The Knowledge Translation Project 2020 Overview

Results and plans for next steps

The Knowledge Translation Project, October 2020

Regional kompetansetjeneste for rehabilitering (RKR) overview of the Knowledge Translation Project. Clinicians who participated in the project represented the facilities listed below.

Asker kommune
CatoSenteret
Godthaab Helse og Rehabilitering
HLF Briskeby Rehabilitering
LHL Sykehuset (tidligere LHL Klinikkene Glitre)
Oslo Metropolitan University
Revmatismesykehuset Lillehammer
Sykehuset Innlandet HF avd. Ottestad
Sykehuset Telemark HF
Sunnaas Sykehus HF
Sørlandets Rehabiliteringssenter
Unicare Bakke
Unicare Landaasen Rehabiliteringssenter AS
Unicare Fram
Vikersund Bad Rehabiliteringssenter

SUNNAAS SYKEHUS

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Abstract

Introduction. The 17-year time lag for the translation of evidence to practice could cause harm to patients, be costly to society, and must be shortened.[1,2] In 2015, the Regional Center of Knowledge Translation in Rehabilitation (RKR) launched the Knowledge Translation Project to target this challenge. The project has two components, including the development of concise summaries with recommendations for the application of evidence by Knowledge Experts (KEs) and a process to implement the summaries in practice led by Knowledge Ambassadors (KAs). Objective. The objective of this report is to evaluate project successes and opportunities for improvement. Methods. We assessed KE recruitment, retention, and summary production; outcomes of KA pilots; and a survey of KE perspectives. Results. Over five years of the project, we recruited 49 KEs, and 21 are still active. The KEs completed ten summaries and partially completed thirteen summaries. Seven rehabilitation facilities participated in three implementation projects. The KE survey results indicated that the project generally had a positive impact on critical appraisal skills, statistics, assessment capabilities, understanding of the application of evidence to practice, and helped with the discussion of evidence-based practice with colleagues. Significantly greater impacts were identified for individuals who participated in > 15 meetings. In addition, 3 of 4 KEs who participated in RKR implementation projects, successfully implemented additional summaries independently. Conclusion. While the KT Project demonstrated several benefits, a high dropout rate and lower than expected summary production rate provides opportunities for improvements. Suggestions for project modifications include changing the role of the KEs to focus on adapting existing guidelines, and use of the project methods to support decision-making related to best practice requests of collaborators.

Abbreviations	
Abbreviation	**Term**
BRAIN	Battery of Rehabilitation Assessments and INterventions
EPIC	Evidence-Based Practice Confidence Scale
KE	Knowledge Expert
KT	Knowledge Translation
KTA	Knowledge-to-Action
KTTs	Knowledge Translation Tools
Mini-BESTest	Mini-Balance Evaluation Systems Test
OM	Outcome Measure
RKR	Regional kompetansetjeneste for rehabilitering Helse Sør-øst

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Appendix 1. Published article on health region survey
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Project Overview

More than 17 years could pass before research evidence generated today is used in the care of patients.[1] The 17-year time lag for the translation of evidence to practice could cause harm to patients, be costly to society, and must be shortened.[2] In 2015, the Regional Center of Knowledge Translation in Rehabilitation (RKR) launched the Knowledge Translation Project (i.e., the KT Project) to target this implementation challenge. The KT Project aims to facilitate the rapid implementation of evidence into practice, standardize the delivery of assessments and interventions in rehabilitation, improve patient outcomes, and develop a network of mentors who are knowledgeable about research evidence. Over the last five years, RKR has worked towards the implementation of this project. This report provides the KT Project background and rationale, implementation plan, results, and recommendations for project improvements.

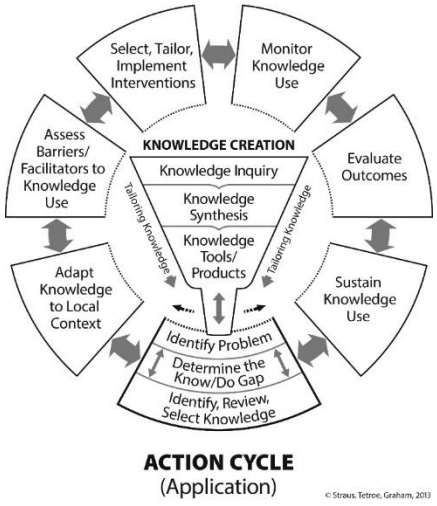


Fig 1. Knowledge-to-Action Framework

The KT Project is based on the Knowledge-to-Action (KTA) Framework, an implementation framework that includes knowledge creation (i.e., research) and implementation into practice.[3] As described in the Figure, this framework includes the knowledge creation funnel at the center of the cycle, which integrates the publication and synthesis of research. The action cycle is on the outside of the Figure and includes 7 phases to implement evidence into clinical practice.[3,4] The KT Project includes two major components: 1) the development of a *database of Knowledge Translation Tools* (KTTs); and 2) an *implementation model* using Knowledge Ambassadors at each clinical site. These components incorporate the majority of the KTA framework.

The database of KTTs incorporates knowledge synthesis and the development of knowledge (i.e., evidence-based) products/tools. These tools include concise summaries of the literature and describe key parameters of using evidence-based practices in the clinic. We recruit clinicians from the South Eastern health region to write the summaries. The clinicians, known as the Knowledge Experts (KEs), are trained in critical appraisal and development of a KT summary. As part of the process, the KEs also adapt the evidence to the local context. In other words, they make recommendations for how the evidence could apply to clinical practice in Norway. If evidence suggests the practice should not be used, this information is also provided.

The second component of the project is an implementation model that utilizes Knowledge Ambassadors (KAs), who are clinicians at clinical sites, to facilitate practice changes at hospitals and clinics throughout the health region. When evidence is recommended for clinical practice, the KAs lead local implementation projects. RKR guides these projects, but they are facilitated locally by the KAs. The implementation process incorporates all phases of the action cycle of the KTA Framework. The original timeline for the project included two years of increasing the capacity of the KEs to develop summaries, followed by implementing the KA plan in the third year. Figure 2 illustrates the planned infrastructure and the roles of the KEs and KAs.

