Understanding Student-Run Health Initiatives in the Context of Community-Based Services: A Concept Analysis and Proposed Definitions

Daniel A. Nagel[1] iD **, Taylor T. Naccarato[1], Mark T. Philip[1], Victoria K. Ploszay[1], Janice Winkler[2], Diana C. Sanchez-Ramirez[1], and Jamie L. Penner[1]**

Abstract

Background: Student-run health initiatives in the community setting have been utilized to provide practical experience for undergraduate students to develop professional competencies, gain exposure to diverse populations, and to engage in activities of social accountability. There is much literature on student-run health initiatives; however, there is no consensus on a definition of this concept or a comprehensive synthesis of the literature that describes student-run health initiatives offered by students in pre-licensure healthcare education programs. **Purpose:** To provide a concept analysis of, and propose a definition for, student-run health initiatives that provide community-based services for students during pre-licensure health discipline education. **Methods:** A systematic literature search and review process was used to identify and synthesize peer-reviewed articles from 7 academic databases covering a range of pre-licensure health disciplines and education. Walker and Avant's framework for concept analysis was used to guide exploration of attributes, antecedents and consequences of student-run initiatives, and to inform development of a definition for this concept. **Results:** The review yielded 222 articles for data extraction and represented 17 distinct pre-licensure health disciplines, 18 health-related disciplines, and a range of other baccalaureate and graduate programs. Our analysis revealed 16 definitions, 5 attributes, 6 antecedents, and consequences identified for student-run health initiatives. Attributes were Provision of Service, Service is Free, Target Clientele, Volunteerism, and Student Governance. Antecedents included Purpose/Rationale, Affiliation with Academic Unit, Location and Partnerships, Funding and Resources, Professional Oversight, and Preparation for Student Role. Consequences were improved access to services and outcomes for clients; competency development, personal gains and interprofessional learning for students; and positive outcomes for broader systems, such as decrease of service utilization and cost/benefit. **Conclusions:** There was no clear conceptual definition for student-run health initiatives, but many defining characteristics and well-described exemplars in the literature. Given the variations in purpose and scope of these initiatives, particularly to distinguish degree of students' roles in operations and the involvement of academic institutions, we propose 3 distinct conceptual definitions: student-run, student-led, and student-infused health initiatives.

Student-run initiatives in community settings have existed for decades and been part of either informal or formal professional development of pre-licensure students in a variety of disciplines. In many instances student-run community-based initiatives have been initiated by students to volunteer their services in communities of need or to gain experience in their area of interest,[1-3] while in other situations student-run initiatives have been adopted or initiated by academic institutions to provide clinical placements for students and offer specific

learning opportunities such as social accountability and interprofessional practice.[4-8] Through our foundational work to

[1]University of Manitoba, Winnipeg, MB, Canada
[2]University of Manitoba Libraries, Winnipeg, MB, Canada

Corresponding Author:
Daniel A. Nagel, College of Nursing, Rady Faculty of Health Sciences, University of Manitoba, 89 Curry Place, Winnipeg, MB R3T 2N2, Canada.
Email: Daniel.Nagel@umanitoba.ca

develop a formal innovative educational program for students in pre-licensure health disciplines that will integrate experiential learning, interprofessional practice and health service delivery in a community setting, we found much relevant information from the literature on student-run health initiatives that could inform the design of such a program. However, we noted there were many concepts used interchangeably with the root term *student-run*, such as *student-led* and *student-operated*. As well, there was broad variance in the way student-run health initiatives are described in the literature and how they are operationalized in practice, and there was no common definition for student-run health initiatives. With our goal to develop an evidence-informed student-run health initiative as a formal part of our educational program, the use of interchangeable terms and lack of a common definition posed a challenge in comparing best practices and program design across the literature.

In this paper we present a concept analysis to explore definitions for, and highlight key characteristics of, student-run health initiatives in the context of community settings. We present findings of a systematic literature search and review process that identified peer-reviewed articles on student-run health initiatives in community settings. Using Walker and Avant's[9] strategy for concept analysis we delineate the attributes, antecedents and consequences for student-run health initiatives and related concepts. Finally, we propose a definition for the concept *student-run health initiative* and for 2 variations on this concept.

Background

Our interest in student-run health initiatives was to more fully understand how they are conceptualized and what elements of their design might be incorporated in a new and innovative student-run education program for pre-licensure students attending our university. Of particular importance was determining how this concept is defined and what characteristics were ascribed to this phenomenon to facilitate an evidence-informed approach to program design, implementation, and evaluation. When definitions of concepts are unclear and/or their associated attributes are not well delineated, there may be significant barriers to fundamental tasks such as measuring and comparing initiatives and their outcomes.[9,10] Although our initial survey of the literature revealed several systematic reviews on outcomes of student-run clinics and a few literature reviews and papers that described aspects of student-led initiatives,[11-16] there was no source that comprehensively defined or described characteristics of student-run health initiatives.

Student-run health initiatives related to the education and preparation of pre-licensure students in professional health programs appear to have originated in North America and are often associated with students in medicine and pharmacy.[8,11,13,15,17-20] While exploring the literature describing

such initiatives we identified that they also exist in other geographic areas including Asia, Australia, and Europe[5,21-23] and in pre-licensure disciplines both inside and outside health care, such as students in engineering and veterinary medicine.[24-26] Student-run initiatives specific to health appeared to range from provision of direct medical care, often for uninsured or at-risk populations, to health promotion and broader community projects, such as improving sanitation conditions and promoting environmental rights.[8,11,13,26,27]

Our a priori literature search revealed a number of concepts that seemed to be used synonymously with the root term *student-run*, such as *student-led*, *student-operated*, *student-organized*, *student pharmacist-run*, and *student-directed*.[7,11,15,28-30] The interchangeable use of terms can lead to ambiguity in the conceptual meaning of a concept that presents a challenge when evaluating the purpose, composition, and processes, and when comparing study findings for a particular concept.[9,10] For the purposes of this paper we use the term *student-run* for consistency with the understanding that one main purpose of our concept analysis is to achieve clarity on this term.

In addition to the interchangeable use of terms for student-run, we also noted in our a priori work that few articles provided an explicit definition for whichever concept was used. Based on the descriptions of student-run initiatives our initial assumption was that student-run meant initiatives were primarily created, implemented, and led by students; to us the term "student-run" suggested independence of actions and autonomy in governance. For instance, Meah et al[13] defined the term student-run clinics (SRCs) as ". . . staffed primarily by medical students who function largely as directors of daily and global operations of the clinic. . .," while Haggarty and Dalcin[11] defined it as ". . .students from a variety of disciplines who collaboratively plan and deliver healthcare and health promotion, typically to underserviced populations." However, we noted that some student-run initiatives were initiated by faculty members of education programs and/or administered by structures within academic institutions that reflected different degrees of independence and autonomy for students.[31-33] As well, we began to appreciate the differences in the fundamental purpose for implementing student-run initiatives, such as to develop professional competencies (ie, knowledge, skills, and aptitude), facilitate interprofessional care, create opportunities for service learning, generate placements for clinical education, and expose students to population groups that might not be seen in traditional education contexts.[6,11,34-39]

The use of synonymous terms for *student-run*, the lack of a common definition for this concept, and the ambiguities that may arise from this lack of clarity can present a challenge for both educators and researchers seeking to evaluate and compare student-run health initiatives as an effective strategy in education or health service delivery. To

gain clarity on the phenomenon of student-run health initiatives, the purpose of this paper is to provide a concept analysis of, and propose a definition for, student-run health initiatives in the context of providing community-based services to clients during pre-licensure health professional education. Our aims were to: (a) provide a comprehensive summary of student-run health initiatives from the literature; (b) describe key characteristics of student-run health initiatives; and (c) propose 1 clear and comprehensive definition for *student-run health initiatives*.

Methods

We used the methods outlined by Walker and Avant[9] that provides a comprehensive and systematic approach to a concept analysis that has been widely used, particularly in nursing. These methods include: (a) selecting the concept; (b) determining the purpose(s) of the analysis; (c) identifying the uses of the concept being explored; (d) distinguishing the characteristics of the concept; and (e) highlighting model cases.[9] We conducted a literature search and used a systematic process similar to Arksey and O'Malley's[40] approach for scoping reviews to screen records and identify articles relevant to the aims of this paper. We also scanned the gray literature and results from a concurrent scoping review for articles that had definitions for student-run and that also met the inclusion criteria.[40] For the purpose of our review, we regarded *student-run health initiatives* to be where students were described in the planning, coordination, and/or implementation of a health initiative as part of their educational, professional, or personal development. We defined pre-licensure health professional education as being where students were enrolled in a professional undergraduate diploma or degree program that would lead to a licensed or registered credential prior to practice in a health profession (eg, medicine, nursing, respiratory therapy, dentistry, etc.).

A literature search of keywords and subject headings (eg, MeSH terms) was conducted by a professional librarian in 7 databases: CINAHL (EBSCO), EMBASE (Ovid), ERIC (ProQuest), Medline (Ovid), PsycINFO (Ovid), Scopus, and Social Services Abstracts (ProQuest) to identify articles and other literature sources that described or referred to student-run initiatives. Keywords *student-run* and *student-led* were both searched, and adjacency searching was used in databases where it was available to capture alternate combinations of the terms (eg, *student pharmacist-led, run by students*). Subject headings (eg, MeSH, CINAHL headings) were used in the respective databases when they were available. Keywords and subject headings were combined with the *or* Boolean operator for a broad search. A separate search concept was not developed for *clinics* or *healthcare*, as the concept was found to be too broad to be meaningful. The full literature search strategy is outlined in Supplemental Appendix A. No date restriction was applied to the search. Results were limited to journal articles. A total of 6242 records were identified up to January 2021 and 3199 duplicate records were removed prior to screening (see Figure 1). A further 2 articles were identified from the concurrent scoping review being conducted by our team.

We systematically reviewed the literature using the Covidence™ systematic review management software following 3 phases: (a) screening of titles and abstracts of records from the literature search; (b) a full text review of resulting articles; and (c) extraction and analysis of data from final articles included at the end of the review. Inclusion criteria for screening were: (a) peer-reviewed academic articles; (b) presence of both a title and abstract; (c) English language; (d) pre-licensure students in health profession education programs; (e) explicit description of student-run initiatives where students provided client services in a community setting (eg, healthcare services, health promotion activities, etc.); and (f) availability of full text. Records were excluded if: (a) the focus was a student-run project for other purposes, such as student learning groups and courses unrelated to service to clients; (b) sources were dissertations, and conference or poster abstracts; (c) they were systematic reviews; and (d) if the articles contained insufficient descriptive information for extraction (eg, no specific characteristics of student-run initiatives were provided).

Title and abstracts, and then full text literature were independently screened by 2 reviewers in Covidence™ and conflicts for inclusion or exclusion of an article were resolved by a third reviewer. The articles from the gray literature and scoping review were screened in the same manner, and then added for data extraction. During the full text review, team members noted how the root term *student-run* and related concepts were used. In the final phase of data extraction and analysis, relevant data was identified for extraction informed by Walker and Avant's[9] strategies for concept analysis to identify definitions, determine defining attributes of this concept, and delineate the antecedents, consequences, and other findings related to student-run initiatives. Our team discussed these findings to decide categories through consensus.

