Optimizing Research to Practice Translation Time Through the Mountain Model: A Delphi Study

Abstract

Introduction: The Mountain Model (MM) is the first published framework to merge evidence based practice and quality improvement (EBPQI) paradigms. The primary focus of the framework is to guide practitioners in healthcare and related settings with translating research for sustained practice improvements. The nurse-led MM is in use and being cited in the literature, however the efficacy of the MM is anecdotal and is not yet supported by empirical evidence for its validity.

Design: A Delphi study of currently practicing evidence-based practice (EBP) and quality improvement (QI) experts spanning eight patient-facing disciplines in healthcare was conducted in September and October 2025 with three iterative rounds.

Methods: Online survey methods were used and the standard for Conducting and REporting of DElphi Studies (CREDES) was followed.

Results: Independent analysis was completed following each round. The multi-disciplinary expert panel reached consensus on 18 items but lacked agreement on 4 items. The MM was ranked as high perceived value and the expert panel achieved consensus that use of this guiding framework is very likely to reduce research to practice translation time. Study results inform potential revisions to the MM with an interdisciplinary focus and addition of identification of a local problem.

Conclusion: Understanding the value of EBPQI, as a new guide for research translation from the empirical world to the practice setting, has the potential to create synergies across the evidence

continuum with scalable, transferable healthcare improvements with less cognitive load and increased simplicity.

Clinical Relevance: There is strong clinical significance as this model can be used not just in nursing, but across many practice disciplines. Clinicians reported excitement about a model that offered a simplified way to guide evidence-informed improvement initiatives from practice settings. Interdisciplinary consensus was strong that the merger of EBP and QI (EBPQI) was very likely to reduce research to practice translation time.

Keywords: research, evidence-based practice, quality improvement, practitioner, clinician

Introduction

Global health and well-being are at an inflection point. The World Health Organization's global patient safety action plan has set forth goals to reduce preventable harm in healthcare settings (WHO, 2021). In the United States, nurses and interprofessional partners have been charged with integrating evidence into practice to move toward improved health and healthcare for all people (National Academies of Science, Engineering, and Medicine, 2021). The iconic Institute of Medicine reports from 2000 (*To Err is Human*) and 2001 (*Cross the Quality Chasm*) (IOM, 2000, 2001) highlighted deficiencies in quality of care and provided the healthcare system a directive to more quickly translate evidence to practice yet, over two decades later, little progress has been made. According to the literature, the research to practice gap in healthcare was stubbornly locked at 17 years (Morris et al., 2011). Although a recent study revisited the research to practice translation time in cancer care, an area which should inarguably be on the cutting edge, authors still found the evidence to practice gap to be 15 years, indicating that little improvement has been made (Khan et. al., 2021). At this rate, it may take over a century to optimize research to practice translation time. Despite a plethora of global clinical practice

guidelines and professional organizational recommendations based on research evidence supporting the best way to provide care for disease management to populations, healthcare systems remain challenged to implement or sustain changes that optimize actual health outcomes in a timely manner.

Background

With the continuous and growing complexity of the healthcare system impacting all patients and professionals across practice-oriented professions, incorporation of quality improvement (QI) principles into evidence-based practice (EBP) initiatives is needed to promote sustained best practices (National Association of Healthcare Quality (NAHQ), 2024). Currently available EBP models have become more complex which may hinder adoption by healthcare practitioners. For example, the latest revised Iowa Model: Evidence-Based Practice to Promote Excellence in Health Care©, which is used globally, incorporates seven primary steps with an accompanying flowchart (Cullen et al., 2023), while QI models are comparatively simplistic by using iterative tests of change through models such as Plan-Do-Study-Act (PDSA).

Anecdotally, it is believed that this coupled process of using both EBP and QI to translate evidence into practice will improve ease of use by the practitioner, providing the ability to identify clinical issues and address them in a timely manner, while reducing cognitive load associated with separate EBP and QI initiatives. The merger of EBP and QI paradigms offers the practitioner the strengths of both approaches, previously not formally combined. Therefore, to address this problem, a new combined framework named the Mountain Model (MM) for Evidence-Based Practice Quality Improvement (EBPQI), offers healthcare professionals a modern, stepwise approach to guide change in the practice arena, increasing the evidence to practice connection and ultimately improving the quality of care (Waldrop & Dunlap, 2024).

The MM's structure is based on the rationale that the greatest return on investment for targeted healthcare improvements is through complete integration of EBP and QI. EBP relies on critical appraisal of a body of the best available research evidence with consideration of clinician expertise and patient values and has been linked to improved patient outcomes and decreased healthcare costs (Conner et al., 2023). However, EBP lacks sustainable monitoring over time available through QI methods (NAHQ, 2024). Conversely, QI's strength is ongoing monitoring, but due to its origins in industry, this method does not rely on use of the best available research evidence when implementing practice changes (Institute for Healthcare Improvement [IHI], 2025). In healthcare, neglecting external research evidence when developing a practice change risks implementing ineffective solutions contributing to wasted healthcare resources (Melnyk & Fineout-Overholt, 2023). The IHI's Model for Improvement (2025), for example, is a QI model frequently used across clinical settings but lacks reference to external research evidence. By combining these two methods into EBPQI using the MM, the best available evidence can be implemented and monitored over time for sustained healthcare improvements, optimizing research to practice translation time (Dunlap & Waldrop, 2025; Houser & Wilson, 2025).

