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Utilization of Research in Acute Care Settings in Alberta (AKUTE)

AKUTE Technical Report

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EXECUTIVE SUMMARY

This document is the final report of a research study funded by AHFMR in 2005, the *Utilization of Research in Acute Care Settings in Alberta* (AKUTE) study. The purpose of the study was to develop and pilot test a survey to measure organizational context and research utilization behaviors by care providers and managers in acute health care settings.

The results of this research project are critical elements for a longer term program of research. This program of research has an overarching goal of understanding how to make changes in the health system that will facilitate adoption of research at the bedside and ultimately lead to improved outcomes for patients and providers. In order to plan interventions to improve health outcomes by using research findings, it is necessary to understand the context within which one is trying to effect change. The focus of this study was to develop a valid tool through which to assess the context within which health professionals work.

By using rigorous conceptual, analytic and statistical methods, this research resulted in the development of the Alberta Context Tool (ACT). This tool has been pilot tested in five professional groups (nurses, physicians, managers, clinical specialists and allied health providers) working in four different acute care hospitals in large urban settings in Alberta.

The tool includes eight dimensions that together explain some of the modifiable elements of context. These dimensions are: leadership, culture, evaluation, organizational slack, structural and electronic resources, information sharing interactions among staff, information sharing activities and information sharing processes (or social capital). Taken together, these eight variables explained almost 70% of the variability in reported research use by the five professional groups. This is a high degree of explanatory power for tools such as this. There has been wide interest from researchers in other parts of the world in using this tool, in part because of the high level of variance explained.

Key findings from the analysis of the pilot data include:

- Groups differed in their use of research with clinical specialists reporting higher research use
- The relationship between perceived leadership and research use varied among hospitals
- The five groups assessed their context differently on five of the eight dimensions of ACT
- Overall, several contextual variables (evaluation, participation in information sharing interactions and use of structural and electronic resources) were positively associated with research utilization.

Perceived context was strongly associated with research utilization and varied among groups. This is important information to have when planning interventions to increase the use of research. Currently the ACT is being used in two Canadian, one Swedish study and a multi-national European study.

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RESEARCH SUMMARY

This technical report summarizes the findings from the *Utilization of Research in Acute Care Settings in Alberta* study, which is the second step of a larger program exploring the use of research in health care settings. The **purpose** of the study was to develop and pilot test a survey to measure organizational context and research utilization behaviours by point of care providers of healthcare and decision-makers. We did this by operationalizing the construct of *context* as it is described in the *Promoting Action for Research Implementation in Health Services* (PARiHS) framework. The **specific objectives** of the project were to: refine and validate a survey that measures research utilization behaviours and organizational variables relevant to research uptake, identify differences in research uptake patterns that may exist among subgroups of research users, and assess the influence of organizational factors on research use among different user groups.

In this study, we developed and piloted a new instrument, the Alberta Context Tool (ACT) to measure organizational context (i.e., organizational work environment) and research utilization behaviours for four subgroups of healthcare clinicians (i.e., nurses, allied providers, physicians, clinical specialists) and a fifth group – managers. Development of the ACT was based on an attempt to balance the requirements of reasonable instrument development principles and the practical realities for a tool that could be completed in a reasonable amount of time. The ACT was administered to participants across different professional groups in complex, busy and resource pressed work settings. Our goal was a tool that could be completed in 20 minutes using an on-line method of administration. Development occurred in three stages: selection of a conceptual framework, conceptual refinement, and item construction. Piloting and data collection of the initial ACT was carried out from October 2006 – January 2007 by the University of Alberta Population Research Laboratory (PRL) using on-line and paper-based forms. A total of 453 healthcare professionals (152 nurses, 181 allied providers, 36 physicians, 46 clinical specialists, and 38 managers) from four Alberta teaching hospitals were sampled, resulting in an overall response rate of 43%.

