Leadership Training in Health Care Action Teams: A Systematic Review

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Abstract

Purpose
To identify and describe the design, implementation, and evidence of effectiveness of leadership training interventions for health care action (HCA) teams, defined as interdisciplinary teams whose members coordinate their actions in time-pressured, unstable situations.

Method
The authors conducted a systematic search of the PubMed/MEDLINE, CINAHL, ERIC, EMBASE, PsycINFO, and Web of Science databases, key journals, and review articles published through March 2012. They identified peer-reviewed English-language articles describing leadership training interventions targeting HCA teams, at all levels of training and across all health care professions. Reviewers, working in duplicate, abstracted training characteristics and outcome data. Methodological quality was evaluated using the Medical Education Research Study Quality Instrument (MERSQI).

Results
Of the 52 included studies, 5 (10%) focused primarily on leadership training, whereas the remainder included leadership training as part of a larger teamwork curriculum. Few studies reported using a team leadership model (2; 4%) or a theoretical framework (9; 17%) to support their curricular design. Only 15 studies (29%) specified the leadership behaviors targeted by training. Forty-five studies (87%) reported an assessment component; of those, 31 (69%) provided objective outcome measures including assessment of knowledge or skills (21; 47%), behavior change (8; 18%), and patient- or system-level metrics (8; 18%). The mean MERSQI score was 11.4 (SD 2.9).

Conclusions
Leadership training targeting HCA teams has become more prevalent. Determining best practices in leadership training is confounded by variability in leadership definitions, absence of supporting frameworks, and a paucity of robust assessments.

Over the past decade, the impact and nature of effective health care teams has been highlighted and studied with increasing rigor.1 Health care action (HCA) teams are interdisciplinary teams that often work under complex, dynamic, and time-pressured conditions to accomplish critical patient care tasks.2,3 Given that such conditions present particular threats to patient safety, it is not surprising that teamwork failures have been directly implicated in the majority of reported adverse events and medical errors.4

As the components of teamwork have been more thoroughly evaluated, it has become clear that team leaders are integral to effective team performance.5

In nonmedical domains, effective team leadership has been shown to improve team performance through the development of team-oriented goals, facilitation of coordination and cooperation, and monitoring of task progression.6 A recent meta-analysis of leadership interventions across all health care settings and disciplines demonstrated that participation in leadership training programs accounted for nearly one-third of the variance in outcomes.6 In HCA teams, leadership training is an important mediator of team leader performance and overall team effectiveness.7

Not surprisingly, the Association of American Medical Colleges and the Accreditation Council for Graduate Medical Education emphasize the need to develop team leadership and management skills in undergraduate and graduate trainees, respectively.8,9 Additionally, several widely adopted teamwork interventions targeting licensed nurses and physicians (e.g., TeamSTEPPS [Team Strategies and Tools to Enhance Performance and Patient Safety]),10 crisis resource management training11 include a leadership component. Currently, however, there are no guidelines or best practices identified for HCA team leadership training. The aim of this systematic review is to synthesize the leadership training literature, focusing on the following questions with regard to HCA teams:

1. What curricular interventions have been used to train team leadership behaviors?
2. What specific behaviors have been targeted in curricula designed to train team leadership?
3. What types of outcome evidence exist to support the effectiveness of team leadership training?

This effort will help identify knowledge gaps in education, team, and leadership science and suggest areas for future research.

Method
We planned, executed, and reported this systematic review in adherence to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards.12,13 We also reviewed and incorporated two additional reports on conducting systematic reviews to ensure the relevance of our approach to the medical education literature.14,15
The definitions of the terms we used to describe types of participants, interventions, outcomes, study designs, and validity evidence are provided in Supplemental Digital Table 1 at http://links.lww.com/ACADMED/A223.

Data sources
We conducted a systematic search of the literature with the assistance of a library science expert (A.L.H.). The following databases were searched from their inception through March 2012 for relevant peer-reviewed English-language studies: PubMed/MEDLINE (1946), CINAHL (via Ebsco, 1977), ERIC (via Ebsco, 1966), EMBASE (via Elsevier, 1974), PsycINFO (via Ebsco, 1806), and Web of Science (1955). Our systematic literature search strategies used a combination of index terms unique to each database and key words relating to teamwork, leadership, training, measurement, and named groups of health care personnel. As an example, we searched the Web of Science database using the following strategy:

- Topic=(teamwork OR leadership OR "team training") AND Topic=("care providers" OR residents OR students OR nurse* OR physician* OR team OR teams OR faculty) AND Topic=(quality OR assessment OR competence OR evaluation OR metrics OR outcome OR validation OR pilot OR evaluated)

The full search strategy used for each database is available in Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A223.

