

Expediting the Harvest and Transfer of Knowledge for Practice in Nursing: Catalyst for a Journal

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INTRODUCTION

The transfer, transformation, and adoption of knowledge-based innovation into practice, based on evidence of clinical utility, may be the strategic *raison d'être* for nursing science. These processes are markedly distinct from the conduct of research but are the heart of nursing's scientific enterprise. Clinically significant research has the potential to make a difference to clients, to clinical practice, or to any other problem with priority for the discipline.⁽¹⁾ In fact, "the survival of the profession may ultimately rely on our ability to establish the clinical significance of our research and consequently our practice."^(2, p. 372)

Dean Sue K. Donaldson⁽³⁾ recently traced the translation of basic sciences into clinical practice from basic scientific experiments through intervention studies, clinical trials,

and demonstration projects and identified the sequence of scientific activity leading from the laboratory bench to the bedside. Clearly, demonstration projects explicate clinical significance and refine research-based protocols for clinical practice. However, the translation, transformation, and diffusion of findings – beyond trials and demonstration projects – into the real world trenches of contemporary health care delivery, validate the potential of evidence-based innovation to actually improve clinical practice. The resulting innovation or change in clinical practice has the potential to affect both the conceptual or cognitive processing of individual nurses as well as clinical decision making and practice actions of nursing services at the organizational level.^(4, 5)

Knowledge utilization in nursing, once a professional mandate for assurance that new knowledge is used for the good of society, has become a strategic imperative. Emerging from ongoing health care reformation, a new economic competitive standard demands that surviving organizations "run to rigor" as they position themselves in the new marketplace.⁽⁶⁾ Successful health care systems and corporations must develop and sustain a capacity for ongoing performance improvement. The ability of practicing nurses and their organizational settings to tap new knowledge as a source of innovation to improve clinical costs, quality, and outcomes of care has always been the goal. Now it is a critical priority.

In the midst of a health care revolution, exploding information technology, a growing portfolio of clinical research in nursing, data-driven quality improvement reporting, and the profession's cumulative research utilization insight and expertise, the

challenges are clear. How can nursing expedite its harvesting and diffusion of new knowledge for practice improvement?

WIDENING THE LENS: KNOWLEDGE UTILIZATION DEFINED

Carper's^(7, 8) classic treatise espoused four fundamental patterns of knowing in nursing and a decade later provided the building blocks for Jacobs-Kramer and Chinn's Model of Nursing Knowledge.⁽⁹⁾ The fundamental patterns of knowing identified were: 1) empirics – knowledge derived from science, 2) aesthetics – knowledge emerging from the art of nursing, 3) personal knowledge – embedded in the embodied knowing of self and through interaction with the other, and 4) ethics – knowledge derived from morality, values, and judgment. While the universe of knowledge in nursing may be most easily grasped as the integration of these four knowledge metapatterns, nursing literature debates the extent to which the art of nursing is rational⁽¹⁰⁾ and notes the postmodern emphasis on pragmatics and events of everyday life as sources of knowledge.⁽¹¹⁾ In contemporary terms, key sources of knowledge for innovation in nursing include research studies, quality improvement analyses and clinical reports capturing “stories from the field.” Recognizing that consensus related to legitimate sources and characteristics of knowledge in nursing is dynamically