Analysis of the data from the pilot to date has included item reduction, psychometric analysis, and bivariate analysis (i.e., tests of difference and correlations). Within the ACT, there are eight hypothesized dimensions of context:

1. Leadership
2. Culture
3. Evaluation
4. Organizational slack
5. Structural and electronic resources
6. Information sharing interactions
7. Information sharing activities
8. Information sharing social processes (social capital)

The first 3 of these dimensions derive directly from the PARiHS framework. Each dimension has its own scale or set of items within the tool. Originally, 76 items comprised these eight dimensions. A total of 25 items were deleted following traditional item reduction analyses: 22 items were deleted based on insufficient endorsement frequency and an examination of bivariate item correlations and item-total statistics; and 3 additional items were deleted because of poor factor loadings with ACT dimensions and/or intrinsic difficulties with the items. The resulting

version of ACT had 51 items comprising the 8 hypothesized dimensions of context. Factor analysis with Principal Components Analysis (PCA) revealed a sound 14-factor structure that accounted for 69.97% of the variance of 'organizational context' in the ACT. Each of the 8 hypothesized dimensions were found to be internally reliable (Cronbach's α range = 0.647-0.915).

Key findings from the bivariate analyses include:

- Statistically significant differences between the four hospitals with respect to perceived leadership and knowledge translation (specifically, conceptual research utilization and overall research utilization).
- Statistically significant differences between the five professional groups with respect to five of the eight dimensions of ACT: leadership, evaluation, structural and electronic resources, information sharing interactions, and information sharing activities. Managers rated both the leadership and evaluation dimensions of context significantly higher than the remaining professional groups. Clinical specialists rated their use of structural and electronic resources significantly higher than the other professions. Managers rated themselves as participating more in information sharing interactions. Managers, physicians, and allied providers tied for participation in the highest number of information sharing activities.
- Statistically significant differences among the five professional groups with respect to knowledge translation (instrumental research utilization and persuasive research utilization). Clinical specialists scored significantly higher on instrumental and persuasive research use compared to the other professions.
- Several contextual variables were positively correlated (at statistically significant levels) with knowledge translation in the sample as a whole, indicating a more positive context is associated with higher self reports of knowledge translation. For example, evaluation, participation in information sharing interactions, and use of structural and electronic resources were correlated at statistically significant levels with all four types of knowledge translation (instrumental, conceptual, persuasive, and overall research utilization). In addition, engagement in information sharing social processes (social capital) and information sharing activities were positively correlated (at statistically significant levels) with three of the four types of knowledge translation: conceptual, persuasive and overall research utilization.

Investigators have argued that context influences knowledge translation activity, and in turn that organizations with better knowledge translation performance have better clinical and safety outcomes. The availability of a robust tool to assess organizational context is important to identifying modifiable factors within the organizational context to which interventions can be productively directed. In addition to providing a means for assessing context, the findings from this study also provide new insights into the research utilization patterns of different groups of health professionals and into the characteristics of organizational context that may be modifiable. These findings will assist in the design of theory-based interventions to enhance research use by healthcare professionals and in particular to tailor interventions to the professional group being targeted. Findings from this study are preliminary and must be interpreted cautiously due to the small sample size of some of the professional groups.

1.0 INTRODUCTION

Our research team believes that one important approach to improving patient care is to *increase the use of research*[c] at both the point of care delivery (i.e., by providers) and among decision-makers. To this end we have undertaken a large program of research to address this approach to the delivery of health care services. This document reports on the general findings (up to the point of multivariate analyses) from the study "Utilization of Research in Acute Care Settings in Alberta" also known as the AKUTE study. AKUTE is the second step of the larger program of study. The larger program has four steps.

Step one was a national survey of research utilization by three occupational groups: decision-makers, physicians, and researchers. Members of our investigative team[d] collaborated with the principal investigator, Dr. Réjean Landry and colleagues at Laval University in Quebec on this project. The Alberta Heritage Foundation for Medical Research (AHFMR) funded an 'Alberta extension' to that study that enabled richer sampling in Alberta including the addition of two groups (nurses and health researchers). The objectives of this first study *(step one)* were to:

- Identify the uses providers and managers in Alberta make of research compared to Canada-wide data
- Identify factors explaining utilization of health research by providers and managers in Alberta compared to Canada-wide data
- Identify factors influencing researchers to engage in dissemination
- Identify factors explaining the creation of linkage mechanisms among researchers and providers/managers
- Derive practical lessons from a better understanding of factors explaining research utilization and
- Compare research utilization patterns across different professional groups

The outcome of this national survey was an assessment of the use of health research results in the Canadian health care system. The *Alberta extension* also investigated differences in research dissemination characteristics of subgroups within Alberta health researchers, including an examination of the empirical relationships between researcher dissemination characteristics and other variables such as research focus, contributions provided by users and a number of research personnel in the research unit. Our findings from the Alberta extension also pointed to important differences in motivating factors that led to the varying dissemination patterns across healthcare professions. Also identified were key measurement (survey) issues that required further development before we could continue with the next stage *(step 2)* of our research. A number of final reports and papers were produced from the national study and the *Alberta extension*. Of note, at the time of writing the Alberta group has had a paper accepted and in press at *Research Policy*[e] and are working on a second one.

