ovid MeSh terms and subject heading for "social determinants of health", which captured multiple definitions of SDOH, were employed. Two grey literature databases (DART-Europe-E-thesis Portal and LENUS/the Irish Health repository) were also searched. Finally, citation searches were undertaken to identify other papers for inclusion.

**Box 1. Keyword search for the SDOH curricula**

<p><b>Ovid MEDLINE search strategy (Literature search Covered till May 2021)</b></p> <ol style="list-style-type: none"> <li>1. Social determinants of health.mp or exp "Social Determinants of Health"/</li> <li>2. (Social determinants of health* or sdoh).mp</li> <li>3. 1 or 2</li> <li>4. exp Curriculum/ or exp Clinical Competence/ or exp Educational Measurement/ or exp Students, Medical/ or exp Education, Medical, Undergraduate/ or exp Education, Medical/ or medical education*.mp. or exp Education, Medical, Graduate/</li> <li>5. (curriculum* or medical education* or medical students* or medical schools*).mp.</li> <li>6. 4 or 5</li> <li>7. 3 and 6</li> <li>8. limit 7 to last 11 years</li> </ol>
<p><b>PubMed search Strategy ( Literature search Covered till May 2021)</b></p> <p>(("Social Determinants of Health"[Title/Abstract] OR "SDOH"[Title/Abstract]) AND ("curriculum"[Text Word] OR "teaching"[Text Word]) AND ("medical school"[Text Word] OR "medical schools"[Text Word])) AND (2010:2021[pdat])</p>
<p><b>Scopus search strategy (Literature search Covered till May 2021)</b></p> <p>( TITLE-ABS-KEY ("Social determinants of health") OR TITLE-ABS-KEY (sdoh) AND KEY (curriculum OR curricula OR teaching OR learning ) AND KEY ("medical student" OR "medical student" OR "medical education" OR "medical school" OR "medical schools")</p>
<p><b>EBSCO search strategy (Literature search Covered till May 2021A.B.</b></p> <p>AB ("social determinants of health" or "determinants of health" or sdoh ) OR TI ("social determinants of health" or "determinants of health" or sdoh AND TX "medical education" or "medical school" or "medical students" or "medical curriculum" or "medical student education" AND (TX ("medical education" or "medical school" or "medical students" or "medical curriculum" or "medical student education"))) AND (TX ( curriculum or curricula or instruction or teaching or learning ))</p> <p>Limiters - Published Date: 20100101-20211231</p>
<p><b>APA PsychInfo search strategy (Literature search Covered till May 2021T.I.</b></p> <p>TI ( social determinants of health or determinants of health or sdoh ) OR AB ( social determinants of health or determinants of health or sdoh ) AND TX medical education or medical school or medical students or medical curriculum or medical student education or clinical education AND ((TX ( medical education or medical school or medical students or medical curriculum or medical student education or clinical education ))</p>
<p><b>ERIC international Search strategy (Literature search Covered till May 2021)</b></p> <p>Ab("Social determinants of health") OR ab(sdoh) OR ti("Social determinants of health") AND (curriculum* or education*) AND medical*</p> <p>Published Date: 2010-2021</p>

Figure 1 depicts the PRISMA flow diagram for study inclusion. An initial search was performed through the six databases. The full keyword search yielded an initial 933 articles imported into Endnote X9 reference manager. These articles were from the following sources: PubMed (n=55), EBSCO (n = 87), ERIC (n = 94), APA PsychInfo (n = 99), Ovid MEDLINE (n = 369), and Scopus (n = 229). After removing duplicates based on EndNote's find duplicate function and a hand search for duplicates (n= 279), a total of 654 articles remained. These papers were then exported to Rayyan to undergo a blinded screening and eligibility stage by (N.N. and O.A.) independently.