One way to validate models is by their use, and the MM has demonstrated initial practical use (Houser & Wilson, 2025; Guthrie-Chu & Dunlap, 2024; Wilson & McAlister, 2024; Waldrop et al., 2025; Dunlap et al., 2024; Reynolds et al., 2025). The MM was introduced in nursing education through an award-winning undergraduate EBPQI textbook (American Journal of Nursing, 2024) which won Sigma Theta Tau International's nursing capstone book award (2025), followed by two newly completed textbooks for graduate and doctoral audiences in education and practice (Dunlap & Waldrop, 2025; Dunlap, Waldrop & Reynolds, 2026).

However, it is not yet clear that all the steps in the process, the directionality of the process, and the components in the MM are all inclusive. One way to validate a model is to test the model components and relationship between these concepts through expert consensus to demonstrate validity of their use in practice. The purpose of this study was to validate a merged EBPQI process built on evidence that facilitates the movement of research findings into practice.

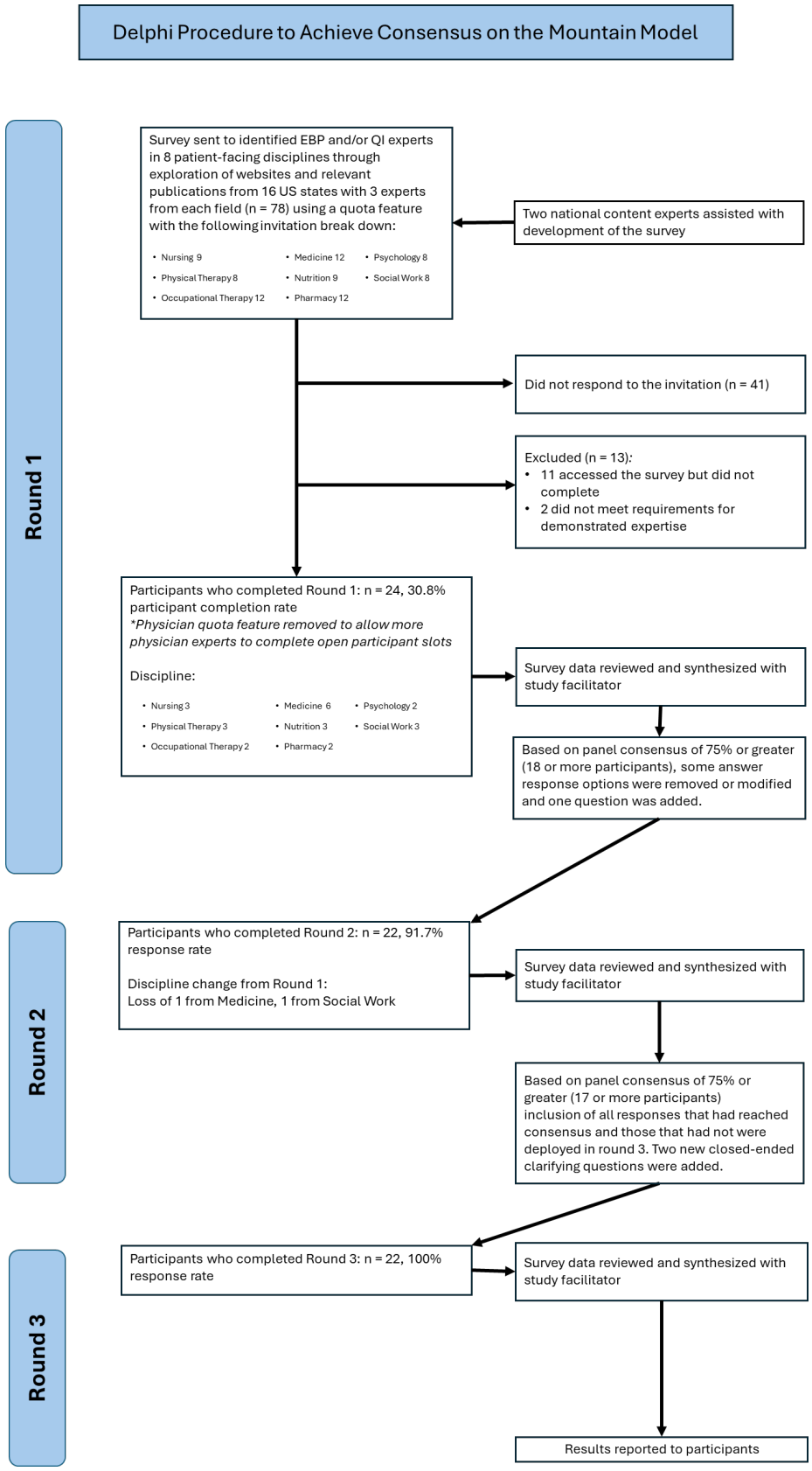
The research questions posed for this study were: Does the MM for EBPQI: (1) reduce cognitive load, (2) increase simplicity, (3) increase scholarship (dissemination), (4) offer disciplinary utility, (5) have value, and (6) enhance the perceived ability of the clinician to move research findings to practice in a more efficacious manner, reducing research to practice translation time?

Methods

Design

This research study used a Delphi design to elicit judgments from an expert panel for forecasting issues of importance. In the Delphi design, a summary of panel views is circulated between iterative rounds to obtain consensus (Flanagan & Beck, 2025) which enables novel lines of inquiry. The Delphi design holds an important place in the canon of methods used in foresight research including exploring new solutions to healthcare problems where evidence is limited (Niederberger & Renn, 2023). This method requires balance between flexibility and rigor, leading to meaningful insight and actionable outcomes (Hasson et al., 2025). The current Delphi study used three iterative rounds overseen by a grant-supported study facilitator to minimize potential researcher bias (see Figure 1).