Results

Our literature search and review yielded 222 articles for data extraction and represented student-run initiatives that involved approximately 35 healthcare-related undergraduate disciplines. While our focus was students in pre-licensure health professions, a variety of the health initiatives also included students from other baccalaureate disciplines (eg, arts, education, law, sciences, etc.) as part of interdisciplinary or interprofessional practice models. A breakdown of categories and other descriptive details are presented in Table 1. Of the health fields represented, we identified
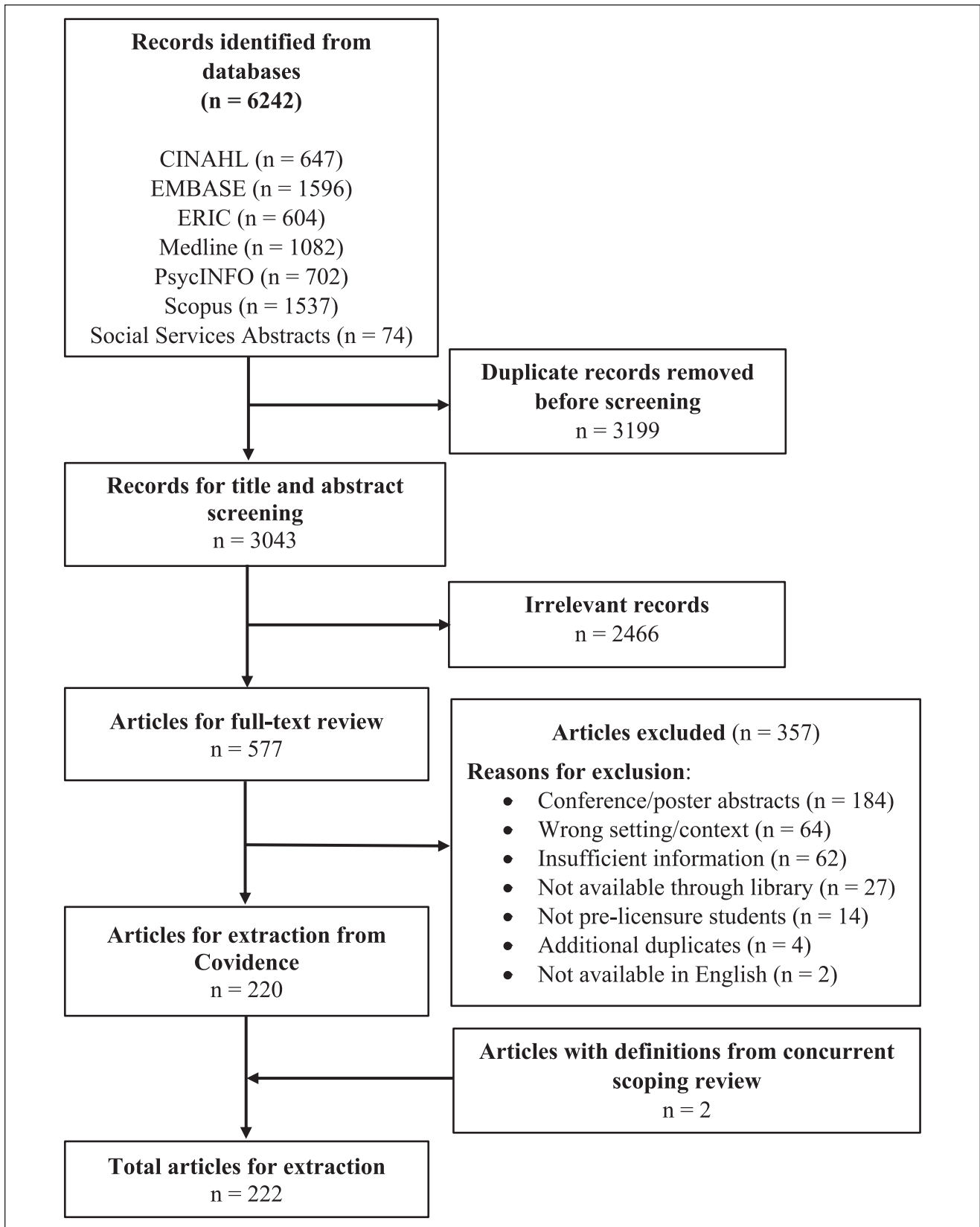
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┌─────────────────────────────────┐
│   Records identified from       │
│          databases              │
│         (n = 6242)              │
│                                 │
│      CINAHL (n = 647)           │         ┌─────────────────────────────────┐
│     EMBASE (n = 1596)           │────────▶│   Duplicate records removed     │
│      ERIC (n = 604)             │         │        before screening         │
│     Medline (n = 1082)          │         │          n = 3199               │
│     PsycINFO (n = 702)          │         └─────────────────────────────────┘
│      Scopus (n = 1537)          │
│ Social Services Abstracts (n = 74) │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│  Records for title and abstract │
│           screening             │         ┌─────────────────────────────────┐
│          n = 3043               │────────▶│     Irrelevant records          │
└─────────────────────────────────┘         │          n = 2466               │
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┌─────────────────────────────────┐         ┌──────────────────────────────────────┐
│  Articles for full-text review  │         │   Articles excluded (n = 357)        │
│          n = 577                │         │                                      │
└─────────────────────────────────┘         │   Reasons for exclusion:             │
                │                            │   • Conference/poster abstracts (n = 184) │
                │───────────────────────────▶│   • Wrong setting/context (n = 64)   │
                │                            │   • Insufficient information (n = 62) │
                │                            │   • Not available through library (n = 27) │
                │                            │   • Not pre-licensure students (n = 14) │
                │                            │   • Additional duplicates (n = 4)    │
                │                            │   • Not available in English (n = 2) │
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│ Articles for extraction from    │
│          Covidence              │
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                │                            │          scoping review              │
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│  Total articles for extraction  │
│          n = 222                │
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Figure 1. Results of systematic literature review for concept analysis.

Table 1. Descriptive Details of Countries and Disciplines Represented in Articles Included for Data Extraction.

Countries represented[a]		Author discipline represented[a]		Student disciplines represented[a,b]	
% (n/222)		% (n/222)		% (n/222)	
North America		Medicine	66.2% (147)	Medicine	73.4% (163)
United States	76.6% (170)	Pharmacy	18.5% (41)	Pharmacy	35.6% (79)
Canada	5.4% (12)	Public health	11.3% (25)	Nursing	23.4% (52)
Europe		Nursing/midwifery	10.4% (23)	Physical therapy	19.4% (43)
United Kingdom	1.8% (4)	Physical therapy	8.1% (18)	Occupational therapy	9.0% (20)
Netherlands	1.4% (3)	Dentistry	2.3% (5)	Social work	16.7% (37)
Sweden	0.9% (2)	Other health-related fields[d,e]	26.6% (59)	Physician assistant	8.6% (19)
Germany	0.5% (1)			Dentistry	8.1% (18)
Australasia				Other pre-licensure health disciplines[d]	14.0% (31)
Australia	7.7% (17)			Health-related fields[e]	23.0% (51)
New Zealand	0.5% (1)				
Africa					
South Africa	1.8% (4)				
Asia					
Singapore	0.9% (2)				
Combined countries[c]	2.7% (6)				

[a]Percentage total exceeds 100% due to instances where multiple countries or disciplines are represented in a single article.
[b]See Supplemental Appendix B for specific break down of student disciplines by article.
[c]Six articles represented 2 countries (eg, Australia and Kenya).
[d]Other health disciplines such as Nutrition and Dietetics, Speech Language Pathology, Podiatry, etc.
[e]Health-related fields such as Public Health, Population Health, Psychology, etc.

17 distinct healthcare disciplines that would typically be categorized as pre-licensure health professions (eg, medicine, nursing, rehabilitation sciences, etc.); in recent years some disciplines, such as physical therapy, have evolved to graduate entry-to-practice and we were unable to distinguish this from the descriptions provided. Nurse practitioners were counted as graduate programs since the first pre-licensure credential typically is registered nurse. Approximately 18 disciplines from other health-related fields (eg, public health, global health, etc.) were identified and there were 8 student-run health initiatives that described involvement of 5 graduate level disciplines (eg, nurse practitioners and other graduate programs).

The literature represented student-run initiatives from 10 individual countries on 5 continents, and 6 articles represented collaborations that involved 2 countries, such as between groups in the United States and Mexico.[17,32] There was a range in typology of articles (see Figure 2) that included primary research studies, descriptive pieces highlighting features of program design, editorials, and other types of manuscripts (ie, position papers, case reports, case studies, etc.). In Table 1 we present a detailed breakdown of countries represented, author disciplines, and student disciplines reflected in our findings. As well, we append a summary of final articles resulting from our review in Supplemental Appendix B.

The root term *student-run* was used in 64.9% of the articles included for extraction from our literature sea

rch[2,5,17,19,20,22,41-53] while *student-led* was used in 23% of these articles.[21,30,54] Other concepts that were used interchangeably with student-run included *student-created*; *student-developed*, *student-directed*, *student-driven*, *student-initiated*, *student-managed*, *student-operated*, *student-organized*, *student nurse-delivered*, *student pharmacist-led*, *student pharmacist-run*, and *student-volunteer*.[6,7,29,55-63] In some cases, more than one term was used interchangeably within the same article, such as *student-run* and *student-led*.[6,62-67]