*Inclusion/Exclusion Criteria*

Articles were deemed eligible for inclusion if they evaluated SDOH curricula for undergraduate or graduate medical students. This included inter-professional SDOH programs where these included medical students. To qualify for inclusion, studies had to contain formal SDOH curriculum content and describe teaching methods and approaches employed. Articles were excluded if they focused on trainees, clinicians, nursing, dental, and pharmacy teaching rather than on medical students. Studies were also excluded if: they did not contain sufficient information regarding the curriculum content and the teaching; they did not focus exclusively on SDOH teaching-

In the first screening step, were a total of 588 articles were excluded. Exclusion criteria were; not relevant (n=329), did not cover medical curricula (n = 118), covered SDOH as applied to global health but not in the country of study (n = 41), were based on service-learning and not didactic content (n = 30), did not

focus on SDOH (n=12), not a study (n=11), not in English (n=5). Lastly, pilot courses were excluded (n=3), and articles that did not provide sufficient information to evaluate the SDOH curricula (n=39) were removed, leaving 66 articles for eligibility.

Two reviewers (NN and OA) performed the eligibility step, and in case of disagreements, a third reviewer resolved disputes about inclusion/exclusion criteria to reach a final inclusion decision. In this step, 66 full articles were examined and included employing the WHO definition of SDOH. A total of 58 articles were excluded because they were concerned with work-based learning in the community and not a structured curriculum (n=4), insufficient curriculum details (n=31), addressed non-medical students (n=9), and studies related to public health curricula focusing on the prevention of infectious and chronic diseases rather than tackling the barriers of healthcare services (n=10). Additionally, studies deemed irrelevant (n=2) were identified and excluded. Studies that evaluated pilot courses (n=3) were excluded as this study aimed to examine the formal curricula integrated into medical schools.

An additional manual search through the reference lists of these included articles yielded one further article which met eligibility criteria. None of the records searched through the grey literature search were eligible for inclusion. The last search from the six included databases and the citation search of the reference lists yielded eight articles for inclusion into the scoping review.

#### *Data synthesis and analysis*

Data from the eight included studies were extracted to an excel sheet, and key information about the authors, country of origin, year of publication, published journal and year of publication was included. The main characteristics of each curriculum were detailed, including the program title, length, layout, enrolment, educational methods, teaching concepts, the level of program implementation, and the learning competencies. We also extracted evaluation and success criteria for each program.

#### *Ethical Approval*

No ethical approval was required since no primary data were collected.

No database registration of the protocol as there is no health outcome identified through the study.

## **Results**

#### *Overview of SDOH curricula*

Table 1 provides an overview of each SDOH curriculum and its primary features. Of the eight curricula included in the review, six were from medical schools in the United States (10–16), one from the United Kingdom (U.K.) (17), and one from Israel (18). Seven programs aimed at medical students only (15–21), and only one curriculum was an inter-professional program covering medical students and other health professionals, including medical, nursing, pharmacy school, public health students, and social work students (23)

A three-step review process was undertaken covering the structure of each curriculum (such as whether it was mandatory or not, the duration of the program), its content (the conceptual framework employed, which didactic methods were included, and the primary learning competencies focused on) and lastly whether the program was evaluated.

#### *Structure and content of SDOH Curricula*

Six medical schools included the SDOH curricula as a mandatory module (16–20,23), whereas two had it as an elective course (21,22). The included programs varied in duration and timing during medical school training. Five were integrated over an entire academic year (16–19,22); one of the five programs lasted 18 months (with a six-month preparation phase), and the remaining three varied between three and four months (21,23,24). Regarding timing, four SDOH curricula were for third and fourth-year medical students at the beginning of the clinical clerkship (17–19,24). The final three programs focused on the first- and second-year medical students (16,21,22). The remaining inter-professional program was integrated at different levels according to each school module design, so the timing of the course was variable (23).

All programs were structured based on a cited public health framework. The U.S. medical curricula (22,23) were based on the United States public health department's *Healthy People 2020* objectives, the overarching 10-year strategic plan for eliminating health disparities (25,26). The main objectives of the U.S. initiative are eliminating health disparities related to socioeconomic conditions, gender, age, race, disability, sexual preference, or environmental status. These objectives can be achieved by improving the health status on a national level, promoting health equities for all age groups, increasing the awareness of the public sector regarding SDOH, working on intersectoral levels to enhance practices, and providing measurable indicators for health level improvement. *Healthy people 2020* captures 12 SDOH related topics, including health access, education, preventive Medicine, environmental condition, violence, sexual health, nutrition and physical health, maternal health, mental health, oral health, drug abuse, and smoking.