Figure 1. Delphi procedure to achieve consensus on the Mountain Model


Delphi Procedure to Achieve Consensus on the Mountain Model
Round 1
Survey sent to identified EBP and/or QI experts in 8 patient-facing disciplines through exploration of websites and relevant publications from 16 US states with 3 experts from each field (n = 78) using a quota feature with the following invitation break down:
• Nursing 9
• Medicine 12
• Psychology 8
• Physical Therapy 8
• Nutrition 9
• Social Work 8
• Occupational Therapy 12
• Pharmacy 12
Two national content experts assisted with development of the survey
Did not respond to the invitation (n = 41)
Excluded (n = 13):
• 11 accessed the survey but did not complete
• 2 did not meet requirements for demonstrated expertise
Participants who completed Round 1: n = 24, 30.8% participant completion rate
*Physician quota feature removed to allow more physician experts to complete open participant slots
Discipline:
• Nursing 3
• Medicine 6
• Psychology 2
• Physical Therapy 3
• Nutrition 3
• Social Work 3
• Occupational Therapy 2
• Pharmacy 2
Survey data reviewed and synthesized with study facilitator
Based on panel consensus of 75% or greater (18 or more participants), some answer response options were removed or modified and one question was added.
Round 2
Participants who completed Round 2: n = 22, 91.7% response rate
Discipline change from Round 1:
Loss of 1 from Medicine, 1 from Social Work
Survey data reviewed and synthesized with study facilitator
Based on panel consensus of 75% or greater (17 or more participants) inclusion of all responses that had reached consensus and those that had not were deployed in round 3. Two new closed-ended clarifying questions were added.
Round 3
Participants who completed Round 3: n = 22, 100% response rate
Survey data reviewed and synthesized with study facilitator
Results reported to participants

The facilitator worked with the primary investigator to review and synthesize the data prior to each subsequent round, which is associated with rigor (Keeny & McKenna, 2011; Junger et al., 2018). Participants were anonymous to each other, another safeguard to prevent undue pressure among expert panelists who may be seen as superior to themselves (McPherson et al., 2018). Anonymity is of key importance to prevent normative influence among expert participants which is most easily accomplished through written, electronic surveys. No one voice is amplified in the synthesis but rather the majority of participant views are fed back to the panel through iterative rounds (Niederberger & Renn, 2023). This study sought consensus in three rounds; greater than three rounds is associated with increased participant dropout rates (Keeney & McKenna, 2011). Most Delphi studies define consensus as a set percentage agreement (Schifano & Niederberger, 2025) with a level of agreement between 70% to 80% widely considered rigorous (Falzarano & Pinto Zipp, 2013; Keeney, Hasson & McKenna, 2006).

Sample

Inclusion and Exclusion Criteria

While there is no agreed upon sample size for Delphi studies (Keeny & McKenna, 2011), a bootstrap study suggested that a size of 23 participants led to response stability within multiple rounds (Akins et al., 2005). Overall, Delphi panel sizes should be carried out with consideration to resource constraints, ideally targeted between 8 to 23 participants (Shang, 2023). Therefore, to ensure inclusion of a heterogeneous sample, sampling criteria included the following: (1) minimum of 5 years of experience within respective professional discipline, (2) reported expertise with EBP/QI, (3) ability to read and understand English, (4) currently employed at least 20 hours per week within discipline, and (5) computer or smartphone access for digital survey completion.

Recruitment

Websites and relevant publications were explored to find participants with demonstrated EBP/QI expertise within their discipline. Prospective participants were emailed the link to the study survey which required disclosure of demonstrated expertise. See Table 1 which depicts the demographic background of participant's expertise. A quota feature was used in Qualtrics™ to cap responses at three participants per discipline. When unable to find three participants with demonstration of EBP/QI experience in a discipline, the quota function was removed to allow additional representatives from the discipline of medicine to fill remaining slots.

Survey Development and Administration

Ethical Considerations

This study was submitted and reviewed by the university's Institutional Review Board (IRB) and determined to not meet the definition of human subjects' research and was exempt from IRB oversight. Informed consent was obtained digitally for all participants prior to completion of the first survey round. The first round of the survey included four questions to verify participants met inclusion criteria. Participants provided contact information including their name, email address, and phone number, and identified a unique character code for use in future rounds. Use of a unique code in subsequent rounds protected confidentiality and ensured identification of participants by discipline throughout the Delphi study. Four demographic questions were collected which included participant age, years of experience within discipline, state of current practice, and setting of primary roles.

