



MCH Leadership Training Program: An Innovative Application of an Implementation Science Framework

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Abstract

Introduction MCH training programs in schools of public health provide specialized training to develop culturally competent and skilled MCH leaders who will play key roles in public health infrastructure. Previous literature has reported on the effectiveness of MCH training programs (e.g., number of trainees, improvement in knowledge/skills); less attention has been devoted to understanding factors influencing program implementation during times of rapid change, while considering internal and external contexts (e.g., global pandemic, social unrest, uncertainty of funding, mental health issues, and other crises).

Purpose This article describes a graduate-level MCH leadership training program and illustrates how an implementation science framework can inform the identification of determinants and lessons learned during one year of implementation of a multi-year program.

Assessment Findings reveal how CFIR can be applicable to a MCH training program and highlight how constructs across domains can interact and represent determinants that serve as both a barrier and facilitator. Key lessons learned included the value of accountability, flexibility, learner-centeredness, and partnerships.

Conclusion Findings may apply to other programs and settings and could advance innovative training efforts that necessitate attention to the multi-level stakeholder needs (e.g., student, program, institution, community, and local/regional/national levels). Applying CFIR could be useful when interpreting process and outcome evaluation data and transferring findings and lessons learned to other organizations and settings. Integrating implementation science specifically into MCH training programs could contribute to the rigor, adaptability, and dissemination efforts that are critical when learning and sharing best practices to expand leadership capacity efforts that aim to eliminate MCH disparities across systems.

Significance

A skilled MCH workforce is essential for an effective public health system to address health disparities and achieve health equity. Preparing MCH professionals to respond to pandemics, disasters, unrest, disparities, and other complex socio-political situations requires training that promotes lifelong learning, commitment, collaboration, and action. However, determinants impacting MCH leadership training program implementation remain unknown. This article illustrates how integrating an implementation science framework could inform development, implementation and evaluation activities. Such application could contribute to improving the rigor, transferability, adaptability, and dissemination efforts during challenging times.

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Rapid systematic, comprehensive, and timely responses to programmatic challenges are critical for learning, adapting, and sharing best practices to expand MCH leadership training capacity efforts.

Keywords Maternal and child health · Leadership training program · Implementation science

Introduction

Need for Adaptive Leadership in MCH Training Programs in Current Landscape

The living conditions where individuals grow and develop, known as the social determinants of health (SDOH), play a key role on maternal and child health (MCH) disparities (Dongarwar et al., 2020). Historically marginalized groups in the U.S. (e.g., Blacks, Hispanics, Native Americans, immigrants, low-income families, rural communities) are disproportionately harmed by a lack of protective SDOH and a series of other public health and socio-political events, including but not limited to climate change and natural disasters (e.g., hurricanes, forest fires), endemics and pandemics (e.g., flu outbreaks), and other societal crises (e.g., economic recessions; unaffordable housing; food insecurity). For instance, in 2020, the U.S. experienced an unprecedented collide of the COVID-19 pandemic, the killing of George Floyd, and ongoing racial and ethnic inequalities, which unfavorably impacts MCH populations and will most notably have significant lasting effects across generations (Khatana & Groeneveld, 2020; Kirby, 2022; Krieger, 2020; Paul et al., 2021; Romano et al., 2021; Toure et al., 2021).

A skilled MCH workforce is critical for ensuring the public health system's readiness to address persistent and emerging challenges (Grason et al., 2012), and to design, implement, and evaluate MCH programs and policies across system levels (Association of Schools & Programs of Public Health, 2021). However, one important challenge to meet the need for a competent MCH workforce is the shortage of culturally diverse MCH professionals who match the values and needs of diverse communities (Alexander et al., 2002; Petersen, 2015). Another challenge is the diminishing MCH capacity and expertise due to the loss of leaders from staff attrition or retirement (Streeter, 2015). Furthermore, effective training programs must align with the most current professional and discipline competencies, reflect workforce needs, operate within funding parameters, and navigate other issues unique within academe. To address the MCH workforce development needs specifically, the Maternal and Child Health Bureau (MCHB; Title V Block Grant) has been supporting 13 Centers of Excellence in MCH (COE) to prepare culturally diverse students for careers in MCH practice,

research, planning, policy development, and advocacy. MCH training programs within schools of public health need adaptive leadership that can rapidly respond to emerging training needs and disseminate effective capacity building activities (Kroelinger et al., 2012; Raskind et al., 2019). When faced with tough challenges and the need to thrive under such conditions, MCH leaders must properly diagnose technical challenges to ensure adaptation and progress. An adaptive leadership approach (Heifetz et al., 2009) results in changes that enable both survival and thriving by building on past successes and failures, embracing experimentation guided by experience, and relying on the implementation of adaptations or rearrangements to program strategies, measures, and evaluative activities. Rather than relying on experience and trial, MCH leaders could incorporate an implementation science framework to guide adaptations.