Two programmes drew upon two different WHO frameworks; the U.K. medical school *SDOH curriculum* adopted the WHO *Life Course model* (27), which identifies the physical and social risk factors during various stages of life from prenatal to middle age, impacting health outcomes in later life. This model educates health professionals regarding the relationship between socioeconomic conditions and health inequalities. The *Etgar course* (18) from Israel adopted Michael Marmot's *The Social Determinants of Health* guidance, explaining ten solid points that link the social structure to the patient's health outcome. This guidance was an initiation of the WHO urban health centre to work as guidance for the public and policymakers. (28)

The *Health equity curriculum* (10) at the *Wake Forest School of Medicine* is based on the National Academic of Science, Engineering, and Medicine's Framework For educating Health Professionals to Address the Social Determinants of health which recommends incorporating SDOH teaching over three

domains; education, community, and organisations collaboration. The education domain comprises four areas, collaborative learning, experiential learning, integrated curriculum, and continuing professional (5)

The *Interprofessional course at the University of South Carolina* (23) integrated multiple frameworks. Specifically, it incorporated the Society of General Internal Medicine's Disparities Task Force guidelines for health disparities education, which covers the racial health disparities and the required knowledge to understand, assess, and recognise the barriers to health inequities. The American Academy of Paediatrics; and The Midwest Academy Manual for Activists frameworks were used to guide the organisational social work implemented in the curricula. (29,30).

The *student-run clinic program at the Mayo Clinic Alix School of Medicine* (16) and the *emergency clerkship course from the New Jersey Medical School* (24) stated that both curricula' accreditation using the Liaison Committee on Medical Education guidance. However, the framework designing for the SDOH curricula was not listed. (31)

The method of delivering the SDOH courses also varied. Most of the curricula are delivered via group tutorials, sessions or group discussions within a classroom or clinical rotations. Three courses used a combination of two teaching modalities: experiential learning and didactic.(18,22,23) Another three courses used the same approach adding the student's reflection as a writing essay or oral presentation third modality. (19–21) On the other hand, the student-run clinic course used the experiential learning method through the weekly student-run clinic. (16) Lastly, the U.K. SDOH curricula applied the innovative flipped classroom method, which includes pre-class learning resources and classroom discussion to enhance that knowledge. (17)

The eight medical school curricula had diverse educational objectives. These varied considerably but tended to have a standard set of competencies: the ability to assess and recognise SDOH related health barriers according to each defined framework, interprofessional skills, representing the core competency of collaborative learning and communication. The programmes also sought to cultivate reflective skills, leadership and teamwork expertise. Critical thinking and practising basic health screening skills were the least competencies expressed across the eight curricula. The eight medical programs learning competencies are detailed in table 2.

#### *Evaluation and outcomes of the SDOH curricula*

All the included curricula were evaluated for the knowledge, the gained competencies, and students' confidence to work with underdeveloped populations. Yet, none of the studies assessed the impact of the student's knowledge on the patient's health outcomes. The evaluations were all performed with online surveys taken pre-and post-curriculum. Two of the eight programs also performed semi-structured interviews to evaluate the course.(16,17)

The analysis of each curriculum showed the following. *The Wake Forest School of Medicine curricula*(19)was evaluated based on three cohorts of 314 students. These cohorts included: the students who received the entire course (nine modules), the shorter course (three modules) and those who did not receive any teaching. The evaluation found significant improvements in the student's confidence and knowledge regarding SDOH through engagement within the emergency department. Knowledge was found to be retained for one year after the exposure to the longitudinal curricula. The results showed no difference between curricula of three to nine modules. The assessment represented the importance of incorporating the curriculum into the clinical clerkship years. The students will be confident to engage with patients and the thriving community partnership to identify the areas of need.