We included indices from relevant journals that were not fully indexed in PubMed at the time of the search. We hand searched issues of Teaching and Learning in Medicine and Medical Teacher published from January 2011 through March 2012 as there was some concern that there was a delay in indexing these journals. We also hand searched all 2006 issues of Simulation in Healthcare to ensure that issues published prior to that journal’s inclusion in MEDLINE were included in the review, as they had not been retrospectively indexed by the time of our literature search. Additionally, we searched the reference lists of all included articles and of pertinent leadership-focused review and observational articles.16-18 These articles were chosen because each contains a significant overview of the leadership literature as it relates to HCA teams.

Study selection
We employed a broad search strategy to capture all studies describing team leadership training in HCA teams, whether as a primary training objective or a component of a larger teamwork curriculum. We determined the need to focus this review on a particular type of team and task work, as the nature of leadership has been clearly linked to both team and task typology.20 We therefore considered all studies with qualitative and/or quantitative methods in which training interventions focused on team-level leadership within HCA teams. We defined HCA teams as interdisciplinary work teams whose members improvise and coordinate their actions in time-pressured, unstable situations where the stakes are high (e.g., code teams, operative teams). We excluded studies if (1) they were review articles or meta-analyses, (2) they did not explicitly train leadership, (3) training focused exclusively on implementation of a new protocol or procedure (e.g., a preoperative checklist), (4) training focused on executive management/leadership, (5) teams were consistent or involved routine tasks (i.e., they were not action teams), or (6) the full-text article was not available in English for review.

Title and abstract review
Our initial search identified 9,913 citations. All titles and abstracts were independently reviewed by two of the authors (E.D.R. and R.F.) for inclusion. If the abstract provided insufficient information or if the reviewers disagreed, the two authors independently reviewed the full text before reaching consensus through discussion. A total of 161 studies were selected for full-text review, and 52 met all inclusion criteria outlined above (Figure 1).

Data extraction
We developed a data abstraction form based on our analysis of the leadership, systematic review, and medical education literature.10,13,19-21 All members of the review team (E.D.R., J.R.S., J.S.I., R.F.) contributed to editing this form through multiple iterations. The form was then piloted in a blinded review of five studies.

9,913 Titles and abstracts reviewed
9,757 Articles identified and screened for retrieval from PubMed, ERIC, CINAHL, EMBASE, Web of Science, and PsycINFO
140 Articles identified and screened through hand search of selected years of Teaching and Learning in Medicine,10 Medical Teacher,10 and Simulation in Healthcare2
16 Articles identified and screened from reference lists

9,752 Articles excluded based on title and abstract review

161 Potentially relevant articles underwent full-text review

109 Articles excluded
13 Review, survey, meta-analysis
89 Leadership not explicitly trained
7 Not action teams

52 Articles describing leadership training for health care action teams included in review

Figure 1 Selection process used in a systematic review of health care action team leadership training curricula in studies published through March 2012. * Issues published from January 2011 through March 2012. † Issues published in 2006.
by all reviewers. Two members of the review team independently abstracted each of the included articles, and reviewer pairings rotated throughout the abstraction process. Initial discrepancies were identified by a research assistant without reviewer responsibilities, and these discrepancies were discussed by the involved pair of reviewers. Consensus was obtained through this discussion or a full team discussion (if needed to resolve differences in interpretation).

All studies included in the review underwent data abstraction in four domains: (1) study characteristics (publication year, study design, number of institutions); (2) participants (number, level of training, profession, medical specialty); (3) definition of leadership (behaviors trained, use of a leadership model); and (4) training curriculum characteristics (evidence supporting the content, theoretical framework supporting the design, training modality, team versus individually directed training, duration of training sessions). Data in three additional domains were extracted for studies that contained an assessment component: (1) assessment design, (2) evidence supporting validity (content validity, internal structure, relationship to other variables), and (3) outcomes measured. The elements of validity represent three of the five categories of validity described by Cook and Beckman. We chose these three because they are the most commonly reported elements of validity, could be captured most reliably by our review team, and are components of the Medical Education Research Study Quality Instrument (MERSQI).