Adaptable academic-practice leadership is needed in MCH training programs to enable major transformations not just in how training is delivered (i.e., from face-to-face to online), but also how training programs work to meet workforce needs. COVID-19 specifically, fundamentally transformed the expectation for mentorship and practical experiences (with completely virtual internships), the way students were engaged in research, and the necessary mental health check-ins during trying times to minimize distress and foster resilience. Thus, we sought an implementation science framework to guide us in the adaptation to societal challenges imposed by but not limited to intensified racial/ethnic inequalities, the COVID-19 pandemic, economic and educational disruptions, and exacerbated mental health issues.

Need for Dynamic Framework to Guide MCH Training Program Implementation

Integrating an implementation science framework into MCH training programs might assist leaders in accounting for such dynamic training contexts and parameters (Wensing et al., 2020). Implementation science has been defined as “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and hence, to improve the quality and effectiveness of health services” (Eccles & Mittman, 2006, p. 1). Similar to both healthcare services and health professional training programs alike, MCH training programs also operate within dynamic environments influenced by micro and

macro factors such as requirements and accountabilities set by funding agencies, evidence-based practices and competencies set by the field, local and national needs, and other social, political, cultural and economic contexts which guide program development, sustainability and overall success (Eccles & Mittman, 2006).

Although the COE of focus in this paper has been operating for many years, a formal implementation science framework has not been considered to examine factors influencing program implementation. Furthermore, there is evidence on the effectiveness of MCH training programs for achieving their educational outcomes (e.g., number of trainees, if knowledge improved, skills gained) (Kavanagh et al., 2015; Taren et al., 2011; Warren et al., 2015); however, the literature provides less attention on factors influencing implementation of activities within training programs. Thus, the literature on implementation science within the MCH field and as applied to health-related training programs remains limited (Fleming et al., 2019), diminishing dissemination efforts of successful practices across programs. Implementation science carries great promise in generating valuable evidence for more effective and sustainable MCH workforce development programs, ultimately improving the adoption, implementation, and sustainability of MCH leadership development efforts across settings and programs (Fleming et al., 2019; Kirk et al., 2016; Thacker, 2009).

Thus, the objective of this article is to describe a graduate-level MCH leadership training program and illustrate how an implementation science framework could inform the identification of determinants and lessons learned during one year of implementation of a multi-year program. The timing of year one of this program provided an unprecedented opportunity to illustrate how context, time, space, and other epidemiological, societal, and political contexts can influence program implementation. Findings have the potential to be applied to other programs and settings and can advance innovative training efforts that necessitate attention to the multi-level stakeholder needs (e.g., student, program, institution, community, and local/regional/national levels). In addition, findings may have great utility to the field of implementation science by extending implementation theories and frameworks to health professional and workforce training programs.

Methods

Setting

The University of South Florida's (USF) College of Public Health is one of 13 national COEs funded by the MCHB, which aims to "(1) strengthen and expand the MCH workforce by training graduate and postgraduate public health

students in MCH, and (2) advance MCH science, research, practice, and policy through a well-trained MCH public health workforce" (Human Resource Service Administration, 2020). The USF is a large, metropolitan, preeminent university located in the southeast U.S., comprises over 50,000 students, and has been designated as a "highest research" and "community-engaged" university by the Carnegie Foundation. The USF's COE is housed within the first accredited college of public health (CPH) in the state by the Council on Education in Public Health (CEPH) and is nationally known for several strengths, such as: curriculum innovation; transforming research to practice; providing leadership and technical assistance; fostering community engagement; and disseminating quality scientific and practice products. The COE has a robust track record of training and supporting students and the health workforce, particularly those from minority and underrepresented background across the continuum (e.g., undergraduate/graduate students, post-doctoral scholars, workforce). Moreover, the MCH program has a long-standing history of collaborations with federal and state Title V and other MCH-related organizations (e.g., MCHB, Association of Maternal and Child Health Programs, CityMatCH, Association of Teachers in Maternal and Child Health, other MCH-funded Training Programs).