Similarly, *the Tulane University elective Curriculum* evaluation was carried out three times, pre-and post-curricula and for the students who didn't receive the elective curricula. The evaluation, which involved 58 students, represented the increase of the students' awareness regarding SDOH through the community-based service and their wellness to work with the underserved population in the future. however, it showed the need for implementing early seminars for pre-clinical engagement to improve the acquired knowledge. (22)

*The Student-run clinic curriculum at the Mayo Clinic Alix School of Medicine* (16)evaluation showed students' confidence to work with an underdeveloped population increased. The evaluation (N= 90 students) demonstrated the disparate outcomes related to the stigma reinforcement of the disadvantaged patients, the tension from dealing with patients in the early clinical years, and the various degrees of commitment to the self-directed learning aspect of the curricula.

The *Etgar course curriculum* at Azrieli Faculty of Medicine at Bar-Ilan University evaluated the post-home visit surveys of 177 students. The analysis showed that home visits helped increase the student's awareness of the broader social context of the health inequities of their patients. The curricula enabled the students to explore the complexity of SDOH related factors in a realistic environment; however, the students reported that organising the visits and household language barriers were significant challenges.

The *SDOH curriculum at the New Jersey Medical School*evaluated 56 students. After the course, online reflection showed increased recognition of the students' SDOH related factors and the ability to apply this knowledge in their practice. However, the evaluation reported that increasing the engagement with an experienced facilitator and more interactive learning activities will significantly impact the students' learning process.

The *SDOH curricula at University College London* were evaluated using the 'flipped classroom method' through an online survey and semi-structured interviews. The evaluation involved 289 students and revealed an increase in students' perspectives regarding the social factors and their implications on their practice. Yet, the student's feedback favoured the discussion session over the taught part of teaching.

The evaluation of the *Inter-Professional curriculum* at the *University of South Carolina* via pre and post-program survey showed enhancement of the students' knowledge regarding interprofessional collaboration between various disciplines. The evaluation, which involved 500 students, revealed that creating more interactive learning modalities will improve the learning impact.

A pre and post-program survey was used to evaluate the *Health disparities elective curricula*. The evaluation indicated that their knowledge and confidence regarding SDOH improved significantly, and it is now being proposed as a mandatory course.

Looking across programs, the highest-rated modalities according to students' self-assessment across the eight programs were the group discussions and the community engagement, which featured realistic patient-centred care experiences.

## Discussion

Our review of eight medical school curricula found considerable variation in how SDOH was integrated into medical school curricula. Six of those had mandatory SDOH requirements. The programmes drew primarily on WHO SDOH frameworks (28,32), the U.S. *Healthy People 2020* framework (24) and the National Academic of Science, Engineering, and Medicine's framework.(5).The best performing programmes for improving medical students' knowledge and awareness about SDOH appeared to be for longer durations than a few short months. Students ratings indicated they most enjoyed community engagement and group discussions which allowed experiential learning rather than classroom-based didactic methods. Several important gaps were found in student course evaluations. Only half of the curricula provided students' the ability to put knowledge about SDOH into practice. Students also voiced that SDOH training would be helpful prior to engaging in clinical training.

### *Study Limitations*

Our research has several limitations. First, our study excluded curricula that incorporated SDOH into other modules. This could potentially overlook effective and important modalities for integrating SDOH into the medical curriculum. Second, our search itself employed a relatively narrowly defined SDOH term. However, when we included many additional terms to capture SDOH, such as 'poverty' and 'living conditions', we did not capture additional research papers on medical school SDOH curricula.

Third, there were limitations arising from the included studies themselves. Specifically, we only found studies in high-income countries like the U.S., the U.K., and Israel medical schools. It is possible that low- and middle-income countries have not published evaluations or descriptions of their SDOH curricula. Future research would be needed to identify these unpublished or grey literature evaluations of SDOH curricula. Ideally, we could have also evaluated differences between elective and mandatory courses, but unfortunately, in several cases, whether the course was obligatory could not be ascertained from publicly available information.