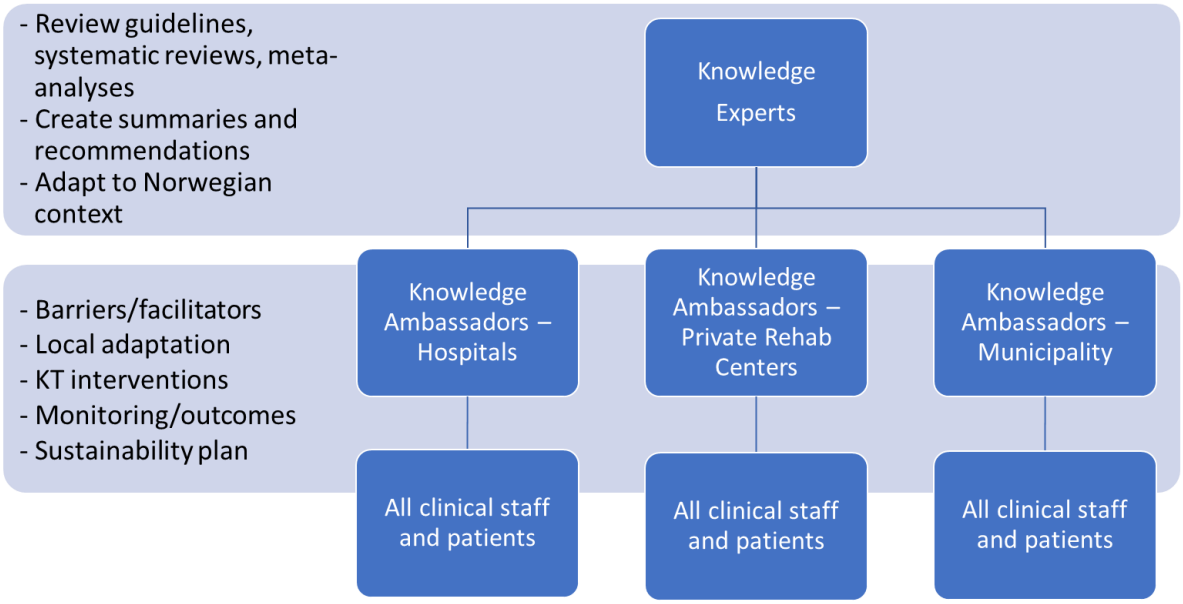


Fig 2. Planned KT Infrastructure for the health region.

Implementation science research supports the need for this project. Across areas of rehabilitation, research studies have repeatedly demonstrated that current care is not consistent with the best available evidence. Despite an increasing focus on evidence-based practice, rehabilitation clinicians prescribe interventions based on clinical experience or what they learned in school, which is often outdated or unsubstantiated information.[5-7] Research indicates that > 90% of clinicians choose treatments based on previous education or outdated texts instead of using more recent evidence to guide practice.[8] In a survey of 244 physical therapists, 87% reported they used evidence to support clinical decision-making < 5 times/month, and 33% reported using evidence < 2 times/month.[9]

Implementation science also suggests the use of systematic processes and implementation frameworks, such as the KTA, which may improve the use of research by clinicians.[10] Several studies have demonstrated positive outcomes after using the KTA framework to implement evidence in rehabilitation, including rehabilitation management of stroke[11] and other neurological disorders[12]. Consideration of the barriers to adopting new practices and the use of multi-component strategies (i.e., KT interventions) to overcome the barriers may also increase adoption.[10] Examples of passive strategies used as KT interventions include providing educational materials and resources. More active strategies include audits of clinical charts and providing feedback on adherence to practice recommendations. Interventions that include multiple components (i.e., a combination of education, mentoring, and audit and feedback) and target barriers have demonstrated an increased impact on behavior than single educational interventions.[13,14] These data indicate that implementation plans need to be comprehensive, but adapted locally to meet the needs of individual clinics. The KT Project utilizes multi-component KT interventions, and the KAs tailor the implementation plan to meet the needs of the clinics.

The KT Project was also adapted from a similar KT Project implemented at the Rehabilitation Institute of Chicago (now Shirley Ryan AbilityLab, Chicago, IL). The Battery of Rehabilitation Assessments and INterventions (BRAIN) was developed to synthesize, adapt, and implement evidence in rehabilitation. The BRAIN includes two components: 1) a process to synthesize, adapt, and make recommendations about applying evidence; and 2) a process to implement the recommended

practices in 3 levels of care. Similar to the KT Project, the BRAIN included clinicians who synthesized literature and made recommendations for clinical practice as well as clinicians who led local implementation projects to encourage the adoption of recommended practices. The BRAIN was studied over six years to examine the use and its impact on evidence-based practice. Successive samples of allied health clinicians participated in surveys to assess the impact of the project, EBP perspectives, use, and barriers before BRAIN implementation (2009; n=136), and 3 (2012; n=115) and six years (2015, n=121) after implementation. Survey data indicated that the BRAIN resulted in a significant increase in the use of EBPs to make clinical decisions and justify care. As a result of the BRAIN, survey participants reported a substantial increase in the use of outcome measures in 2012 (74%) and 2015 (91%) and evidence-based interventions in 2012 (62%) and 2015 (82%). In 2012, significant differences ($p < .01$) in the impact of the BRAIN on practice were identified between therapists who were directly involved in the BRAIN as compared to uninvolved therapists. In 2015, no significant differences existed between involved and uninvolved therapists. After six years of sustained implementation, the BRAIN expedited the adoption of EBPs throughout this large system of care in rehabilitation. To date, the facility continues to use the BRAIN to guide its implementation processes.

In summary, research from current practice, implementation science, and clinical implementation projects provided the rationale for the development of the KT Project in Norway. Using this evidence as a guide, we utilized the KTA framework and adapted the BRAIN project to the Norwegian context. Over the last five years, we have tested different components of this project to determine its efficacy.