Training outcomes were categorized according to a modified Kirkpatrick hierarchy: (1) participant satisfaction, attitudes, perceptions, or opinions; (2) modification of knowledge and skills; (3) behavioral change/transfer of learning; and (4) changes in patient- or system-level measures. Posttraining surveys that only solicited participants’ impressions of the training environment (e.g., comfort of room) were not considered to be outcome measures. However, surveys inquiring about trainee perceptions of acquired knowledge or skills (e.g., perceived ability to lead a resuscitation team) were coded as outcomes. Additional data (response rate, data analysis complexity and suitability) were abstracted as a means to grade methodological quality using the MERSQI.

Data analysis
We summarized training design, content, and implementation (number of trainees, level of learner, etc.) using descriptive statistics. We synthesized leadership behaviors, and we identified and linked themes to an existing health care teamwork taxonomy. Briefly, each reviewer identified and listed the specific behaviors (if provided) that were considered part of leadership training for each study. These behaviors were grouped by theme and reviewed by the study team. For example, “assigns roles” and “distributes tasks” are two ways to describe task delegation. We then chose to frame these behaviors within a teamwork taxonomy that is linked by empiric evidence to team effectiveness and has been translated for use in health care team research. We used the MERSQI to evaluate study quality and calculated scores for all studies that included an assessment of the leadership training. Possible MERSQI scores range from 5 to 18.

Results

Search results and study design
Of 9,913 studies initially identified, 161 studies (2%) were reviewed in detail, and 52 (0.5%) met our inclusion criteria (see Figure 1). The characteristics of the included studies are summarized in Table 1. The majority were published after 2006 (n = 44; 85%). The most common study designs were single-group pre-/posttest studies (n = 21; 40%), followed by randomized controlled or comparison trials (n = 12; 23%), single-group posttest studies (n = 9; 17%), descriptive studies (n = 7; 13%), and two-group, nonrandomized trials (n = 3; 6%). In more than two-thirds of the studies (n = 36; 69%) participants were enrolled from a single institution.

Training content
Five studies (10%) reported leadership training as the primary objective of their curriculum, and the remainder focused on general teamwork training with a leadership component (Appendix 1). Only 2 studies (4%) cited a team leadership model: shared leadership and initiating structure.

Fifteen studies (29%) explicitly mentioned discrete leadership behaviors; these included 4 of the 5 studies that focused on leadership specifically. An additional 4 studies (8%) reported leadership as “assuming the role of team leader” but did not define the leadership role or any specific behaviors. For leadership behaviors reported in these 19 studies, see Supplemental Digital Table 2 at http://links.lww.com/ACADMED/A223. The remaining 33 studies (63%) did not explicitly define leadership or anchor leadership training objectives to distinct behaviors.

When reported, leadership behaviors were heterogeneous; however, we identified several themes. To provide structure to these themes, we applied the described leadership behaviors to an existing teamwork behavior taxonomy (Table 2). Curricula commonly included training in planning-related leadership behaviors that provide organization and structure to the HCA team and its efforts (transition processes), such as assigning roles or delegating tasks, information gathering and sharing, and determining and communicating a plan. Leadership behaviors that directly enable teams to accomplish their goals (action processes) were also described; these included coordinating actions, monitoring the team’s progress, tracking critical resources, and coaching, evaluating, and supporting team members. Some studies also described training in interpersonal skills that facilitate both planning (transition processes) and action processes, such as effective communication and conflict management.

Training method and participants
More than half the reviewed studies (n = 28; 54%) reported using or modifying a training program previously reported in the literature. The most commonly referenced programs included crisis resource management (n = 17; 33%)—a set of principles rather than a single curriculum—and TeamSTEPPS (n = 8; 15%). The remaining 24 studies (46%) implemented a novel curriculum. Among the 52 reviewed studies, 36 (69%) provided evidence to support their training design in the form of a literature review (n = 32; 62%) and/or subject matter expert review (n = 7; 13%), though only 9 (17%) explicitly described
**Table 1**

Characteristics of 52 Studies Included in a Systematic Review of Leadership Training in Health Care Action Teams, Published Through March 2012