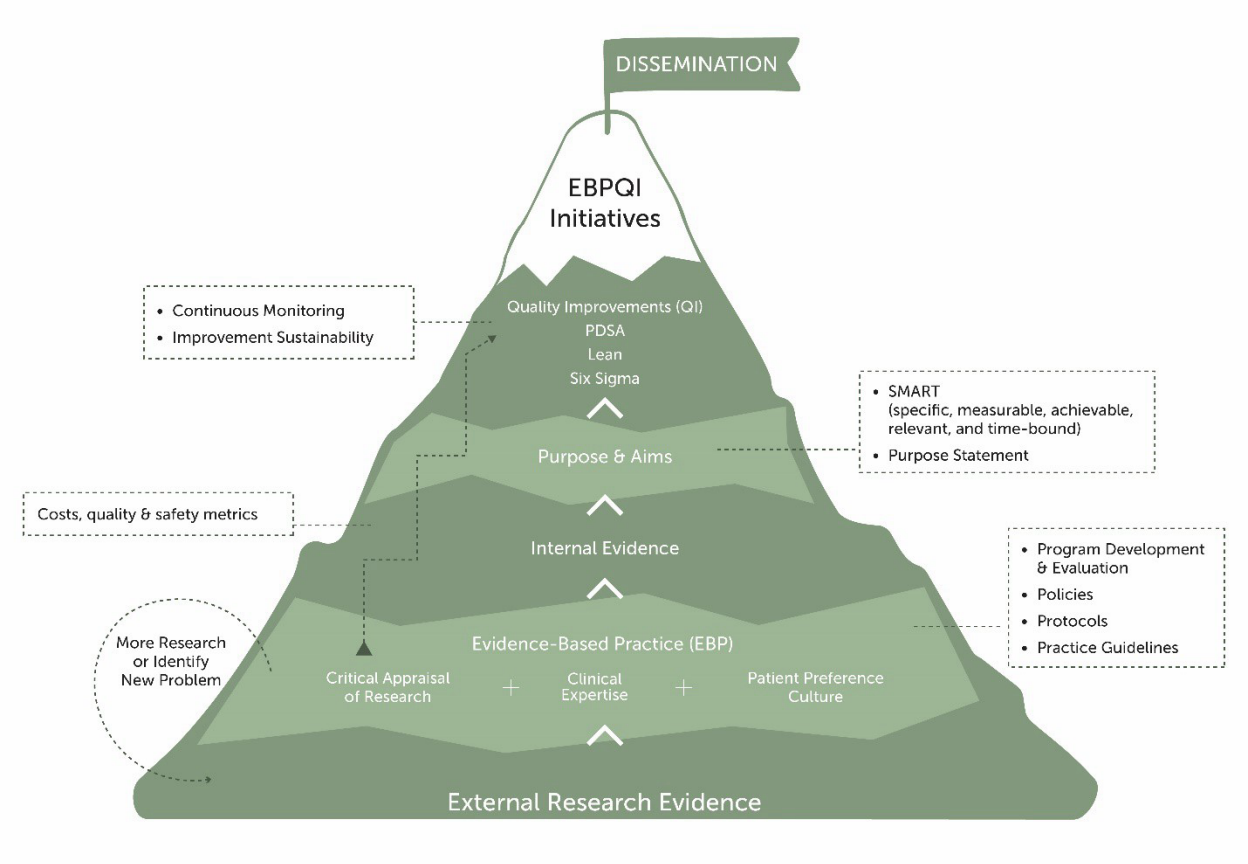
Survey Development

Two content validity experts certified in EBP and QI with extensive survey development experience piloted the instrument and were consulted prior to deployment and following each

round to ensure content validity and flow was optimized. All items were constructed to explore the emerging nature of a merged EBPQI approach that has not been tested empirically and reported in the literature to date.

All participants were given study material including a digital copy of the article describing the MM for EBPQI (Waldrop & Dunlap, 2024) and were instructed to refer to the MM for EBPQI (Figure 2) for visual representation of the narrative content. The same study material was digitally linked in all three Delphi rounds to ensure ease of access for review. During completion of the survey, participants were asked to assume that a practice problem had been identified that will guide a search of the research evidence (Waldrop & Dunlap, 2024b) and begin the journey of the MM. For example, one might consider one of the myriads of issues affecting the population of people on the autism spectrum or with diabetes which crosses patientfacing disciplines, and how the MM might guide the practitioner in translating research evidence into practice toward achievement of health improvement.

Figure 2. The Mountain Model for EBPQI



The survey items included questions regarding participant's perceived value of each of the six components of the MM in the ascending order starting with external research evidence and ending with EBPQI initiatives as depicted on the visual with corresponding explanations to define each component (see Table 1). Perceived value of each component was ranked on a 3point Likert scale (1 = low value, 2 = moderate value, 3 = high value).

Table 1. Mountain Model Component Definitions

External Research Evidence	Encompasses peer-reviewed publications, clinical practice guidelines, professional practice recommendations, policies and protocols, and government and institutional reports that are supported by research findings and/or other sources of robust external evidence.

Evidence-Based Practice	Encompasses (1) critical appraisal of research, clinical practice guidelines, professional organization recommendations, policies and protocols, clinical expertise, patient preference culture, and (2) synthesis of the body of literature to determine if adequate evidence exists, with return to foundational (external research) level if adequate evidence does not exist.
Internal Evidence	Encompasses organizational data (outcomes, trends) such as internal benchmarking data, cost of current practice, cost of change, quality and safety data.
Purpose & Aims	Encompasses development of a purpose statement and measurable aims.
Quality Improvement	Encompasses implementation of the evidence-based practice (EBP) change, continuous monitoring, evaluation and sustainability.
EBPQI Initiatives	Encompasses dissemination to internal organization, dissemination in peer-reviewed venues, and dissemination to the general population

An open-ended text entry question asked participants if the stepwise fashion of the MM, with loops back to research, could be more clearly presented in an alternate order to determine appropriateness of component directionality. If participants felt an alternate order would be clearer compared to the current depiction, they were asked to present this order and include a

narrative rationale. A second open-ended question asked if there were any components not present in the MM that should be for potential inclusion in a future iteration.

Participants were also provided conceptual and operational definitions for each of five concepts tested in the study which included: 1) cognitive load, 2) disciplinary utility, 3) research to practice translation time, 4) simplicity, and 5) scholarship. Following review of the concept definitions (Table 2) and primary associated task(s) by component as follows: external research evidence (searching), EBP (synthesis), internal evidence (metrics identification and measurement), purpose and aims (clarifying), QI (monitoring, analysis and feedback), and EBPQI initiatives (summation and development of dissemination products), participants were asked to rank order the MM components.

Participants were then asked to use the operational definitions as outlined in Table 2 to rank the overall value of the MM (encompassing all components) to determine if the perceived value of all MM components by concept was low (1), moderate (2) or high (3) using a table format with space for narrative comments for each concept. Participants were also asked an open-ended question about the overall value of the MM.

