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Implementation Science Training and Resources for Nurses and Nurse Scientists

Leanne M. Boehm, PhD, RN, ACNS-BC¹, Deonni P. Stoldorf, PhD, RN², Alvin D. Jeffery, PhD, RN³

¹*Iota*, Assistant Professor, Vanderbilt University School of Nursing; Nashville, TN, USA

²*Iota*, Assistant Professor, Vanderbilt University School of Nursing; Nashville, TN, USA

³*Iota & Nu Lambda*, Medical Informatics Fellow, U.S. Department of Veterans Affairs, Nashville, TN, USA

Abstract

Purpose: The purpose of this article is to describe the differences between quality improvement and implementation science, the urgency for nurses and nurse scientists to engage in implementation science, and international educational opportunities and resources for implementation science.

Organizing Construct: There is a push for providing safe, effective, patient-centered, timely, efficient, and equitable health care. Implementation science plays a key role in adoption and integration of evidence-based practices to improve quality of care.

Methods: We reviewed implementation science programs, organizations, and literature to analyze the roles of nurses and nurse scientists in translating evidence into routine practice.

Findings: Implementation-trained nurses and nurse scientists are needed as part of multidisciplinary teams to advance implementation science because of their unique understanding of contextual barriers within nursing practice. Likewise, nurses are uniquely qualified for recognizing what implementation strategies are needed to improve nursing care across practice settings.

Conclusions: Many international clinical and training resources exist and are supplied to aid interested readers in learning more about implementation science.

Clinical Relevance: Half of research evidence never reaches the clinical setting, and the other half takes 20 years to translate into clinical practice. Implementation science-trained nurses are in a position to be excellent improvers for meaningful change in practice.

Keywords

Evidence-based practice; implementation science; quality

The substantial push for enhanced patient safety began with the publication of the National Academy of Medicine's (NAM) groundbreaking report *To Err is Human: Building a Safer Health System*. This report revealed that numerous patient deaths occur as the result of preventable medical errors (Kohn, Corrigan, & Donaldson, 2000). The NAM's second report, *Crossing the Quality Chasm*, provided solutions to address the risks to patient safety by proposing six dimensions for healthcare improvement (Institute of Medicine Committee on Quality of Health Care in America, 2001). Specifically, healthcare organizations must improve to provide care that is safe, effective, patient centered, timely, efficient, and equitable. These dimensions provide the focus for implementation of evidence-based practice (EBP), reducing preventable harm in healthcare, and continue to drive quality improvement (QI) initiatives.

Considering that half of research evidence relevant to clinical practice never reaches the clinical setting, translating evidence into routine clinical care requires focused interdisciplinary efforts (Balas & Boren, 2000). Implementation science (IS) was established to develop evidence-based strategies to promote the uptake of EBP into clinical care. The purpose of this article is to describe the differences between QI and IS, the urgency for nurses and nurse scientists to engage in IS, and international educational opportunities and resources for nurses interested in IS.

Quality Improvement vs. Implementation Science

Quality Improvement

QI broadly refers to work that aims to improve the quality, safety, and value of health care. One common QI framework is the Model for Improvement, which guides users in the development of a specific, measurable, achievable, relevant, and time-bound (SMART) aim (Langley, 2009). This SMART aim comprises quantitative measures to assess outcomes along with a change strategy for successful improvement. QI is further characterized by visualization of the current system (e.g., process map), commitment to rapid testing of change strategies via Plan-Do-Study-Act (PDSA) cycles, and observing for variation in the data in order to determine statistically significant improvement (Langley, 2009). Testing changes on a small scale, learning from each PDSA cycle, and refining change strategies can then lead to broader change for a microsystem or population.

Implementation Science

Implementation science also aims to improve the quality of health care, but the approach is focused on systematic adoption and integration of evidence-based health interventions within a particular setting (Brownson, Colditz, & Proctor, 2018). While QI is informed largely by the automotive industry (e.g., Toyota lean manufacturing), IS is informed by behavioral science because implementation requires changing practice patterns within specific settings. Figuratively, one could think of QI as the practice arm of improvement and IS as the research arm of improvement via informed implementation of EBP. It currently requires almost 20 years to transform original research into practice that benefits patient care (Balas & Boren, 2000). Thus, IS primarily explores outcomes related to the implementation of healthcare interventions such as acceptability, appropriateness, adoption, feasibility, and

sustainability, in addition to those outcomes important to QI (e.g., safe, effective, equitable, timely) (Proctor et al., 2011). Implementation science may also include client outcomes like patient satisfaction, function, and quality of life as secondary outcomes (Proctor et al., 2011). Measurement of specific implementation outcomes and the accompanying development of robust implementation methods can enhance the effectiveness of implementation efforts, lead to more timely adoption of EBP, and improve the quality of health care.