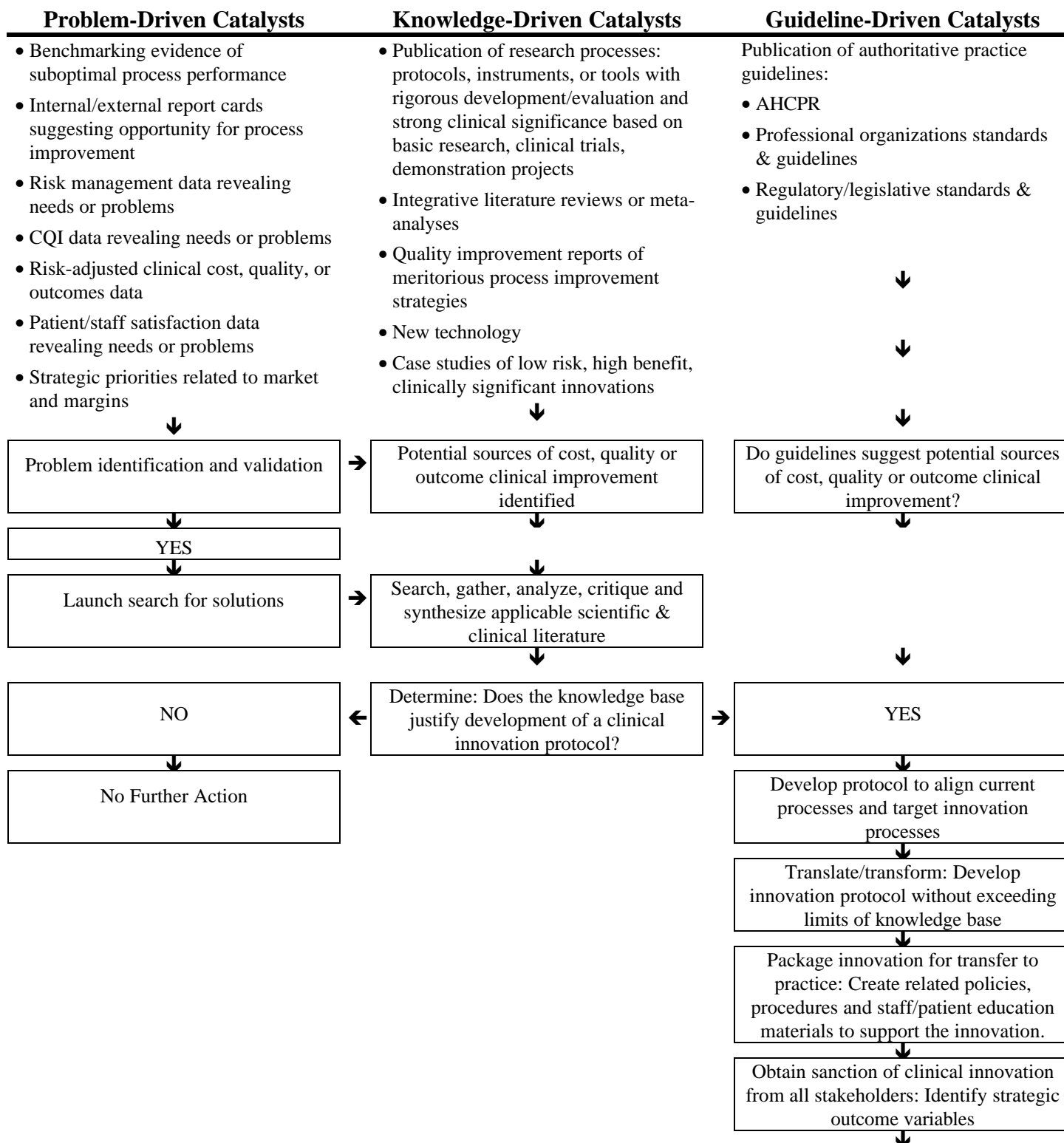
evolving, the arena of knowledge utilization is envisioned broadly as the application of **available** knowledge (theoretical, artistic, personal and ethical) or technology by a new user or perhaps for a new use.⁽¹²⁾

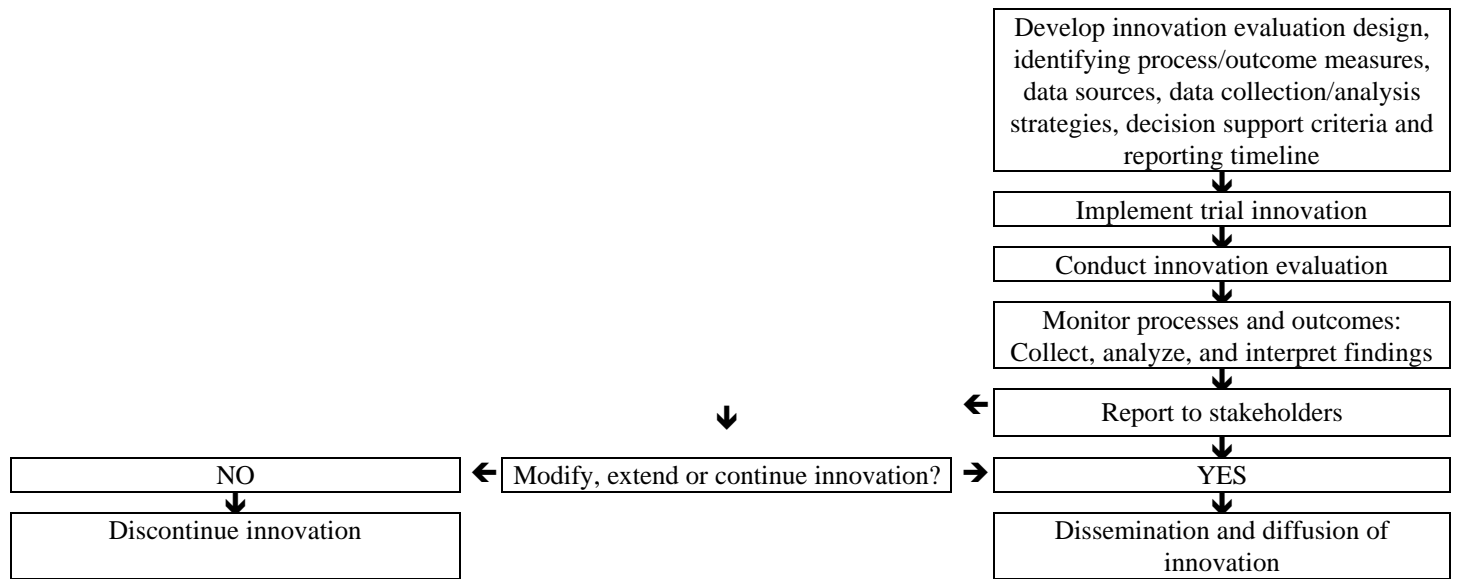
Knowledge utilization inherently involves “a complex process of political, organizational, socioeconomical and attitudinal components.”^(12, p. 2) Theoretical models for knowledge utilization and diffusion have evolved as the field has advanced. Core components of the utilization process include *adoption* – the decision to accept and undertake the change required by the new knowledge creating the innovation; *dissemination* – spreading the new knowledge; and *diffusion* – purposeful spreading of the innovation following adoption and use of the new knowledge.⁽¹²⁾

