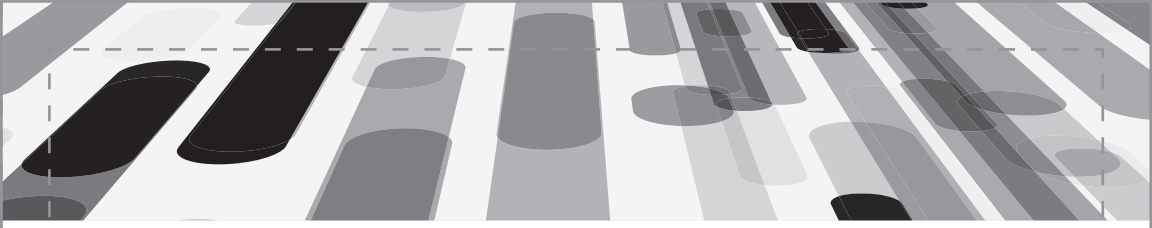

CHAPTER 3

Implementation Science and Team Sciences: The Value for Projects

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CHAPTER OBJECTIVES

1. Provide an overview of implementation and team science.
2. Discuss a variety of implementation science theoretical frameworks.
3. Identify key characteristics for successful teamwork through implementation science.
4. Describe implications of project management through an implementation science lens.

KEY TERMS

Implementation science
Interprofessional Education Collaborative (IPEC)
Knowledge translation
National Center for Advancing Translational Science (NCATS)
Science of Team Science (SciTS)
Translational science

ROLES

Healthcare researcher
Healthcare team member

PROFESSIONAL VALUES	
Evidence-based practice	Teamwork
Patient-centered care	

CORE COMPETENCIES	
Cultural competency and awareness	Interprofessional collaboration
Emotional intelligence	Resilience
Flexibility	Shared problem-solving
	Team building skills

Introduction

The complexity of health care has led to the development of disciplines such as translational, implementation, and team sciences. While interrelated and complementary, each discipline is distinct. This chapter will focus primarily on implementation and team sciences, yet it is helpful to place all three disciplines into context, as the development of each is directly related to specific needs and events within research and healthcare systems. An examination of how each area has developed gives a snapshot in time to some of the challenges healthcare professionals currently face in their day-to-day roles within practice settings, as well as ways to meet these challenges. Implications for project planning and management will be described.

It is estimated that it takes 17 years for research evidence to make an impact on clinical practice (Morris, Wooding, & Grant, 2011), which highlights the significant time lags in the conversion of basic science into practices that benefit patients. This process of conversion is what is referred to as "translation," and each phase of the translational research process has activities which contribute to these time lags, including securing financing in the form of grants, receiving approvals from institutional review boards (IRBs), conducting clinical trials, presenting and publishing research results, and developing practice guidelines. Furthermore, there are different phases in the translational research process, and the activities contributing to these time lags may occur in more than one phase:

T1: involves processes that bring ideas from basic research through early testing in humans

T2: involves the establishment of effectiveness in humans and clinical guidelines

T3: primarily focuses on implementation and dissemination research

T4: focuses on outcomes and effectiveness in populations

T0: involves research, such as genome-wide association studies, that wraps back around to basic research (Fort, Herr, Shaw, Gutzman, & Starren, 2017)

The term *translational research* first appeared in health science literature in the early 1990s, and given the relative newness of the field of **translational science**, it makes sense that formal definitions continue to evolve. **National Center for Advancing**