Clinical Example: Addressing Delirium Using QI vs. IS Approaches

Valid and reliable tools are guideline recommended for the assessment of delirium in hospitalized patients. One hospital that implemented a validated delirium screening tool later identified inaccuracies in nursing assessments, which resulted in unidentified delirium and missed opportunities to treat patients with delirium (DiLibero, DeSanto-Madeya, Dottery, Sullivan, & O'Donoghue, 2018; DiLibero et al., 2016). The subsequent QI project aim was to achieve >80% delirium assessment accuracy by nurses. The improvement team used a multifaceted educational intervention and conducted real-time tracking of delirium assessment accuracy trends via a run chart. Over 11 months, delirium assessment accuracy improved from 70% to 96%. The resulting success of this QI initiative led to subsequent spread to two other hospital units. The focus of the QI project was to implement specific, evidence-based interventions (i.e., education and monitoring accuracy trends) to improve patient clinical outcomes.

Using the same example of enhancing delirium assessment in hospitalized patients, an implementation scientist might focus on (a) assessing current adherence to, and accuracy of, delirium assessment in a practice setting; (b) employing a multidisciplinary team to explore the best strategies for addressing implementation challenges; and (c) selecting appropriate measures to determine the effectiveness of a strategy. Implementation scientists identify implementation strategies (e.g., audit and feedback, dynamic training, disincentives, peer leaders, etc.) in order to better implement an intervention within a practice setting. Implementation scientists might evaluate how nurses use a particular implementation strategy and whether that strategy resulted in improved implementation (e.g., satisfaction, usefulness, utility, and feasibility). Alternatively, frontline nurses might apply IS methods by developing a unit advisory board, critically evaluating the literature related to delirium assessment, and proposing strategies best suited for their environment and most likely to improve implementation. Implementation scientists evaluate outcomes specific to implementation efforts (e.g., acceptability and sustainability of the delirium screening tool), while frontline nurses evaluate clinical outcomes (e.g., delirium assessment accuracy).

Need for Implementation-Trained Nurses: Why Nurses and Why IS?

It is critical for IS-focused clinicians to be present in health care. Implementation teams are inherently multidisciplinary because many interventions span across disciplines, and success is more likely when all disciplines involved in the intervention are represented in implementation processes (Stolldorf, 2017; Stolldorf, Mion, & Jones, 2016). As the clinicians embedded in almost every sector of health care and typically on the front lines of patient care, implementation-trained nurses are positioned to be excellent “meta-improvers”

for meaningful change. Nurses are often at the forefront of QI initiatives to implement EBP healthcare interventions. Therefore, healthcare systems increasingly need well-trained nurses and leaders who are knowledgeable of ideal implementation strategies for use across diverse settings, populations, and interventions.

The National Institutes of Health is working to build capacity in IS by funding formal training programs and generating program announcements soliciting investigator-initiated proposals for translating research into practice (Glasgow et al., 2012). Nurses and nurse scientists are needed to lead and contribute to multidisciplinary research teams advancing the science of implementation. Given nurses' unique clinical role and affinity for interprofessional collaboration, coupled with their ongoing involvement with implementing EBP in clinical settings, nurses have a vested interest in learning and applying IS. Specifically, nurses need advanced knowledge of the factors affecting adoption, implementation, and sustainment of EBP and further develop IS methods to accelerate the implementation of EBP.

Organizational change can be difficult to achieve due to a variety of contextual factors (e.g., capacity, leadership support, lack of interprofessional collaboration) known to impede implementation efforts (Arroyave, Penaranda, & Lewis, 2011; Lau et al., 2015; Shoemaker, 2015). To achieve implementation success, change is often needed at different organizational levels (i.e., individuals, units, and/or organizations) (Chaudoir, Dugan, & Barr, 2013). When nurses develop implementation plans that include the careful selection of processes that will facilitate change at the desired organizational level, successful implementation is more likely. Implementation plans must also account for existing organizational barriers like nursing culture and leadership, hospital size, staffing, finance, workload, administrative responsiveness, and resistance to change, which can significantly influence implementation of an evidence-based intervention (Powell et al., 2017; van Achterberg, Schoonhoven, & Grol, 2008).