CATALYSTS OF CLINICAL INNOVATION IN NURSING

Catalysts for clinical innovation in nursing arise from several sources and may be clustered as problem-driven catalysts, knowledge-driven catalysts, and guideline-driven catalysts. An overview of clinical innovation catalysts in nursing, inspired by the original Iowa Model for Research-Based Practice to Promote Quality Care,⁽¹³⁾ is presented in **Figure 1**.

Figure 1: Clinical Innovation Catalysts in Nursing[®]





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Problem-driven catalysts have emerged as health care systems have progressed from quality assurance to total quality management (TQM). Inherently in TQM, internal and external cost, quality and outcome trends and comparisons are monitored and comparatively benchmarked, sparking awareness of previously unrecognized clinical process or practice problems and opportunities for improvement. Additional problems can arise from risk management findings and from customer and provider incidents and satisfaction surveys. Collectively, these sources cue health care professionals and systems to system problems and process-improvement needs, spawning the search for innovative solutions.

Knowledge-driven catalysts arise when individual nurses or their employing organizations become aware of new knowledge or technology with the potential to improve cost, quality, or outcomes of care. Scanning the environment for innovations arising from new knowledge provides clinical users and organizational settings with early awareness of promising innovations.⁽¹⁴⁾ Through scanning users are able to identify potential solutions to problems before they become improvement priorities. Actively searching for promising solutions also avoids the costs of exhaustive future searching or innovation invention. Research publications, integrative or meta-analytic literature reviews, case studies, and technology assessment reports are common sources of knowledge-based triggers to innovation.⁽¹⁴⁾ Berwick also includes knowledge obtained from the ongoing nature of organizational-centered analyses, when careful attention to detail leads to unique knowledge for performance improvement obtained from no other source.

Guideline-driven catalysts arise from the publication of authoritative clinical practice guidelines (e.g. those published by the Agency for Health Care Policy and Research and by professional organizations). Finally, regulatory standards, guidelines, and recommendations may catalyze focused process analyses and subsequent reflection on current practice, ultimately leading to the evaluation of clinical innovations.

THE THEORETICAL AND CONCEPTUAL CONTEXT OF KNOWLEDGE UTILIZATION

A dominant theoretical perspective in the field of knowledge utilization emerged when a seminal research development and diffusion model⁽¹⁵⁾ did not adequately address the impact of planned change or the influence of user characteristics. A refined knowledge system, the Linkage Model, was developed.⁽¹⁶⁾ The Linkage Model proposed an interdependent relationship between two reciprocal subsystems in the knowledge creation and utilization enterprise: (1) the *knowledge generation subsystem*, the source of knowledge-based solutions; and (2) the *knowledge user subsystem*, the consumers of knowledge-based solutions. The *users* also serve as the source of real world problems and drive further knowledge generation efforts.

The Linkage Model is based on the notion that knowledge utilization and diffusion are *acts of communication* between the resource system producing the new knowledge and the user or new knowledge consumer subsystem. Linkers are persons who serve to connect the two subsystems by transmitting new knowledge and conveying user needs and results feedback.⁽¹⁷⁾ Direct care staff who are early adopters of innovation, as well as

advanced practice nurses, staff development educators, and administrators, are often mentioned as formal and informal linkers in clinical settings in nursing.

User system “transformation”⁽¹⁸⁾ or “reinvention”⁽¹⁹⁾ has been identified as a critical step in the knowledge utilization process. In transformation, the user system internally processes a message – the innovation – altering it, without substantively changing it, to fit the organization’s own needs. Transformation is a key step in the internalization process, necessary to sustain an innovation once it is adopted. Sustained use of knowledge-based innovations in nursing practice requires *translation* of the underlying knowledge in both language and operations that are familiar to users.⁽⁴⁾ For example, in adopting a pain assessment tool from the literature, an organization might have the tool laminated, the organizational logo put on it, and institutionally-specific instructions printed on the back. As a result, the tool “looks” like the organization and staff adoption of the innovation is fostered.

Both researchers and users have a role in *translating new knowledge*. Largely ignored in nursing literature, translation is crucial at the organizational level. Translation differs significantly from the *creation* of knowledge-based innovations. An adopting organization will be more likely to accept and sustain an innovation seen as its own.⁽¹⁸⁾ It may be that the tactics of translation are as important to the use of the innovation as the innovation itself. Thus, *feedback from users, in the form of tactical insight and expertise, about how they have translated and transformed research for practice may aid other potential adopters in their quest to embrace and use a target innovation*. Dissemination of these

tactics of transformation may be invaluable to future adopters of an innovation and a latent reward for delayed adoption.