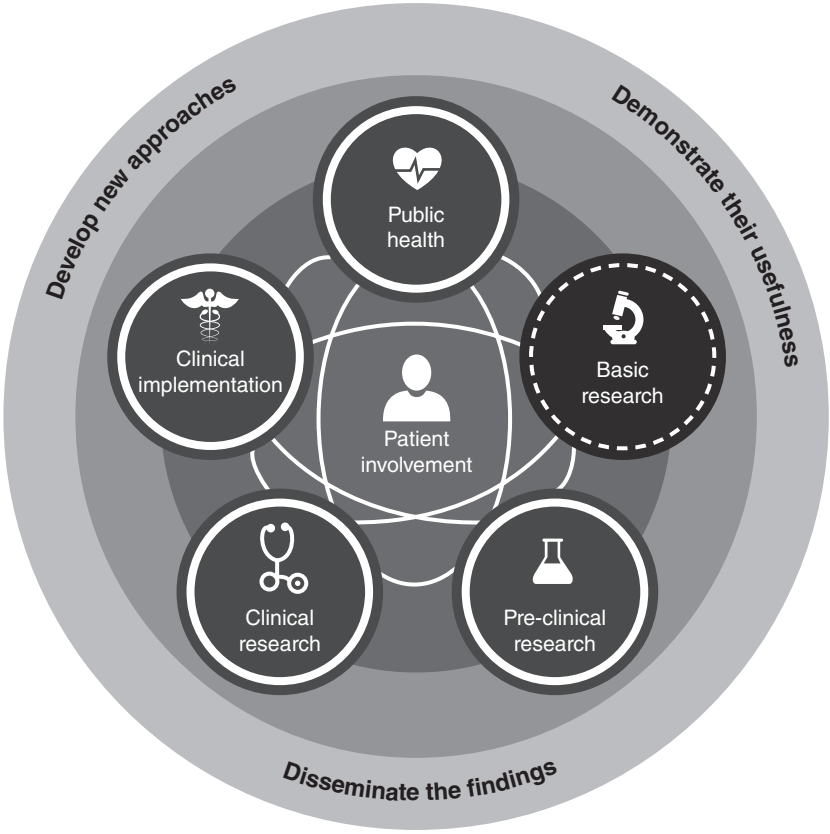

FIGURE 3-1 NCATS Translational Science Spectrum (*National Center for Advancing Translational Sciences at the National Institutes of Health*).

Translational Science (NCATS) of the National Institutes of Health (NIH) currently describes a Translational Science Spectrum (**FIGURE 3-1**), which "represents each stage of research along the path from the biological basis of health and disease to interventions that improve the health of individuals and the public. The spectrum is not linear or unidirectional; each stage builds upon and informs the others." Patient involvement is considered a critical feature of all the stages of the translation process (NCATS, 2015a). The Clinical and Translational Science Awards (CTSA) Program operates under the leadership of NCAT to support a national network of medical research institutions known as "hubs." In 2017, it was estimated that 57 medical research institutions in the United States would receive CTSA Program funding, with the hubs collaborating at both the local and regional level to develop and promote training, research tools, and processes designed to get more evidence into practice as quickly as possible and to make a positive impact on patient care (NCATS, 2015b, c).

The T3 and T4 phases of the translational research process introduce us to **implementation science**, which is "the study of methods to promote the adoption and integration of evidence-based practices, interventions and policies into routine health care and public health settings" (Fogarty International Center, 2017). The synthesis

of research findings into digestible formats for inclusion in systematic reviews, practice guidelines, and other evidence-based resources is one of the strategies to help healthcare professionals implement relevant evidence into clinical practice (Straus, Tetroe, & Graham, 2009). There are multiple conceptual frameworks that provide structure to the implementation of evidence into practice, including the Promoting Action on Research Implementation in Health Sciences (PARiHS), the Consolidation Framework for Implementation Research (CFIR), the Knowledge to Action Framework (KTA), and the Aims, Ingredients, Mechanism, Delivery framework (AIMD). Brief overviews of these frameworks follows.

Promoting Action on Research Implementation in Health Sciences (PARiHS)

Promoting Action on Research Implementation in Health Sciences (PARiHS) is a multidimensional framework designed to represent the complexity of the change processes involved in implementing research into practice and includes three elements: evidence, context, and facilitation. In the PARiHS framework, evidence includes research, clinical experience, patient experience, and local data/information. Implementation processes are likely to be more successful when research and clinical and patient experiences are located toward high. For research, high includes studies that are rigorous and have received consensus. High for clinical experiences are those that have been made explicit and verified via critical reflection, critique, and debate. Patient experience is considered at a high level when patient preferences have been used as part of the decision-making process. For local data and information to be considered high, they should have been systematically collected and evaluated.

Context in the PARiHS framework refers to the environment or setting where people receive health care as well as the environment or setting in which the proposed changes are to be implemented. Successful implementation of evidence into practice is influenced by three broad themes: culture, leadership, and evaluation. Organizations that create learning cultures are potentially able to facilitate change more easily, as attention is paid to individuals, group processes, and organizational systems. Transformational leaders are those who are able to transform cultures and create contexts that are more conducive to the integration of evidence into practice. They do this through inspiring staff to have a shared vision and by establishing clear roles, effective teamwork, and organizational structures. Evaluation is a key component in the environment, as measurement generates evidence on which to base practice and demonstrates if changes to practices have been successful.