Program Description

The COE delivers an interprofessional MCH training program that is comprised of three major components: (1) Education/training for master and doctoral students in MCH; (2) Science/research in MCH (faculty-led and student-led); and (3) Practice (technical assistance to and collaboration with Title V and MCH-related organizations). The first major component (education) encompasses *core* training curriculum (graduate courses) for all students enrolled in the MCH concentrations and an *enriched* MCH leadership development program for a small cohort of students (six MCH scholars selected annually). To illustrate the promising application of CFIR in this paper, we emphasize the *MCH scholar program* (enrichment component) and its training strategies for leadership development in the field of MCH public health. The MCH Scholars' program includes:

- (1) Multi-pronged recruitment and selection process: Six scholars are competitively selected from a pool of applicants based on holistic underrepresented minority criteria, MCH career trajectory, emerging leadership, and commitment to equity. This cadre of scholars receive tuition, stipend, and support to travel to conferences for two semesters (Fall/Spring).
- (2) Leadership development activities include an individualized leadership development plan (based on self-assessment of MCH leadership competencies),

analysis of career trajectory strengths and gaps/weaknesses (SWOT analysis of resume and job preparation), leadership series seminars, academic and community leadership mentorship, engagement in MCH-focused applied research and dissemination (student-faculty collaboration), as well as experiential learning through placements with Title V/MCH organizations. Of these, the leadership seminars include specific topics to foster MCH leadership competency development (conflict resolution, cultural competence, family-professional partnership, health literacy, translational research, interprofessional education) and authentic leadership through storytelling (e.g., MCH leaders are invited to share their leadership trajectory). In addition to the MCH scholars, these seminars reach multiple tiers of audiences, such as: other master and doctoral level students concentrating in MCH; students, faculty and staff across the College of Public Health and the greater university; and community partners and the MCH/public health workforce.

- (3) Evaluation activities: The COE employs a rigorous process and outcome evaluation utilizing various data sources including pre-post assessments of the MCH Navigator (Grason et al., 2015), leadership/topical seminar evaluations, logic model of individualized leadership development (goals, objectives, deliverables), academic-community research internships evaluations, exit surveys, and reflection products to support continuous program quality improvement efforts and inform reporting requirements, and other dissemination activities. Of note, although the COE develops, administers, and maintains these varied evaluation instruments, prior to these pragmatic adaptations as applied to CFIR, implementation factors were not explicitly included in existing evaluation instruments.

The time period drawn for this illustrative example was year one of the new 5-year funding cycle (June 1, 2020–May 31, 2021), which was during the COVID-19 pandemic, exacerbated by social unrest due to the killing of George Floyd, increasing mental health crises, and other educational and life stressors. Moreover, during this time, the university (similar to other institutions nationwide) was predominantly operating remotely with limited in-person offerings, programming and other services. In this context, we had to adapt to meet the needs of students, faculty, community partners, and other stakeholders. This article reports on an educational training program and thus Institutional Review Board approval was not obtained.

Consolidated Framework for Implementation Research (CFIR)

The Consolidated Framework for Implementation Research or CFIR, a “pragmatic meta-theoretical framework,” was identified as a promising framework to apply to the current training program given that it is classified as a deterministic theory and can identify barriers and facilitators influencing implementation success (Damschroder et al., 2009; Nilsen, 2015). There are 39 constructs across the following five domains: (1) Intervention characteristics; (2) Outer setting; (3) Inner setting; (4) Characteristics of individuals involved; and (5) Process (Damschroder et al., 2009). These constructs (i.e., determinants) across system levels (i.e., domains) can align with student, program, institution, community, and local/regional/national levels in this MCH training program example (see Fig. 1).