Table 2. Mountain Model Concept Definitions

Concept	Conceptual Definition – Concept meaning	Operational Definition – How you will measure/observe
Cognitive load	Amount of information in working memory	Amount of mental effort required, task complexity and time to complete

Simplicity	Straightforward, easy to understand and lacking in unnecessary complexity.	Minimizes unnecessary steps, fulfills its purpose without extraneous complexity. Communicated clearly in a few words or visuals.
Scholarship	Rigorous, credible work which has been evaluated by field experts.	Published or presented work that contributes to new knowledge and advances the discipline or field.
Disciplinary utility	Being useful or beneficial or providing value toward achievement of a purpose or goal.	Solves a problem or meets a need and facilitates achievement of a goal more effectively and efficiently.
Research to practice translation time	Time interval between the generation or research evidence and its widespread implementation or integration in routine practice	Time lag between publication of evidence and uptake in guidelines, protocols, and practice. Speed and efficiency of knowledge translation

Lastly, the survey included three questions seeking agreement. The first question was used to determine how likely use of a combined model (EBPQI) compared to using a singular (EBP or QI) model would be to move findings from research into practice sooner; responses were rated on a 4-point Likert scale (1 = very likely to 4 = very unlikely). Participants were asked an additional question which inquired if the merger of EBP and QI (EBPQI) presented in

the MM is valuable to decreasing research to practice translation time across patient-facing disciplines in healthcare; responses were rated on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). A final question asked participants to rate if a certification for healthcare professionals to demonstrate competency in EBPQI guided by the MM would be valuable to decreasing research to practice translation time in healthcare; responses were rated on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). A final open-ended question asked if participants had any other comments they wished to share.

Survey Administration

At the conclusion of each round, feedback was provided to participants inclusive of all answers regarding number of participants, percentages for each Likert response, and synthesized comments when narrative replies were provided (see Figure 1). Feedback has an influence on individual responses and achievement of consensus (Barrios et al., 2021) and surveys with feedback allow for revision of assessment (Niederberger & Renn, 2023). Since a range of 70% to 80% consensus rate for expert panels is associated with rigorous Delphi findings, consensus was set to 75% or greater for all three study rounds. Each survey was deployed for 2 weeks with reminders sent at 1 week and 2 days prior to the due date.

Round 1

Of the 78 individuals invited to participate, 24 (31% response rate) completed the first round. All survey responses were reviewed with the study facilitator.

Round 2

In Round 2, the number of deidentified participants (n = 24) who completed Round 1 and their responses were shared, along with percentages of ranking or agreement of all responses. For 75% consensus to be reached, agreement of at least 17 of the 24 participants was required. For

the perceived value questions, if less than 10% of survey participants selected an answer, that answer option was removed; therefore, low (1) value response options were removed on all six MM component questions and options moderate (2) or high (3) were presented to the panel a second time.

Narrative comments revealed that identification of a local problem below the external research evidence level on the MM should be added to a future iteration. The survey was adjusted to ask participants if they agreed or disagreed with the statement that the first level of the MM should begin with identification of a local problem.

In Round 1, the panel identified EBPQI initiatives as the most valuable component in translating research to practice. Therefore, in Round 2, participants were asked to agree or disagree with the statement that EPBQI is the most valuable component of the MM for the translation of research to practice and include their rationale for disagreement.

The concept rankings for translating research to practice, cognitive load, simplicity, scholarship, and disciplinary utility were modified to only agree or disagree based on Round 1 responses. For overall values, greater than 90% of respondents selected moderate (2) or high (3) value for each concept, therefore low value (1) was removed from all five concepts in the table and moderate (2) and high (3) remained with space for narrative comments next to each corresponding concept.

For the open-ended item inquiring about the overall value of the MM, participants were given a synthesized statement that their comments indicated overall, the MM provided a valuable blend of EBP and QI necessary to achieve synergistic and sustainable healthcare improvements. In round 2, this item was also modified to an agree or disagree question type.

For the rated question asking if a combined (EBPQI) model compared to a singular (EBP or QI) model could move research into practice sooner, 96% (n = 23) of respondents chose the

"likely" or "very likely" response; as such, "unlikely" and "very unlikely" were removed from the Round 2 answer options. For the rated question asking if the merger of EBP and QI presented in the MM is valuable to decreasing research to practice translation time across patient-facing disciplines in healthcare, 100% (*n* = 24) of participants chose "agree" or "strongly agree;" as such "disagree" and "strongly disagree" were removed from the response options. The final closed-response question asked participants if a certification for healthcare professionals to demonstrate EBPQI competency guided by the MM would be valuable to research to practice translation time in healthcare. Three participants (13%) disagreed with the majority (n = 21, 87%) selecting "agree" or "strongly agree;" as such, "disagree" and "strongly disagree" were removed from item response options for Round 2 as consensus was reached.

Round 3

Twenty-two of 24 initial participants (92% response rate) completed Round 2 of the survey with one representative from social work and one from medicine not completing the second survey. To maintain consensus at 75% or greater of returning participants, agreement of 17 or more participants for Round 2 results was now required. All responses were provided back to participants for each question. For transparency on items where consensus had been reached by Round 2, the results were provided, however, no further action was required. Consensus was reached on 12 items in Round 2. Therefore, during Round 3 participants were required to complete only 10 closed-answer responses on the remaining items to reach consensus. For 8 items where consensus had not yet been reached, participants could see previous results, but the response options remained the same.

Based on Round 2 results, EBPQI remained the most valuable component in translating research to practice, however, due to participant feedback the rank order was adapted for the

survey in Round 3. Similarly, for the concept of scholarship (dissemination), EBPQI also remained the highest rated component, and an updated order was put forward to the group for agreement.