[c] In this report we most often use the term research utilization. While we are aware of important differences in meaning between terms and of significant terminological confusion in the field, we use research utilization, knowledge translation and research implementation synonymously – by all of these terms we mean the use of research in clinical practice or management decisions.
[d] Dr. Carole A. Estabrooks, Dr. Peter Norton, and Dr. Judy Birdsell
[e] Estabrook**s**, C.A., Norton, P., Birdsell, J.M., Newton, M.S., Adewale, A.J., & Thornley, R. (in press). Knowledge translation and research careers: Mode I and Mode II activity among health researchers. *Research Policy*.

Step two. The project described in this report (the AKUTE project) builds on what we learned from the national study and the Alberta extension. Here we developed and piloted a new instrument, the *Alberta Context Tool (ACT)* to measure organizational content (i.e., the work environment) and research utilization behaviours for four subgroups of healthcare clinicians (i.e., nurses, allied healthcare providers, physicians, clinical specialists) and managers, which we identified as users or potential users of research information. The development and pilot testing of the ACT was necessary in order to undertake subsequent steps in the larger program of research. Those steps were conceptualized as comparing research uptake across provider groups, patient care units, hospitals, and provinces; identifying predictors of research uptake and examining the effects of research uptake on patient, provider and system outcomes.

The **purpose** of the AKUTE study was to develop and pilot test a survey to measure organizational context and research utilization behaviours by point of care providers of healthcare and decision-makers. We did this by operationalizing the construct of *context* as it is described in the *Promoting Action for Research Implementation in Health Services* (PARiHS) framework. The specific **objectives** of the project were to: refine and validate a survey that measures research utilization behaviours and organizational variables relevant to research uptake, identify differences in research uptake patterns that may exist among subgroups of research users, and assess the influence of organizational factors on research use among different user groups.

Findings from this pilot study have been used to further refine the ACT, which is currently being used in two large scale Canadian studies, one in pediatric acute care,[f] and the other in residential long-term care[g]. It is being used in a six country European Union 7th framework study that will launch in 2009.[h] Plans are also underway to secure funding for its use in a national study of pediatric hospitals in Sweden. Findings from the AKUTE study constitute a descriptive and pre-experimental body of work that served to enable these four major initiatives. It will also serve as a foundation to design group-specific intervention studies (i.e., specific to nurses, allied healthcare providers, physicians, clinical specialist and managers) to improve research utilization programs. More specifically, results will be used to develop profiles of context and intervention strategies based on these profiles to improve linkage mechanisms, dissemination, and utilization of health research in Canada and elsewhere and consequently, improve outcomes in acute care and long term care settings.

This report is the *index product* of AKUTE and will assist both further inquiries into the topic of the influence of context on research utilization in acute care settings, and act as a guide in the production of peer-reviewed publications, clinical papers and presentations from the study.

[f] *Translating Research on Pain in Children (TROPIC): A team grant.* Stevens, B. (PI), Estabrooks, C.A., Lee, S., McGrath, P., Johnson, C., et al. HSC CIHR CTP 79854.

[g] *Translating Research in Elder Care (TREC), A Five Year Research Program*. ($4.73 million). Estabrooks, C.A., Cummings, G.G., Degner, L.F., Dopson, S., Laschinger, H., McGilton, K., Menec, V., Morgan, D., Norton, P., Profetto-McGrath, J., Rycroft-Malone, J., Sales, A., Smith, M., Stewart, N., Teare, G. CIHR MOP 53107.

[h] European Union, 7th framework programme: *Facilitating Implementation of Research Evidence* (FIRE). Seers, K., (PI), Harvey, G., Rycroft-Malone, J., McCormack, B., McCarthy, G., Wallin, L., Estabrooks, C., Titchen, A., Cox, K. FP7-HEALTH-2007-B (proposal # 223646)

2.0 SURVEY DEVELOPMENT

2.1 The Need for ACT

Organizational context is increasingly recognized as central to shaping research use by healthcare providers. To date however, there is relatively little empirical evidence to support this assumption. One reason for this deficiency in empirical evidence is the lack of a robust instrument capable of measuring organizational context in complex healthcare settings. We originally intended to refine and validate *the Alberta Nurse Survey* used in the Alberta extension of step one of our larger program of research to measure context. However, it became apparent that the revisions to that instrument would have been so extensive as to render it a new instrument. We elected instead to start anew and to use the PARiHS framework to guide our work.