In general, CFIR can be applied before, during and after implementation, and identifies determinants (e.g., barriers and facilitators) that assist in explaining the extent of implementation success (Damschroder et al., 2009). The framework’s authors underscore that not all constructs should be utilized, and researchers should identify which constructs are most salient to their intervention, setting and population. However, for illustrative purposes, in this article we included a brief application of all the constructs included in the framework. Operational definitions of what could be assessed in future efforts as applied to this MCH leadership training program were conceived based on ongoing formal and informal discussions among program faculty and staff throughout year one (e.g., weekly Center meetings; monthly Concentration meetings; other ad hoc meetings and correspondence that occurred with faculty/staff during planning and implementation of program activities). These program faculty and staff played lead roles in trainee recruitment and selection; developing, and implementing program activities (e.g., leadership seminars); facilitating experiential opportunities in the field with Title V and related MCH community organizations; facilitating academic-community research internships; and trainee advising.

Results

CFIR Application to the MCH Leadership Training Program

Table 1 presents a pragmatic application of the CFIR constructs to year one of a multi-year training program. In brief, the *intervention characteristics* domain includes the “what, why and how” of the program. This includes the origin and rationale for the program, how the program may be better than existing training efforts, and the attractive attributes of

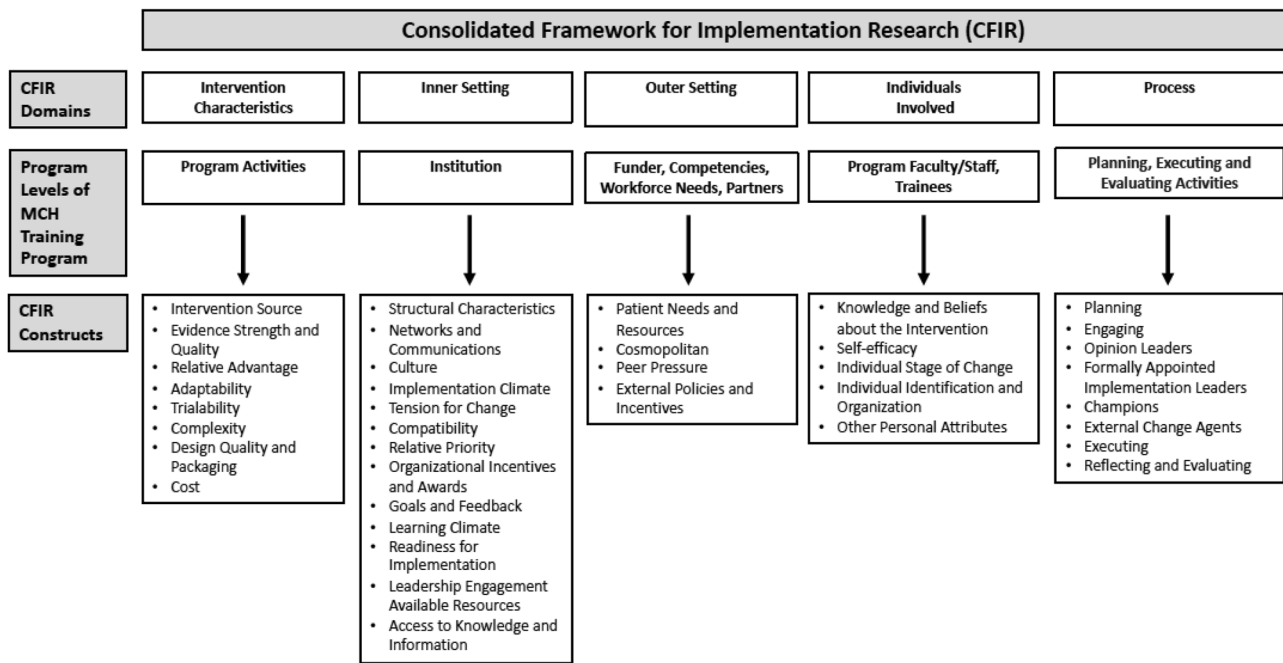


Fig. 1 Alignment of CFIR Domains, MCH Training Program Levels, and CFIR Constructs

the program such as being adaptable and generally easy to implement. The *outer setting* domain includes forces external to the organization that influence implementation, such as national recommendations and guidelines, networks and collaborations with other organizations, competitor programs, and trainee needs. The *inner setting* includes physical, social, and cultural factors, as well as the organization’s commitment, capacity, and readiness to implement the program. The *characteristic of individuals* domain refers to the implementers’ (program faculty/staff) knowledge, beliefs, skills, and personal traits that may impact program success. Lastly the *process* domain are the people and plans needed to lead and support the development, implementation, and evaluation activities of the program.