Several articles provided substantial and explicit descriptions of the student-run health initiative[6,29,35,61,63,68] and 16 authors provided definitions for the concept they used (see Table 2). While there were similarities across the definitions that reflect a focus on provision or delivery of a health-related service by students and some delineation of student roles, there was not a common definition for student-run health initiatives. With respect to the roles of students, 13 definitions explicitly described students as having the primary responsibility for operationalizing the health initiative,[5,8,21,34,45-50,52,69,70] 5 stated that medical students are the primary leads,[5,8,46,48,70] 1 noted the voluntary nature of the initiative.[49] About 10 definitions explicitly highlighted the supervisory or support roles of licensed professionals,[5,45,47-53,69] 6 delineated specific target client groups (eg, underserved),[5,22,45,48,49,51] and none of the definitions indicated an association with a formal education program, although 3 mentioned providing a learning opportunity or environment for students.[22,34,49]
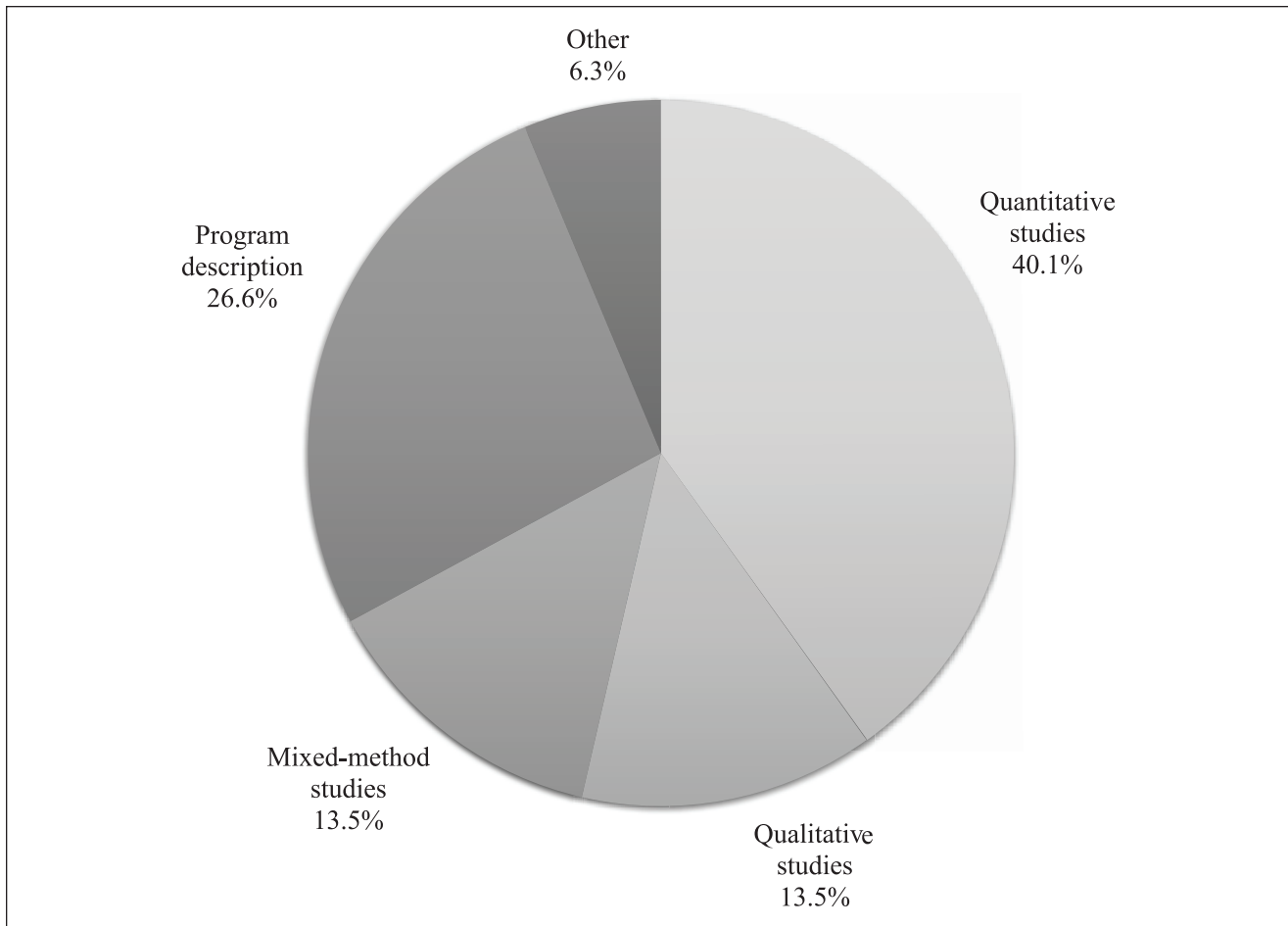
Figure 2. Typology of articles represented in literature review.

Attributes of Student-run Initiatives

Attributes are the defining characteristics of a concept that help distinguish what phenomena match the concept.[9] From our analysis we identified 5 attributes (Table 3) that are fundamental characteristics of student-run initiatives in a community setting and include: *Provision of Service*; *Service is Free*; *Target Clientele*; *Volunteerism*; and *Student Governance*. We now delineate these attributes recognizing the wide variation in composition and mandates of student-run initiatives described in the literature.

Provision of Service

Provision of some form of service to members of the community was a common characteristic of student-run initiatives and was identified in 97.7% (n = 217) of articles included in our review. An estimated 54.5% of articles reflected direct delivery of primary care services,[29,35,52,68,71,72] and other initiatives included health promotion, health education, and navigation of other healthcare and social support networks.[1,6,44,73] One article described student-run

indirect health initiatives where social work students promoted environmental rights in community.[27]

While many services were part of ongoing initiatives, such as clinics and regular mobile outreach programs,[6,29,35,51,52,71,72,74,75] some were episodic as with annual influenza vaccinations and health fairs.[54,56,57,64,76,77] Delivery of healthcare services ranged from primary care, which is generally first point of contact in relation to a health concern,[19,20,53,78] to ongoing follow-up of chronic conditions like diabetes and cardiovascular disease[35,48,79,80] and specialty services, such as prenatal care, musculoskeletal clinic, psychiatry, gynecologic care, and surgery.[20,28,58,61,81] A few individual health care student-run initiatives provided a range of primary care, specialty services, and diagnostics that sometimes also provided a consistent, comprehensive, and ongoing source of care for clients.[68,74,82-84]

Service is Free

Services offered by student-run initiatives were explicitly stated as being free to clients in 69.4% (n = 154) of the articles.[1,29,35,52,61,62,72,78,81,85-88] The term student-run free

Table 2. Concepts and Definitions of Student-Run Health Initiatives From Articles Included in Concept Analysis.

Source	Concept used	Definition
Beck[45]	Student-run free clinic	". . .small projects managed by health professional students, supervised by licensed health professionals, offering free health services to those without health access."
Buckley et al[21]	Student-led clinic	". . .is initiated by and directed by students, from the identification of an appropriate facility, development of clinical procedures, and day-to-day operations" (referenced Buchanan and Whitlen[111])
Dekker et al[46]	Student-run clinic	". . .are completely run and organized by medical students from their first year onwards." (referenced Meah et al[13])
Drexler et al[5]	Student-run free clinic	". . .provide basic medical treatment for underserved people who may be uninsured, homeless or have limited access to regular health care due to non-medical reasons. Medical students have the lead role as a provider of care for these patients and are, with support of licensed health care professionals, responsible for the operational management of the clinic."
Liang En et al[22]	Student-run clinic	". . .one form of service learning, combine the provision of medical care to underserved communities with an educational platform for students."
Forbes et al[34]	Student-led clinic	". . .refers to clinical learning centers where students manage and deliver supervised health care as well as contribute to the operational management." (referenced Simpson and Long[8])
Hu et al[50]	Student-run free clinic	". . .are primary healthcare delivery programmes, in which medical and allied health professional students are responsible for operational management and providing patient care under the guidance of licensed preceptors."
Hu and Leung[69]	Student-run free clinic	". . .medical and allied health professional students manage clinic operations and provide care for patients under the guidance of licensed preceptors."
Huang et al[51]	Student-run clinic	". . .are health care clinics in which interprofessional teams of health care students engage in the primary care of patients who are typically from marginalized populations, with licensed preceptors available for consultation." (referenced Simpson and Long[8])
Johnston et al[52]	Student-run clinic	". . .has been defined as a setting where students take the lead in providing health-care services supervised by licensed health-care professionals."
Johnston et al[53]	Student-run clinic	". . .is an environment where healthcare services are provided by healthcare students under the supervision of licensed healthcare professionals."
Lawrence et al[47]	Student-run free clinic	". . .healthcare delivery programs in which health professional students take primary responsibility for the logistics, operational management and treatment of patients under the guidance and supervision of licensed providers."
Lee et al[48]	Student-run free clinic	". . .are institutions operated primarily by medical students, with oversight by attending licensed physicians, that provide health care services to poor or uninsured patients."
Lie et al[49]	Student-run clinic	". . .is an educational volunteer services activity initiated and coordinated by students under the guidance of licensed faculty, and it offers clinical experiences for students while providing much needed services to the underserved." (referenced Haggarty and Dalcin[11]; Hemba and Plumb[1])
Simpson and Long[8]	Student-run clinic	". . .is a health care delivery program in which medical students take primary responsibility for logistics and operational management and which is capable of prescribing disease-specific treatment to patients."
Ueberroth and Siegel[70]	Student-run clinic	". . .is a health care delivery system in which undergraduate medical students assume the responsibility of organising, managing and operating day-today activities of an outpatient health clinic."

clinic, or SRFC, was frequently used in healthcare specific contexts to describe free services.[17,28,38,48,50,58,71,84,89] There were some instances where not all services were provided free and nominal fees were required for laboratory work, diagnostics, specialty services, and vaccines.[2,3,34,78,90] We discuss funding and resources for student-run initiatives later in this paper; however, the ability to provide free services was in large part due to the voluntary contributions of

Table 3. Sample of Articles That Explicitly Feature or Describe 9 or More Attributes and/or Antecedents.

Article sources	Attributes						Antecedents				
	Provision of service	Service is free	Target clientele	Volunteerism	Student governance	Purpose/ rationale	Affiliation with academic unit	Location and partnerships	Funding and resources	Professional oversight	Preparation for student role
Asanad et al[41]	X	X	X	X	X	X	X	X		X	X
Beck[45]	X	X	X	X	X	X		X	X	X	X
Buckley et al[21]	X	X	X	X	X	X	X	X		X	X
Dang et al[76]	X	X	X	X	X	X	X	X		X	X
Liang En et al[22]	X	X	X	X	X	X	X	X	X	X	
Farokhi et al[29]	X	X	X	X	X	X	X	X	X	X	X
Hemba and Plumb[1]	X	X	X	X	X	X	X	X	X	X	
Khalil et al[82]	X	X	X	X		X	X	X	X	X	
Lawrence et al[47]	X	X	X	X	X	X	X	X		X	X
Moskowitz et al[6]	X		X	X	X	X	X	X	X	X	X
Palma et al[35]	X	X	X	X		X	X	X	X	X	
Riddle et al[68]	X		X	X	X	X	X		X	X	X
Rosenbaum et al[87]	X	X	X	X	X	X	X		X	X	
Stuard et al[61]	X	X	X	X	X	X	X	X	X	X	X

students, healthcare providers, educators, and other personnel.[28,48,71,82,86,87] As well, some student-run initiatives were supported by healthcare agencies and other partners to provide laboratory, diagnostic, pharmaceutical, and specialty services free of charge or at low costs.[20,28,35,86,91]

Target Clientele

A target clientele or population was explicitly identified in approximately 91.4% of articles as the focus of the student-run health initiative. These health initiatives spanned a range of populations and health conditions, most commonly in the provision of care to persons who were uninsured, underserved, and/or considered to be at-risk.[6,18,29,35,45,51,61,64,68,71,72,76,85,88,91] Persons uninsured for healthcare services was 1 prominent population for student-run services, particularly through SRFCs, in much of the literature originating in the United States.[20,22,41,42,45,72,78,83,91-93] Uninsured status was closely associated with low socioeconomic standing, including poverty and the "working poor," or not meeting criteria for Medicaid as in the case for many immigrants and refugees.[19,20,42,61,78] The term *underserved* was used in conjunction with persons who were uninsured,[1,44,65] but also in reference to geographical locations (eg, inner city or rural areas) and in relation to racialized groups, such as immigrants, First Nations, Asian, Black, or Latino background.[2,6,19,29,35,45,47,61,72,76,77,91,94] Groups of people considered "at-risk" overlapped with the aforementioned populations, but also included sex-workers, persons who use drugs, and those who may be exposed to other infectious diseases.[17,42,54,67]