Despite these limitations, our study has several strengths. To our knowledge, this is the first systematic appraisal of how SDOH is integrated into medical school and the relative effectiveness of these programmes. Our findings also corroborate expert judgements about SDOH competencies. For example, in an influential study by Mangold et al. 2019, the authors concluded that integrating SDOH teaching in medical schools as a longitudinal curriculum, not just during clinical rotations or pre-clinical period only, would better promote understanding of the intersectional relationship between health outcomes and social factors. (33)

### *Implications for Future Research and Practice*

Our research identifies several directions for future research. There is a clear need for better collaboration between the medical schools and the community partners. Ideally, this would include a needs assessment of the local community and provide a mechanism for community partners to play a role in designing the SDOH curriculum.

Our research has several important implications for how best to integrate SDOH into medical school curricula. First, it revealed that multiple conceptual frameworks could be applied and adapted to local specificities, even though they capture the SDOH-related barriers differently.

Secondly, programs that lasted longer and followed medical students longitudinally appeared to perform better than shorter duration programmes. This was especially important for equipping students with skills and competencies to apply SDOH in clinical settings. Nevertheless, shorter duration programs did significantly improve students' knowledge about SDOH.

Thirdly, most curricula relied on one or two methods to deliver the SDOH concepts. The teaching modalities varied between programs with a predominance of didactic and experiential learning, which relies on students' engagement, reflection and application of this knowledge. Our finding demonstrates greater effectiveness when a combination of conventional and interactive teaching methods is employed. These interactive methods include the 'flipping teaching' technique, mentorship and realistic patients' care experience on the students' knowledge and understanding. Each program should be integrated with combined teaching modalities such as collaborative learning, experiential learning, integrated curriculum, and continuing professional to reinforce the SDOH concepts and create lifelong learners. (5)(17)

Fourthly, although the literature regarding teaching SDOH is increasing, published articles involving interprofessional collaboration are scarce. (34) It is essential to address other health professionals, not only physicians, via interprofessional courses. Reducing the barriers of health inequities requires the collaboration of the whole health professional sector for a holistic approach and sustainable impact.

Finally, overall the programme evaluations were weak. They tended to focus on student knowledge; the greater focus should be placed on creating lifelong learners and the actual impact on patients' health outcomes.

Although still in the early stages, these initial findings show the great potential and promise for including SDOH in the medical curriculum. The benefits from combining teaching methods and incorporating various domains that capture the local specification with a global framework to create lifelong learners are

promising. This will be an essential strategy to prepare the next generation of doctors and medical leaders to address health disparities and create socially accountable physicians.

## Declarations

### *Ethics approval and consent to participate*

Not applicable as the study was a systematic review

### *Consent for publication*

All authors have given consent for publication

Identifying information: NA

### *Availability of Data and Materials*

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

### *Competing Interests*

The authors declare that they have no competing interests

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No funding went into this manuscript.

### *Authors' contributions*

NN conceived of the manuscript, performed the search and analysis, and wrote the first draft of the manuscript. DS support the interpretation and analysis of the manuscript and contributing to the writing and editing. OA contributed to the screening, second review, and analysis of the data. MEA supervised the research, including its conception, and contributed to revising the manuscript.