KT Project Implementation

During the first year of the KT Project, we developed the processes and materials used for education, training, and summary development. This work included the formation of a strategic plan, development, and administration of an online survey of clinical practice in the health region, creation of 14 online courses, and recruitment of the first 15 KEs. The strategic plan included an assessment of clinical practice in the health region (online survey), the process for the development of the KTTs; education and training plan for the KEs, KAs, and Managers; and an assessment plan for each implementation project (in collaboration with the KAs).

A total of 316 professionals in the health region participated in the online survey of clinical practice. The results indicated that evidence-based practice activities performed are related to literature searches, critical appraisal, and discussing evidence. Approximately 65% and 75% of respondents agreed that the outcome measures and evidence-based interventions are standardized within the local clinic. Fewer agreed that OMs (13%) and evidence-based interventions (39%) are standardized regionally. For a complete review of the survey results, please see the published article in Appendix A.

Knowledge Expert Recruitment, Retention, and Summary Production

The first KE group was recruited in 2015 and consisted of ten physiotherapists and one physician. We studied the KEs' experiences and perceived barriers and enablers of success. This study used a qualitative approach and was conducted in collaboration with Cato Bjørkli (Psychologist, associate) and his students at the University of Oslo, Department of Psychology. We utilized the Capability, Opportunity, and Motivation Model of Behaviour to explore how these experiences related to the behavioral adaptation and participation. Three months after starting the project, semi-structured interviews were conducted to understand the CoP members' experiences and reflections. The project identified ten themes related to the potential contributors to the group's success and failure. Themes included project management, technological solutions, efficacy, organizational support, interaction, the bigger picture, self-development, time, and motivation. These findings assisted us in improving the early project plans to ensure we were meeting the needs of the KEs. A manuscript of the project is currently in review and will be made available once published.

After the first KE group, we continued to recruit clinicians into four other groups. In total, we recruited 49 clinicians who participated as KEs. The groups were multi-disciplinary and often included physiotherapists, occupational therapists, and nurses. We wrote summaries in groups and individually. The groups produced a total of 10 summaries, with another 13 summaries that are partially developed. The topics of the summaries are listed in Table 1.

One of the challenges that we experienced with the KT Project was a high dropout rate for the KEs. Of the 49 KEs who started the project, only 21 are still actively participating. KEs left the project at various points, including < 2 months after starting the project (n=14), while writing summaries (n=8), and after finishing a summary (n=6). Figure 3 describes KE participation.

Table 1. Completed and Partially Completed Summaries

Completed Summaries
Assessment Summaries
Locomotor Capabilities Index – 5 (LCI-5; amputee)
Mini-Balance Evaluation Systems Test (Mini-BESTest; across diagnostic groups)
Prosthetic Limb Users Survey of Mobility (PLUS-M; amputee)
Short Physical Performance Battery (SPPB; Frail Elderly)
Intervention Summaries
Cognitive Behavioral Treatment (Fatigue, Multiple Sclerosis)
Energy Conservation (Multiple Sclerosis)
Exercise (Multiple Sclerosis)
High Intensity Gait Training (Stroke)
Motivational Interviewing (across diagnostic groups)
Tai Chi (Community-dwelling elderly)
Partially Completed Summaries
Assessment Summaries
Disorders of Arm Shoulder and Hand (DASH; across diagnostic groups)
Goal Attainment Scale (GAS; across diagnostic groups)
Intervention Summaries
Activities of Daily Living Training (Stroke)
Applications for lifestyle changes (Diabetes mellitus II)
Constipation prevention (Home care)
Home-based training to improve strength (Chronic Obstructive Pulmonary Disease)
Low-Intensity Training Focused on Body Awareness (Chronic Fatigue Syndrome)
Mindfulness (across diagnostic groups)
Physical exercise to improve cognition (Stroke)
Post-operative hip fracture management (Elderly)
Shared Care (across diagnostic groups)
Strength Training (elderly)
Virtual Reality (musculoskeletal disorders)

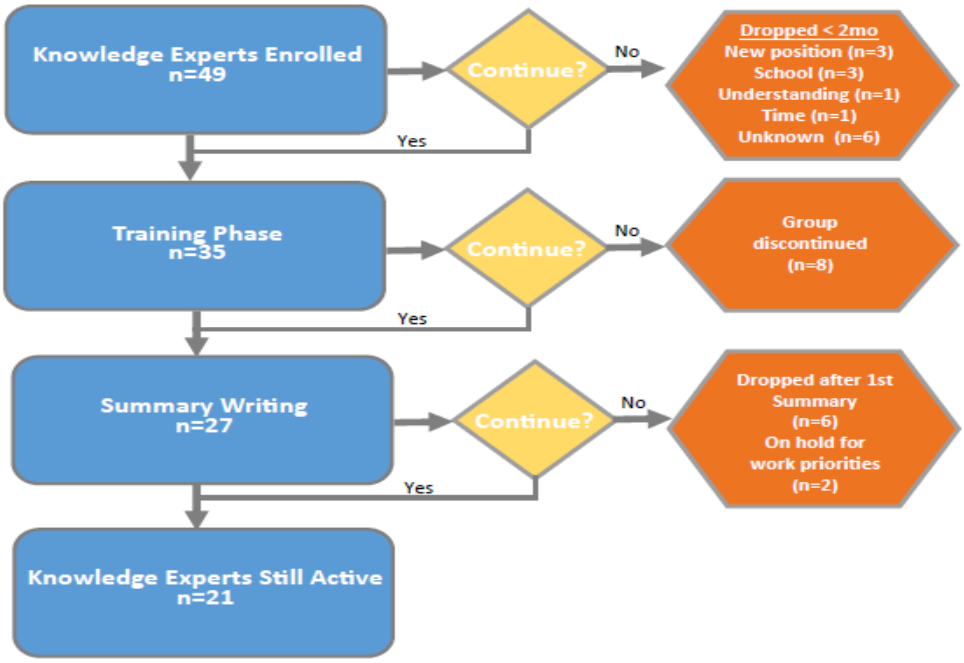


Fig 3. Knowledge Expert Participation

The Knowledge Ambassador Pilot

The role of the KAs is to facilitate local implementation of the recommended practices. Using the Action Cycle of the KTA framework, the KAs work with RKR to further adapt recommendations to the local context (i.e., their facilities) and implement them. We tested the KA role in two ways: 1) By utilizing the KEs as KAs in local implementation pilots; and 2) Recruiting KAs from sites not involved in the project to implement summary recommendations.