Sound knowledge in IS will enable nurses to successfully tailor implementation efforts to meet the needs of their organizations. Nurse scientists understand these contextual barriers within which nurses' practice and can facilitate the necessary buy-in from colleagues and serve as opinion leaders to enhance implementation. These skills, in addition to nurses' implicit ability to problem solve and think critically, make them well-equipped to understand what implementation strategies are best for enhancing the incorporation of EBP into nursing and healthcare. There are nurse scientists already beginning to make a difference (Costa et al., 2017; Dolansky, Schexnayder, Patrician, & Sales, 2017; Leeman et al., 2018; Sales et al., 2016; Stetler, Ritchie, Rycroft-Malone, Schultz, & Charns, 2009), and more implementation-trained nurses are needed to continue this important work.

Clinical and Training Resources

Training is required to prepare the next generation of IS nurse scientists to ensure consistent application of IS concepts. Concepts critical to training include theories, models, frameworks, designs, measurement, strategies, and outcomes specific to implementation. We have identified a variety of resources to share with the community to assist interested readers

in learning more about IS. We have curated university-based programs, fellowship and career development grants, independent research grants, professional organizations, conferences/meetings, and other miscellaneous readings and tutorials. The data presented in Table 1 can guide individualized training plans and serve as a resource for incorporating IS competencies into nursing curricula (Chambers, Proctor, Brownson, & Straus, 2017; Ginossar et al., 2018).

Conclusions

It can be challenging to find opportunities for learning new skill sets, but many international resources do exist for becoming more knowledgeable and experienced with implementation and IS. We encourage interested readers to take advantage of the opportunities we have outlined here and contribute to this important and growing field. Our patients and communities cannot wait another 20 years to receive the best possible care; we need well-equipped nurses and nurse scientists now who can successfully facilitate implementation efforts to improve health and health care.

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Clinical Resources

- Implementation Science. <https://implementationscience.biomedcentral.com/>
- TDR. Implementation research toolkit. <https://www.who.int/tdr/publications/topics/ir-toolkit/en/>
- University of North Carolina at Chapel Hill. Implementation Science Exchange. <https://impsci.tracs.unc.edu/>

Table 1.

Resources for Learning and/or Conducting Implementation Science

Institution/location	Website	Description
Universities		
Adult and Child Consortium for Health Outcomes Research and Delivery Science (University of Colorado, U.S.A.)	ucdenver.edu/academics/colleges/medicalschoo/programs/ACCORDS/Pages/welcome.aspx . See Cores and Programs.	Offers internal training grants, online resources (e.g., checklists, textbooks, worksheets), and learning opportunities Online
Center for Clinical Quality & Implementation Research (Vanderbilt University Medical Center, U.S.A.)	vumc.org/implementation/	Interdepartmental, multidisciplinary center that offers internal training grants, learning opportunities (e.g., seminars, symposia, workshops), and consultation
Center for Health Innovation & Implementation Science (Indiana University, U.S.A.)	hii.iu.edu/	Offers boot camp workshop, implementation short course, webinars, distance-education graduate certificate program Online
Centre for Implementation Science (King's College, U.K.)	kcl.ac.uk/ioppn/depts/hspr/research/cis/training-events.aspx	Provides consultations for local organizations, hosts seminars, 2-day implementation master class, and international conference
Gillings School of Public Health (University of North Carolina, U.S.A.)	sph.unc.edu/research/explore/implementation-science/	Offers in-person seminars and >10 implementation science-focused graduate courses Online
Implementation Research Institute (Washington University, U.S.A.)	iristl.org/	Supports career development for early- and mid-career investigators; applicants can receive distance training and mentorship Online
IMPSCIX (University of North Carolina, U.S.A.)	impsci.tracs.unc.edu/	Multiple resources and tutorials for theories, frameworks, grant writing, and publishing implementation science Online, free
Institute for Clinical & Translational Research (University of Wisconsin-Madison, U.S.A.)	ictr.wisc.edu/	Offers short courses, conferences, certificates, workshops, and consultation Online, free
Specialist Certificate in Implementation Science (University of Melbourne, Australia)	online.unimelb.edu.au/medicine-and-public-health/social-work/specialist-certificate-in-implementation-science-overview	6-month certificate in implementation science; domestic and international students welcome Online
Fellowships and career development awards		
F32, K01, K08, T32, & R36 Grant Mechanisms (Agency for Healthcare Research & Quality)	ahrq.gov/funding/training-grants/index.html	Provides funding to individuals and organizations for predoctoral, postdoctoral, and early-career health services and implementation science researchers
K12 Grant Mechanism (U.S. National Heart, Lung, & Blood Institute)	nhlbi.nih.gov/	Provides funding to organizations to offer intramural career development awards to research faculty
Quality Scholars Fellowship (U.S. Department of Veterans Affairs)	vaqs.org/	2-year interdisciplinary fellowship focused on both quality improvement and implementation science
Grants		
Dissemination & Implementation Research in Health R-Level Funding (U.S. National Institutes of Health)	grants.nih.gov/grants/oer.htm	Funding opportunities for R01, R03, and R21 mechanisms solicit investigator-initiated proposals for pilot through large-scale research studies in dissemination and implementation