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## Tables

**Table 1. Summary table of the eight articles curricula content and layout of SDOH teaching**

Study	Medical School	Program title	Program enrolment	Program Layout	Program content
Denizard-Thompson et al. 2021	The Wake Forest School of medicine	The health equity curriculum	Mandatory	Two days of simulation training  15 minutes session three times weekly for three weeks for the student's reflection, learning tasks, and group discussions	Module(1): Internal medicine and poverty/access to care  Module(2): Psychiatry and food insecurity  Module(3): Paediatrics and educational disparities  Module(4): Obstetrics and gynaecology and women, infant health  Module(5): Anaesthesiology and Implicit bias in pain  Module(6): Family medicine and Transportation  Module(7): Surgery and Environment/discharge planning  Module(8): Neurology and Social network  Module(9): Emergency medicine and housing  The first 4 modules only contained community-based learning activities.
Rockey et al. 2021	Mayo Clinic Alix School of Medicine	Student-run clinic	Mandatory	The clinic runs weekly over two and half days	Students take an initial assessment of the patients, then present to the physician, where he prescribes any further investigation or prescriptions needed
Sagi et al. 2020	Azrieli Faculty of Medicine at Bar-Ilan University	Etgar course*	Mandatory	A full-day introductory session  Four tutorials within the clinical rotations.  Home visits within one week of discharge and follow up the phone within two weeks of the home visit  Reports for their home-visits experience.	Lectures and simulation-based training  Tutorials include case simulation for patients to help recognise the SDOH  Home-visit post-discharge, using a semi-structured report to evaluate the barriers for healthcare in underprivileged areas  Planning a discharge plan and liaison with any services required.
Moffett et al. 2019	New Jersey Medical School	Social Determinants of Health course	Mandatory	Two orientation sessions for a small group of students  Three learning activity stages over 4 weeks	15-20 minutes orientation session twice at the start to set the program layout and at the end for the student's reflection and oral presentations  Learning activity(1): students-patients interview regarding patient's condition, their reflection on the hospital process starting from t.E.D. ED, social aspects and the discharge plan  Learning activity(2): Small group discussions to generate research plan for each patient interviewed, explore SDH factors and offering solutions presented with PowerPoint presentation  Learning activity(3): Oral presentation as a team facilitated by the faculty member to present the suitable plan and reflection.
Gostelow et al. 2018	University College London Medical School	Social determinants of the health curriculum	Mandatory	Online Self-paced learning for one week  90 minutes simulated scenarios discussions with a facilitators	The online self-directed learning consists of reading, videos like TED talks and small quizzes.  The discussion sessions with the simulated patients enable students to explore more into the social history, and pauses are made to highlight the main points regarding the health advocacy and health equity barriers
Addy et al. 2015	University of South Carolina	Interprofessional Education Program	Mandatory	Three live meetings  Six web-based modules completed individually or with small group  The six modules, integrated into the comprehensive courses at medicine and nursing schools, presented as	Module(1): introduction to inter-professional learning, team collaboration and patient safety  Module(2): The roles of each disciplines in the health system towards patients  Module(3): Innovation approach suggested by the student to improve healthcare  Module(4): Cultural variation and its impact on healthcare decision, and cultural believes and communications

				independent pharmacy, public health, and social work schools.	Module(5): a devoted movie and reading to related topics Module(6): Case analysis and plan management to overcome healthcare barriers and students' reflection on the entire course.
Gonzalez et al. 2015	Albert Einstein College of Medicine in Bronx, New York	Health Disparities elective	Elective	13 sessions, each one lasts for one and half hour  Eight sessions are focusing on health disparities, and five sessions focusing on advocacy skills.	Three sessions: Introductory of the health disparities  Three sessions: Focusing on the factors contributing to the health disparities  One practical clinical session: cultural competency skills practising such as open-ended questions, management methods, bias recognition, and management  Five sessions: Advocacy skills, community perspectives on health disparities
Drake et al. 2017	Tulane University School of Medicine.	Social Contexts in Medicine	Elective	Six seminars/one and half hours each  Four home visits(minimum)  Three mentorship sessions  Reflection exercise	Six seminars include: An introduction of the SDOH, Healthcare barriers and the infrastructure, Implicit bias of the healthcare providers, Interprofessional health responsibilities, and SDOH context  Home-visit- kit and interview skills. a minimum of four home visits, each visit lasts about one to one and half hours, where the second-year student accompanies the first-year students to explore the healthcare barrier, connect with the patients on a social level, identify the suitable interventions and apply the basic health screening practices  Mentorship sessions with one physician mentor and four students for reflection and discussion on the experience and the possible solutions for the health equity barriers.