Determinants of Program Implementation

After one year of a multi-year program, several determinants of implementation can be noted. For example, the complexity of balancing school-work-family demands (*Outer setting—trainee needs and resources*; and *Characteristics of individuals—personal attributes, self-efficacy*) with the training objectives and requirements necessitated that both the program and trainees be flexible and accountable to meet these requirements. Relatedly, navigating various schedules given the ongoing disruptions in work, study, family, and health realms were observed (*Process—planning*). Lastly, given the absence of “in-person” social connectedness,

forms of social support and social engagement were limited (*Inner setting—structural characteristics; available resources*).

Another determinant of the program’s success could be attributed to the increased reach beyond the selected scholar cohort as all programming was delivered via remote modalities (*Intervention characteristic—relative advantage*). For instance, other students, faculty, and staff within and across the College of Public Health and university, as well as community partners, were able to participate in activities given the use of the online platform to deliver the meetings, seminars, student symposiums, and academic-community research internships. In addition, the collaborations within/across university and community partners (*Outer setting—cosmopolitanism*) were identified as important elements. For example, to assist in addressing the family partnership competency, the COE was able to continue its partnership with another MCHB-funded training program which coordinates an annual statewide Family Partnership conference (transitioned to virtual conference due to the pandemic). In addition, capitalizing on existing social support/connectedness opportunities (e.g., collaborations with MCH student organization events) assisted in meeting program goals related to recruiting, retaining, and supporting trainees of diverse backgrounds (*Inner setting—networks and communication; culture*). Lastly the processes, activities, and people assured there were dedicated physical/virtual and social space for program faculty/staff and trainees alike to reflect on the content,

Table 1 Application of the Consolidated Framework for Implementation Research Constructs to the University of South Florida's Center of Excellence in Maternal and Child Health Education, Science and Practice

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
I. INTERVENTION CHARACTERISTICS		
A	Intervention Source	Primarily internally developed based on student, program, community and local/state MCH needs. However, program elements guided by funder requirements, national MCH Leadership Competencies, and other MCH evidence and workforce demands
B	Evidence Strength & Quality	The “why and how” of the program strategies, elements and content. For example, programming is guided by MCH outcomes/disparities, workforce needs, MCH Leadership Competencies, and best practices in training and leadership development (e.g., mentorship, storytelling, leadership theory and practice, etc.)
C	Relative Advantage	The MCH leadership training program can be compared to traditional and common attributes of graduate MCH/public health programs, such as: proactive vs. passive; individualized and learner-centered (utilization of the Individualized Leadership Development Plans (IDLDP) vs. general cohort
D	Adaptability	Adapted to local institution context, culture and capacities. Tailored to student body and local/regional MCH needs
E	Triability	Ability to pilot training program components over time as part of innovation and quality improvement processes (e.g., pilot virtual academic-community research internships during COVID-19)
F	Complexity	Although a multi-dimensional training program, must be feasible to implement and not disrupt trainees' existing degree program requirements. Program must also be not too complicated to assure COE faculty/staff expertise and other institutional/community partners and resources can facilitate program delivery with ease

Table 1 (continued)

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
G	Design Quality & Packaging	<p>Bundled based on key training program activities (e.g., mentorship; seminars/trainings; research internships; professional development, etc.) and presented to support trainee's ILDP. Presented to fit within existing graduate degree program and has the potential align with other degree program requirements (e.g., research internship may be able to count towards our applied learning experience or integrated learning experience requirements). Overall program is marketed to highlight benefits (e.g., mentorship, research experience, tuition waiver, stipend, etc.) to attract competitive and promising students who are dedicated to addressing MCH health disparities and achieving health equity</p>
H	Cost	<p>Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs</p> <p>Inputs needed for program (derived from program's logical model: MCHB grant funding; Institutional support & resources; Curricular structure specific to MCH; Interdisciplinary institutional Centers; Faculty with nationally renowned expertise and leadership in MCH; Faculty/staff time; Academic-community partnerships with stakeholders in Title V and MCH-related programs; and Monitoring/evaluation systems). Also, includes thinking about sustainability of program beyond external funding</p>
II. OUTER SETTING		
A	Patient (Trainee) Needs & Resources	<p>Students' training needs identified during recruitment interviews, on-boarding questionnaires to gauge interests and needs; trainees SWOT (strengths-weaknesses-opportunities-threat) analyses applied to their professional goals, and development of IDLPs</p>
B	Cosmopolitanism	<p>Collaboration with Title V and other MCH organizations; other training programs across state and region; other local, state, regional, and national MCH partners and stakeholders</p>