Target clientele for student-run health initiatives also included specific demographic groups based on age, gender, or family units.[1,45,76] As well, some healthcare services focused on particular conditions, such as chronic disease management (eg, diabetes, hypertension, HIV), dental care, prenatal care, rehabilitation, and mental health.[29,35,61,78,80,81,85,95]

Volunteerism

The use of volunteers to operationalize student-run initiatives in the community was a common theme throughout the literature and there was much variation in: the mix of volunteers and non-volunteers; how volunteers were engaged in the initiatives; and the dependence on volunteerism for operations. Many literature sources where volunteerism was described were in reference to students who volunteered without any expectation of credit toward their education program and usually were connected to a desire for experiences outside the normal curricula of their program.[22,29,35,61,62,68,81,82,85] However, there were situations where students were identified as volunteers and there was either a connection to program credit or fulfillment of some other obligation, such as service-learning hours or interprofessional care experience.[51,71,72,74,90,96,97] Volunteerism also extended to practitioners, particularly where there was a requirement for professional oversight in services being delivered or need for alternative service, such as interpretation and laboratory skills.[42,45,61,68,78,98,99] There were also numerous circumstances where practitioners and other staff complement (eg, social workers), including faculty members, were employed by academic institutions or affiliated agencies and supported student-run initiatives.[5,20,30,43,56,57,74,78,83,99]

Volunteers were engaged in a variety of ways in student-run initiatives to provide administrative or logistical support, coordinate operations, direct services to clients, provide interpretation, and/or to assist clients with advocacy or navigation with systems.[35,69,72,83,87,94] Volunteers also filled leadership and mentorship roles often based on their area of expertise and experience within the initiative; a "just-in-time" trainer model where information was provided by volunteers as needed was given as a specific example.[6,54,61,71,72] Dependence on volunteerism seemed necessary to ensure viability and sustainability of some initiatives to enable regular operations, adequate staffing, and cost containment.[1,42,78,82,85-87]

Recruitment for, and requirements to be, volunteers were also described in the context of student-run initiatives. Recruitment for volunteers involved active searches by committees, through advertisements and presentations to student groups.[1,6,61,76,85] Requirements to be a volunteer included completion of courses or training in advance of the experience, submission of applications, specific time commitment, and/or vetting through an interview process to ensure preparedness, dedication to, and fitness for the volunteer experience.[29,41,67,71,72]

Student Governance

Few articles provided complete detail on governance structures for student-run initiatives, although many authors did provide a description of the roles and opportunities where students played active parts in leadership and management positions associated with operations of the service. Governance structures included committees, board of directors, executive boards, or planning teams that had general oversight of the organization and operation of initiatives.[1,6,18,21,22,33,39,68,72,76,94,100] Functions of governance structures included executive decision-making, financial management, liaising with external stakeholders (eg, municipalities and community partners), media relations, recruitment, volunteer coordination, and research.[1,6,18,19,21,22,29,76] While some governance structures were largely run by student representatives, many included professionals (eg, faculty and/or clinicians) and stakeholders from the affiliated agency or community.[1,18,22,68,100]

For day-to-day operations of the initiatives, students assumed leadership and management responsibilities for administrative support, coordination of services (eg, shift supervisor, case coordinators), scheduling, education of volunteers, and oversight of junior team members.[2,21,22,41,45,55,61,70,72,76,99] Selection of students for leadership positions was decided through processes including application for roles, elections, and interviews; consideration for the position often included previous work with the initiative and/or progression in the educational program such as being in the last years of a program.[2,6,33,45,47,68,76] Ensuring ongoing consistency in the program was cited as an important factor for continuity and stability of the initiative. This was accomplished by overlapping student coverage across years through a minimum time commitment and by promoting leaders from junior to senior positions.[71,88,96,101] Ongoing guidance by professional overseers, such as faculty advisors, also helped provide continuity and institutional memory for the initiatives.[18]

Antecedents for Student-Run Initiatives

Walker and Avant[9] define antecedents as ". . .those events or incidents that must occur or be in place prior to the occurrence of the concept" (p. 178). We identified 6 antecedents necessary for the development and implementation of student-run initiatives: *Purpose/Rationale*; *Affiliation with Academic Unit*; *Location and Partnerships*; *Funding and Resources*; *Professional Oversight*; and *Preparation for Student Role*.

Purpose/Rationale

Development and implementation of student-run initiatives was broadly predicated on factors such as: (i) an identified need for service provision; (ii) an interest to acquire or utilize knowledge and skills; (iii) a desire to contribute to community; or (iv) a combination of the aforementioned purposes. In many instances, the idea of the initiative was explicitly identified as being student generated from a grass-roots level.[1,2,21,22,41,45,51,73] However, in other cases the initiative seemed predominantly by faculty and academic institutions as a means for students to develop competencies in their education program (eg, interprofessional care) or to gain experience through exposure to specific populations.[34,36,39,43,44,50,71,72,74,93]

Some identified needs for service provision included addressing needs in service (eg, improved access to care, rehabilitation, and legal services), enhancing client outcomes (eg, management of chronic health conditions), and bridging gaps in insurance coverage.[1,21,29,35,68,78,81] Acquiring or utilizing knowledge and skills, such as assessing clients, performing clinical interventions, offering social support,

and educating clients were some of the competencies articulated in the literature.[22,29,41,45,61,83,88] Providing students with experiences beyond the core curriculum to enhance confidence, develop sensitivity to unique populations, and gain exposure to issues of health inequity were also cited as a purpose for student-run initiatives.[6,35,41,43] In addition, exposure to interprofessional collaboration and practice with students from other disciplines was also a goal for student-run initiatives.[6,18,29,44,51,71,72,102]

The desire to contribute to community was expressed in relation to social accountability and/or voluntary service learning where provision of service was dedicated to fostering partnerships with external agencies and communities.[5,18,22,29,35,73] However, this contribution to community often overlapped with either addressing an identified need for service and/or the acquisition of competencies that were reflected in goals or guiding principles of the student-run initiative.[5,22,35,45]

Affiliation With Academic Unit

In several articles reviewed, student-run initiatives were supported by an educational institution where the students attended their professional and/or discipline programs.[1,6,29,35,56,57,61,68,71,72,85,87,102] Connections between the educational institutions and the initiatives in many articles could be characterized as formal, where an explicit relationship in terms of provision of resources and ties to clinical placement was described by authors. As will be presented later, resources that educational institutions formally provide student-run initiatives include funding, material goods, human resources, liability coverage, professional oversight, and other operational support.[38,45,68,71,74,76,89,103] A number of articles either had minimal description of the connection with the educational institution, or there was a less formal association, as in the case where student organizations within an institution appeared to independently lead or sponsor a student-run initiative.[2,22,91,104]

In many articles it was evident that some educational institutions or specific departments played a very active part in running and managing the student-run initiatives in conjunction with offering courses, creating clinical experiences or providing clinical placements.[1,34,41,44,56,57,75,95,105-107] While educational preparation of students was noted as a motivation for this level of engagement by institutions, such as providing interprofessional education, practical experience, or exposure to specific populations,[6,29,35,43,85,89,102,107,108] community engagement, mandatory service learning, and provision of service to stakeholders, including the public, were also reported.[18,21,35,54,70,73,98] Active recruitment of students to programs or provision of innovative services, for example collaborative programs, were other motivations cited for educational institutions to formally be involved with student-run initiatives.[17,81,85,105]

Location and Partnerships

Location and space were key considerations for student-run initiatives often requiring careful planning, negotiation, and legal/affiliation agreements.[1,39,45,74,103] Of the articles reviewed, 76.1% (n = 169) explicitly identified use of a static site where the initiative was situated in a physical location (eg, church, shelter, etc.), 6.3% were mobile to serve clients in various places,[18,22,35,39,41,52,53,57,70,75,88,107] and other sites, such as immunization clinics, were identified as temporary.[54,56,76] Static locations were frequently associated with churches and religious organizations (eg, Salvation Army and North Dallas Shared Ministries)[29,39,43,45,52,53,61,65,70,71] but also with non-profit and non-government organizations, such as shelters, recovery centers, and other associations.[1,2,5,6,35,41] Other sites included schools and community centers.[21,41,45,93,101] With regards to many direct health-care service initiatives, co-location with existing clinics, health centers, and campus health facilities were also common.[29,47,51,67,73,82,98,99]

Formal partnerships also played a role in connection to securing location and space, sometimes also doubling as an in-kind donation or resource.[18,45,98] Partnerships were also a means for the student-run initiative to create service-learning opportunities or provide access to unique populations, such as working people who are homeless or immigrants.[18,29,35,45] As well, formal partnerships involving co-location with existing healthcare facilities provided client access to laboratory and diagnostic services.[18,47,65]

Funding and Resources

Funding and other resources for the sustainability of student-run initiatives was identified as an important consideration by many authors, particularly where service provision was free.[14,30,56,86,98,103,109] While many initiatives were staffed through volunteers and spaces provided through donated or co-location with other services,[17,19,20,78,82,98] there was a need for paid support positions, operational costs, equipment, and other supplies. Paid support positions, such as clerical and medical assistants, provided day-to-day infrastructure for program continuity.[45,105] In most situations, professional oversight of students was provided by education institutions, partnering agencies or volunteer licensed healthcare providers[6,22,29,35,56,57,76,82,85]; however, in some cases funding was provided to compensate supervisor or director positions.[21,30,34,36,68]

Operational costs included liability insurance, telephone, utilities, security, marketing, office supplies, and administrative support.[6,29,39,45,57] In some situations, liability insurance was covered by universities, health sectors, and/or the supervising healthcare professionals.[21,89,103] Equipment and supply needs for student-run initiatives varied depending on services provided and availability of in-kind support, but included pharmaceuticals, laboratory services, diagnostic imaging, and medical supplies.[28,29,39,45,84,88,98,99,109]

Main sources of financing for many student-run initiatives came from federal or state funding.[4,14,42,45,77,89,94,99,110] In some cases, seed or operational funds were also committed through the affiliated educational institution and student associations.[1,14,19,20,50,68,87,89,94,109,110] Charitable organizations and foundations, such as the March of Dimes, non-profit agencies, and churches, were also identified as financial contributors for many initiatives[1,6,14,19,29,45,48,61,71,84,88,99] as were donations from sponsors and other benefactors.[4,20,28,71,78,82,86] In several student-run initiatives, the governance and leadership structure included volunteer roles dedicated to fundraising as part of the operational plan.[22,36,39,56] As previously mentioned, in-kind donations of resources by partner organizations or of material or labor by students and community members also accounted as a way to offset costs[35,36,42,68,87,94,99,103] and, in some student-run initiatives, cost recovery came through billing of clients who had health insurance coverage or on a sliding scale assessment.[46,78,105]