A thorough review of existing literature on organizational context and its measurement revealed that while various instruments exist to measure concepts that are sometimes considered to comprise aspects of organizational context – for example, organizational culture, organizational climate, practice environment, and areas of work life – no published context instruments designed to generally and parsimoniously measure context existed. As a result, we decided to develop a new instrument, the Alberta Context Tool (ACT), using an approach that attempted to balance the requirements of reasonable instrument development principles and the practical realities of administering it to many participants across different professional groups in complex, busy and resource pressed work settings.

2.2 Development of ACT

2.2.1 Instrument Development Guidelines

The approach taken to develop the ACT was an attempt to balance, to the extent possible, the following three key guidelines:

1. **Theoretical framework.** We used the Promoting Action on Research Implementation in Health Services (PARiHS) framework. We operationalized concepts from the PARiHS framework and where necessary, operationalized related concepts from the literature (e.g., when the framework did not provide direction).
2. **Brevity.** The resulting ACT instrument had to be brief enough to be tolerated in busy and resource stretched work settings; our target was 20 minutes to complete an on-line version. This decision made our work of necessity pragmatic.
3. **Modifiability.** We chose to focus on concepts of organizational context that were potentially *modifiable*. Therefore we did not include concepts that we determined could not be a focus of future research implementation intervention studies.

2.2.2 ACT development process

ACT development occurred in several stages: (1) selection of a conceptual framework, (2) conceptual refinement, and (3) survey item construction. Although we present the phases as being more or less discrete in this report, the process was highly iterative in nature.

Stage 1: Selection of a conceptual framework
The PARiHS framework was selected as the conceptual framework to guide the development of the ACT. We chose the PARiHS framework because: (1) it explicitly addresses organizational context, which is the primary construct the ACT is intended to measure, (2) it is both sufficiently instructive, as well as, flexible in nature, and (3) we have the opportunity as we progress in our research program to consult actively with the developers of the framework.

The PARiHS framework is based on the interplay between three key constructs: evidence, context, and facilitation. Our primary focus in developing the ACT was on the construct of "context". *Organizational context, according to this framework, refers to the environment or setting where research uptake is to occur, and can be understood along a continuum from low to high on each of three aspects: leadership, culture and evaluation*. While the ACT does address the construct of context using the PARiHS framework, we were also influenced by work specifically focusing on organizational concepts relevant to research and/or knowledge use more generally. Additionally, our research team brought expertise in a number of areas such as knowledge translation (Estabrooks), leadership (Cummings), organizational behavior (Birdsell), and patient safety (Norton) which were incorporated in the ACT. Further, because we were constructing the ACT in the context of a fairly large pilot study with other needs, we also included items assessing non-contextual concepts [e.g., knowledge translation (our dependent variable developed for use in the pilot study) and staff burnout (measured using the Maslach Burnout Inventory-General Survey (MBI-GS) short form)].

Stage 2: Conceptual refinement
Organizational context, for the ACT, was conceptualized broadly as consisting of core PARiHS concepts (i.e., leadership, culture and evaluation) as well as expanded concepts identified in the literature including: information sharing activities, information sharing interactions, information sharing social processes (social capital), structural and electronic resources, organizational slack (i.e., time as a resource and human resources) and relationship with work (e.g. job satisfaction). A diagrammatic representation of the ACT (as conceptualized) is located in Figure 1.

In order to apply the PARiHS framework for the purpose for which we were using it and to incorporate the additional concepts identified above to an overall measure of organizational context, part of the ACT development included the development of summary *templates* for all identified concepts to be incorporated into the ACT. Team members were tasked to individual concepts based on their expertise and asked to develop templates on their assigned concepts. The templates had a standardized format consisting of theoretical/conceptual definition; operational definition and an overview of relevant literature and existing instruments/items (where available) measuring the concept. Template development was further guided by the following series of questions:

- Has the concept been measured in the past?
- Has the concept been operationalized?
- Are there any assessment tools available (i.e., scales, surveys, questionnaires, single items) that have been used to probe this concept?
- If there is an assessment tool available, does it have reported psychometric properties?
- Are there any journal articles that have used or written about the assessment tools?
- Which professional groups have been examined using these assessment tools and are they practical for the professional groups under consideration in this study?