Institution/location	Website	Description
Fogarty International Center (U.S. National Institutes of Health)	fic.nih.gov/Pages/Default.aspx	The “Implementation Science Information and Resources” page provides news, resources, and funding mechanisms
Health Services Research R18 Demonstration and Dissemination Grants (Agency for Healthcare Research & Quality)	grants.nih.gov/grants/guide/pa-files/PA-18-793.html	Funding opportunity for organizations or institutions working toward a concretely scoped health services research project
Professional organizations (*1 or more relevant conferences hosted by organization)		
Academy Health*	academyhealth.org/	Professional home for health services researchers that focuses on implementation research as a foundational science to most healthcare delivery improvement activities; co-hosts “Annual Conference on the Science of Dissemination & Implementation in Health” with U.S. National Cancer Institute
Canadian Coalition for Global Health Research	ccghr.ca/resources/knowledge-translation/	Contains free, online curriculum of three modules focused on knowledge translation within healthcare settings Online, free
Consortium for Implementation Science (RTI International)	consortiumforis.org/	Actively conducts implementation science projects and shares details via website, which contains many examples for well-scoped implementation research studies
European Implementation Collaborative (EIC)*	implementation.eu	Organization that aims to improve lives through implementation of evidence-informed human services across Europe. Connects visitors to international implementation resources, networks, and events.
Institute for Healthcare Improvement*	ihi.org/education/Pages/default.aspx	Leading organization in healthcare quality improvement; website contains access to a number of online and in-person training opportunities emphasizing quality improvement Online, free
Kings College London Center for Implementation Science	clahrc-southlondon.nihr.ac.uk/centre-implementation-science	Center is part of the National Institute of Health Research with an array of experts in implementation and improvement science. Aims to understand the implementation of evidence-based practice and clinical research in healthcare settings.
Knowledge Translation Canada*	ktcanada.org/	Offers Knowledge Translation Conference with focus on implementation and serves as a resource to facilitate the uptake of research evidence in practice; offers seminar series and summer implementation institute
Scottish Improvement Science Collaborating Centre	siscc.dundee.ac.uk/	National organization focused on identifying and creating methods for large-scale healthcare improvement activities
Society for Implementation Research Collaboration*	societyforimplementationresearchcollaboration.org/	Facilitates networking, has information on many in-person training workshops and conferences, and provides dozens of introductory resources/videos for those new to implementation science
Training Institute for Dissemination & Implementation Research in Health [TIDIRH] (U.S. National Institutes of Health)	obsr.od.nih.gov/training/	Training program that includes a 4-month online course and 2-day in-person training covering the entire continuum from theoretical foundations to practical considerations Online
Training Institute for Dissemination & Implementation Research in	cancercontrol.cancer.gov/IS/training-education/tidirc/index.html	Training program that includes a 4-month online course and 2-day in-person training covering the entire continuum from theoretical

Institution/location	Website	Description
Cancer [TIDIRC] (U.S. National Cancer Institute)		foundations to practical considerations across the cancer control continuum. Online
U.S. Department of Veterans Affairs' Quality Enhancement Research Initiative	queri.research.va.gov/	Primary focus is quality improvement, but organization stores free webinars focused on implementation science using real-world scenarios Online, free
Other resources and materials		
Advanced Topics in Implementation Science Webinars (U.S. National Cancer Institute)	cancercontrol.cancer.gov/IS/training-education/Webinars.aspx	Provides free video webinars via YouTube for implementation methods related to cancer care Online, free
Dissemination and Implementation Models in Health Research and Practice	dissemination-implementation.org/	Helps with selecting dissemination and implementation models and find measurement instruments for model constructs Online, free
<i>Dissemination and Implementation Research in Health: Translating Science to Practice</i> , 2nd edition	ISBN-13: 978-0190683214 ISBN-10: 019068321X	Serves as a practical guide to implementation science and includes relevant resources at the end of each chapter
<i>Implementation Science</i> journal	implementationscience.biomedcentral.com/	Premier peer-reviewed journal for healthcare-focused implementation science methods
Implementation Research Toolkit (World Health Organization)	who.int/tdr/publications/topics/ir-toolkit/en/	Online, module-based curriculum for learning about implementation research Online, free

Note.: free = free training available; online = online training available.