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<thead>
<tr>
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<tbody>
<tr>
<td>Single or multi-institutionb</td>
<td>Single institution</td>
<td>36 (69)</td>
<td>Multi-institution</td>
</tr>
<tr>
<td>Study design</td>
<td>Single-group pre–posttest</td>
<td>9 (17)</td>
<td>Two-group, nonrandomized</td>
</tr>
<tr>
<td>Specialty of learnerc</td>
<td>Anesthesiology</td>
<td>14 (27)</td>
<td>Emergency medicine</td>
</tr>
<tr>
<td>Level of learnerc</td>
<td>Student</td>
<td>12 (23)</td>
<td>Graduate trainees</td>
</tr>
<tr>
<td>Trained as team or individual</td>
<td>Individual</td>
<td>14 (27)</td>
<td>Team</td>
</tr>
<tr>
<td>“Leadership” defined</td>
<td>Yes</td>
<td>15 (29)</td>
<td>No</td>
</tr>
<tr>
<td>Training modality*</td>
<td>Computer-based</td>
<td>10 (20)</td>
<td>Lecture-based</td>
</tr>
<tr>
<td>Level of outcome1</td>
<td>Participant perceptions</td>
<td>34 (67)</td>
<td>Knowledge or skills modification</td>
</tr>
<tr>
<td></td>
<td>Behavior changes</td>
<td>8 (16)</td>
<td>Patient- or system-level impact</td>
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*The definitions of the terms used to describe study design, training modality, and outcome levels are available in Supplemental Digital Table 1 at http://links.lww.com/ACADMED/A223.

The key points include:

- **Level of outcome**: The study used a modified Kirkpatrick hierarchy. Outcome percentages were calculated with a denominator of 45, based on the total number of studies that reported an evaluation of the training intervention. Some studies reported multiple outcomes; thus, the total number is greater than the total number of studies with evaluations.

- **Using a theoretical framework to direct the development of their curricular intervention. These frameworks included** experiential learning, lecture-based training, deliberate practice, and theory of probabilistic functionalism.

- **Lecture-based training** was the most frequently used training modality (n = 43; 83%), followed closely by simulation-based training (n = 42; 81%), with many studies using more than one training modality. Computer-based training was used in 4 studies (8%). Forty-three studies (83%) provided information regarding the duration of training, which ranged from 0.5 to 100 hours; however, the time devoted specifically to leadership development was often difficult to ascertain. The 5 studies with leadership training as the primary focus reported training durations of 0.5 to 4 hours.

- **Nearly all studies** trained physicians (n = 48; 92%), and more than half trained nurses (n = 28; 54%). Although many studies trained medical and/or nursing students, participants most frequently were graduate trainees (n = 27; 52%) or licensed practitioners (n = 27; 52%) representing a wide range of specialties.
### Table 2

**Examples of Health Care Action Team Leadership Behaviors in Relation to an Existing Teamwork Taxonomy**

<table>
<thead>
<tr>
<th>Type of Behavior</th>
<th>Teamwork Taxonomy and Definitions</th>
<th>Examples of Leadership Behaviors from previous studies</th>
</tr>
</thead>
</table>
| **Transition processes (evaluation and planning)** | Mission analysis: Identifying the main tasks by gathering information and determining available resources and expertise | • Organizes the group<sup>32,68</sup>  
• Shares knowledge to facilitate understanding<sup>32,33,51,69,81</sup>  
• Identifies all team members<sup>70</sup>  
• Cross-checks information<sup>49</sup>  
• Assesses limitations of team members<sup>53</sup>  
• Assesses the available information<sup>70,71</sup> |
| Goal specification: Identifying and prioritizing goals; identifying and fulfilling needed roles | • Let's team know what is expected of them<sup>38</sup>  
• Uses uniform guidelines / standards<sup>38</sup>  
• Delegates tasks<sup>29,32,33,35,36,60,69,71</sup> |
| Strategy formulation: Developing a course of action as well as contingency plans; adjusting plans in response to environmental and task changes | • Provides direction<sup>36,44</sup>  
• Plans work to be done<sup>38,36,70</sup>  
• Decides how to accomplish goals<sup>35,36</sup>  
• Anticipates outcomes and likely contingencies<sup>29,35</sup>  
• Verbalizes plans or changes in plan<sup>74,77</sup> |
| Reflection: Having team members reflect on performance to identify potential areas of strength and need for improvement | • Provides information about team performance through debriefs<sup>41</sup> |
| **Action processes** | Monitoring progress toward goals: Tracking and communicating information related to the team's progress toward goals | • Reevaluates progress continuously<sup>32,35,69</sup>  
• Positions self to ensure that he or she can see monitor<sup>22</sup>  
• Monitors the performance of team members<sup>32,38,72</sup>  
• Ensures that team performance adheres to algorithm<sup>74</sup> |
| Systems monitoring and adaptation: Tracking team resources (personal and equipment) and environmental conditions to ensure that the team can accomplish its goals | • Manages resources available to team members<sup>29,41,74</sup>  
• Maintains “big picture” perspective<sup>73</sup>  
• Solves problems<sup>38</sup> |
| Coaching/backup: Assisting team members with completing their tasks, whether providing coaching, hands-on assistance, or taking over a task | • Backs up team members<sup>52</sup>  
• Provides support to team members when needed<sup>41</sup>  
• Evaluates team members critically and redirects as needed<sup>45</sup>  
• Coaches team members<sup>68</sup> |
| Coordination: Orchestrating the sequence and timing of actions | • Has ability to coordinate team members activities<sup>41,54</sup> |
| **Interpersonal skills** | Conflict management: Managing conflict proactively and reactively | • Manages disruptive behavior quickly<sup>32,25</sup> |
| Team cohesion: Building commitment of team members to complete the team's task | • Asks other team members for suggestions<sup>32,35</sup> |
| Effective communication: Using techniques to facilitate clear communication between team members | • Engages in closed-loop communication<sup>79,96</sup>  
• Communicates clearly with all members of the team<sup>35,60,68</sup>  
• Makes short, clear statements<sup>32,33,71</sup>  
• Uses "out loud" communication<sup>73</sup> |