- Do short forms of any identified assessment tools exist or are there specific items from these tools that we can use?
- Does the item represent a modifiable concept?

Stage 3: Item Construction
Item construction for the ACT occurred through a series of three steps as follows.

Step 1. A one day working session was held where the research team met with the goal of producing initial draft items for all identified concepts. This meeting began with the team reviewing all templates produced in Stage 2 (i.e., conceptual refinement).

Step 2. Following review of all templates as a group, the research team then divided into subgroups based on expertise, experience with instrument development, and interest. Each subgroup was charged with the responsibility of drafting initial items (with response scales) for the ACT for their assigned concept(s) while continuing to keep in mind the three core instrument guidelines identified at the beginning of the process: (1) the conceptual framework guiding ACT (2) brevity and (3) modifiability.

Step 3. Following the one-day working session during which initial draft items were constructed for the various concepts, the research team meet on a weekly basis to refine the items and construct the ACT.

Table 1 displays an explanation (i.e., definition), initial number of items, sample items and scaling for concepts in the ACT.

2.2.3 Summary of ACT Development

Following item generation, a master version of the ACT survey was generated for the adult acute care setting. Subsequent to the master adult acute care version, five forms of the adult acute care version of ACT were generated: (1) nurse provider (registered nurses and licensed practical nurses) form, (2) allied provider form, (3) physician form, (4) clinical specialist form, and (5) manager form. Items included in each for the most part were consistent across the five forms with the exception of some minor wording changes for select items and their stems to ensure applicability to specific professional groups. Most variability across forms came from the demographic items, with specific demographic items (e.g., registration in professional organizations) only being included on some forms.

Subsequent to the development of the **original ACT** (*adult acute care version and its five professional forms*), additional versions have been developed for:

1. The pediatric acute care setting (with five forms also for nurses, allied providers, physicians, clinical specialists, and managers) and
2. The residential long-term care (i.e., nursing home) setting (with six forms for healthcare aides, nurses, allied providers, physicians, clinical specialists, and managers).

Figure 1. The Alberta Context Tool (ACT)