Etgar\* is a Hebrew word that means "challenge" is an abbreviation for literacy, support, and a bridge between medicine and society.

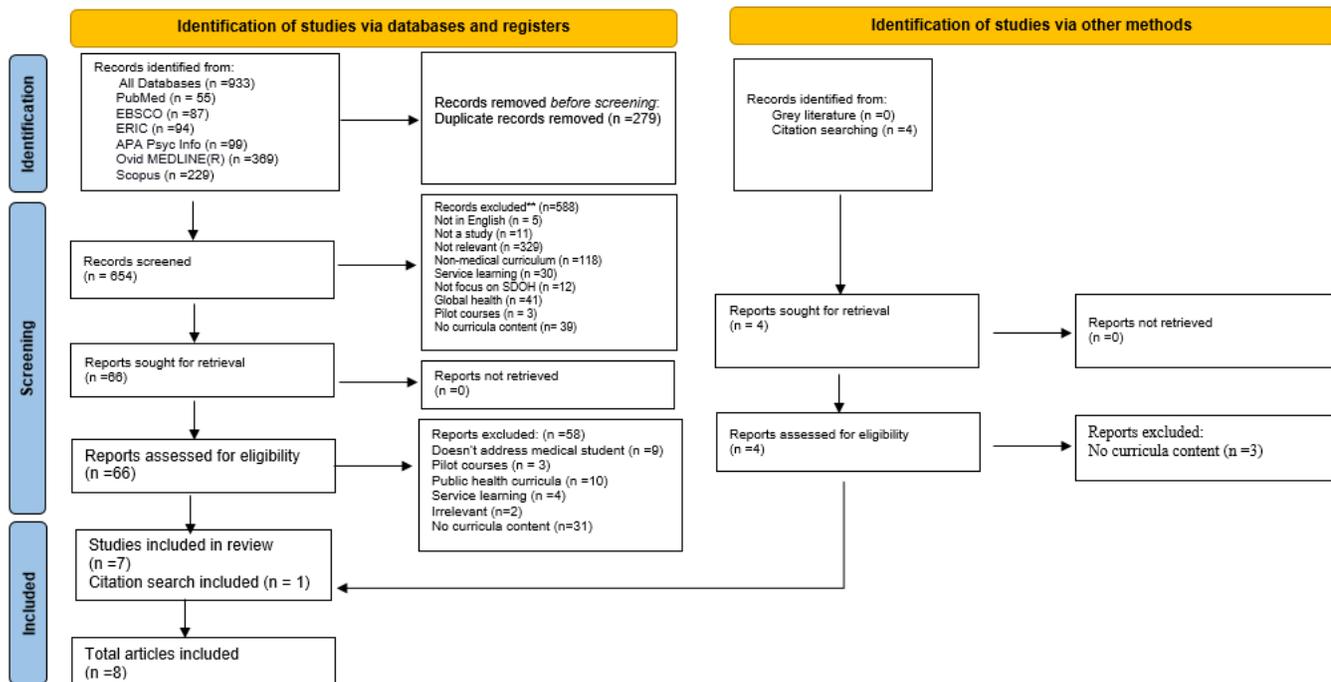
**Table2. Summary Table of Eight Medical School Curricula competencies on Social Determinants of Health**