Table 1 (continued)

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
C	Peer Pressure	Ongoing competition among other MCH programs to attract promising trainees; Continual need to assure high quality support and retention of trainees
D	External Policy & Incentives	External forces driving program including Title V workforce need assessments, HRSA funding opportunity announcement directives; HRSA reporting and benchmarks; public health competencies from ASPPH, including CPH exam domains (e.g., leadership, advocacy) which the program can contribute
III. INNER SETTING		
A	Structural Characteristics	Institutional capacity, including geographic and physical and social architecture (e.g., diverse student body demographics; student support offices and resources); history of institution's training experience; very supportive administration, etc.
B	Networks & Communications	Institutional structure of networks and collaborations; Affiliations and partnerships with institution's research/practice Centers and MCH-related community organizations
C	Culture	Program is in complete alignment with institution's (1) <i>culture</i> (innovators; interprofessional); (2) <i>mission</i> (to provide excellence in public health education, leadership, advocacy, research and service; to nurture and motivate our students; and to deliver enhanced health and well-being to all humankind through collaborative partnerships with researchers, educators, health professionals and administrators); (3) <i>vision</i> (be the exemplar catalyst for public health innovation and advancement of the profession, locally and globally); and (4) <i>values</i> (social responsibility, social justice; multidisciplinary approach, global perspective, altruism, diversity and inclusiveness, leadership, and academic excellence)

Table 1 (continued)

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
D	Implementation Climate The absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization	Institution's commitment to training racial/ethnic minorities and underrepresented groups; Expectation of excellence in curricula, student-engagement, community-engagement, and research and practice activities
1	Tension for Change The degree to which stakeholders perceive the current situation as intolerable or needing change	Need for innovative, transformative, and skill-based training to address significant MCH workforce demands and limitations
2	Compatibility The degree of tangible fit between meaning and values attached to the intervention by involved individuals, how those align with individuals' own norms, values, and perceived risks and needs, and how the intervention fits with existing workflows and systems	Need for responsive training to address systemic racism beyond traditional approaches Fits within institution's culture, faculty/community expertise and commitment to training along with synergy with current programs of study
3	Relative Priority Individuals' shared perception of the importance of the implementation within the organization	Importance of training diverse MCH workforce; commitment to social justice and equity
4	Organizational Incentives & Rewards Extrinsic incentives such as goal-sharing awards, performance reviews, promotions, and raises in salary, and less tangible incentives such as increased stature or respect	Tangible/intangible incentives/rewards include: attract competitive students; increase number of students trained; produce high-quality students contributing to institution's recognition at state, regional and national levels; and share and disseminate program, achievements and lessons (e.g., innovative teaching activities, conference abstracts, publications)
5	Goals and Feedback The degree to which goals are clearly communicated, acted upon, and fed back to staff, and alignment of that feedback with goals	Weekly staff meetings; workplan and evaluation processes; faculty co-investigator input; advisory board guidance (community); and feedback from funding agency/program officer
6	Learning Climate A climate in which: a) leaders express their own fallibility and need for team members' assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation	Quality assurance built-in to training program (including monitoring and evaluation activities); Open conversations between leadership, faculty and program staff regarding what is working with the program and what could be improved; dedicated meetings for interchange with Community Advisory Boards

Table 1 (continued)

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
E	Readiness for Implementation	Leadership buy-in; history of training and innovation; support from various institutional units/department (e.g., academic affairs, faculty affairs, student/alumni data, research office, faculty expertise, etc.)
1	Leadership Engagement	Commitment, involvement, and accountability of leaders and managers with the implementation
2	Available Resources	The level of resources dedicated for implementation and on-going operations, including money, training, education, physical space, and time
3	Access to Knowledge & Information	Ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks
IV. CHARACTERISTICS OF INDIVIDUALS		
A	Knowledge & Beliefs about the Intervention	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention
B	Self-efficacy	Program faculty/staff's confidence in being successful in recruiting, training, and mentoring diverse students and workforce members
C	Individual Stage of Change	Identify program faculty/staff's professional development needs and provide mentoring, coaching, or other training (e.g., support travel to conferences)
D	Individual Identification with Organization	Program faculty/staff's alignment with institution's mission, vision and values; Strong commitment to excellence in education, research and practice
E	Other Personal Attributes	Program faculty/staff's intellectual competence and curiosity, values related to student mentoring and community engagement, and openness to innovation and change
V. PROCESS		