Facilitation in the PARiHS framework refers to the process of enabling or making easier the implementation of evidence into practice. This is achieved by an individual with the appropriate role, skills, and knowledge who acts as a facilitator to help individuals, teams, and organizations apply evidence into practice. High facilitation in the PARiHS framework is holistic (sustained partnerships, developmental, adult learning approaches, high intensity/limited coverage) and with an appropriate level of facilitation, whereas low facilitation is more task oriented (episodic contact, practical/technical help, didactic approach to teaching, low intensity/extensive coverage) and would correspond to either absent or inappropriate facilitation (Rycroft-Malone, 2004).

In order for the PARiHS conceptual heuristic to become a truly useful and integrated framework for practitioners of implementation science, three areas have

been identified that need further work: conceptual development, empirical testing and refinement, and the development of reliable measures to diagnose and evaluate readiness to change and the effectiveness of that change within an organization (Kitson et al., 2008). Subsequent studies have reinforced the need for development in these three areas and have suggested other issues to consider, such as the role that individuals play in the implementation process. To that end, the integrated or i-PARiHS has been proposed as a more integrated approach. In addition to the key constructs of evidence, context, and facilitation, a new construct has been suggested: the recipient, or the people who are affected by and influence implementation at both the individual and collective team level. This new construct recognizes the importance that groups or teams of individuals have in influencing the adoption of evidence into practice. The i-PARiHS also makes a distinction between the inner context of the immediate local setting versus the outer context of the wider health system that the organization is a part of, including the policy, social, regulatory, and political infrastructures surrounding the local context. The facilitation construct is also positioned as the active ingredient of implementation, with networks of novice, experienced, and expert facilitators who help structure the process while engaging and managing relationships with key stakeholders as well as identifying and negotiating the barriers to implementation within their settings (Harvey & Kitson, 2016).

Consolidation Framework for Implementation Research

The lack of consistent terminology and definitions in implementation theories as well as no one theory containing all of the key constructs needed for successful implementation has been identified as a problem in the science of implementation, leading to the development of the Consolidated Framework for Implementation Research (CFIR; CFIR Research Group, n.d.). This meta-theoretical framework contains the common constructs identified from published implementation theories and is designed to embrace, rather than replace, the already-existing significant research related to implementation science. The CFIR's goal is to help advance the field by providing consistent taxonomy, terminology, and definitions and to allow researchers to select the constructs from the CFIR that are the most relevant for their particular setting and needs.

The CFIR is composed of five major domains which interact with each other to influence the effectiveness of implementation. **TABLE 3-1** briefly describes the domains, but more comprehensive information on each is available at http://cfirguide.org/constructs.html. These constructs are meant to provide a beginning foundation for understanding implementation as well as provide a guide for formative evaluations of intervention studies and programs. The CFIR can also be used to organize and promote the synthesis of implementation research findings and studies, as the constructs included in the framework can be used to more clearly explain the concepts in a consistent manner across studies (Damschroder et al., 2009). Damschroder et al. (2009) provide commentary on fostering health services research implementation (findings into practice) aligning the CFIR framework for advancing the science.

Knowledge-to-Action (KTA) Framework

The Knowledge-to-Action (KTA) Framework is meant to help conceptually clarify key elements involved with moving knowledge into action. Recognizing that the multiple

TABLE 3-1 Consolidated Framework for Implementation Research Constructs

Construct		Short Description
I. Intervention Characteristics		
A	Intervention Source	Perception of key stakeholders about whether the intervention is externally or internally developed.
B	Evidence Strength and Quality	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.
C	Relative Advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution.
D	Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs.
E	Trialability	The ability to test the intervention on a small scale in the organization and to be able to reverse course (undo implementation) if warranted.
F	Complexity	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement.
G	Design Quality and Packaging	Perceived excellence in how the intervention is bundled, presented, and assembled.
H	Cost	Costs of the intervention and costs associated with implementing the intervention, including investment, supply, and opportunity costs.
II. Outer Setting		
A	Patient Needs and Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritized by the organization.
B	Cosmopolitanism	The degree to which an organization is networked with other external organizations.
C	Peer Pressure	Mimetic or competitive pressure to implement an intervention, typically because most or other key peer or competing organizations have already implemented, or are in a bid for, a competitive edge.