*Team taxonomy dimensions are derived from a health care team taxonomy supported by expert consensus and empirical evidence.<sup>27,78</sup>*

*All full list of all behaviors described in all included studies that defined leadership is available in Supplemental Digital Table 2 at http://links.lww.com/ACADMED/A223.*

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with outcomes correlated to the experience or training level of participants,<sup>8,9,27,29</sup> clinical metrics,<sup>93,139</sup> other teamwork measures,<sup>9,27,44</sup> and personality type (extravert versus introvert).<sup>30</sup> (For types of validity evidence by study, see Supplemental Digital Table 3 at http://links.lww.com/ACADMED/A223.)

The MERSQI scores for the 45 studies with an assessment component ranged from 6 to 16.5 with a mean of 11.4 (SD 2.9) (see Appendix 1; see also Supplemental Digital Table 3 at http://links.lww.com/ACADMED/A223). Among the 5 studies with a primary focus on leadership training, MERSQI scores ranged from 6.5 to 14.5. In the highest-scoring study, Hunziker and colleagues<sup>69</sup> demonstrated that a brief (half-hour) HCA team leadership training session for medical students improved clinical care metrics (measured by "hands on time" and time to initiation of CPR) and resulted in improved leadership performance (measured by the number of "leadership utterances") in a simulated cardiopulmonary arrest four months after the intervention. Strengths of this study included a randomized controlled trial design, a large number of participants (n = 237) with a high response rate (>75%), the assessment of interrater
reliability, the demonstrated correlation between leadership and clinical care metrics (relationship to other variables), and improvement in both the knowledge and skills of participants.

Discussion

Our review takes an important first look at the literature on HCA team leadership training, which has become more prevalent, and provides an overview of training content, implementation, and evaluation. In most studies, leadership training was embedded in a larger teamwork curriculum, which makes it difficult to draw conclusions regarding the impact of leadership-specific training on outcomes. However, including leadership training as part of team training often provides opportunities to train in a team setting—a critical characteristic of effective team leadership training. In many studies, the teams were interdisciplinary, and, overall, participants represented a wide range of specialties and professions. Here, we discuss our findings in relation to the research questions that guided this review and offer recommendations for future research.

What curricular interventions have been used to train team leadership behaviors?

Curricular interventions included in this review often employed strategies designed to support active learning, including human patient simulation and virtual-reality-based training. Such immersive learning techniques have been recommended for training teamwork competencies, including leadership. One of the most compelling benefits of using simulation-based training in leadership interventions is the ability to learn and practice in a team. Given that team leadership behaviors are largely focused on regulating the actions of team members, leadership curricula that offer immersive, team-based training opportunities may have a greater impact on team and team leader performance. Simulation also allows for repetition, guided reflection, and mastery learning, all of which have been suggested as crucial elements of effective training. Further research is needed to understand which training strategies and settings best facilitate transfer of leadership training to the practice environment.