EXPEDITING THE HARVEST OF NEW KNOWLEDGE: LESSONS FROM RESEARCH UTILIZATION PROJECTS IN NURSING

During the past two decades, six large-scale, multifaceted projects have been undertaken that specifically focus on nursing research diffusion and utilization. These projects provide a foundation upon which nursing’s capacity for innovation mastery may be advanced. The following overview of nursing’s large-scale, multifaceted research utilization projects is based on Donaldson’s overview.⁽²⁰⁾

The first of these projects was sponsored by the Western Interstate Commission for Higher Education (WICHEN), now the Western Institute of Nursing (WIN).⁽²¹⁾ With the general goal of improving patient care by increasing the quality, quantity, and utilization of clinical nursing research, the project provided a structured and collaborative mechanism for participating nurses. With Rogers and Shoemaker’s⁽²²⁾ theoretical perspective as the framework for their effort, the utilization component of the WICHEN project aimed to develop models to specifically overcome barriers to research utilization. Analysis of project evaluation data revealed that over half of the participants reported full implementation of their target innovation. The WICHEN project established the potential impact of regional continuing education on research utilization knowledge and skill in a diverse sample of practicing nurses. It also succeeded in fostering the adoption of new knowledge into practice,

completely or partially, in each nursing service organization that participated.⁽²¹⁾

King, Barnard and Hoehn⁽²³⁾ developed a model for the diffusion and utilization of a research-based nursing innovation following the conclusion of the first phase of the Nursing Child Assessment Satellite Training (NCAST) Project. The model, generally from Rogers and Shoemaker's⁽²²⁾ social interaction and diffusion framework, consisted of four interdependent components: (1) recruitment, (2) translation, (3) dissemination, and (4) evaluation. In conducting the dissemination and utilization project, the investigators recruited available learners across geographic sites and utilized four communication modes to share new knowledge for practice. In its national and technological scope, this project contributed an intriguing new model for research dissemination and diffusion. In addition, the definition of the research utilization process was significantly altered, as this model combined the theory of diffusion and utilization with new satellite and telecommunications technology in an effort to systematically assure the transfer of important new research specific to child assessment into clinical practice.

The Conduct and Utilization of Research in Nursing Project (CURN) was conducted by the Michigan Nurses' Association over a five-year period. This project obtained and disseminated current research findings and refined research use methodologies. Grounded in Havelock and Havelock's Linkage Model,^(24, 25) the CURN project facilitated organizational change required for effective research utilization. A body of research-based clinical protocols was developed. In addition, processes and criteria

for innovation adoption and evaluation were developed and tested.^(26, 27)

Through participation in a series of nine workshops, innovation teams from 17 southeastern Michigan hospitals moved through the CURN research utilization process. Longitudinal follow-up over four years traced the impact of the project on participating service organizations. Findings from the CURN project have been widely disseminated and a detailed guide was developed describing the sequence of processes necessary for individual or institutional research utilization in nursing.⁽²⁷⁾ Another important outcome of the CURN project was the legacy of ten clinical innovation protocols which were developed from the nursing research base. Both the method and substance of these protocols established a foundation for future work in the nursing research utilization arena.

The subsequent Research Utilization in Nursing (RUN) project used a quasi-experimental approach to investigate the extent to which participants in the WICHEN, NCAST and CURN projects differed.⁽²⁸⁾ The Research Utilization Survey Instrument, used as a structured telephone interview, was developed and tested in the RUN project. The Survey measured concepts representing five major constructs: (1) research utilization treatment program components; (2) target population characteristics; (3) individual change factors; (4) organizational change factors; and (5) research utilization outcomes and used structural equation modeling to develop and test research utilization models for nursing.⁽²⁹⁾

Findings related to participant recollections, short-term use of research findings, and

enduring influences differed significantly by group.⁽²⁹⁾ The models developed reaffirm the significance of position-related responsibility for research use and the centrality of communication in research use behaviors.⁽³⁰⁾ *In other words, RN research use behaviors are strongly influenced by their job-related responsibility and opportunity for communication that might make them aware of new knowledge.* This may apply to other health professionals as well.

Benefiting from earlier research and demonstration, two major continuing education projects were funded by the Division of Nursing in 1990. The Moving New Knowledge into Practice Project⁽³¹⁾ evaluated the effectiveness of practice-oriented, topic-focused research conferences. These conferences brought together administrators and clinicians with investigators who had research-based innovations ready for transfer to practice, *stimulating important utilization-driven interaction between researchers and clinical users.* Through pre- and postconference workshops, participants were guided in selecting innovations for their setting, interpreting practice implications and identifying implementation strategies and goals.⁽³¹⁾ In addition, proceedings of five conferences were summarized in research-based, focused monographs (Key Aspects of...) that were broadly disseminated.⁽³²⁻³⁶⁾

The Orange County Research Utilization in Nursing (OCRUN) Project (1990-94) created a regional consortium of clinical service and academic nursing organizations. OCRUN staff provided research utilization continuing education to administrative, academic, and clinical members. During the project, nurse executives, their administrative and clinical