The Knowledge Expert taking on the Role of the Knowledge Ambassador

In two separate projects, we utilized the KEs to facilitate implementation projects at their facilities. The first project included implementing the Mini-BESTest at Unicare Bakke and Unicare Fram. A third site was initially involved but dropped out while trying to collect implementation data. The second project included implementing the SPPB across four different settings at Telemark Hospital, Skien. Each of these projects is detailed below.

Mini-BESTest Implementation Pilot at Unicare Fram and Unicare Bakke

IN 2017, the first knowledge expert group completed a knowledge summary on the Mini-Balance Evaluation Systems Test (Mini-BESTest, see Appendix 2) and conducted a pilot project to implement the assessment into clinical practice. To do this, the RKR collaborated with Unicare Fram and Unicare Bakke.

The KEs used the KTA to guide the implementation of the Mini-BESTest. During this process, clinicians and managers at each facility participated in discussions and surveys to determine barriers and facilitators to the routine use of the Mini-BESTest in practice. Barriers and facilitators guided the selection of implementation strategies. These strategies included a combination of educational strategies (mentoring, training), audit and feedback regarding administration rates, securing equipment and modifying the environment, and leadership support.

After implementing the Mini-BESTest, anonymous patient information was collected to monitor the use of the test and determine how it was applied in different patient populations. During the 6-month implementation project, the KEs and clinicians successfully used the Mini-BESTest during the care of 134 patients. Clinicians collected data on individuals with Parkinson's Disease (n=88), stroke (n=27), and other diagnoses (degenerative disease, polyneuropathy, other neurologic conditions, and musculoskeletal conditions, n=19). Mean initial scores on the Mini-BESTest of 20.5 points revealed that most patients assessed with the test were not at fall risk. At discharge, the mean change was 2.7 points, and the mean discharge score was 23.2. The mean time between test administrations was 2.75 weeks.

The data collected during this pilot study provided valuable insight into the balance impairments and improvements demonstrated by patients treated at these sites. Approximately 37% of patients were classified as "at fall risk" because they scored $\leq$ 19 points. Interestingly, 62% demonstrated a meaningful change (score change of $\geq$ 3), including 44% of patients with Parkinson's disease and 63% of patients with stroke. We also compared this data to outcomes achieved in research studies in Parkinson's disease patients, the largest group in the pilot. Our findings indicated that, although the length of stay was relatively short in the clinic, changes were similar to those seen in much longer research studies. For example, in a study that compared intensive cycle ergometer to the treadmill for 2, 30-minute sessions per day, five days per week, for three weeks resulted in mean changes of 2.3 points (ergometer group) and 3.3 points (treadmill group).[15] A highly challenging balance program delivered in 60-minute sessions, 3 x week, for ten weeks resulted in a change of 3 points.[16] These are just two of many studies that tested patients with similar levels of balance impairment and achieved similar results with a much higher dose of therapy than in the Norwegian clinics.

After the conclusion of the pilot, the KEs confirmed their recommendation for routine use of the Mini-BESTest in clinical practice. The implementation process provided the group with valuable insight into the feasibility and value of using the Mini-BESTest in clinical practice. They are also continuing to use the Mini-BESTest in routine practice at these sites. In addition, these KEs continued to use this process to implement other summaries recommended by the KEs. To learn more about this project, please view the video at https://www.youtube.com/watch?v=KyZzeCWrvZ4.

Short Physical Performance Battery Implementation Pilot at Telemark.

Cathrine de Groot (Physiotherapist), a KE in group 2, led the implementation pilot of the Short-Physical Performance Battery (SPPB) at Telemark hospital Skien. The SPPB is a test of the physical function of the lower extremities that includes a short balance assessment, gait speed, and a chair stand. The score range is 0 to 12, and the maximum score is 12. It has excellent reliability and validity in the frail elderly population and is predictive of falls, disability, institutionalization, general health improvement, and mortality. Information to assist clinicians with decision-making is also available, including the standard error of measurement, minimal detectable change, and minimum clinical important difference scores. (See Appendix 3 for SPPB summary)

Four different Telemark settings/programs participated in this pilot. These included a fitness center, a multiple sclerosis center, acute inpatient care (frail elderly only), and frail elderly in the municipality. The action cycle of the KTA framework guided the project, which took ~4 months to complete. During the pilot, the SPPB was collected once on the patients to assess the feasibility of administering the measure and potential application in the patient population treated. In addition to the SPPB, we collected gait speed, which is also administered in the SPPB but converted to an ordinal

scale for scoring. The primary barriers to routine administration of the SPPB were clinician knowledge of the purpose of the test and lack of understanding of how to identify appropriate patients. Time to administer the test, finding a good location to administer the test, and finding equipment (e.g., walking aids were not readily available) were also barriers. Other barriers included administering the test with patients on isolation precautions and with impaired cognition. Facilitators included the perception that the test is simple and easy to learn, that the SPPB will help measure the effectiveness of rehabilitation, and may result in quality improvement.

During the pilot, 56 patients were assessed with the SPPB across the four clinical sites, which included a fitness center (n=13), Multiple Sclerosis program (n=8), inpatient acute (frail elderly; n=28), and the municipality (n=7). A total of 18 clinicians participated across the sites. The mean and median scores for each site are listed in Table 2 below. In general, scores at two sites demonstrated a ceiling effect, and two sites showed the measurement results were at an appropriate level on the scale for the patients. At the two sites where the SPPB demonstrated a ceiling effect, gait speeds measured in m/s demonstrated potential for routine use in practice based on the scores of the patients.