Construct		Short Description
D	External Policy and Incentives	A broad construct that includes external strategies to spread interventions, including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting.
III. Inner Setting		
A	Structural Characteristics	The social architecture, age, maturity, and size of an organization.
B	Networks and Communications	The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization.
C	Culture	Norms, values, and basic assumptions of a given organization.
D	Implementation Climate	The absorptive capacity for change; shared receptivity of involved individuals to an intervention; and extent to which use of that intervention will be rewarded, supported, and expected within their organization.
1	Tension for Change	The degree to which stakeholders perceive the current situation as intolerable or needing change.
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.
3	Relative Priority	Individuals' shared perception of the importance of the implementation within the organization.
4	Organizational Incentives and 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.
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.

(*continues*)

TABLE 3-1 Consolidated Framework for Implementation Research Constructs (*continued*)

Construct		Short Description
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.
E	Readiness for Implementation	Tangible and immediate indicators of organizational commitment to the decision to implement an intervention.
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 ongoing operations, including money, training, education, physical space, and time.
3	Access to Knowledge and 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 and 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	Individuals' belief in their own capabilities to execute courses of action to achieve implementation goals.
C	Individual Stage of Change	Characterization of the phase an individual is in as they progress toward skilled, enthusiastic, and sustained use of the intervention.
D	Individual Identification with Organization	A broad construct related to how individuals perceive the organization and their relationship with and degree of commitment to that organization.
E	Other Personal Attributes	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.

Construct		Short Description
V. Process		
A	Planning	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.
B	Engaging	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.
1	Opinion Leaders	Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention.
2	Formally Appointed Internal Implementation Leaders	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 roles.
3	Champions	Individuals who dedicate themselves to supporting, marketing, and "driving through" an implementation, overcoming indifference or resistance that the intervention may provoke in an organization.
4	External Change Agents	Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction.
C	Executing	Carrying out or accomplishing the implementation according to plan.
D	Reflecting and Evaluating	Quantitative and qualitative feedback about the progress and quality of implementation accompanied by regular personal and team debriefing about progress and experience.

terms used in the KTA field were only contributing to confusion, the creators of the KTA Framework reviewed multiple interdisciplinary planned action theories about the process of change and developed a framework focused on the concepts of knowledge creation and the action cycle that leads to the implementation or application of knowledge. Knowledge creation is represented as a funnel and consists of the knowledge

or research types used in health care. As the knowledge moves through the funnel, it becomes more synthesized or refined (synopses, practice guidelines, clinical care pathways) and feasibly more usable by stakeholders. Action cycles contain the activities needed for knowledge implementation and are dynamic, influencing each other as well as being influenced by the knowledge creation phases. Commonalities within the various planned action theories reviewed are represented by the following phases:

- Identify a problem that needs addressing
- Identify, review, and select the knowledge or research relevant to the problem
- Adapt the identified knowledge or research to the local context
- Assess barriers to using the knowledge
- Select, tailor, and implement interventions to promote the use of knowledge
- Monitor knowledge use
- Evaluate the outcomes of using the knowledge
- Sustain ongoing knowledge use (Graham et al., 2006)

The KTA Framework is one of the most frequently cited conceptual frameworks for **knowledge translation** but is being used in practice with varying degrees of completeness and theory exactness when integrated into an implementation process. Many of the studies that have utilized the KTA framework were conducted in Canada, no doubt a reflection of the association of the KTA Framework with the Canadian Institutes of Health Research and the subsequent adoption by Canadian research funding organizations. These studies reported and gave examples of how the KTA Framework was integral to the design, delivery, and evaluation of their implementation activities, with enactment of the KTA Framework ranging from informing to full integration, indicating a flexibility of use for local needs and circumstances (Field, Booth, Ilott, & Gerrish, 2014).

Aims, Ingredients, Mechanism, Delivery (AIMD)

To address the issue of multiple terminologies and frameworks within the field of implementation science, an international collaboration of scholars met in 2012 to develop a simplified framework to describe interventions that promote and integrate evidence into health practices, systems, and policies. Their goal was to create a "meta-framework" that would accommodate the use of existing frameworks in the field and was thus designed to be "terminology agnostic." To that end, the working research group was comprised of members from the fields of quality improvement, evidence synthesis, policy, information science, public health, patient safety, and behavior change. The framework developed as a result of these initial efforts was composed of four components: (1) Intended targets, or the intended effects of the intervention and/or its beneficiaries; (2) Active ingredients, or the critical components that define the intervention and are required to initiate change; (3) Causal mechanisms, or the proposed pathways or policies by which an intervention will effect change; and (4) Mode of delivery or application, or the ways in which active ingredients are applied.