Table 1 (continued)

Construct	Short Description (Source: https://cfirguide.org/constructs/)	University of South Florida's COE Application Example
A	<p>Planning</p> <p>The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance, and the quality of those schemes or methods</p>	<p>Program logic model and workplans; Didactic (e.g., course and seminar) and experiential (e.g., research internships) objectives, lesson plans, guidelines; Evaluation plan (e.g., data collection sources, measures)</p>
B	<p>Engaging</p> <p>Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities</p>	<p>Recruitment, supports and buy-in from program faculty, staff and community and graduate level mentors</p>
1	<p>Opinion Leaders</p> <p>Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention</p>	<p>Institution leadership/administration; junior/senior faculty members; community partners; MCH student organization; MCH students and alumni</p>
2	<p>Formally Appointed Internal Implementation Leaders</p> <p>Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role</p>	<p>Project Director and Associate Director (faculty) charged with overall responsibility of the administration, planning, implementation and evaluation of project</p>
3	<p>Champions</p> <p>“Individuals who dedicate themselves to supporting, marketing, and ‘driving through’ an [implementation]” [101] (p. 182), overcoming indifference or resistance that the intervention may provoke in an organization</p>	<p>Project Director and Associate Director, faculty co-investigators and program staff who are dedicated to supporting program activities</p>
4	<p>External Change Agents</p> <p>Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction</p>	<p>Key Title V and other MCH-related organizations/stakeholders who provide informal and formal (e.g., Advisory Board) strategic direction and guidance to training program</p>
C	<p>Executing</p> <p>Carrying out or accomplishing the implementation according to plan</p>	<p>Workplans identifying key activities, persons responsible (directors/program faculty/staff) and associated timelines</p>
D	<p>Reflecting & Evaluating</p> <p>Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience</p>	<p>Weekly staff meetings; monthly meeting with MCH faculty; check-in meetings with trainees (one-on-one or in group setting); Community Advisory Board meetings; monitoring & evaluation plans; program quality improvement processes guided by CFIR</p>

skills, and opportunities afforded, as well as the intended outcomes achieved during the program (*Process—plan; engage; reflect and evaluate*).

Lessons Learned

Utilizing CFIR enabled us to quickly visualize the domains that needed adaptations. For instance, regarding program components related to the leadership development of scholars, it was necessary to keep intervention characteristics (i.e., selection, training, mentorship, and evaluation of the MCH scholars). Thus, some of the real-time changes that occurred for the MCH scholar component included (inner settings): (1) streamlining review processes for scholar selection using multicriteria and virtual collaboration with faculty reviewers; (2) implementing condensed seminars and trainings via remote modalities; and (3) utilizing learning management systems to manage scholars' activities and deliverables, provide individualized feedback, and implement evaluative measures. Regarding *outer setting*, we were able to continue our collaboration with MCH leaders who co-deliver our seminars, increase our reach to a wider university and community audience (as in previous iterations, the face-to-face activities were available only to a smaller group of students and invited community partners), and continue networking, exchange of information, and dissemination of science and practice activities among faculty and staff due remote meetings and conferences at local, regional and national levels.

When considering the *individuals involved*, students and mentors (faculty) had a greater control of the metrics for the individualized development plan as they were able to devise their own goals and activities using a logic model. The utilization of online logic model for the research internship was also useful to track deliverables with tangible products toward the end of the program. We also implemented additional check-in meetings to assess student well-being and gather feedback on activities.

Thus, CFIR was helpful to MCH program leaders in understanding factors influencing the development, implementation and evaluation of a training program and in informing adaptations that could occur in real-time during implementation. The application of CFIR also shows promise and utility in guiding future continuous quality improvement efforts and may assist in interpreting process and outcome evaluation findings.

Discussion

This article illustrates the utility of an implementation science framework to a graduate-level MCH leadership training program to address contextual issues during trying times. Notably, by considering our essential program components,

the *inner settings* of the institution, the *outer settings* (context of Title V collaborations, community partners, and MCH leaders), the *individuals involved* (scholars), and the *processes* (leadership development activities aimed at fostering MCH leadership competencies), facilitated a rapid adaptation of the program's implementation without sacrificing key features for leadership development training.