Table 2. Results of the SBBP pilot project at Telemark

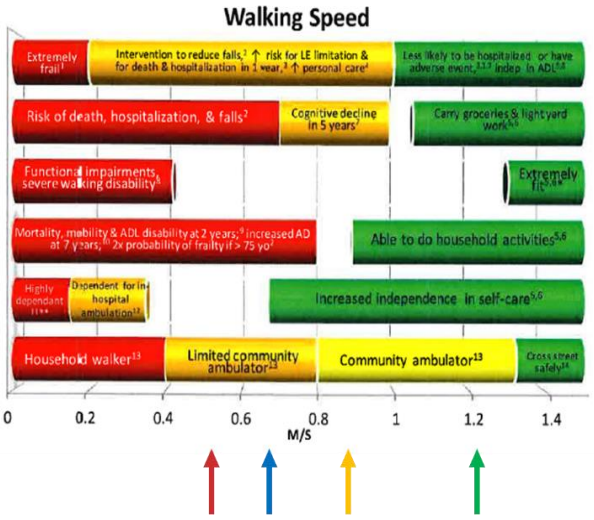
Clinical Site	Enrollment (n=56)	Mean SPPB	Median SPPB	Mean Gait Speed	Median Gait Speed	Project Outcome & Recommendations
Fitness Clinic	n = 13	9.7	11	1.05 m/s	1.19 m/s	SPPB demonstrated a ceiling effect on many, but could use gait speed as an outcome measure.
Multiple Sclerosis Patients	n = 8	10	10	0.88 m/s	0.86 m/s	SPPB demonstrated a ceiling effect on many, but could use gait speed as an outcome measure.
Municipality	n = 7	6.9	6.0	0.68 m/s	0.66 m/s	Appropriate measure to continue to use in practice. Gait speed should also be included as a score.
Inpatient frail patients	n = 28	4.4	4.0	0.54 m/s	0.53 m/s	Appropriate measure to continue to use in practice. Gait speed should also be included as a score.

As illustrated in figure 4 (adapted from Middleton et al., 2016),[17] patients at 3 of 4 sites demonstrated gait speeds lower than specific thresholds related to general health and mobility. These data indicate that, while the SPPB may be appropriate for use at two clinical sites, gait speed may be more broadly applied to predict future events and assess change over time.

SPPB Project – Lessons Learned

The clinicians were able to collect SPPB and gait speed data on 56 patients across four settings at Telemark. As described in Table 2, the group concluded that the SPPB is not appropriate for use at the fitness center or with the multiple sclerosis patients because of the ceiling effect. However, gait speed may be an appropriate measure that should be investigated further. The SPPB and gait speed were appropriate measures for use in the municipality and inpatient. Approximately 1-year later, 8 of the 18 clinicians who participated in the pilot report they are still using the SPPB in clinical practice.

Fig 4. Gait speed comparisons with predictors and normative values



> 1,0 m/s; normal funksjon – Hjertegruppa, Median = 1.19
0,6 – 1,0 m/s; begynnende skrøpelighet – Rehab. Poliklinikk, Median = 0.86
0,6 – 1,0 m/s; begynnende skrøpelighet – Skien Helsehus, Median = 0.66
0,0 – 0,6 m/s; skrøpelig funksjon – Geriatri, Median = 0.53

Recruitment of Knowledge Ambassadors

The second method of testing the KA role and process included recruiting clinicians from sites not involved in the KT Project. We initially recruited four sites to participate. Two sites dropped-out after learning more about the project. The dropout reasons included discomfort with being a change agent (n=1) and the inability to prioritize the project (n=1). Another site is delaying the project because of multiple competing implementation projects. owever, they plan to continue in 2021. The last site, HLF Briskeby - Rehabilitering og Utadrettede Tjenester, piloted the KA role with an implementation project on the Mini-BESTest.

Mini-BESTest Implementation at HLF Briskeby - Rehabilitering og Utadrettede Tjenester

In collaboration with Briskeby's KA, Trude Strand Grøv (physiotherapist), we are in the process of implementing the Mini-BESTest for the balance and dizziness program that includes a short inpatient stay, a home program, and one more inpatient stay. The objectives for the Mini-BESTest implementation program at Briskeby were to:

1. Determine the feasibility of using the Mini-BESTest for patients undergoing dizziness and balance rehabilitation at Briskeby Rehabilitation Center
2. Identify the barriers and facilitators to using the Mini-BESTest within the dizziness and balance rehabilitation program at Briskeby Rehabilitation Center
3. Determine the optimal parameters to apply the Mini-BESTest within the dizziness and balance rehabilitation program at Briskeby Rehabilitation Center
4. Identify the balance-related outcomes of the dizziness and balance rehabilitation program at Briskeby Rehabilitation Center

The action cycle portion of the KTA framework guided the implementation project. We held informal discussions to identify barriers and develop implementation strategies. The primary barriers were related to understanding how to administer the test and interpret findings, as well as fitting the test into the already tightly scheduled program for the patients. We were able to successfully

implement the Mini-BESTest, which was collected within two days of beginning and completing the program.

The Mini-BESTest data was collected on 11 patients who participated in the first cohort of the program. Our findings indicated that 5 of 11 patients demonstrated a ceiling effect. The median change of the Mini-BESTest for patients who *did not* demonstrate a ceiling effect was *not* outside of measurement error. This indicates that these patients may not have demonstrated a meaningful change because of the program. As a result of this finding, the clinicians at Briskeby reviewed the treatments provided to patients in this program and improved the protocol. They collected data on the second cohort of patients before closing for COVID-19. The results of the second set of data are delayed because of this closing.

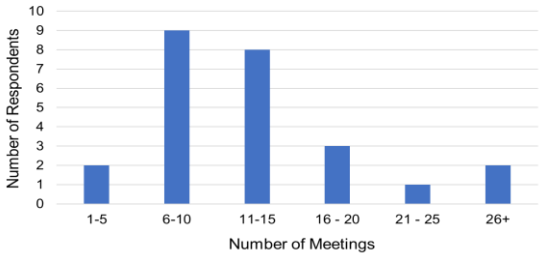
KT Project Evaluation

In order to better understand the knowledge experts' perceptions of the KT Project, we surveyed them about the impact of the KT Project, confidence in evidence-based practice, general project questions, and reasons for dropping out. The next section of this report provides an overview of the survey results. Please see the entire list of survey questions in Appendix 4.

Survey Participant Demographics and Engagement in the KT Project.