What specific behaviors have been targeted in curricula designed to train team leadership?

We found that few studies used leadership models or behavioral taxonomies to support their curricular design. As a result, meaningful comparison of interventions was precluded by the considerable variability or absence of operational definitions for leadership and leadership behaviors (see Supplemental Digital Table 2 at http://links.lww.com/AcademMed/A223). Even when studies reported using an established curriculum, there was variation in the leadership behaviors included in the training. When leadership behaviors were specified, they were largely task-centric and directive, focusing on planning (obtaining and analyzing information, defining goals, determining team strategy) and action/implementation (giving direction, monitoring the team, managing resources, and assisting team members) to ensure successful outcomes (Table 2). Several studies included leadership behaviors focused on the development of team members (coaching, providing support, and evaluation). This duality in leadership roles (directive and developmental) is consistent with both the contingency and dynamic delegation models of HCA team leadership. In these models, the balance between directive leadership behaviors and empowering/coaching leadership behaviors is dependent on the situation, task, and team: Time-sensitive, critical patient care situations likely require more direct, authoritative behaviors, whereas routine situations permit leaders to safely foster team members' independence. Similarly, a leader may elect to delegate decision making to experienced team members, or provide additional coaching and hands-on supervision for novice team members. Further conceptual and empirical testing of these models is necessary to establish a framework of leadership on which a common taxonomy of behaviors can be developed and evaluated. Creating such a framework is an important first step toward rigorous, evidence-based assessment of HCA team leaders and their impact on patient care.

What types of outcome evidence exist to support the effectiveness of team leadership training?

Drawing conclusions regarding the value or impact of leadership training requires assessments supported by evidence of validity. Of the 52 studies we reviewed, only 2 employed an objective assessment tool focused on leadership. Other measures included more general teamwork metrics and patient-related outcomes, including hospital length of stay and morbidity and mortality data. Although one could argue that the assessment of systems- or patient-based outcomes is of primary importance, failure to link these outcomes to changes in processes (behaviors) is problematic. Measuring processes allows the assessment to be diagnostic—that is, to inform investigators about the performance outcome as well as how that outcome was reached. Without this information, the reasons for the success or failure of training interventions cannot be identified, and curricula cannot be refined on the basis of the outcomes.

Several study-related factors limited our ability to determine best practices for leadership training. Many studies we reviewed lacked a control group, and the majority used a single-group pre-/posttest design to measure learning outcomes. Few studies reported the psychometric data necessary to draw conclusions regarding the validity of the assessments employed. This lack of methodological rigor is reflected in the relatively low MERSQI scores (mean 11.4) and is consistent with prior studies assessing the quality of medical education research. Additionally, in leadership and team-based research, it is important to indicate the targeted level of training and the level of analysis, as both can be directed toward either individuals or teams. Without this information, drawing conclusions based on data related to leadership research is subject to considerable error. Future studies evaluating leadership training interventions should strive to acknowledge threats to validity, consider ways to enhance reliability (e.g., rater training and assessment, blinding), and carefully account for the multilevel aspects of interventions, outcomes, and analyses.

Strengths and limitations

This review has several limitations. We restricted our search strategy to include only peer-reviewed studies published in English and did not include any non-indexed or open access journals.
The strengths of our study include the scope of the search strategy, which was comprehensive and included six databases as well as multiple reference lists. As noted above, we targeted both leadership- and teamwork-related terms to maximize identification of leadership training efforts. We also included studies with all types of health care practitioners at all levels of training to maximize the generalizability of the results.

Conclusions

This review highlights current gaps in the health care team leadership training literature and suggests future areas of research. There is a clear need for researchers to develop, test, and adopt leadership frameworks and behavioral taxonomies that can support the rigorous development and assessment of team leadership training. Concurrently, there is a need to assess training at multiple outcome levels, including individual skills, team-based processes, and patient outcomes. Developing this line of research will require establishing a firm foundation of basic science that links to enhanced trainee behaviors and, ultimately, to changes in patient- and systems-based outcomes. In other words, there is a need to develop a translational research approach to leadership and team performance in HCA teams. Such research would promote identification of the characteristics of leadership training curricula that improve transfer of learning, team effectiveness, and, ultimately, health care quality.

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