“linkers,” and staff nurse “users” participated in role-specific OCRUN research utilization courses. One year after taking OCRUN courses, participating nurses were more attuned to the innovation potential of research findings, reported having greater skills to implement innovations, and perceived greater informal leadership within their organizations. *Trends suggested greater research utilization activities and increased numbers of innovations were incorporated into practice when practicing nurses participated in regional networking that expedited access to and use of new knowledge for practice along with CE that focused on the process of knowledge use and transformation of innovations.*⁽³⁷⁾

From the WICHEN, CURN, NCAST, RUN, Moving New Knowledge Into Practice and OCRUN projects, much has been learned about the processes inherent in research-based knowledge use, dissemination, and diffusion in nursing. Research utilization, itself an innovation among clinicians and nursing service organizations, has been increasingly adopted by individual nurses and these organizations.

Nursing’s research utilization legacy is substantial. *The challenge now is: (1) to build nursing’s knowledge utilization infrastructure; (2) to expand the innovation use capacity of individual clinicians across the continuum of care; and (3) to foster synergies among participants in the nursing knowledge enterprise to reduce redundant literature searching and retrieval, and link upstream innovation adoption with the tactical insight of clinicians who have pioneering experience with the transfer and transformation of the innovation. Strategies must be developed to expedite the*

transmission of knowledge-based solutions that may improve practice, to leverage technology and literature synthesis expertise and amplify feedback from consumers of nursing research to drive future inquiry.

DIFFUSION OF INNOVATIONS AMONG HEALTH PROFESSIONALS

Since the mid-1950s, numerous studies have examined factors associated with innovation use and adoption among health care professionals, usually physicians. These studies have consistently noted that face-to-face communication is the most powerful determinant of individual innovation use. Physicians continue to report an overload of information.⁽³⁸⁾ Access to innovation sources has been associated with cosmopolitanism,⁽³⁹⁾ access to opinion leaders,⁽¹⁹⁾ and centrality or placement in a communication network within a close area.^(19, 39-42) In addition, “the rapidly increasing availability of information has coincided with fundamental change in the structure and delivery of care—access to medical information and dissemination of findings is central to the management of costs and clinical outcomes.”^(38, p. 1)

FACTORS INFLUENCING EVIDENCE-BASED INNOVATION DIFFUSION IN NURSING

While a period of sharply reduced federal interest in knowledge utilization,⁽⁴³⁾ the 1980s saw much exploratory innovation and diffusion research in nursing. Investigators examined the degree of adoption of several research-based innovations, explored the association between organizational mechanisms and adoption of innovations by nurses, compared organizational communication strategies in increasing adoption of a selected innovation, and

analyzed the influence of selected factors in the acceptance of an innovation by hospital-based nurses.⁽⁴⁴⁻⁵²⁾ A theme emerging from these studies linked the perception of *administrative support of an innovation* to the acceptance and adoption of the innovation. Nurses have cited both (1) lack of time to read research and implement new ideas, and (2) lack of authority to change patient care as specific organizational barriers to research utilization.⁽⁵³⁻⁶¹⁾ Evidence of administrative commitment in communication and the establishment of structures to foster innovation development were highly significant.

Despite their diverse methods, as a group, studies of research-based innovation in nursing suggest that practicing *nurses are not consistently aware of new knowledge* that is applicable to practice and, if they are aware, they may not have integrated that awareness into their conceptual repertoire or clinical behaviors. Because nurses generally practice in groups within licensed organized health care settings, the transfer or innovation requires individual awareness and commitment to change as well as organizational efforts to implement a target innovation which may involve multiple disciplines, departments, and multifaceted processes.

Other factors that may influence the ability of individual nurses to successfully adopt new knowledge into practice include: (1) participation in continuing education; (2) access to nursing information and literature; (3) sanctioned time to participate in research access and use activities; and (4) availability of colleagues with advanced education to facilitate and link nurses with research and to

assist in the transformation from research findings to practice innovations.^(53-54, 62-69)

EXPEDITING STEPS IN THE KNOWLEDGE USE PROCESS

Basic steps in organizational research utilization were identified in the CURN project. These steps have continued to guide nursing's research utilization more than a decade later and are useful for knowledge utilization generally. A seminal publication from the CURN project, *Using Research to Improve Nursing Practice: A Guide*, detailed the research utilization process.⁽²⁷⁾ A second important guide, *Research Utilization: A Study Guide*, reiterated the CURN approach.⁽⁷⁰⁾ Titler et. al. (1994) further explicated the steps in the research utilization process and aided clinicians in envisioning triggers to improve practice through research in the original *Iowa Model for Research Based Practice to Promote Quality Care*—formatted as a flow diagram capturing the steps in the research utilization process. *The revised Iowa Model for Evidence Based Practice to Promote Quality Care*⁽⁷¹⁾ updates the original model and integrates strategic insights from managed health care and the emerging language of evidence-based practice. The first step in nursing's classic research-utilization process begins when, after identifying the problem or need driving the innovation use initiative, practitioners must access, gather, examine, evaluate, and judge the merit and clinical significance of studies, reports, or narratives that constitute the body of research or knowledge in the area of interest. In order to view the knowledge base as a whole, the research user must summarize the available knowledge using narrative summaries, synthesizing analysis, or meta-analysis. To use new knowledge, then,

consumers of the potential evidence-based innovation and their organizational settings must engage in a cycle of information access, review, summarizing, and appraisal activities. These activities become precursors to decisions about the merit of the innovation, its transformation, pilot or trial implementation and evaluation, ultimately leading to innovation adoption decisions and diffusion.