Professional Oversight

Approximately 84.2% of articles explicitly described involvement of practicing professionals in either an advisory capacity or in direct operations of student-run initiatives. One rationale for professional involvement and oversight was risk management, specifically in terms of liability coverage and ensuring quality of care in the delivery of services.[54,68,76] Although few authors explicitly identified professional licensure as a requirement for professional oversight, most articles in the review did describe a professional credential (eg, physician, nurse, nurse practitioner, dentist, pharmacist, etc.) for individuals having responsibility for oversight of operations and students performance.[35,48,50,56,57,65,71,81,83,95,102]

When acting in a professional oversight capacity, faculty members and/or professional stakeholders provided guidance and general support for the initiative as consultants, advisors, and/or members of the governance structure.[51,61,76,100,111] Professional oversight in direct operations was largely described as supervision of the activities conducted by students, and was covered by faculty, clinical instructors, agency preceptors, volunteer clinicians, or a combination of the aforementioned professionals.[22,29,51,61,72,78,80,83,99] This included providing mentorship and support in competency development for assessment, hands-on skills, education (eg, health promotion), planning care, and interprofessional practice.[5,29,47,81,96] It also involved overseeing quality of services delivered by students and ensuring competence through observations and reviews of procedures.[54,68,77] As well, limitations to student

capabilities and scope of practice in health-related initiatives required professional interventions, as with writing prescriptions, making specialist referrals and ordering diagnostics.[18,64,74]

Preparation for Student Role

Preparation to participate in the student-run initiatives was identified as important to provide support and context for the students in their role and to promote quality of the service being delivered.[41,91,111] Preparation and training for the roles included a range of activities such as completion of pre-requisite academic courses (either specific courses or level within a program, such as third or fourth year), formal orientations to the initiative, educational modules (eg, "just-in-time" training), workshops, practicing skills, and observational experiences.[5,6,29,39,44,54-56,61,64,68,76,85,97] Buckley et al[85] described the requirement of students demonstrating minimum competency of basic skills before volunteering for the initiative. Reviewing established policies and procedures, literature reviews on related topics, reference binders, and historical documentation on the initiative were also used to prepare students.[54,67] Another strategy to prepare students for their role(s) and that also served to both provide competencies in leadership and support consistency in the initiative was utilization of mentorship or apprenticeship models. In these instances, senior or experienced students would mentor incoming students to provide "just in time" training, role model values, give guidance or coaching such as through pairing or shadowing.[41,45,47,54,55,65,79]

Consequences Associated With Student-Run Initiatives

Walker and Avant refer to consequences as being the outcomes or results that occur because of a phenomenon.[9] Consequences associated with student-run health initiatives included benefits for clients, students, and the broader system (ie, for health initiatives the benefit was for the healthcare system). For clients there was improved access to services that was reflected by services at no-cost, ongoing continuity of care, episodic point of dispensing (eg, annual influenza clinics), and/or providing temporary care until long-term care was secured.[1,22,23,28,29,41,54,58,82,112] Improved client outcomes were also reported in relation to student-run initiatives, including less incidence of infection (eg, influenza rates), better maintenance of chronic illness, increased uptake of screening (eg, mammography, hepatitis B and C, HIV), effective treatment of depression, and improved quality of life.[1,22,23,43,82,93]

Consequences for students included competency development in relation to their chosen discipline and/or an element of personal gain from the experience. Specific knowledge, skills, and abilities that were gained and highlighted in the literature included hands-on clinical work, interpersonal communications, leadership, social accountability, community engagement, client education, impact of social determinants of health, and cultural safety competencies.[3,17,22,54,61,81,103] The opportunity to learn alongside other students and preceptors in an interprofessional environment was evident in almost 42% of the articles where outcomes included gaining appreciation of, and experience working with, other disciplines.[3,28,81,102] Personal gains that students identified as a benefit of their experience were a sense of purpose in providing services (eg, social responsibility through service-learning), gaining insight to different contexts of practice (eg, working with various population groups and other cultures), and opportunities for volunteerism.[3,29,58,97,102,103]

Consequences that reflected outcomes to the broader system included cost/benefit (eg, treatment costs), likelihood of service use (eg, emergency departments and hospitals), population health outcomes, and enrollment to health insurance plans.[23,38,86,113-115] Outcomes were evaluated and described through detailing operational costs, cost analysis (eg, student-run service to physician office visit), impact on actual or perceived use of hospitals and emergency departments, and barriers for clients in seeking insurance coverage.[23,38,86,112-114]

Although most consequences for clients, students, and the broader system reported in the literature were framed as positive findings, there were also some concerns noted in relation to quality of care and appropriateness of services for student-run health initiatives. Consistency and continuity of care was one aspect of quality, particularly when there was dependence on volunteerism or when initiatives ran concurrent with the semesters of the academic institution where there was high turnover of both students and mentors, as well as interruptions or lack of follow-up in service delivery.[4,8,19,34,35,50,61,62,82,90,91,104,111,116] Ensuring adequate preparation of students before participation in initiatives was also identified as essential to quality of care given variation in knowledge/skill sets, limited time to develop clinical skills, and teaching done by medical students.[1,36,42,50,54,104,111] As well, adequate resources that included limited access to specialty services, diagnostics, medications, or inpatient hospital care were noted as a challenge.[45,62,74,111] In relation to appropriateness of services, recommendations were made to better evaluate how well student-run health initiatives meet the needs of clients, such as the fit of the service and access.[75,111] Ethics in provision of student-run health initiatives related to running services based on student availability, sufficient follow-up care, potential harm with inadequate training/education, and perceptions of protection of privacy, were raised as issues for consideration.[35,36,47,54,111,116]

Discussion

Our systematic search and review of the literature and concept analysis of student-run health initiatives in community settings highlighted a diverse representation of programs from many different countries and a mix of different models operationalized by students or academic institutions. Our concept analysis identified many key characteristics of these initiatives including 5 attributes, 6 antecedents, as well as consequences of student-run health initiatives for the clients being served, students, and the broader health system. Our review also found 16 explicit definitions for student-run or student-led health initiatives; however, most articles lacked any definition. Although there were similarities across some of the definitions that were provided, there was no clear consensus in the meaning of student-run health initiatives. Key similarities included the provision of a service, opportunities for students to take lead responsibility in operationalization and delivery of services, and the role of licensed professionals in providing oversight of student activities in the initiative. None of the definitions made reference to an affiliation with an academic institution or other stakeholders and only 3 definitions made specific reference to the student-run health initiative being some form of educational opportunity.[22,34,49]

From the attributes and antecedents, we discerned 3 main common elements across student-run health initiatives. First, whether formally or informally associated with academic institutions, the initiatives have capacity to facilitate development of required competencies of students in pre-licensure health education programs. Competencies are regarded as the integrated knowledge, skills, and aptitude or attitude required of health professionals to practice appropriately and safely in their specific discipline.[117] As highlighted in the results, development of various competencies for pre-licensure students were described as the *Purpose/Rationale* of the student-run initiatives[6,22,61,68,82] although there were few explicit descriptions of the educational mechanism for how this was achieved. Where students were the main drivers of the health initiatives and played key roles in operationalizing them, it would be unreasonable that they would bear the responsibility of evaluating the competencies of peers or necessarily have the ability to do so. As noted in our findings, professional oversight by licensed mentors and preceptors to provide guidance to students likely would help support development of competencies; however, the manner in which this might be officially done, especially given the voluntary nature of many student-run health initiatives, is unclear.

A second common element is that student-run health initiatives offer a practical "hands on" element for development of competencies of students in any pre-licensure health discipline utilizing an experiential learning approach and this was well described in the literature.[22,29,41,45,76,85] In some situations, where the initiative was facilitated more formally by an academic institution, there was an intentional tie to the curriculum through course requirements, with or without course credit for the experience.[6,45,74,109] Formal connections to curriculum design and accompanying evaluations that are mandated by academic institutions distinguishes this type of student-run health initiative in that oversight and operationalization is mainly done by the institution even though students may play a leading role in the delivery of care and services.

Finally, a third common element across student-run health initiatives was a focus in addressing gaps in health service delivery for a broad range of clients and populations in various community settings; this was well described in the antecedent *Provision of Service*. As noted in the attribute *Target Clientele* and the definitions, the underserved population was the most common group who faced gaps in service and to whom services where directed. Given that the vast majority of literature (>76%) we reviewed originated in the United States, this may reflect the differences in health insurance coverage and resulting challenges for access to health services.[1,35,41,45,82] However, with high demands for primary health care (ie, primary care, prevention services, and health promotion) in community settings, and the range of health conditions that need support in various population groups, there is much potential for academic programs to intentionally design and implement student-run health initiatives to facilitate development of competencies required for pre-licensure health education programs. For example, many articles described delivery of health services to specific population health groups with particular needs (eg, immigrants or refugees requiring basic care, translation, and assistance with navigation within systems) that can facilitate student learning related to interpersonal communications, assessments, culture, health promotion, social justice, and advocacy for clients.[1,6,29,35,41,45,61,68] Or provision of services to clients living in areas that are geographically disadvantaged and where students may gain different perspectives on the impacts of social determinants of health, scope of practice, and appreciation of gaps in the health system (eg, requirement of health professionals in underserved locations).[1,6,22,35,45,61,68] In all these contexts, pre-licensure students in professional health programs could also develop entry-to-practice competencies in a variety of areas, such as chronic disease management, public health, interprofessional collaborative practice, and health education.[6,22,29,35,41,45,47,61]

Specific differences identified through our concept analysis included the degree of student autonomy in running the initiatives; the extent of involvement by academic institutions; the role of volunteerism in contrast to clinical placements; and whether credit was awarded for student participation. This was highlighted by Doucet et al[118] who introduced the term *student-infused* in conjunction with an institution-led pulmonary rehabilitation program noting that students had "limited ability to independently provide clinical interventions, required liability coverage, and did not have input" into the design of the program (p. 27).

In light of our findings, and recognizing that student-run health initiatives can significantly vary in purpose and scope, we now propose 3 definitions that may help in providing conceptual clarity: *student-run*, *student-led*, and *student-infused* health initiatives.

Proposed Conceptual Definitions

In proposing these conceptual definitions, we believe that all 3 concepts would be underpinned by core attributes and antecedents: *Provision of Service*; *Target Clientele*; *Purpose/Rationale*; *Location and Partnerships*; *Funding and Resources*; and *Professional Oversight*. Ensuring these specific characteristics would help articulate a mandate for the initiative, ensure appropriateness of the activities being conducted, ensure safety and quality of service, and promote the long-term sustainability of the initiative. Then, depending on what the overarching goal of the initiative is, the other attributes and antecedents may be applied contingent on who takes an active lead in creating and developing the initiative. For instance, if students are primarily responsible for designing, implementing, and operationalizing the initiative, then *Volunteerism* and *Student Governance* may be additional defining characteristics. As such, our proposed conceptual definitions are:

(a) *Student-run health initiatives*—projects or programs that are initiated and mainly operated by students but operationalized outside of formal academic institution/curriculum structures to provide a health-related service(s) to community members. Students' participation is voluntary and not-for-credit.

(b) *Student-led health initiatives*—projects or programs that are initiated by academic institutions and mainly operated by students either in conjunction with, or outside, of formal academic institution/curriculum structures to provide a health-related service(s) to community members. In this model students may or may not get co-curricular credit, but participation is not a requirement for credit within the curriculum.