The online survey was distributed to 40 KEs by email, and the response rate was 65% (n=26). The degree of KT Project engagement of survey participants varied from dropping-out before completing one summary (n=10), dropping out after completing one summary (n=10), and individuals who are still in the project (n=6). The number of meetings attended is demonstrated in Figure 5. Approximately 19 individuals participated in ≤15 meetings. The meetings occurred bi-monthly, indicating participation was < 6 months for this group of individuals.

Fig 5. Number of Meetings Attended by Survey Respondents



Impact of the KT Project.

Several questions asked about the impact of the KT Project. In general, the participants had a mean score that indicates "agree" or "strongly agree" that the project increased their confidence in critical assessment, gave them a better understanding of statistical concepts, improved assessment capabilities, improved understanding of the application of evidence in clinical practice, and helped with discussions about evidence-based practice with colleagues. The KEs were split into two groups for analysis, including those who participated in ≤ 15 and > 15 meetings. A significant difference between groups was identified for several questions, indicating that participation in more meetings resulted in a greater impact from the project. Specifically, individuals who participated in > 15 meetings reported strong agreement with project impacts of increased confidence in critical assessment, increased understanding of the application of evidence in practice, and increased confidence in explaining evidence to patients. In addition, several other items were trending toward significance, including increased understanding of statistical concepts, improved assessment capabilities, increased standardized measurement in practice, and increased use of evidence-based practices. Table 3 describes the results of this section of the survey.

Table 3. Impact of KT Project	Whole group (n=26)			< 15 meetings (n=17)		15+ Meetings (n=7)		
The KT Project has…	Mean	SD		Mean	SD	Mean	SD	p-Value
made me more confident in my ability for critical assessment	4.08	0.89		3.76	0.90	4.71	0.49	0.02*
given me a better understanding of statistical concepts	3.92	0.93		3.65	1.00	4.43	0.53	0.06
improved my assessment capabilities	3.92	0.98		3.65	1.06	4.43	0.53	0.09
increased my own use of standardised measurement tools	3.54	1.10		3.29	1.10	4.00	1.00	0.21
increased the use of evidence-based therapies in my clinical everyday life	3.58	1.10		3.29	1.05	4.14	1.07	0.14
given me an understanding of how I can apply evidence in clinical practice	4.08	0.84		3.76	0.83	4.71	0.49	0.01*
made me more confident in how I explain evidence to my patients	3.58	1.06		3.24	0.97	4.14	1.07	0.04*
helped me discuss evidence-based practice with my colleagues	3.85	1.12		3.82	1.07	3.71	1.38	1.0

1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree; *indicates significant finding; SD=Standard Deviation

To explore potential associations between the amount of participation and the impact of the KT Project, we also conducted Pearson's correlations. We found a *moderate correlation* between more meetings and improved understanding of applying evidence to practice (0.445, n=25, p=0.026). An *excellent correlation* between more meetings and sharing of information with clinicians at their workplace (0.638, p=0.026; n = 25) was also identified.

Confidence in Evidence-Based Practice.

The survey participants also completed the Evidence-Based Practice Confidence scale (EPIC). The EPIC includes 11 questions that ask the participants to rate their confidence to perform various components of EBP, such as conducting literature searches, critical appraisals, and integration of research into practice and patient preferences.[18] Participants rated themselves on an 11-point scale with a range of 0 to 100%. The total score reflects the mean of each of the individual items.[18] A low score indicates minimal confidence, and 100% indicates complete confidence. The EPIC has established face and content validity,[18] excellent reliability and internal consistency,[19] and acceptable construct validity.[19] We developed five additional questions using the EPIC's structure to target areas covered in KE education and training.

The results indicated a relatively high score on the EPIC of 73.78% (SD 15.96). The score was substantially higher than the initial score of 57.8% obtained by the KEs in the first group before undergoing training. In addition, clinicians who participated in > 15 meetings had a mean of 77.1% (SD 16.6), whereas clinicians who participated in ≤ 15 meetings scored 71% (SD 15.4). While we cannot directly compare a pre-post score on the EPIC on the same group of KEs; the published Minimum Detectable Change is 4.5 points.[19] This provides promising results indicating that these methods may have the potential to improve clinicians' confidence in evidence-based practice.

We also assessed correlations between the impact of the KT Project and EPIC scores. These analyses identified moderate, significant correlations between the several project impacts and the EPIC score. The findings are described in Table 4.

Table 4. This KT project has….	Correlation with modified EPIC score	p-Value
has made me more confident in my ability for critical assessment	Moderate (0.46)	0.02*
given me a better understanding of statistical concepts	Moderate (0.41)	0.045*
improved my assessment capabilities	Moderate (0.56)	0.005*
increased my own use of standardised measurement tools	Moderate (0.53)	0.008*
increased the use of evidence-based therapies in my clinical everyday life	Moderate (0.40)	0.051*

General KT Project Questions.

The survey participants also responded to several general questions about the KT Project, listed in Table 5. In general, participants reported agreement with statements related to understanding project goals and that their management supported the project. Other responses indicated agreement to neutral, as described in Table 5.

Summary development also results in recommendations. These include that the practice 1) does not have enough evidence to recommend it; 2) should not be implemented, or 3) should be implemented. Twelve survey respondents indicated they wrote a summary. Of these KEs, seven reported that the recommendation indicated the practice should be implemented. In addition, there was a perfect correction (1.0, p = .000) between whether a practice was recommended by the KEs and sharing the summary results with colleagues. This indicates that clinicians were sharing information about practices that should be implemented, but not sharing information about practices that should not be implemented or did not have enough research on them. This is interesting since clinicians often chose practices that were commonly used in practice. Perhaps, they were less comfortable with sharing that there is no evidence to support practices being used by colleagues.