In the case of a target innovation that is less tangible than a procedural or technical knowledge-based practice, such as an aesthetic or ethical innovation, organizational adoption may be especially difficult. Champions of the innovation may have to confront the potential bias of the "audience" toward empirics and address skepticism toward other sources of new knowledge for clinical practice before gaining the consensus necessary to initiate the first steps in the process of innovation use.

As the knowledge use cycle is repeated, the cost and quality of the effort may vary widely as literature/information searches are launched, relevant citations gathered, evaluation criteria applied, and findings and implications interpreted. As individuals and organizations undertake each critical step in the initial knowledge use process (pre-implementation), there is the potential for wide variation. Threats to the integrity of conclusions drawn from the knowledge base can occur with nonsystematic literature identification/gathering, poorly conceived knowledge use approaches, and inconsistent or incomplete evaluation criteria and conclusions.

Table 1 presents a summary of recommended criteria emerging from the literature for analyzing and reviewing a research base for

knowledge use. There is strong agreement in the nursing literature that evaluating the **scientific merit** of the knowledge base must

be considered. In addition to scientific merit, the **clinical utility or practice relevance** of the knowledge base must also be assessed.

Table 1. Analysis of the research knowledge base for research utilization: Summary of criteria for evaluating merit of knowledge base

Criteria	CURN ^(26,27)	Stetler/ Merram ⁽⁷²⁾	Funk et al, ⁽³¹⁾	Hayward et al, ⁽⁷³⁾	AHCPR ⁽⁷⁴⁾
Purpose of the Research Knowledge Base Analysis					
As basis for clinical protocol to be used within an organization	X				
To help nurses & organizations problem solve or make decisions related to patient issues (cognitive or direct application possible)		X			
To disseminate research via conferences to highlight its practical relevance			X		
Clinical practice guidelines to influence practice				X	X
Scientific Merit Criteria					
Validity	X	X		X	X
Generalizability (at least construct replication)	X	X			X
Risk - used to mediate stringency with which replication/scientific merit are applied	X	X			
Summary of major contributions of the work		X			
Recency of evidence				X	
Other Scientific Criteria					
Focus of interest to conference presenters			X		
Relevance/importance to nursing practice			X		X
Applicability across settings			X	X	X
Practice Relevance Criteria					
Clinical merit	X	X		X	
Clinical control over variables (interventions) studied	X		X		
Feasibility	X	X		X	
Cost-benefit issues	X				X
Assessment of outcomes with current practice base		X			
Probability of effecting change/fit with practice goals				X	
Medical liability					X
Use of limited resources					X
Concerns of all stakeholders addressed					X
Evaluation of Practice Changes Related to Innovation					
Evaluation of practice changes	X			X	
Availability of measures	X				
Clinical control over measurement tools	X				
Scientific merit of measures	X				

Steps in the process of knowledge utilization may be costly as they require access to literature/information search and retrieval resources, staff time for literature review, analysis, and consensus development. However, all are prerequisite to the real work of innovation translation, trial implementation, evaluation, refinement, and diffusion. Several efforts to improve efficiency in the research utilization process, through focused collaboration, have been developed. These local and regional consortia report pooling of resources, insight and expertise, sharing literature search results, passing along preliminary conclusions related to scientific merit and clinical significance for a cluster of studies, and developing new protocols as a joint venture. All have had favorable results.^(37, 75-76)

It is important to note that there is evidence that not all nurses are interested in accessing new knowledge for practice. Bostrom & Wise⁽⁷⁵⁾ found that systems installed on patient care units that made research-based new knowledge available to nurses were only used by a core group of nurses. In the role of opinion leaders, these nurses essentially became “information brokers,” reminiscent of Havelock’s “linkers.”

Access, synthesis, and temporal barriers to knowledge use in nursing are potentially minimized by the recent growth of communications networking technology, resulting in new electronic knowledge utilization synergies that provide researchers, scholars, and clinical users with unprecedented opportunities to expedite new knowledge transfer. For example, capitalizing on the indexing capability and sophisticated web-based information access

and dissemination strengths of Cinahl Information Systems, the CINAHL Clinical Innovation Database (CCID) and *The Online Journal of Clinical Innovations* provide clinicians and health care settings with access to topical literature searches, comprehensive bibliographic citations, preliminary narrative synthesis and evaluation of the resulting body of knowledge for scientific merit and clinical significance, identification of relevant innovation transformation tactics, and recommendations for innovation use that can be available online. Text copy can be dynamically updated as relevant new knowledge emerges and offers instant accessibility to clinicians.⁽⁷⁷⁾ **Most importantly,** *the web-based Clinical Innovation Database (CCID) and The Online Journal of Clinical Innovations provide continuous opportunities for the generators/synthesizers and clinical users to engage in discussion as each participates in the process of knowledge-based innovation transfer.*