(c) *Student-infused health initiatives*—projects or programs that are initiated by academic institutions as part of the formal curriculum and mainly operated or delivered by students to provide a health-related service(s) to community members. In this model, development and implementation of the project or program is designed with intention to promote acquisition of entry-to-practice competencies through experiential learning, service learning, or other planned activities as either a required or optional for-credit pre-licensure education strategy.

We see these proposed definitions as a starting point for future discussion and refinement to gain conceptual clarity

for the phenomenon of student-run health initiatives. Further, noting the lack of definitions in most articles and minimal descriptions of the initiatives in other articles, we suggest authors ensure adequate details are provided in articles to facilitate comparisons of programs, goals, and outcomes through the literature.

Limitations

One limitation to our concept analysis was the restriction of our review only to English language articles due to the skills of our team. As a result, we likely will have missed representation from regions, such as from Central and South America that would be predominantly Spanish or Portuguese and Asia that is linguistically diverse. Related to this are exclusion of 2 articles that were not available in English. Limitation in language could also account for lack of representation of literature from developing countries that might provide another perspective on student-run health initiatives and other contexts of service delivery, such as different healthcare systems, local factors, and other population characteristics.

Another limitation is the imprecise nature of search terms for databases, which is complicated by how things are indexed in databases. Part of this is related to inconsistent usage of concepts and lack of common definitions as demonstrated by the results of our literature review. There is typically limited controlled vocabulary (eg, Medical Subject Headings terms) available for topics that are new and emerging, and that are, therefore, less commonly or inconsistently searched. As a result, there was limited subject heading coverage available for the concept student-run health initiatives and similar terms; MEDLINE (Ovid) and Embase (Ovid) were the only databases which had a relevant subject heading (which was "student-run clinic" for both databases). With this limitation in mind and reliance on keyword searching, articles that were described in unexpected ways may have been missed. For example, we found the additional terms *student-infused* and *student-assisted* outside of the literature search for this concept analysis.[118,119] We attempted to account for these challenges by using adjacency searching to address multiple possible phrasings. Still, this explains why we found the terms *student-infused* and *student-assisted* outside of the search process.

Finally, another limitation to our review was not having access to 27 articles for full text review; however, given the representation of the literature we screened and volume of data this would likely have little impact on our analysis and final outcomes.

Future Directions

This concept analysis was initiated in conjunction with foundational work to design an innovative education program to provide a practical learning experience for students in pre-licensure health disciplines. The identification of attributes,

antecedents, and consequences have helped to delineate some important defining characteristics of student-run health initiatives and to identify some opportunities for future work. As noted at the outset, one of the corresponding projects we were undertaking was a scoping review to map the current knowledge of existing student-run initiatives and identification of the characteristics have helped our team determine a protocol for data extraction. These characteristics and the use of definitions will be of further benefit in the design and execution of environmental scans of like programs, as well as informing the design of targeted systematic reviews to synthesize data on specific foci, such as client outcomes (eg, access to services, health outcomes, etc.), student learning (eg, competency development, perceptions of educational experience, etc.), and benefits to the broader health system (eg, addressing gaps in services, cost/benefits, etc.). As well, we highlighted some gaps in knowledge specific to consequences that need to be further researched, such as quality of care, appropriateness of services, and ethics of operating student-run health initiatives. The results of this concept analysis and consequent work may also serve to provide guidance and recommendations for development or refinement of student-run health initiatives in practice.

Conclusion

Student-run health initiatives have been demonstrated to have both the capacity to prepare pre-licensure students in healthcare disciplines for practice and to provide health services for clients in the community. Although our concept analysis confirmed there was no clear definition for student-run health initiatives, there was some commonality in the definitions presented and several defining characteristics for this concept. The volume of literature and well-described exemplars that highlight the similarities and differences of existing student-run health initiatives support the need for clearer definitions and delineation of characteristics to inform development and/or refinement of similar initiatives. The information we gained from the literature and the characteristics we identified support the distinct definitions we offer for *student-run*, *student-led*, and *student-infused* health initiatives. We view these proposed definitions as a starting point to adding clarity for these concepts. Clear conceptualization is an important step to advance future pre-licensure student health service delivery initiatives, promote potential formal incorporation of student-run health initiatives into health professions education, and better support research in this area.

Author Contributions

This study was conceived by DAN and JLP, and both developed the protocol and oversaw the execution of the concept analysis. JW led the development of the literature search strategy, ran the searches and provided assistance throughout the project. DAN, TTN, MTP, VKP, and JLP participated in screening of titles and abstracts and of full-text articles. TTN, MTP, and VKP conducted data extraction and preparation of the appendix and tables, and all authors participated in data interpretation. DAN was lead writer of the manuscript, and all authors reviewed, edited, and approved the final manuscript.

ORCID iD

Daniel A. Nagel [iD] https://orcid.org/0000-0002-8089-589X

Supplemental Material

Supplemental material for this article is available online.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article and its supplementary files.

References

1. Hemba KE, Plumb J. JeffHOPE: the development and operation of a student-run clinic. *J Prim Care Community Health*. 2011;2(3):167-172. doi:10.1177/2150131911404239
2. Lee BJ, Wang SK, So C, et al. A student-led health education initiative addressing health disparities in a China town community. *Am J Pharm Educ*. 2015;79(9):132. doi:10.5688/ajpe799132
3. Sheu LC, Zheng P, Coelho AD, et al. Learning through service: student perceptions on volunteering at interprofessional hepatitis B student-run clinics. *J Cancer Educ*. 2011;26(2):228-233. doi:10.1007/s13187-010-0142-6
4. Abuelenen T, Khalil S, Simoneit E, et al. Prevent and protect: a vaccination initiative for uninsured patients at a student-run free clinic. *J Community Health*. 2020;45(5):910-915. doi:10.1007/s10900-020-00808-w
5. Drexler R, Fröschle F, Predel C, et al. Establishing a student-run free clinic in a major city in Northern Europe: a 1-year experience from Hamburg, Germany. *J Public Health (Oxf)*. 2019;42(4):793-798. doi:10.1093/pubmed/fdz165

6. Moskowitz D, Glasco J, Johnson B, Wang G. Students in the community: an interprofessional student-run free clinic. *J Interprof Care*. 2006;20(3):254-259. doi:10.1080/13561820600721091

7. Simmons K, Klein M, Stevens C, Jacobson T. Implementation of a student pharmacist-run diabetes education and management clinic in a federally qualified health center in Texas. *Curr Pharm Teach Learn*. 2019;11(8):849-852. doi:10.1016/j.cptl.2019.04.015

8. Simpson SA, Long JA. Medical student-run health clinics: important contributors to patient care and medical education. *J Gen Intern Med*. 2007;22(3):352-356. doi:10.1007/s11606-006-0073-4

9. Walker LO, Avant KC. *Strategies for Theory Construction in Nursing*, 6th ed. Pearson; 2019.

10. Rodgers BL. Concepts, analysis and the development of nursing knowledge: the evolutionary cycle. *J Adv Nurs*. 1989;14(4):330-335. doi:10.1111/j.1365-2648.1989.tb03420.x

11. Haggarty D, Dalcin D. Student-run clinics in Canada: an innovative method of delivering interprofessional education. *J Interprof Care*. 2014;28(6):570-572. doi:10.3109/13561820.2014.916658

12. Holmqvist M, Courtney C, Meili R, Dick A. Student-run clinics: opportunities for interprofessional education and increasing social accountability. *J Res Interprof Pract Educ*. 2012;2(3):264-277. doi:10.22230/jripe.2012v2n3a80

13. Meah YS, Smith EL, Thomas DC. Student-run health clinic: novel arena to educate medical students on systems-based practice. *Mt Sinai J Med*. 2009;76(4):344-356. doi:10.1002/msj.20128

14. Ng E, Hu T. A survey of Canadian interprofessional student-run free clinics. *J Interprof Care*. 2017;31(6):781-784. doi:10.1080/13561820.2017.1346590

15. Schutte T, Tichelaar J, Dekker RS, van Agtmael MA, de Vries TP, Richir MC. Learning in student-run clinics: a systematic review. *Med Educ*. 2015;49(3):249-263. doi:10.1111/medu.12625

16. Warren S, Puryear E, Chapman M, Barnett TM, White LS. The role of social work in free healthcare clinics and student-run clinics. *Soc Work Health Care*. 2017;56(10):884-896. doi:10.1080/00981389.2017.1371097

17. Burgos JL, Yee DC, Vargas-Ojeda AC, Ojeda VD. The health frontiers in Tijuana undergraduate internship program: a novel global health experience in Mexico for pre-medical/pre-health undergraduates. *J Health Care Poor Underserved*. 2016;27(3):947-953. doi:10.1353/hpu.2016.0117

18. Dugani S, McGuire R. Development of IMAGINE: a three-pillar student initiative to promote social accountability and interprofessional education. *J Interprof Care*. 2011;25(6):454-456. doi:10.3109/13561820.2011.597525

19. Mootz A, Price A, Elahi C, et al. Retrospective analysis of population demographic characteristics, medical interventions, and resource use at a medical student-run clinic on the Texas-Mexico border. *J Health Care Poor Underserved*. 2019;30(2):519-531. doi:10.1353/hpu.2019.0034

20. Price CR, Hatch LA, Radisic A, et al. Enhancing adherence to cervical cancer screening guidelines at a student-run free clinic. *J Community Health*. 2020;45(1):128-132. doi:10.1007/s10900-019-00724-8

21. Buckley E, Vu T, Remedios L. The REACH project: implementing interprofessional practice at Australia's first student-led clinic. *Educ Health (Abingdon, Engl)*. 2014;27(1):93-98. doi:10.4103/1357-6283.134360

22. Liang En W, Koh GC, Lim VK. Caring for underserved patients through neighborhood health screening: outcomes of a longitudinal, interprofessional, student-run home visit program in Singapore. *Acad Med*. 2011;86(7):829-839. doi:10.1097/ACM.0b013e31821d841d

23. Stuhlmiller CM, Tolchard B. Developing a student-led health and wellbeing clinic in an underserved community: collaborative learning, health outcomes and cost savings. *BMC Nurs*. 2015;14(1):32. doi:10.1186/s12912-015-0083-9

24. Bishop GA, Long CC, Carlsten KS, Kennedy KC, Shaw JR. The Colorado State University pet hospice program: end-of-life care for pets and their families. *J Vet Med Educ*. 2008;35(4):525-531. doi:10.3138/jvme.35.4.525

25. Gore M, Lana SE, Bishop GA. Colorado State University, pet hospice program. *Vet Clin North Am Small Anim Pract*. 2019;49(3):339-349. doi:10.1016/j.cvsm.2019.01.002

26. Stein OR, Schmalzbauer L. Engineers without borders at Montana State University: student-led engagement and transnational collaboration. *J High Educ Outreach Engagem*. 2012;16(3):187-209.