The original framework went through a validation project and further refinement over the next 3 years, resulting in the validated and revised version of the simplified framework version 1, now called the AIMD framework (**TABLE 3-2**). The AIMD framework still contains the four original components, but the concepts and associated descriptions were made more simple and clear. As a result, Intended Targets became AIMS, Active Ingredients became Ingredients, Causal Mechanisms became Mechanisms, and Mode of Delivery or Application became Delivery.

TABLE 3-2 The AIMD Framework

Component	Description
Aims	What do you want your intervention to achieve and for whom?
Ingredients	What comprises the intervention?
Mechanism	How do you propose the intervention will work?
Delivery	How will you deliver the intervention?

Bragge, P., Grimshaw, J. M., Lokker, C., & Colquhoun, H. (2017). *AIMD: A Validated, Simplified Framework Of Interventions To Promote And Integrate Evidence Into Health Practices, Systems, and Policies. BMC Medical Research Methodology, 17* (38). Retrieved from https://doi.org/10.1186/s12874-017-0314-8

The creators of AIMD believe it can serve as a framework for effective communication between team members of implementation interventions as well as serve as a guide for the development of intervention designs and reporting toolkits (Bragge, Grimshaw, Lokker, & Colquhoun, 2017).

Selecting the appropriate implementation framework to guide local projects may be confusing, and some recommendations to help improve the process include using methods such as concept mapping, group model building, conjoint analysis, and intervention mapping (Powell et al., 2017). Checklists for identifying the determinants of practice, including one tool with a focus on behavior change in health professionals, are available and may prove useful for those who are designing, conducting, evaluating, or reporting implementation projects (Flottorp et al., 2013). For those who are involved in implementation research, the Standards for Reporting Implementation Studies (StaRI) initiative developed a 27-item checklist that provides a guideline for the transparent and accurate reporting of implementation studies. The StaRI standards are registered with the EQUATOR Network (http://www.equator-network.org), where the checklist is available as a download (Pinnock et al., 2017).

Value of Implementation and Team Science for Sustainable Clinical Projects

Team science applies conceptual and methodological approaches from multiple disciplines and health professions in order to address complex clinical problems. While there is a growing emphasis on interprofessional training for health professions students to prepare them for team-based clinical practice, training for researchers who are team or interprofessionally based has traditionally been lacking. It is also increasingly being recognized that truly effective patient care requires a combination of both interprofessional medical practice and transdisciplinary scientific knowledge, which necessitate clinical practice guidelines that take into account team-based care and that integrates knowledge from multiple disciplines (Begg et al., 2014; Croyle, 2008). The NIH recognizes the importance of cross-disciplinary science, in which team members with training and expertise in different fields work together to combine or

integrate their perspectives in a single research endeavor, which is seen as a promising approach to accelerate both scientific innovation and the translation of scientific findings into effective policies and practices (National Cancer Institute, n.d.). The National Institute for Mental Health (NIMH) has made team science a priority and has designed a 2-year training institute in mental health implementation science called the Implementation Research Institute (IRI). Both mentoring and collaboration are emphasized in the training program, and an analysis of the IRI has demonstrated a significant impact of the mentoring relationships on future scientific collaborations, as evidenced by increases in grants, presentations, and publications produced by IRI attendees and their mentors in a post-training 2-year time span (Luke, Baumann, Carothers, Landsverk, & Proctor, 2016).

A team science academic–industry hybrid model, the multidisciplinary translational team (MTT), is a combination of several team types adapted for an academic setting and includes an interprofessional group of scientists who are working together to solve a common translational problem. The CTSA has provided support for MTTs in the form of infrastructure and team development training, including orientation meetings to the CTSA for team members, assistance with producing team and individual objectives and tasks, the development of team leadership councils which functioned as a peer mentoring network, and hosting a team-building workshop. An evaluation of MTTs showed four different team type trajectories, which indicates the need for team specific interventions in the areas of leadership and resources to help them reach their maximum potential: (1) teams with traditional leadership; (2) teams focused on basic science; (3) stable, high-functioning teams with junior project managers; and (4) teams with inexperienced leaders. The teams that were identified as having effective team processes developed interdisciplinary concepts and publications that most likely would not have happened without the interaction between the team members (Wooten et al., 2015).