The effectiveness of any effort to expedite steps in the knowledge utilization process will hinge on the extent to which the criteria for inclusion into the knowledge base and the criteria for determining the readiness of new knowledge for practice reflect consensually validated standards of scholars and clinicians. Subjecting knowledge synthesis methods to thorough review and ensuring pre-publication expert peer review of online documents are key to the integrity of the CINAHL Clinical Innovation Database (CCID) and *The Online Journal of Clinical Innovations*. A potential strength of the CCID initiative is the opportunity to capture and pass along to the user clinical anecdotal literature relating innovation implementation tactics, the substance of operational

transformation. It may be found that these tactics are as important to users as the innovation itself.

PROPOSED APPROACH TO EVALUATING KNOWLEDGE FOR TRANSFER TO PRACTICE

Because knowledge use is inherently broader in its information sources and inclusion criteria than research use, the potential of the innovation to improve quality, costs and outcomes of care must be weighed against the risk of using innovations derived from non-empiric knowledge, sometimes labeled “soft” science or sources. **Table 2** presents proposed criteria and indicators, integrating and expanding criteria previously proposed for research utilization, for the broader purpose of the CINAHL Clinical Innovation Database (CCID) and *The Online Journal of Clinical Innovations* knowledge utilization efforts. **Table 2** is presented in a worksheet format and is intended to guide consumers of new knowledge in the process of evaluating a selected research or knowledge base or target innovation for transfer into practice. The evaluation criteria focus on the potential

of a target innovation to improve cost, quality, and outcomes in practice and includes nonempiric sources of new knowledge for practice. While the evaluation criteria could be quantified, weighted, and used to “rate” an innovation, they are intended to *guide a process of consensus development in which experienced clinicians analyze the weight and source of the knowledge in light of the potential risks, benefits, and demands of the situation*. The proposed criteria suggest that low risk innovations with the potential for **high** benefits may be appropriately and tentatively adopted into practice with the caveat that the innovation be subjected to a rigorous evaluation since it does not have a history of formal, established scientific evidence of clinical effectiveness. *The threshold for adoption of an innovation cannot be quantified, but rather must integrate the collective wisdom, derived from all patterns of knowing, of a group of innovators whose best judgment judiciously advances the potential innovation forward into practice, one step at a time.*

Table 2

Criteria for Evaluating Knowledge for Transfer to Practice: A Guide

Criteria – <i>Scientific Merit</i>	Indicator(s)	Evaluation Notes for a Target Innovation
<p>Validity*</p> <p>*Knowledge base exists in scientific literature or substantive quality improvement literature.</p>	<p>Research design integrity:</p> <ul style="list-style-type: none"> • Rationale for study • Theoretical support/perspective • Method fit to question(s) • Appropriateness/credentials of measures • Sample source, representativeness • Methodologic rigor • Analytical strategy(s) • Strengths/limitations of design & method justify innovation consideration <p style="text-align: center;">OR</p> <p>Clinical process improvement design integrity:</p> <ul style="list-style-type: none"> • Evidence of rigorous CQI methodology with rigorous evaluation • Strengths/limitations of design & method justify innovation consideration 	

Table 2 (Continued)

Criteria for Evaluating Knowledge for Transfer to Practice: A Guide

Criteria— <i>Clinical Significance</i>	Indicator(s)	Evaluation Notes for a Target Innovation
Strength of Evidence	<ul style="list-style-type: none"> • Recent—within past 5 years • Evidence presented • Currency of cited sources • Published/presented in peer reviewed forum • Replication (full or partial) 	
Generalizability	<ul style="list-style-type: none"> • External validity (whether study findings can be applied to groups beyond the study sample) • Reports of adoption/implementation • Relevance to clinical practice across settings 	
Strategic Value	<ul style="list-style-type: none"> • Innovation focuses on high cost, high risk, high volume patients or clinical condition • Innovation focuses on marketplace priority • Innovation addresses a priority within a clinical setting 	
Clinical Merit	<ul style="list-style-type: none"> • Evidence of innovation potential to improve clinical costs, quality, or outcomes of nursing practice as contrasted with current practice • Potential of innovation, in whole or part, to strengthen nursing process • Current practice is no longer an ethical alternative to the proposed innovation 	
Cost Effectiveness	<ul style="list-style-type: none"> • Evidence of cost benefit associated with innovation contrasted with current practice • Evidence of improved shareholder value 	
Acceptable Risk* * Risk is appraised in conjunction with scientific merit	<ul style="list-style-type: none"> • Consensually validated agreement that expected benefit to patients > actual or potential risk • Low risk, high benefit, strong scientific merit innovations are preferred; low risk, high benefit, minimally tested innovations are acceptable with consensual review and agreement. 	