Study	Country	Medical School	Program title	Program enrolment	Year of medical school	Program length	Educational method(s)	Learning Competencies
Denizard-Thompson et al. 2021	The United States.	The Wake Forest School of medicine	Health equity curriculum	Mandatory	Third-year clinical clerkship	Full-year	1. Didactic online or in-person 2. Experiential Learning 3. Reflective assignments and presentations	1. Inter-professional learning experience 2. Critical thinking 3. Community engagement and exposure to diversity in realistic situations 4. Recognition of the community priorities and the impact of health outcomes 5. Reflective skills
Rockey et al. 2021	The United States	Mayo Clinic Alix School of Medicine	Student-run clinic	Mandatory	Second-year medical students	Full year	Experiential Learning	1. Community engagement and exposure to diversity in realistic situations 2. Inter-professional experience and working with a multidisciplinary team 3. Recognition of the community priorities and the impact of health outcomes 4. Understanding the responsibilities healthcare providers towards patient's care 5. Basic health screening skills
Sagi et al. 2020	Israel	Azrieli Faculty of Medicine at Bar-Ilan University	Etgar course*	Mandatory	The third and the fourth-year students	Full year	1. Didactic 2. Experiential Learning	1. Realistic care experience 2. Early recognition of the healthcare equity barriers through home visits. 3. Experience of community service with the broader context of SDOH. 4. Reflective skills
Moffett et al. 2019	The United States	New Jersey Medical School	Social Determinants of Health curriculum	Mandatory	Fourth-year medical students	Four weeks	1. Didactic 2. Experiential learning 3. Reflective	1. Inter-professional workplace learning experience. 2. Reflection skills 3. Recognition of the community priorities and the impact of health outcomes 4. Ability to apply this knowledge for appropriate referrals to relevant resources. 5. Critical thinking
Gostelow et al. 2018	England	University College London Medical School, Medical School	Social determinants of the health curriculum	Mandatory	The fourth-year medical students	Full-year	"Flipped classroom learning": pre-class reading or videos, followed by in-class case-based discussion, tutorials or simulation Collaborative learning	1. The ability to understand health equity barriers in the UK 2. Recognise the suitable interventions to overcome those barriers at various levels 3. Understanding the concepts of lifestyle drift and LifeCourse Concept. 4. Recognition of the role of healthcare in reducing health inequalities on a local and global level.

								<ol style="list-style-type: none"> <li>Recognise the suit interventions to overcome those barriers at various levels</li> <li>Apply the acquired knowledge to decrease health inquiries and apply health advocacy.</li> </ol>
Addy et al. 2015	The United States	University of South Carolina	Interprofessional Education Program	Mandatory	<ol style="list-style-type: none"> <li>Medicine (first year)</li> <li>Nursing</li> <li>Pharmacy</li> <li>Public Health</li> <li>Social Works</li> <li>Other disciplines.</li> </ol>	Variable according to each discipline	<ol style="list-style-type: none"> <li>Didactic</li> <li>Experiential learning</li> </ol>	<ol style="list-style-type: none"> <li>The values of Inter professional workplace experier</li> <li>Roles of each health discipline toward the patients.</li> <li>Cultural competenc</li> <li>Identifying, analysi and planning for barriers regarding health equity.</li> </ol>
Gonzalez et al. 2015	The United States	Albert Einstein College of Medicine in Bronx, New York	Health disparities elective	Elective	First-year medical students	Three months	<ol style="list-style-type: none"> <li>Didactic</li> <li>Reflective assignments and presentations</li> <li>Experiential Learning</li> </ol>	<ol style="list-style-type: none"> <li>Legislative visits experience and community engagement</li> <li>Collaborative learn</li> <li>Recognition of the community prioritie and the impact of health inequity on health outcomes.</li> <li>Creating advocacy skills and patient-doctor relationship skills and Writing a interview skills with simulated cases.</li> <li>Overcome the futu health disparities factors</li> </ol>
Drake et al. 2017	The United States	Tulane University School of Medicine.	Social Contexts in Medicine	Elective	First and second-year medical students	Eighteen months	<ol style="list-style-type: none"> <li>Didactic</li> <li>Experiential Learning</li> <li>Support and guidance learning.</li> </ol>	<ol style="list-style-type: none"> <li>Inter-professional workplace experier</li> <li>Roles of each health discipline toward patients.</li> <li>Cultural competenc</li> <li>Identifying, analysi and planning for barriers regarding health equity within the local communi</li> <li>Basic health screening skills</li> </ol>

Etgar\* is a Hebrew word that means "challenge" is an abbreviation for literacy, support, and a bridge between medicine and society.

## Figures



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71.

Figure 1  
PRISMA flow diagram for the systematic scoping study on SDOH medical school curricula.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [PRISMA ScR Fillable Thesis 2.docx](#)