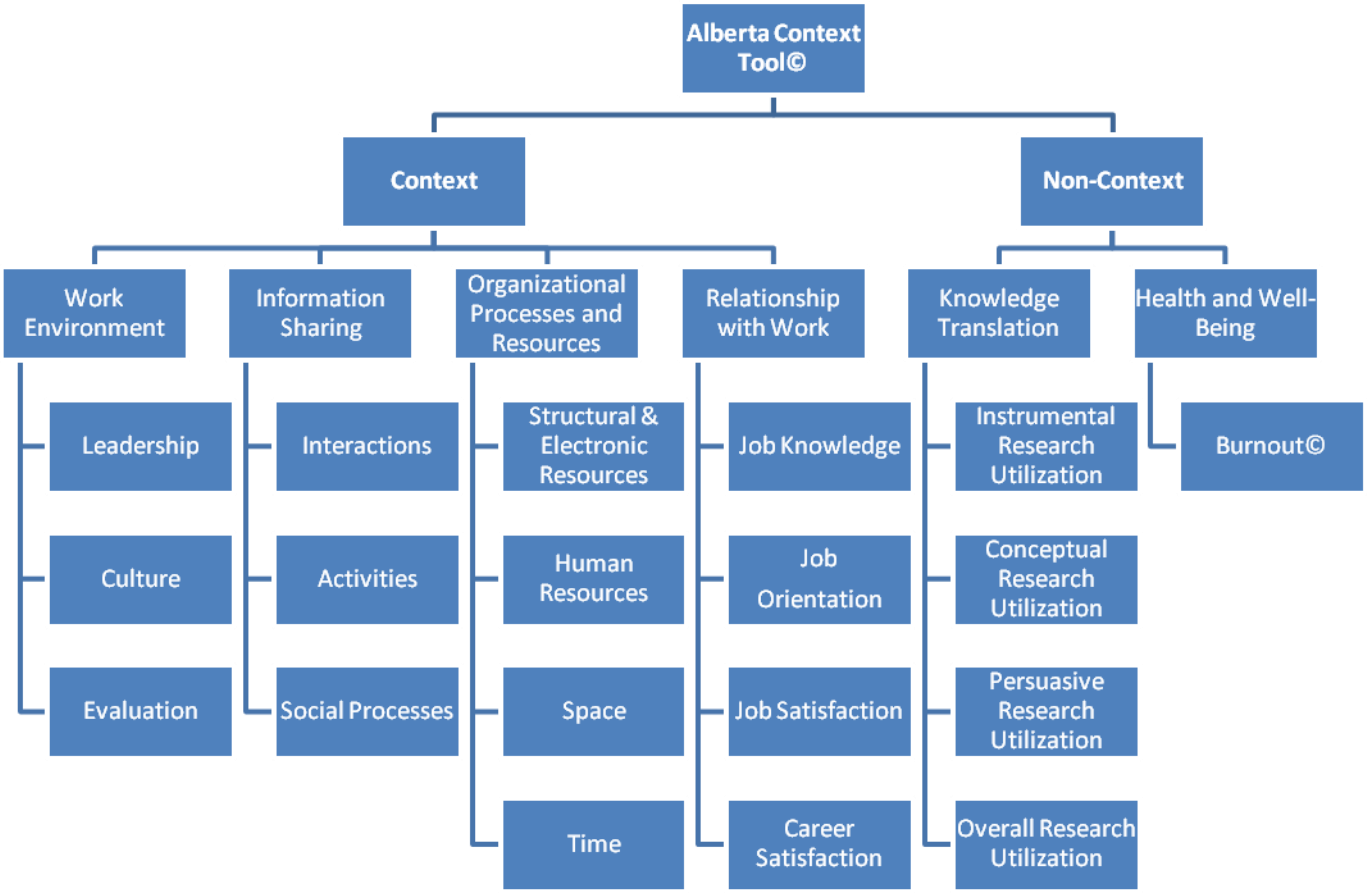


Table 1. Concepts in the ACT

Concept	Explanation	# of items piloted (before item reduction)	Sample item	Scale
Leadership	*Resonant leadership* is defined as the actions of formal leaders in an organization to influence change and excellence in practice through the development of trusting, collaborative and effective relationships with colleagues and staff.	10	Looks for feedback to ideas and initiatives even when it is difficult to hear	5-point likert scale (strongly disagree to strongly agree)
Culture	Culture is defined as the way that "we do things" in our organizations and work units.	8	My organization effectively balances best practice and productivity	5-point likert scale (strongly disagree to strongly agree)
Evaluation	Evaluation is the process of using data to assess group/team performance and to achieve outcomes. Some examples of such data are patient falls, infection rates, pain control, adjusted case weights, length of stay, staffing information and patient/family satisfaction.	7	Our team routinely monitors our performance with respect to the action plans	5-point likert scale (strongly disagree to strongly agree)
Slack	The cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy. Thus, slack acts as a buffering mechanism in the workflow process. Conceptualized as consisting of human resources, time as a resource, and space as a resource.	9	Time: How often do you have "down time" (e.g., time when you and/or your colleagues can choose to do something extra for patients)?	Scale Varies: Human: 5-point likert scale (strongly disagree to strongly agree) Time: 5-point frequency scale (never to very frequently) Space: 5-point frequency scale (never to very frequently); dichotomous
Structural and Electronic Resources	Resources are defined as the material and structural elements that facilitate the ability to access and use research.	13	How often do you use/attend the following? - A Library	5-point frequency scale (never to very frequently)
Information Sharing Interactions	Information sharing interactions are organizational structures (those related to individuals working in the organization and their roles), both formal and informal, operating at various levels (micro, meso, macro) that make research use more probable.	9	How often do you interact with people in the following roles or positions? - Someone who *champions* research and its use in practice	5-point frequency scale (never to very frequently)