The **Science of Team Science (SciTS)** is a rapidly growing field which has the potential to positively impact both translational and implementation science and to improve health care. Interprofessional teams are not limited to just translational or research teams, as the complexity of providing optimal patient care within our modern healthcare system necessitates well-functioning teams comprised of healthcare providers, administrative leaders, support staff, patients, industry, and community agencies/members. The composition of these teams will fluctuate depending on the task at hand, the need for different types of expertise, access to resources/personnel, or any other number of variables inherent in healthcare organizations. Many of the skills identified in the SciTS literature apply as much to clinical teams as they do to research teams, and strengthening teamwork has been identified as a top priority for improving health care, especially when it comes to patient safety (Clancy & Tornberg, 2007). The argument can be made that "soft skills" are integral for effective collaboration and team functioning and may not have received adequate emphasis in the health sciences curriculum during professional training. Many of these soft skills are addressed in the **Interprofessional Education Collaborative (IPEC)** Core Competencies for Interprofessional Collaborative Practice, which focus on four domains: (1) values/ethics: work with individuals of other professions to maintain a climate of mutual respect and shared values; (2) roles/responsibilities: use the knowledge of one's own role and those of other professions to appropriately assess and address the needs of healthcare patients and to promote and advance the health of populations; (3) interprofessional communication: communicate with patients, families, communities, and professionals in health and other fields in a responsive and responsible manner that supports a

team approach to the promotion and maintenance of health and the prevention and treatment of disease; and (4) teams/teamwork: apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan, deliver, and evaluate patient/population-centered care and population health programs and policies that are safe, timely, efficient, effective, and equitable (IPEC, 2017). Each domain includes sub-competencies that further identify the skills and actions needed to achieve the IPEC core competencies. These skills and actions can also be thought of in broader categories, such as cultural and diversity awareness, emotional intelligence, strategic thinking, conflict resolution, persuasion, resilience, flexibility, and the ability to inspire moral- and competence-based trust, and have been identified for contributing to the ability to successfully collaborate with others in a variety of disciplines (Gibert, Tozer, & Westoby, 2017).

Data from interviews with NIH researchers who were part of five teams that ranged from successful (defined as teams that developed a reasonable level of cohesiveness and were able to pursue their missions) to groups that ended because of conflict indicate that the following characteristics contribute to an effective team: effective leadership, self and other awareness, established trust among team members, open communication strategies, shared expectations, clear definition of roles and responsibilities, a shared vision, appropriate recognition and credit given to team members, allowing for disagreement while mitigating conflict, learning each other's languages, and enjoying the science and working together (Bennett, Gadlin, & Levine-Findley, 2010) Trust has been identified as one of the most critical elements for successful teams and therefore should not be left to chance. Specific steps that can be taken to proactively build trust within teams include having explicit conversations where partnership expectations are discussed, on what the roles within the team will be, on how information/data/resources will be shared, on how decisions will be made, and on how disagreements or conflicts will be handled (Bennett & Gadlin, 2012).

Key contributing characteristics for successful teamwork such as the development of a common understanding of both the roles of team members and the structure of the work have been referred to as a shared mental model (SMM) (Canon-Bowers, Salas, & Converse, 1993). The SMM construct, as it relates to clinical teamwork and health professions learners to date, has not been well defined, with interventions to foster or measure SMM in clinical teams being not well represented in the published literature (Floren et al., 2017). There are a variety of tools which can be used to measure teamwork, however, including those that measure the teamwork of individuals working within teams, the teamwork of teams as a whole, and those that assess both individuals and teams. One of the more well-known ones is the TeamSTEPPS Teamwork Attitudes Questionnaire, which is designed to assess the teamwork attitudes, knowledge, and skills of learners who have gone through the TeamSTEPPS curriculum (Agency for Healthcare Research and Quality, 2016). Another validated tool that has been associated with improved patient outcomes is the Team Climate Inventory, which was originally designed to measure a team climate for innovation using five scales related to: (1) Participative safety; (2) Support for innovation; (3) Vision; (4) Task orientation; and (5) Social desirability (Anderson & West, 1996). Over 70 unique tools designed to quantitatively measure teamwork in an internal medicine setting have been identified in the literature, indicating no lack of resources for those looking to assess teamwork in their local setting (Havyer et al., 2014). Clearly, the behavior of healthcare professionals and healthcare organizational culture are key variables that impact the quality of patient care and the sustainability of clinical projects. Staying abreast of research findings in

the fields of both implementation and team science can equip those who are part of clinical care teams or who are conducting quality improvement and research projects with strategies and tools that will better enable successful outcomes.