27. Androff D, Fike C, Rorke J. Greening social work education: teaching environmental rights and sustainability in community practice. *J Soc Work Educ*. 2017;53(3):399-413. doi:10.1080/10437797.2016.1266976

28. Evans PT, Ewing JK, Walia S, Miller RF, Hawkins AT. Implementation of general surgery care into a student-run free clinic. *J Surg Res*. 2020;255:71-76. doi:10.1016/j.jss.2020.05.031

29. Farokhi MR, Glass BJ, Gureckis KM. A student operated, faculty mentored dental clinic service experience at the University of Texas health science center at San Antonio for the underserved refugee community: an interprofessional approach. *Tex Dent J*. 2014;131(1):27-33.

30. Kent F, Drysdale P, Martin N, Keating JL. The mixed-discipline aged-care student clinic: an authentic interprofessional learning initiative. *J Allied Health*. 2014;43(1):51-56.

31. Black JD, Palombaro KM, Dole RL. Student experiences in creating and launching a student-led physical therapy pro bono clinic: a qualitative investigation. *Phys Ther*. 2013;93(5):637-648. doi:10.2522/ptj.20110430

32. Ojeda VD, Eppstein A, Lozada R, et al. Establishing a binational student-run free-clinic in Tijuana, Mexico: a model for US–Mexico border states. *J Immigr Minor Health*. 2014;16(3):546-548. doi:10.1007/s10903-012-9769-1

33. Rogers O, Heck A, Kohnert L, Paode P, Harrell L. Occupational therapy's role in an interprofessional student-run free clinic: challenges and opportunities identified. *Open J Occup Ther*. 2017;5(3):7. doi:10.15453/2168-6408.1387

34. Forbes R, Beckman E, Tower M, et al. Interprofessional, student-led community health clinic: expanding service provision and clinical education capacity. *Aust Health Rev*. 2021;45(2):255-260. doi:10.1071/AH20021

35. Palma ML, Arthofer A, Halstead KM, Wahba JM, Martinez DA. Service learning in health care for underserved

communities: University of Iowa Mobile Clinic, 2019. *Am J Public Health*. 2020;110(9):1304-1307. doi:10.2105/AJPH.2020.305755

36. Sheu LC, Toy BC, Kwahk E, Yu A, Adler J, Lai CJ. A model for interprofessional health disparities education: student-led curriculum on chronic hepatitis B infection. *J Gen Intern Med*. 2010;25(Suppl 2):140-145. doi:10.1007/s11606-009-1234-z

37. Barrera L, Trumbo SP, Bravo-Alcántara P, Velandia-González M, Danovaro-Holliday MC. From the parents' perspective: a user-satisfaction survey of immunization services in Guatemala. *BMC Public Health*. 2014;14(1):231. doi:10.1186/1471-2458-14-231

38. Trumbo SP, Schuering KM, Kallos JA, et al. The effect of a student-run free clinic on hospital utilization. *J Health Care Poor Underserved*. 2018;29(2):701-710. doi:10.1353/hpu.2018.0053

39. Westra R, Skube S, Zant M. HOPE clinic: a place to care. *Minn Med*. 2011;94(11):49-51.

40. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19-32. doi:10.1080/1364557032000119616

41. Asanad K, Zheng J, Chan-Golston A, et al. Assessing quality of care through client satisfaction at an interprofessional student-run free clinic. *J Interprof Care*. 2018;32(2):203-210. doi:10.1080/13561820.2017.1395827

42. Ginoza ME, Tomita-Barber J, Onugha J, et al. Student-run free clinic at a syringe services program, Miami, Florida, 2017–2019. *Am J Public Health*. 2020;110(7):988-990. doi:10.2105/AJPH.2020.305705

43. Morello CM, Singh RF, Chen KJ, Best BM. Enhancing an introductory pharmacy practice experience at free medical clinics. *Int J Pharm Pract*. 2010;18(1):51-57. doi:10.1211/ijpp.18.01.0009

44. Poore JA, Milgrom LB, & Edgington L. An innovative role for nursing students within a student-run free clinic. *Creat Nurs*. 2017;23(3):147-150. doi:10.1891/1078-4535.23.3.147

45. Beck E. The UCSD student-run free clinic project: trans-disciplinary health professional education. *J Health Care Poor Underserved*. 2005;16(2):207-219. doi:10.1353/hpu.2005.0026

46. Dekker RS, Schutte T, Tichelaar J, et al. A novel approach to teaching pharmacotherapeutics—feasibility of the learner-centered student-run clinic. *EurJ Clin Pharmacol*. 2015;71(11):1381-1387. doi:10.1007/s00228-015-1916-x

47. Lawrence D, Bryant TK, Nobel TB, Dolansky MA, Singh MK. A comparative evaluation of patient satisfaction outcomes in an interprofessional student-run free clinic. *J Interprof Care*. 2015;29(5):445-450. doi:10.3109/13561820.2015.1010718

48. Lee JS, Combs K, Pasarica M 2016. KNIGHTS Research Group Improving efficiency while improving patient care in a student-run free clinic. *J Am Board Fam Med*. 2017;30(4):513-519. doi:10.3122/jabfm.2017.04.170044

49. Lie DA, Forest CP, Walsh A, Banzali Y, Lohenry K. What and how do students learn in an interprofessional student-run clinic? An educational framework for team-based care. *Med Educ Online*. 2016;21(1):31900. doi:10.3402/meo.v21.31900

50. Hu T, Cox KA, Nyhof-Young J. Investigating student perceptions at an interprofessional student-run free clinic serving marginalised populations. *J Interprof Care*. 2018;32(1):75-79. doi:10.1080/13561820.2017.1363724

51. Huang K, Maleki M, Regehr G, McEwen H. Examining the educational value of student-run clinics for health care students. *Acad Med*. 2021;96(7):1021-1025. doi:10.1097/ACM.0000000000003922

52. Johnston D, McInerney P, Moch S. Learning experiences of medical and pharmacy students at a student-run clinic in South Africa and the development of a framework for learning. *Educ Health*. 2020;33(3):87-94. doi:10.4103/efh.EfH_281_18

53. Johnston D, McInerney P, Thurling H. Experiences of the homeless accessing an inner-city pharmacy and medical student-run clinic in Johannesburg. *Health SA Gesondheid*. 2020;25:1358. doi:10.4102/hsag.v25i0.1358

54. Adams LM, Canclini S, Tillman K. "This is not a drill": activation of a student-led influenza vaccination point of dispensing. *J Am Coll Health*. 2019;67(2):88-91. doi:10.1080/07448481.2018.1463228

55. Cusumano J, Martin CS, Butler B, Bixler B, Shirk K. Efficacy of a physician assistant student-developed behavior change program at a local free clinic. *J Physician Assist Educ*. 2017;28(1):41-44. doi:10.1097/JPA.0000000000000106

56. Hays A, Schriever C, Rudzinski J, Lynch JL, Genrich E, Schriever A. Fostering interprofessional education through a multidisciplinary, community-based pandemic mass vaccination exercise. *Am J Public Health*. 2018;108(3):358-360. doi:10.2105/AJPH.2017.304240

57. Hannings AN, Duke LJ, Logan LD, et al. Patient perceptions of student pharmacist–run mobile influenza vaccination clinics. *J Am Pharm Assoc*. 2019;59(2):228-231.e1. doi:10.1016/j.japh.2018.10.018

58. McQuillan T, Wilcox-Fogel N, Kraus E, Ladd A, Fredericson M. Integrating musculoskeletal education and patient care at medical student-run free clinics. *PMR*. 2017;9(11):1117-1121. doi:10.1016/j.pmrj.2017.03.008

59. Russi AE, Bhaumik S, Herzog JJ, Tschoe M, Baumgartner AC. Impact of an education-centered medical home on quality at a student-volunteer free clinic. *Med Educ Online*. 2018;23(1):1505401. doi:10.1080/10872981.2018.1505401

60. Santa Maria D. Feasibility and efficacy of a student nurse-delivered, parent-based sexual health curriculum in under-served communities: a pilot randomized-controlled trial. *Pediatr Nurs*. 2018;44(1):12-16.

61. Stuard WL, Squiers K, Suss A, et al. Development and implementation of psychiatric services in a student-operated clinic. *Community Ment Health J*. 2019;55(4):553-560. doi:10.1007/s10597-018-0325-x

62. Welsh KJ, Patel CB, Fernando RC, et al. Prevalence of bipolar disorder and schizophrenia in Houston Outreach Medicine, Education, and Social Services (HOMES) clinic patients: implications for student-managed clinics for underserved populations. *Acad Med*. 2012;87(5):656-661. doi:10.1097/ACM.0b013e31824d4540

63. McAndrew S, Jackman C, Sisto PP. Medical student-developed obesity education program uses modified team-based learning to motivate adolescents. *Med Teach*. 2012;34(5):414-416. doi:10.3109/0142159X.2012.668238

64. Landy DC, Gorin MA, O'Connell MT. Student-led rural health fairs: attempting to improve medical education and access to health care. *South Med J*. 2011;104(8):598-603. doi:10.1097/SMJ.0b013e31822580a9

65. Lough LE, Ebbert JO, McLeod TG. Evaluation of a student-run smoking cessation clinic for a medically underserved population. *BMC Res Notes*. 2011;4(1):55. doi:10.1186/1756-0500-4-55

66. Milligan C, Cuneo CN, Rutstein SE, Hicks C. "Know your status": results from a novel, student-run HIV testing initiative on college campuses. *AIDS Educ Prev*. 2014;26(4):317-327. doi:10.1521/aeap.2014.26.4.317

67. Ouyang D, Yuan N, Sheu L, Lau G, Chen C, Lai CJ. Community health education at student-run clinics leads to sustained improvement in patients' hepatitis B knowledge. *J Community Health*. 2013;38(3):471-479. doi:10.1007/s10900-012-9631-3

68. Riddle MC, Lin J, Steinman JB, et al. Incorporating the principles of the patient-centered medical home into a student-run free clinic. *Adv Med Educ Pract*. 2014;5:289-297. doi:10.2147/AMEP.S66762

69. Hu T, Leung FH. An evaluation of wait-times at an interprofessional student-run free clinic. *J Interprof Care*. 2016;30(4):532-535. doi:10.1080/13561820.2016.1181614

70. Ueberroth BE, Siegel DR. The utility of EMRs in student run clinics. *Clin Teach*. 2020;17(2):159-162. doi:10.1111/tct.13043

71. Sick B, Sheldon L, Ajer K, Wang Q, Zhang L. The student-run free clinic: an ideal site to teach interprofessional education? *J Interprof Care*. 2014;28(5):413-418. doi:10.3109/13561820.2014.907779

72. Sick B, Zhang L, Weber-Main AM. Changes in health professional students' attitudes toward the underserved: impact of extended participation in an interprofessional student-run free clinic. *J Allied Health*. 2017;46(4):213-219.