Table 2 (Continued)

Criteria for Evaluating Knowledge for Transfer to Practice: A Guide

Criteria— <i>Clinical Significance</i>	Indicator(s)	Evaluation Notes for a Target Innovation
Feasibility	<ul style="list-style-type: none"> • Innovation implementation is possible in typical settings • Innovation implementation is possible by typical nurses with the support of typical organizational resources and supports • Interdisciplinary collaboration required by innovation is possible in target setting • Administrative support necessary to launch innovation exists in target setting • Clinical opinion leaders exist to support the innovation development process • Evaluation is possible in clinical setting 	
Evaluation Potential	<ul style="list-style-type: none"> • Innovation evaluation strategy may be derived from literature or ongoing CQI monitoring/measurement • Evaluation assesses both extent of innovation implementation and impact(s) of innovation • Evaluation assesses both patient and provider satisfaction with innovation 	
Impact on Resource Utilization	<ul style="list-style-type: none"> • Innovation adoption is consistent with efforts to conserve resources • Resources used to translate, transform and implement innovation can be justified based on expected benefit to patients, providers, and/or organizational strategic goals 	

THE STRENGTHS AND LIMITATIONS OF META-ANALYSIS FOR KNOWLEDGE SYNTHESIS

Meta-analysis is a relatively recent analytical advance that enables results from a cluster of methodologically similar and theoretically comparable studies that comprise a knowledge base to be analytically examined as a whole, each study becoming a “subject” or case in a new meta-study that statistically pools the disparate results of each.⁽⁷⁸⁾ Meta-analysis takes the narrative summarization and systematic synthesis of a knowledge base used in nursing research utilization to evaluate the relative weight and rigor of evidence, to a higher level of quantitative analytic sophistication. Conceptual, operational, and analytical issues challenge the rigor and validity of meta-analyses, resulting in efforts to describe and measure the quality of primary studies prior to including them in meta-analyses.⁽⁷⁹⁻⁸²⁾ Meta-analysis has emerged as a key method used in federal effectiveness evaluations of the literature undertaken for clinical practice guideline development⁽⁸³⁾ and is increasingly respected by clinicians based on findings that the results of large clinical trials are comparable to the meta-analytically pooled results of smaller trials.⁽⁸⁴⁾ Clearly, meta-analysis is a strong method for utilization focused synthesis of empirical studies that meet methodological standards for quality and are logically linked.

HARVESTING NEW KNOWLEDGE FOR PRACTICE

Nursing’s knowledge utilization tradition has emphasized the scientific rigor of the knowledge base, emphasizing the empiric pattern of knowing derived from quantitative research. Qualitative research has been misused and undervalued as a source of innovation due to a “perceived lack of relevance and utility” despite its methodologic and epistemologic popularity.⁽⁸⁵⁾ The empiric bias also potentially results in underutilized new knowledge gleaned from other valid sources – aesthetics, ethics, and personal knowing. An example of an emerging field of knowledge for practice is the arena of clinical quality improvement. “Buried in our embrace of classical rules of design lies a problem of significant and growing scale – not all sound learning occurs through formal science.”^(14, p. 877)

It is time for the discipline of nursing to consciously expand potential sources of new knowledge for practice innovation and to harvest knowledge evolving from careful inductive and deductive learning that may or may not be research-based. Berwick labels one source of this new knowledge “real time science,” noting that a systematic process of learning such as quality improvement can occur outside of science. In addition to harvesting “low lying” fruit ripe for practice transfer that can be gathered from nursing’s research enterprise, valuable knowledge of clinical significance may be gleaned from qualitative research, clinical exemplars, discoveries from process improvement, and the evaluation of improvement-driven innovations.

In addition, through internal and external benchmarking activities, clinicians and their clinical settings have the opportunity to identify examples of “better practice,” to investigate probable explanations for comparatively better performance, and to identify innovations for potential consideration. These sources of information may potentially affect cost, quality, or outcome improvement by providing clinicians with access to low risk innovations that have established evidence of high benefit to practice. In using innovations based on “real time science,” health care providers are cautioned that their use demands rigorous evaluation, in lieu of evidence of effectiveness gleaned from formal science. Systematically scanning a wide range of formal and informal knowledge sources of potential clinical knowledge is crucial to expediting the transfer of this “foraged” new knowledge into practice.

IN CONCLUSION

Ultimately, knowledge utilization in the new millennium will be expedited when clinicians in every role and setting consider the quest for knowledge to improve practice to be an endless and thrilling journey, fueled by rich sources of practical and formal knowledge. Nursing has acquired research utilization insight and expertise from two decades of systematic inquiry while building a body of practice-relevant qualitative and quantitative research, complemented by stories from the field of innovation invention, adoption, translation, and evaluation. At the same time, new technology connects the nursing knowledge system of users and researchers permitting previously unimagined types of linkages. We know the fundamental steps in the knowledge use process. Let us now commit to expedite the transfer of new knowledge into practice, building on our collective expertise, maximizing our economy of effort, and measuring the impact of our efforts on clinical costs, quality, and outcomes.

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