Notable lack of consensus remained on the newly added question inquiring about EBPQI initiatives as high or low cognitive load with 16 (73%) participants rating this component as high and six (27%) rating low cognitive load. Therefore, two new clarifying questions based on the narrative comments were added related to cognitive load. The first was an agree/disagree statement that EBPQI may require high cognitive load, however; moving through the iterative levels of the MM as a guide may reduce cognitive load. The second new question asked participants the following: "In the context of the complex healthcare system, any initiative proposed to improve healthcare systems will be complex and potentially require a high cognitive load, but when compared to other EBP or QI models that participants were familiar with, would the MM for EBPQI require higher or lower cognitive load?" The final open-ended response question asked participants if they had any other information they wished to share.

Analysis

Descriptive statistics, including the mean and standard deviations, were calculated for all quantitative questions and included for each round. Mean and standard deviations were included by round for all quantitative questions (see Tables 4 and 5). Narrative synthesis was conducted by the facilitator, content validity experts, and the researcher between rounds (Keeney & McKenna, 2011).

Results

Demographic Findings

Of the 78 individuals who were invited to participate, 24 completed round one (31%) and 22 completed both Rounds 2 (92%) and 3 (100%), with continued representation from all eight patient-facing disciplines. See Table 3 for an overview of demographic and clinical characteristics of the 24 participants.

Table 3. Demographic and Clinical Characteristics of Respondents

Demographic & Clinical Characteristics (*n* = 24)	**Mean; n (%)**
Year of experience within the discipline, mean (SD)	16.79, range: 6-36
Age, mean (SD)	44.29, range: 32-67
Practice State, n (%)	
California	1 (4%)
Colorado	1 (4%)
Indiana	1 (4%)
Minnesota	3 (12%)
New Jersey	1 (4%)
New York	1 (4%)
Ohio	2 (8%)
Texas	13 (54%)
West Virginia	1 (4%)
Setting of Primary Role, n (%)	
Academic/University	10 (42%)

Clinical Practice	12 (50%)
Professional Organization	2 (8%)
***Areas of Expertise, n (%)**	
EBP/QI publication	10 (42%)
EBP/QI presentation	15 (62%)
Leading an EBP/QI initiative	8 (33%)
Oversight/teaching EBP/QI	16 (67%)
Serving as EBP/QI consultant	7 (29%)
Extensive EBP/QI clinical expertise	10 (42%)
EBP/QI certification	3 (12%)
Advanced/continuing education	17 (71%)

*Respondents could choose more than one option

MM Components and Concepts

Respondents ranked each MM component for value (see Table 4). The internal evidence component did not meet the consensus rate with only 16/22 (73%) of participants in agreement. MM components were rank ordered for each concept of interest with the top rated (highest value) component reported. Overall values, encompassing all components of the MM were completed for each concept of interest (see Table 5) with high value consensus for all concepts except for cognitive load.

Table 4. Value Ratings for Mountain Model Components

Component	Round 1, *n* = 24 Mean (SD)	Round 2, *n* = 22 Mean (SD)	Round 3, *n* = 22 Mean (SD)	Consensus Reached at 75% for High Value
External research evidence	2.83 (0.38)	2.86 (0.35)	*	Yes
Evidence-based practice	2.79 (0.42)	2.95 (0.21)	*	Yes
Internal evidence	2.67 (0.57)	2.63 (0.49)	2.73 (0.46)	No
Purpose and aims	2.71 (0.46)	2.86 (0.35)	*	Yes
Quality improvement	2.75 (0.53)	2.97 (0.43)	*	Yes
EBPQI initiatives	2.54 (0.66)	2.77 (0.43)	*	Yes

*Consensus reached after round 2 and did require review in round 3; Ratings: 1 = low value, 2 = moderate value, 3 = high value

Table 5. Overall Mountain Model Value Ratings for Concepts of Interest

Concept	Round 1, *n* = 24 Mean (SD)	Round 2, *n* = 22 Mean (SD)	Round 3, *n* = 22 Mean (SD)	Consensus Reached at 75% for High Value
Cognitive Load +	2.33 (0.64)	2.32 (0.48)	2.41 (0.50)	No
Disciplinary Utility	2.58 (0.50)	2.73 (0.46)	2.91 (0.29)	Yes

Research to practice translation time	2.58 (0.58)	2.82 (0.40)	*	Yes
Simplicity	2.25 (0.68)	2.55 (0.51)	2.55 (0.51)	No
Scholarship	2.29 (0.75)	2.68 (0.48)	2.77 (0.43)	Yes

*Consensus reached in round 2; Ratings: 1 = low value, 2 = moderate value, 3 = high value +

Did not indicate directionality

In analysis, when respondents ranked the MM components individually with concepts, consensus was reached that EBPQI initiatives are high cognitive load (*n* =22, 100%) with narrative comments supporting that while the MM is likely to reduce cognitive load, EBPQI initiatives aiming to improve practice demand high cognitive load. Consensus agreement was reached that moving through the iterative levels of the MM as a guide may reduce cognitive load at the EBPQI point (*n* = 21/22, 95%). When compared with other EBP or QI models the expert panel was familiar with, consensus was not reached with rating the MM for EBPQI higher (*n* =12, 54%) or lower cognitive load (*n* = 10, 45%).

For MM components, consensus was reached in Round 2 that internal evidence was ranked highest value for simplicity (*n* = 17, 77 %). For overall value, consensus was not reached that the MM (encompassing all components) was high value (*n* = 12, 55%). For MM components, consensus was reached that EPBQI initiatives ranked highest in term of scholarship (*n* = 22, 100%). For overall value, scholarship also had high value, reaching consensus (*n* = 17, 77%).