73. Meierhofer J, Baumgartner L, Howard K, Lounsbery J, Reidt S, Moon J. Facilitating student pharmacist learning through student-led development of a service-learning opportunity. *Curr Pharm Teach Learn*. 2013;5(6):611-615. doi:10.1016/j.cptl.2013.07.006

74. Batra P, Chertok JS, Fisher CE, Manseau MW, Manuelli VN, Spears J. The Columbia-Harlem homeless medical partnership: a new model for learning in the service of those in medical need. *J Urban Health*. 2009;86(5):781-790. doi:10.1007/s11524-009-9386-z

75. Hastings J, Zulman D, Wali S. UCLA mobile clinic project. *J Health Care Poor Underserved*. 2007;18(4):744-748. doi:10.1353/hpu.2007.0097

76. Dang CJ, Dudley JE, Truong HA, Boyle CJ, Layson-Wolf C. Planning and implementation of a student-led immunization clinic. *AJPE*. 2012;76(5):78. doi:10.5688/ajpe76578

77. Bennard B, Wilson JL, Ferguson KP, Sliger C. A student-run outreach clinic for rural communities in Appalachia. *Acad Med*. 2004;79(7):666-671. doi:10.1097/00001888-200407000-00010

78. Ryskina KL, Meah YS, Thomas DC. Quality of diabetes care at a student-run free clinic. *J Health Care Poor Underserved*. 2009;20(4):969-981. doi:10.1353/hpu.0.0231

79. Gorrindo P, Peltz A, Ladner TR, et al. Medical students as health educators at a student-run free clinic: improving the clinical outcomes of diabetic patients. *Acad Med*. 2014;89(4):625-631. doi:10.1097/ACM.0000000000000164

80. Zucker J, Gillen J, Ackrivo J, Schroeder R, Keller S. Hypertension management in a student-run free clinic: meeting national standards? *Acad Med*. 2011;86(2):239-245. doi:10.1097/ACM.0b013e31820465e0

81. Danhausen K, Joshi D, Quirk S, Miller R, Fowler M, Schorn MN. Facilitating access to prenatal care through an interprofessional student-run free clinic. *J Midwifery Womens Health*. 2015;60(3):267-273. doi:10.1111/jmwh.12304

82. Khalil S, Hatch L, Price CR, et al. Addressing breast cancer screening disparities among uninsured and insured patients: a student-run free clinic initiative. *J Community Health*. 2020;45(3):501-505. doi:10.1007/s10900-019-00767-x

83. Liu MB, Xiong G, Boggiano VL, Ye PP, Lin S. Providing specialty care for the poor and underserved at student-run free clinics in the San Francisco Bay area. *J Health Care Poor Underserved*. 2017;28(4):1276-1285. doi:10.1353/hpu.2017.0113

84. Lu KB, Thiel B, Atkins CA, et al. Satisfaction with healthcare received at an interprofessional student-run free clinic: invested in training the next generation of healthcare professionals. *Cureus*. 2018;10(3):e2282. doi:10.7759/cureus.2282

85. Buckley K, Tsu L, Hormann S, et al. A health sciences student–run smoking cessation clinic experience within a homeless population. *J Am Pharm Assoc*. 2017;57(1):109-115.e3. doi:10.1016/j.japh.2016.09.008

86. Johnston D, McInerney P, Miot J. Volunteering, health and the homeless - the cost of establishing a student-run primary healthcare clinic serving the inner-city homeless in South Africa. *BMC Health Serv Res*. 2020;20(1):202. doi:10.1186/s12913-020-5061-6

87. Rosenbaum BP, Patel SG, Guyer DL, et al. The pharmaceutical management system at Shade Tree Family Clinic: a medical student-run free clinic's experience. *Inform Health Soc Care*. 2008;33(3):151-157. doi:10.1080/17538150802184828

88. Williams AM, Botsford B, Mortensen P, Park D, Waxman EL. Delivering mobile eye care to underserved communities while providing training in ophthalmology to medical students: experience of the Guerrilla Eye Service. *Clin Ophthalmol*. 2019;13:337-346. doi:10.2147/OPTH.S185692

89. Aultman J, Kingsbury D, Baughman K, Fischbein R, Boltri JM. Reimagining proactive strategic planning toward patient-centered care: processes and outcomes in a medical school's department of family and community medicine. *Int J Health Gov*. 2020;25(3):223-233. doi:10.1108/IJHG-03-2020-0017

90. Thompson A, Jordan TR, Brookins-Fisher J, Karmaker M, Evans N. Formation of a student-led, community-based, chronic disease center at an urban university. *Health Educ*. 2018;50(2):2-6.

91. Butala NM, Murk W, Horwitz LI, Graber LK, Bridger L, Ellis P. What is the quality of preventive care provided in a student-run free clinic? *J Health Care Poor Underserved*. 2012;23(1):414-424. doi:10.1353/hpu.2012.0034

92. Smith S, Malinak D, Chang J, et al. Implementation of a food insecurity screening and referral program in student-run free clinics in San Diego, California. *Prev Med Rep*. 2017;5:134-139. doi:10.1016/j.pmedr.2016.12.007

93. Soltani M, Smith S, Beck E, Johnson M. Universal depression screening, diagnosis, management, and outcomes at a student-run free clinic. *Acad Psychiatry*. 2015;39(3):259-266. doi:10.1007/s40596-014-0257-x

94. Weissman GE, Morris RJ, Ng C, Pozzessere AS, Scott KC, Altshuler MJ. Global health at home: a student-run community health initiative for refugees. *J Health Care Poor Underserved*. 2012;23(3):942-948. doi:10.1353/hpu.2012.0093

95. Murzl CA, Durns TA, Mowrey LT, Tubbs AS, Boeve SA. A medical student-run child and adolescent psychiatry clinic: one institution's experience. *Acad Psychiatry*. 2017;41(5):582-586. doi:10.1007/s40596-017-0753-x

96. Rebholz CM, Macomber MW, Althoff MD, et al. Integrated models of education and service involving community-based health care for underserved populations: Tulane student-run free clinics. *South Med J*. 2013;106(3):217-223. doi:10.1097/SMJ.0b013e318287fe9a

97. Young HJ, Erickson ML, Johnson KB, Johnson MA, McCully KK. A wellness program for individuals with disabilities: using a student wellness coach approach. *Disabil Health J*. 2015;8(3):345-352. doi:10.1016/j.dhjo.2014.12.003

98. Cesari WA, Vaikunth SS, Lewis JB, Panda M. Know your audience: analysis of chief complaints at clinica esperanza, a student-run free clinic in Memphis, Tennessee. *J Prim Care Community Health*. 2012;3(4):295-298. doi:10.1177/2150131912442713

99. Kumar NR, DuVernois G, Almeida-Monroe V, Siegert N, De Groot AS. Evaluating the impact of a student-run women's clinic on access to gynecologic care for uninsured women in Rhode Island. *R I Med J*. 2019;102(10):52-56.

100. Traynor K. At homeless clinic, Alabama pharmacy students gain experience and serve local need. *Am J Health Syst Pharm*. 2018;75(10):585-589. doi:10.2146/news180031

101. Sheu L, O'Brien B, O'Sullivan PS, Kwong A, Lai CJ. Systems-based practice learning opportunities in student-run clinics: a qualitative analysis of student experiences. *Acad Med*. 2013;88(6):831-836. doi:10.1097/ACM.0b013e31828ff92c

102. Passmore A, Persic C, Countryman D, et al. Student and preceptor experiences at an inter-professional student-run clinic: a physical therapy perspective. *Physiother Can*. 2016;68(4):391-397. doi:10.3138/ptc.2015-87E

103. Palombaro KM, Dole RL, Lattanzi JB. A case report of a student-led pro bono clinic: a proposed model for meeting student and community needs in a sustainable manner. *Phys Ther*. 2011;91(11):1627-1635. doi:10.2522/ptj.20100437

104. Miller KM, Ha DF, Chan RK, Andersen SW, Howell LP. Impact of a student-led community education program to promote pap test screening among Asian-American women. *J Am Soc Cytopathol*. 2017;6(4):145-154. doi:10.1016/j.jasc.2017.03.004

105. Berman R, Powe C, Carnevale J, et al. The crimson care collaborative: a student-faculty initiative to increase medical students' early exposure to primary care. *Acad Med*. 2012;87(5):651-655. doi:10.1097/ACM.0b013e31824d5269

106. Martinez JTC, Fargason RE, Meador-Woodruff JH. Preclinical medical students as the primary longitudinal provider of psychiatric care in the outpatient setting: a novel training model. *Acad Psychiatry*. 2017;41(4):538-541. doi:10.1007/s40596-016-0659-z

107. Duford A, Matvienko O. Student-led mobile health clinic: patients served and learning experience. *J Physician Assist Educ*. 2019;30(3):149-154. doi:10.1097/JPA.0000000000000266

108. Ellett JD, Campbell JA, Gonsalves WC. Patient satisfaction in a student-run free medical clinic. *Fam Med*. 2010;42(1):16-18.

109. Howell CK, Reveles KR, Knodel LC, Pattyn NR, Frei CR. Know your medicine: a novel student-led community service learning program. *Curr Pharm Teach Learn*. 2017;9(3):353-359. doi:10.1016/j.cptl.2017.01.006

110. Price S. Clinic in the colonias. *Tex Med*. 2018;114(6): 32-34.

111. Buchanan D, Witlen R. Balancing service and education: ethical management of student-run clinics. *J Health Care Poor Underserved*. 2006;17(3):477-485. doi:10.1353/hpu.2006.0101

112. Pribish A, Khalil N, Mhaskar R, Woodard L, Mirza AS. Chronic disease burden of the homeless: a descriptive study of student-run free clinics in Tampa, Florida. *J Community Health*. 2019;44(2):249-255. doi:10.1007/s10900-018-0580-3

113. Alhallak I, Williams DK, Eudy R, Puryear E, Clark M. Impact of student-run free clinics in urgent care. *J Community Health*. 2021;46(3):522-526. doi:10.1007/s10900-020-00890-0

114. McGeehan M, DeMaria R, Charney P, Batavia AS. Insurance enrollment at a student-run free clinic after the patient protection and affordable care act. *J Community Health*. 2017;42(4):785-790. doi:10.1007/s10900-017-0318-7

115. Stuhlmiller CM, Tolchard B. Population health outcomes of a student-led free health clinic for an underserved population: a naturalistic study. *J Community Health*. 2018;43(1):193-200. doi:10.1007/s10900-017-0402-z

116. Smith D, Ramesh S, Smith M, Jensen A, Ellaway R. The Calgary student run clinic in context: a mixed-methods case study. *Can Med Educ J*. 2019;10(3):e27-e38. doi:10.36834/cmej.56911

117. Verma S, Paterson M, Medves J. Core competencies for health care professionals: what medicine, nursing, occupational therapy, and physiotherapy share. *J Allied Health*. 2006;35(2):109-115.

118. Doucet JR, Fournier TA, Bishop CM, Gaudet DJ, Nagel DA. Pilot of a community-based interprofessional "student-infused" pulmonary rehabilitation program in Saint John, New Brunswick. *Can J Respir Ther*. 2021;57:26-31. doi:10.29390/cjrt-2020-053

119. Frakes KA, Brownie S, Davies L, Thomas JB, Miller ME, Tyack Z. Capricornia Allied Health Partnership (CAHP): a case study of an innovative model of care addressing chronic disease through a regional student-assisted clinic. *Aust Health Rev*. 2014;38(5):483-486. doi:10.1071/AH13177