Four respondents indicated that they participated in an implementation project guided by RKR to implement a summary. Three clinicians reported they implemented a summary without RKR guidance. There was an excellent correlation between participating in a RKR implementation project and conducting one without RKR guidance (0.816; p=.001). There was also an excellent correlation between more meetings and implementing a KT summary without RKR guidance (0.603, p=.038). Therefore, participating in more meetings and a RKR implementation project may have increased the capacity to implement independently. Lastly, there was an excellent

Table 5. General KT Project Questions	Mean (n=26)	SD
I have a good understanding of what are the project's overall goal	4.31	0.93
The software for online meetings used in the project has been a good solution	3.54	1.14
I find that my management supports my participation in the project	3.96	1.18
I have been given time to work to be able to participate in meetings and perform project-related activities	3.31	1.26
My participation in the project has contributed to an increased understanding of EBPs in my workplace	3.54	1.03
My participation in the project has contributed to more EBP among others working in rehabilitation	3.08	0.80
My participation in the project has helped patients receive evidence-based rehabilitation	3.46	0.86

1=Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree; SD = Standard Deviation

correlation between participating in a RKR implementation project and contributing to EBP in rehabilitation (0.625; p=0.03).

Benefits and Challenges of the KT Project.

Survey respondents were asked to provide open-ended responses to the benefits and challenges of the KT Project. Two reviewers categorized responses into themes. The themes included the project's impact on change in the clinic (n=1), gaining new knowledge (n=4), understanding how to influence change (n=2), increasing networks (n=1), and the use of a good teaching strategy (n=1). Reported challenges included lack of support/interest from colleagues/management (n=2), communication with management (n=2), differing level of knowledge of participants (n=3), and the content and structure of teaching the KEs (n=6).

Drop-out Reasons (n=10).

Survey participants that dropped out of the project before finishing a summary were also asked to provide information about dropout reasons. Figure 6 describes the responses to this question. The most common reason for dropping out was changing position at work and difficulty prioritizing the project. Surprisingly, we often heard that the academic level and English language challenged people. However, these responses indicated that these factors might not have been reasons for dropping out of the project.

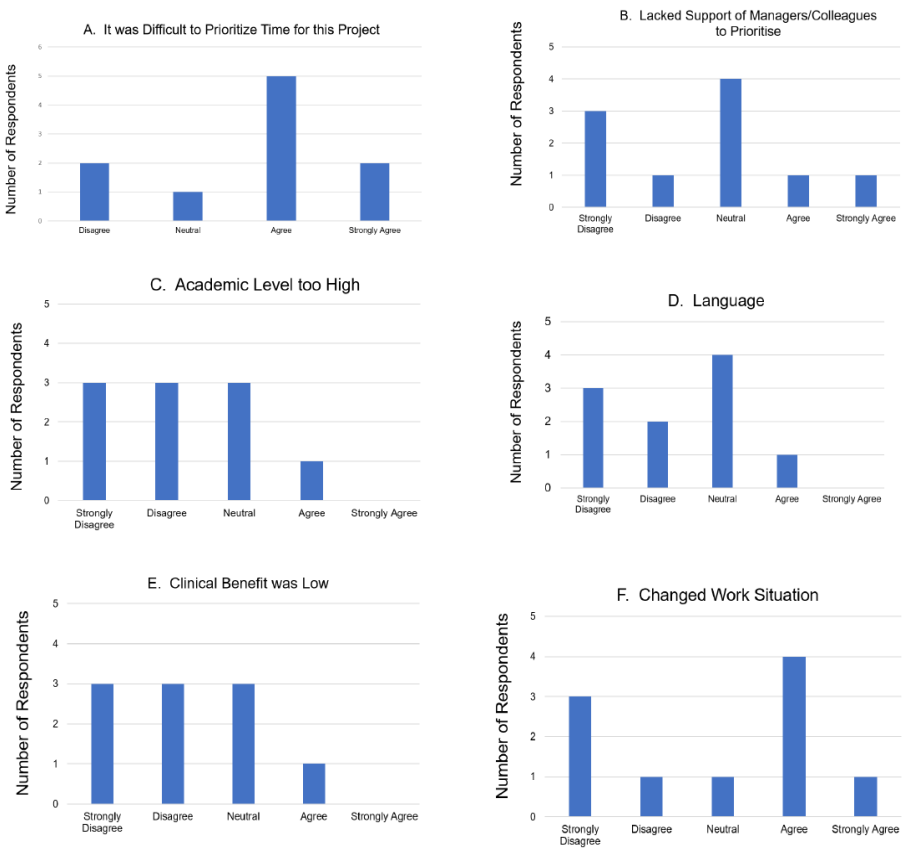


Fig 6. Drop-out Reasons

Reflection from the project leaders

The project leaders also reflected upon project expectations and experiences. In general, the leaders expected a much higher rate of summary production, quicker summary production, and fewer dropouts. As suggested in the survey comments, various levels of baseline knowledge about critical appraisal and lack of time to focus on the project while at work were barriers to summary production and KE retention. Individuals who stayed in the project were provided time for project-related tasks and were willing to complete tasks outside of work. They also quickly integrated concepts they learned, such as using measurement results to support decision-making, into their daily practice. In addition,

facilities that clearly articulated organizational goals related to implementing evidence-based practice were also more successful in completing implementation projects.

When comparing this project to the BRAIN, a similar successful project implemented in the United States, several differences in project implementation should be noted. First, groups in the BRAIN project were discipline-specific and related to either assessments or interventions. For example, we had physiotherapy assessment groups, as well as physiotherapy groups that focused on interventions. In the Norwegian project, group members were interdisciplinary and often did not practice in the same area. Therefore, evidence being reviewed by one group member was often not of interest to the other group members. This may have contributed to decreased group-related motivation. In addition, incentives for participation in the project in the US included a bonus through a professional growth program. In the Norwegian project, an incentive typically was not provided. The lack of incentive may have also contributed to decreased summary production and a higher dropout rate. Lastly, many clinicians in the US project had higher amounts of training in critical appraisal as part of masters and doctorate programs, which is a requirement for entry-level physiotherapy, occupational therapy, and speech language pathology. Whereas, in the Norwegian project, a higher amount of time to train clinicians on critical appraisal was required. These insights may also help us better adapt this program to the Norwegian context.

Summary and Next Steps

RKR has dedicated time and resources to develop the KT Project over the last five years. The project has resulted in the production of 10 summaries, with an additional 13 summaries in development. Implementation of new practices also occurred as part of implementation projects at seven clinical sites. In addition, many KEs who participated in the KT Project continued to implement additional summaries without RKR guidance. In general, KEs reported a positive impact of the project, regardless of the number of meetings attended. However, these data indicate there was an increased impact on those who participated in $\geq$ 15 meetings.