Consensus was reached that the MM for EBPQI has high value (*n* = 20, 91%) for disciplinary utility. Although all panelists agreed that a certification for healthcare professionals

to demonstrate competency in EBPQI guided by the MM would be valuable to decrease research to practice translation time in healthcare, a split between agreement (*n* = 12, 54%) and strong agreement (*n* = 10, 45%) remained. Narrative comments stated that 1) training in both paradigms was needed and demonstration of competency in EPBQI would provide for standardization and

2) certification could be beneficial to practicing clinicians across fields. Future interdisciplinary EBPQI certification framed by the MM may address this needed gap. Additional narrative comments supported visible inclusion of interprofessional collaboration to be annotated on the MM.

For MM components, consensus was reached that EBPQI initiatives have the highest value for research to practice translation time. The panel also strongly agreed that the merger of EBP and QI (EBPQI) presented in the MM is of high value to decrease research to practice translation time across patient-facing disciplines in healthcare (*n* = 18, 82%). Narrative comments supported that the combination of EBP and QI was easy to understand and valuable for use by practitioners who are often overburdened, beyond currently available frameworks to guide improvements in complex and challenging healthcare systems. For rank order questions, consensus was reached that the following updated order represented the most value in translating research to practice (most to least valuable): 1) EBPQI initiatives, 2) QI methods, 3) EBP, 4) internal evidence, 5) purpose and aims, and 6) external research evidence. Narrative comments supported that "external research evidence" was ranked last, not due to lesser importance but rather it is the item being translated into practice. Panel consensus was reached by 21 participants (95%) in Round 2 that overall, the MM provides a valuable blend of EBP and QI necessary to achieve synergistic and sustainable improvements in healthcare.

Most participants (95%, $n = 21$) agreed that the steps of the MM are clearly presented in its current order. When asked if additional steps were needed, 90% ($n = 20$) agreed that the first level of the MM should begin with identification of the local problem.

Discussion

Expert validation of the value and utility of the MM was identified through the engagement of 22 currently practicing experts across eight patient-facing disciplines within the healthcare field. A three-round Delphi design provided initial consensus using a modified approach to orient panelists and ensure each participant began from a common base of information within the first-round survey. This approach also lends itself to simplified statistical interpretation and analysis (Keeny & McKenna, 2011). Consensus was reached with panel agreement on 18 items and not reached on 4 items. Each component within the combined EBPQI framework was also rated as having high value, except for the "internal evidence" component in which the panel agreement rate fell just below the cut off for consensus at 73% ($n = 16$). This may have been due to the historical lack of internal evidence used in many EBP models.

Cognitive Load

Cognitive load, defined as the amount of mental effort and working memory related to task complexity and time to complete, was the most notable concept where participants did not reach consensus in terms of its value to the practitioner. However, it is hypothesized that for those who have an EBP *or* QI background and not both, the integration of a second model (inclusive of strengths) could be perceived as additional cognitive load. Paradoxically, participants also felt that moving through the levels (components) of the MM in a systematic way may lower cognitive load.

Simplicity

Consensus was reached that the MM is high value in minimizing unnecessary steps without extraneous complexity. The MM and its stepwise approach were also communicated clearly and had easy to understand visuals. It is noteworthy that EBPQI initiatives was ranked higher than EBP and QI methods for simplicity, further supporting that a merged EBPQI approach reduces complexity. For example, the revised Iowa Model: Evidence-Based Practice to Promote Excellence in Health Care© added several steps to EBP without full incorporation of QI principles (Cullen et al., 2023).

Simplicity may be enhanced visually with inclusion of the recommended level of problem identification below the external research evidence level on the MM figure. Of note, while there was consensus among the experts that simplicity is enhanced, the panel answered in the opposite manner for cognitive load leading the researcher to believe that the participants may not have fully appreciated how to operationalize the concept of cognitive load.

Scholarship

Scholarship, defined as rigorous, creditable work that has been evaluated by field experts and disseminated in peer-reviewed forums, was ranked most highly with EBPQI initiatives, representing the pinnacle of actual practice improvement across disciplines. Since scholarship is shared as dissemination and EBPQI initiatives include this, it is logical that both would be ranked as high value by the panel. This may also signal the value of the synergy across the evidence from research to translation to dissemination. Dissemination of EBPQI initiatives, while not generalizable, are transferable if adapted to other contexts and populations and is how sustainable improvement can be scaled (Dunlap et al., 2024). This is important as disseminated work is used as a baseline for others to build on for future endeavors, such as research or EBPQI initiatives.

Disciplinary Utility

All disciplines represented in this study recognized the high disciplinary utility of the MM. Similar to other models that have emerged from a singular discipline such as the Model for Improvement which is highlighted by the IHI (IHI, 2025) or the revised Iowa Model: EvidenceBased Practice to Promote Excellence in Health Care© (Cullen et al., 2023), that also have interdisciplinary utility.

There is currently no accredited EBP and QI certification available with the importance of the ability to demonstrate expertise in any area such as certified healthcare interpreter (Certification Commission for Healthcare Interpreters, 2025). A future blended certification in EPBQI, rather than single certifications in EBP or QI for nurses and interdisciplinary partners, may provide practical means to demonstrate expertise in a merged paradigm.

Research to Practice Translation Time

It is noteworthy that the panel came to early, high-level consensus that the summative EBPQI initiatives were the most valuable component to support reduced research to practice translation time. This study provides evidence for the value of pursuing a different, synergistic approach to practice change, reinforcing that a combination of both EBP and QI may result in greater benefits than either paradigm alone. Prior to this model, no proposal for fully combining these paradigms existed (Waldrop & Dunlap, 2024). This is groundbreaking as no literature has examined this to date.