Implications for Project Planning and Management

Understanding implementation science models and the various tools and strategies for moving evidence into true practice and sustained improvement provides the "next steps" in the uptake of evidence-based practice. Common language and terminology provide a beginning to the effective spread and scale-up of successful projects. Incorporating the science of team science, working together as interprofessional teams, can also be facilitative in the process. Being able to "diagnose" teamwork attitudes, knowledge, and skills of learners through the use of assessment tools will be important to a starting point in developing a shared mental model. Trust is a cornerstone of team success and positive outcomes. Evaluation of the structure, processes, and outcomes of the actual implementation and the team's effectiveness advances real-time improvement and sustainability for population health management.

Summary

- Strategies to address the real-world needs of patients and the providers who care for them are the impetus behind translational, implementation, and team science in health care.
- National networks such as PCORnet, the National Patient-Centered Research Network, are actively working to improve health and health care by fostering faster, less expensive, and more powerful ways to conduct observational and experimental clinical effectiveness research (CER) studies, utilizing strong partnerships between patients, clinicians, and health systems via 33 partner networks and a Coordinating Center (Patient-Centered Outcomes Research Institute, 2016).
- Advances in the fields of implementation science and team science are identifying effective strategies for healthcare providers to take the evidence produced from these research studies and apply them to improve the health of patients in their local settings.
- While the challenges of working in multidisciplinary or interprofessional teams can be great, the benefits of increased opportunities for new scientific knowledge, mentorship, and innovation can provide great rewards that will benefit patients, practice settings, organizations, and healthcare systems.

Reflection Questions

1. What role do you see for yourself in the more efficient and timely implementation of evidence into practice to help improve the health of patients?
2. What are some of the characteristics essential to fostering a productive team environment?

3. How can you contribute to an organizational culture that promotes and rewards collaboration?
4. Consider your last project. How did you use (or could use) an implementation model and team science principles?

Learning Activities

Identify a program or clinical project that would benefit from the structure provided by an implementation science theory or framework. Which theory or framework would you use and why?

What characteristics or strategies do you believe would best work for promoting team cohesiveness in your practice environment? How would you go about improving teamwork in your environment?

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Case Exemplar

Case Study 1

Collaboration and Implementation Science

Linda Roussel

Building on the concept of collaboration from an implementation science perspective has been the focused work of the Clinical Translational Science Awards (CTSA) hubs on a multi-site research platform perspective. The partner CTSA hubs became aware of the limited study on the implementation process, specifically noting the chasm between evidence generated and actions taken to implement evidence into routine clinical and public health practice (Kerner et al., 2005). Effective interventions "tested" under controlled research settings do little to illuminate the challenges and barriers to translating findings into real-world settings. Considering the translational perspective is essential to reaching the longer-term goal of improving research impact to the broader population, resulting in value-added returns on scientific investments. The National Implementation Research Network (NIRN, 2015) defines implementation science as the study of factors that impact the full and effective use of innovations in practice. The aim is not to answer factual questions about what is but rather to determine what is required to make the change or improvement. The National Institute of Health (NIH) has made implementation science (T3–T4 resear\ch) a priority, launching CTSAs in 2006. We have noted growth in implementation science, specifically moving from a set of studies chronicling the many barriers and facilitators to successful adoption, uptake, and sustainability. The past decade has experienced the movement toward comparing implementation strategies to implementation as a matter of course and more recently to the comparison of multiple active strategies (Proctor, Powell, & McMillen, 2013). In tandem, researchers have been advancing the methods and measures of implementation science by focusing on greater rigor and robustness of complex processes (Neta et al., 2015). With this backdrop, CTSA hubs have conceptually developed a platform using implementation science and collaboration to advance frontline engagement and nursing-sensitive outcomes. Through a robust virtual collaboratory, the CTSA hubs and their clinical teams would focus on sharing implementation strategies to improve key critical patient care and systems outcomes, such as reducing readmission rates, reducing length of stay, improving transitions of care, and reducing hospital-acquired conditions (HACs).

Reflection Questions

1. What is the process for building a virtual collaboratory from an implementation science perspective?
2. How may one address challenges associated with partner hubs within a virtual environment?

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