While the KT Project has demonstrated a positive impact on knowledge and rehabilitation practice, we experienced challenges with a high number of dropouts in the KE groups and lower than expected summary production rate. A significant challenge in this project was to create summaries and retain KEs; we believe we will see increased success in the KT Project by adapting the project in a few ways. These include changing the role of the KEs to adapt existing guidelines and other recommendations, instead of summarizing literature.

In addition, we plan to use the process to create summaries to collaborate with others to make recommendations for specific practice. We will also continue to use the Action Cycle of the KTA framework to guide implementation projects. Details about these modifications are below.

1) Change the role of KEs to adapt existing guidelines for implementation, instead of summarizing literature.
    a) KEs will select a guideline, systematic review, or meta-analysis to review and adapt. The process will include discussions about the application of the evidence in the Norwegian context, as well as specific recommendations for implementation in practice.
    b) Summaries will include a brief overview of the guideline and how the recommendations should be implemented in Norway.
    c) KEs will pilot the recommendations at their sites
    d) After an implementation pilot by the KEs, KAs will be recruited for further implementation

2) The KT Project knowledge creation methods will also be used to provide support for groups who are seeking advice from RKR on the implementation of specific practices. Some examples of these situations may include:
   a) Producing systematic reviews in collaboration with other clinics/competence centers aiming at answering specific questions and aiming for a publication
   b) Master degree projects in collaboration with Universities
   c) Quality improvement projects in networks, rehabilitation units, and other facilities in Norway
   d) Consensus projects regarding specific topics

3) RKR will continue to use the KTA - Action cycle for implementation. This will include:
   a) implementation research
   b) implementing evidence-based recommendations
   c) implementing core outcome measures

To test the modification of the KE role as described in #1 above, we will recruit a discipline-specific group of clinicians to review, adapt, and implement recommendations from a published guideline. While we pilot these project modifications, we will refine the methods and evaluate the success of this modification of the KT Project.

In summary, we have found great benefit in the KT Project; however, we have identified opportunities for improvement. The KT Project has excellent potential to continue to make an impact on rehabilitation in Norway with these suggested modifications.

References

1. Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *Journal of the Royal Society of Medicine.* 2011;104(12):510-520.
2. Heath Economics Resarch Group OoHE, RAND Europe. *Medical Research, What's it Worth? Estimating the Economic Benefits from Medical Research in the UK.* . London, Unitied Kingdom: UK: Evaluation Forum;2009.
3. Straus S, Tetroe J, Graham I. *Knowledge Translation in Health Care: Moving from Evidence to Practice.* 2nd edition ed. West Sussex, UK: BMJ Books; 2013.
4. Graham ID, Logan J, Harrison MB, et al. Lost in knowledge translation: time for a map? *The Journal of continuing education in the health professions.* 2006;26(1):13-24.
5. Moore JL, Roth EJ, Killian C, Hornby TG. Locomotor training improves daily stepping activity and gait efficiency in individuals poststroke who have reached a "plateau" in recovery. *Stroke; a journal of cerebral circulation.* 2010;41(1):129-135.
6. Lang CE, Macdonald JR, Reisman DS, et al. Observation of amounts of movement practice provided during stroke rehabilitation. *Archives of physical medicine and rehabilitation.* 2009;90(10):1692-1698.
7. Wiles R, Ashburn A, Payne S, Murphy C. Discharge from physiotherapy following stroke: the management of disappointment. *Soc Sci Med.* 2004;59(6):1263-1273.
8. Kloda LA, Bartlett JC. Clinical information behavior of rehabilitation therapists: a review of the research on occupational therapists, physical therapists, and speech-language pathologists. *Journal of the Medical Library Association : JMLA.* 2009;97(3):194-202.
9. Salbach NM, Guilcher SJ, Jaglal SB, Davis DA. Determinants of research use in clinical decision making among physical therapists providing services post-stroke: a cross-sectional study. *Implementation science : IS.* 2010;5:77.
10. Fischer F, Lange K, Klose K, Greiner W, Kraemer A. Barriers and strategies in guideline implementation—a scoping review. Paper presented at: Healthcare2016.
11. Petzold A, Korner-Bitensky N, Menon A. Using the knowledge to action process model to incite clinical change. *The Journal of continuing education in the health professions.* 2010;30(3):167-171.
12. Moore JL, Pickering, L., Mathur, G., Van Der Laan, K., Hornby, T.G. The Battery of Rehabilitation Assessments and INterventions: A Case of Successful Knowledge Translation. Paper presented at: American Physical Therapy Association, Combined Sections Meeting2014; Las Vegas, NV.
13. Jones CA, Roop SC, Pohar SL, Albrecht L, Scott SD. Translating Knowledge in Rehabilitation: Systematic Review. *Physical therapy.* 2015;95(4):663-677.
14. Grimshaw JM, Eccles MP, Lavis JN, Hill SJ, Squires JE. Knowledge translation of research findings. *Implementation science : IS.* 2012;7:50.
15. Arcolin I, Pisano F, Delconte C, et al. Intensive cycle ergometer training improves gait speed and endurance in patients with Parkinson's disease: A comparison with treadmill training. *Restorative neurology and neuroscience.* 2015;34(1):125-138.
16. Conradsson D, Lofgren N, Nero H, et al. The Effects of Highly Challenging Balance Training in Elderly With Parkinson's Disease: A Randomized Controlled Trial. *Neurorehabilitation and neural repair.* 2015;29(9):827-836.
17. Middleton A, Fritz SL, Lusardi M. Walking speed: the functional vital sign. *J Aging Phys Act.* 2015;23(2):314-322.
18. Salbach NM, Jaglal SB. Creation and validation of the evidence-based practice confidence scale for health care professionals. *Journal of evaluation in clinical practice.* 2011;17(4):794-800.
19. Salbach NM, Jaglal SB, Williams JI. Reliability and validity of the evidence-based practice confidence (EPIC) scale. *The Journal of continuing education in the health professions.* 2013;33(1):33-40.