Similar to healthcare interventions, health professional training programs do not exist in a vacuum and are susceptible to challenges and opportunities that are reflective of the system in which they are embedded. The series of current events that unfolded and/or were escalated in Spring 2020 and which continue today, underscore the need for training programs to be acutely attuned to the needs and stressors that may be impacting faculty, students, and community partners. During year one of a multi-year program, program stakeholders experienced a global pandemic, social unrest, political upheavals, and continuing forms of structural racism. These multi-level contextual factors and lived experiences necessitate a systems approach to planning and reflecting on program implementation, such as afforded by CFIR.

Context and setting are important in implementation science and affect the implementation success of the current program, and the generalizability and transferability of findings and lessons learned to other programs and settings (Nilsen & Bernhardsson, 2019). As illustrated in this application, numerous constructs across domains served as salient determinants of implementation. However, during a year which experienced unprecedented times, determinants that aligned with the *inner setting* domain were paramount in program delivery. For instance, the institutional capacity (*structural characteristics*), organizational structure of networks and collaborations (*networks and communications*), the organization's mission, vision, and values (*culture*), and the organization's commitment to training a diverse health workforce and expectations for excellence in innovations in curricula, research and practice supported the program in its ability to pivot and prosper.

This innovative application of CFIR to an MCH leadership training program suggests that an implementation science framework may have great utility in extending to health professional and workforce training programs. Furthermore, this paper highlights the need for a framework to be flexible and to extend to complex and dynamic health programs that have unique target audiences (program implementers and recipients) that differ from traditional health interventions that implement specific health care services or practices. This paper also denotes how some determinants (or constructs) may not be mutually exclusive, and how these can be viewed as both barriers and facilitators. For example, this was observed in relation to social connectedness and social support among program stakeholders. On the one hand, this was a barrier as the traditional structural characteristics of

the organization and available resources were disrupted. On the other hand, the program was able to capitalize on other networks and communication channels and partner with initiatives and virtual collaborations to augment the program's ability to recruit, support, train, mentor and engage participants.

One modification to CFIR that may extend its application to health professional training programs is to adjust the “*Characteristics of individuals*” domain to also include participant (trainees) rather than solely referring to the implementers (faculty/staff). Although the “*patients (participants) needs and resources*” construct is represented in the *Outer Setting* domain, training programs give much attention to their participants (trainees) that many of the *Characteristics of the individuals* constructs (e.g., knowledge & beliefs about the intervention; self-efficacy; individual stage of change; other personal attributes) would be better aligned with trainees vs. exclusively focusing on the program implementers. Other researchers have also previously recommended the addition of a “sixth domain” to the CFIR framework to focus on patients. This sixth domain would elevate participant voices and needs in implementation science work (Taichman et al., 2020). The addition of a participant-centered domain may assure that all stakeholders' needs are being met and accounted for during program implementation.

Although this paper presents a unique application to CFIR to health training programs, limitations must be noted. First, this application includes ongoing input, feedback and discussions from the perceptions of the program implementers (faculty/staff), and thus, other program stakeholders (e.g., trainees; community partners) should be involved in the future implementation evaluation efforts. In addition, this pragmatic application of CFIR to a MCH leadership training program was developed from ongoing communication and meetings among program faculty and staff. Future research should employ implementation science theories and methods to prospectively and empirically evaluate the extent of influence of each determinant on implementation outcomes and identify whether it was a facilitator or barrier to program implementation.

In conclusion, when applying CFIR to a MCH leadership training program, application examples of implementation determinants were identified. The use of an implementation science framework could be helpful when analyzing and interpreting future process and outcome evaluation findings. Moreover, key lessons were learned, such as the value of accountability, flexibility, learner-centeredness, and partnerships. Applying an implementation science framework can assist with transferability of MCH training program elements and lessons learned to other organizations and settings (e.g., other COE and catalyst programs). Future research and practice efforts could further identify, operationalize, and

empirically measure constructs from CFIR and other implementation science frameworks to health professional training and workforce programs. Integrating implementation science specifically into MCH training programs could contribute to the rigor, adaptability, and dissemination efforts that are critical when learning and sharing best practices to expand leadership capacity efforts that are working towards the elimination of MCH disparities across systems.

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