In addition to EBPQI, research can also be combined with EBP and translated through other types of initiatives including evidence-based practice program evaluation (EBPPE) and policy analysis (EBPPA) which the MM has recently been adapted to guide (Waldrop, Dunlap & Reynolds, 2026) due to academic demand and clinical practice needs. A set of newly published

reporting guidelines (Waldrop, Dunlap & Reynolds, 2026) may assist in guiding and disseminating these types of reports. These two new adaptations of EBPPE and EBPPA guided by the MM have yet to be tested with research and may support similar synergism and additional value.

Potential Adaptations in the MM

This study adds significantly to the literature and also has tremendous clinical relevance. The expert panel agreed that the stepwise progression of the MM and its components were clear and two possible additions to the MM were recommended. Participants reached consensus that a potential future iteration of the MM might include the addition of identification of a local problem. While all problems will be local, understanding the problem in general is a component necessary for searching for the best available external research evidence (Waldrop & Dunlap, 2024b). Participants also recommended including interdisciplinary collaboration on the MM. These additions could be incorporated to strengthen the validity of the MM across patient-facing healthcare disciplines.

Future Research

Future research involving mixed methodologies can explore the concept of EBPQI initiatives and their impact on dissemination such as how, why, and where. Next steps are needed to build on this work with comparative studies that show the value of the combined model versus a singular approach. While EBP and QI are well accepted concepts within healthcare, an EBPQI concept analysis may be helpful since the combined EBPQI may be different from EBP and QI. A concept analysis will help to describe the attributes and characteristics for the combined EBPQI model.

While the MM addresses EBPQI, newly adapted versions are now demonstrating that policy initiatives and program evaluation can be guided by the MM (Waldrop et al., 2025; Waldrop et al., 2026). Program evaluation and policy analysis, focused on moving external research evidence into health and wellness programs and local to global health policy respectively, can be examined using a rigorous research method to reduce the research to translation gap. Future research protocols can be constructed prospectively to demonstrate the efficacy of the MM with policy issues and program evaluations utilizing this adapted framework. Policy and program issues also transcend discipline boundaries and often have implications that can affect multiple disciplines simultaneously. Dissemination of these two additional types of specific reports are much needed to more comprehensively improve health and healthcare. Lastly, exploration of a nurse-led, interdisciplinary theory that tests the combination of EBP with QI, program evaluation, and policy analysis to determine interdisciplinary utility will be investigated in future research studies.

Study Significance

The MM offers healthcare disciplines a modern approach to guide changes in the practice arena, increasing the research to practice connection through a merged EBP and QI process built on a foundation of external research evidence (Waldrop & Dunlap, 2024). What is significant about this study is its disciplinary transcendence. While the research to practice gap is certainly multifactorial, one aspect is the inability of the practitioner to move research findings to real world practice settings through a stepwise systematic model. By combining both EBP and QI paradigms, the MM may be simpler for practitioners to use, possibly reducing cognitive load, increasing scholarly dissemination and interdisciplinary utility, and ultimately reducing research to practice translation time.

Use of the MM for EBPQI will likely lead to a better understanding and application of use of the best available research evidence in healthcare practice settings. Healthcare practitioners are continuously attempting to implement solutions in siloed environments. Dissemination of EBPQI initiatives (how research has been used in practice) provides the opportunity for others to adapt this evidence to their settings, therefore amplifying and multiplying its use and can reduce the time it takes for practice changes to become standard of care.

Limitations

This research is the first report on validating the value of the MM. Although three experts in each discipline were sought in eight fields, the final sample of respondents lacked one occupational therapist, one psychologist, and one pharmacist. The remaining expert slots were filled with physicians due to the long duration of use of EBP within the discipline of medicine compared to the other included fields (Sackett, 1997). Due to its importance to the design, "expertise" was narrowly defined; as such, individuals could only participate if they had been in practice more than 5 years and were still practicing in their respective disciplines.

While geographic diversity was sought, 13 participants ultimately responded from Texas, the second largest state in the United States, with the largest health sciences center in the world, exhibiting diversity within itself. The remaining respondents were from eight other states which span east to west coast. Global participants were not included because of the shortened history of EBP and QI in disciplines outside of nursing and medicine and lack of published evidence of expertise from countries outside the United States.

Conclusion

This research provides initial expert validation of the MM for EBPQI. The study results will inform the evolution and potential updates to the MM with an interdisciplinary focus. Understanding the value of EBPQI in guiding research translation across healthcare disciplines has the potential to create synergies throughout the evidence continuum with the goal of realizing sustainable, scalable, transferable healthcare improvements. New EBPQI reporting guidelines (Reynolds et al., 2026) framed by the MM are available as open access resources to guide and assess the robustness and rigor of EBPQI reports.

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Clinical Resources: (all open access):

EBPQI initiatives:

PPCO:

https://journals.lww.com/ajnonline/fulltext/2024/03000/ce__beyond_pico_a_new_question_simplifies_the.19.aspx and MM article, EBPQI reporting guideline

The Mountain Model for EBPQI:

https://journals.lww.com/ajnonline/fulltext/2024/03000/ce__beyond_pico_a_new_question_simplifies_the.19.aspx

Adapted MM for EBPPE and EBPPE:

Insert open access AJN Article (in press)

EBPQI, EBPPE and EBPPA Reporting Guidelines framed by Mountain Model:

https://journals.lww.com/jncqjournal/fulltext/9900/evidence_based_practice_quality_improvement.267.aspx

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