Concept	Explanation	# of items piloted (before item reduction)	Sample item	Scale
Information Sharing Social Processes (Social Capital)	Social capital consists of the stock of active connections among people: the trust, mutual understanding, and shared values and behaviours that bind the members of human networks and communities and make cooperative action possible.	12	People in the group share information with others in the group	5-point likert scale (strongly disagree to strongly agree)
Information Sharing Activities	Information sharing activities refers to mechanisms within an organization that an individual can participate in which can promote the transfer of knowledge.	8	How often do these activities occur? -Team meetings	5-point frequency scale (never to very frequently)
Relationship with Work • Job Satisfaction	Job satisfaction refers to an individual's perception of whether they are "satisfied" in their current job (e.g. satisfied being a nurse in hospital 1).	4	Job Satisfaction: Overall I am satisfied with my present job.	5-point likert scale (strongly disagree to strongly agree)
• Career Satisfaction	Career satisfaction refers to an individual perception of whether they are "satisfied" in their career (e.g. satisfied being a nurse overall).			
• Adequate knowledge	Adequate knowledge for one's job refers to the self-perception of whether an individual feels they have enough information to carry out their job effectively and safely.			
• Adequate Orientation	Adequate orientation for one's job refers to the self-perception of whether an individual feels they have had enough orientation to carry out their job effectively and safely.			
Health/Well-Being • Burnout	Burnout refers to a debilitating psychological condition brought about by unrelieved work stress (Maslach, 1982)	9	I feel tired when I get up in the morning and have to face another day on the job	7-point frequency scale (never to daily)
Research Use (Dependent Variable)	The application of research findings to clinical practice. There are four types of research utilization: instrumental, conceptual, persuasive, and overall.	4	On your LAST typical work day how often did you use research in this way?	5-point scale (10% or less to almost 100%)

3.0 FIELD TESTING

3.1 Ethical approval

The AKUTE study received approval from the following Alberta bodies: (1) University of Alberta Health Research Ethics Board, and (2) the Conjoint Health Research Ethics Board, University of Calgary. Operational and Administrative Approval was received from: (1) the Northern Alberta Clinical Trials and Research Center (NACTRC), Capital Health, Edmonton, and (2) the Scientific, Administrative and Ethical Review of Clinical Trials/Health Research Committee, Calgary Health Region.

3.2 Pre-testing of the ACT

An initial pre-test (i.e., feasibility test) of the ACT was conducted by 2 members of the research team between June and September 2006. The purpose of the pre-test was to determine face validity of the ACT, ease of administration (and the identification of any items that were not worded clearly), adequacy of instructions and transitional statements, general flow and time to completion. The pre-test consisted of 4 focus groups held with a total of 20 healthcare professionals including 5 nurse providers, 2 allied providers, 4 physicians, 5 clinical specialists, and 4 managers. Participants were recruited from 4 urban hospitals in Alberta in clinical areas that complemented the prospective sample to be used for the pilot test. Participants were asked to complete the appropriate form of the ACT for their professional group and following completion, to speak with a member of the research team in a focus group setting. The pre-testing identified item wording and terminology in the ACT in need of further clarification (e.g., defining 'hallway talk' and 'medication rounds' in the information sharing activities concept) and also determine logistics of ACT administration (e.g., time to complete). Based on feedback obtained in the pre-test, revisions were made to the ACT prior to pilot testing the instrument.

3.3 Pilot-testing of the ACT

3.3.1 Sample stratification

Four acute care tertiary teaching hospitals, two located in each of the Calgary Health and the Capital Health regions, provided the sampling pool for the pilot study. Five healthcare professional groups at these four hospital sites were eligible to participate: nurses, allied providers, physicians, clinical specialists and managers. Thus, the sample was stratified by healthcare professional group (five levels) and hospital site (four levels). Inclusion and exclusion criteria for the different professional groups are summarized in Table 2 and the number of available professionals in each hospital site, in Table 3.

Table 2. Inclusion and Exclusion Criteria by Professional Group

Professional Group	Inclusion Criteria	Exclusion Criteria
Nurses	Registered nurses (RNs) and licensed practical nurses (LPNs) in permanent positions (part-time/ full-time) in Medicine, Surgery, Specialty (ER, ICU)	Healthcare Aides Clinical trial nurses Casual status Pediatrics Obstetrics Mental Health Ambulatory Care
Allied Providers	Pharmacists (clinical) Respiratory therapists Rehabilitation therapists (occupational therapists and physiotherapists)	Non-professional Allied Providers (e.g., respiratory aide)
Physicians	Regional appointment, attending physician, on consulting roster Medicine, Surgery, Specialty (ER, ICU)	Residents or Fellows Medical department heads Medical residency directors Psychiatrists
Clinical Specialists	Continuing professional educator Clinical staff education Patient education Clinical nurse educators Clinical nurse specialists Clinical specialists Professional Practice Leaders	Nurse Practitioners Academic staff (primary role as an assistant, associate, or full professor)
Managers	Unit managers Patient care managers Program managers Medical department heads Medicine, Surgery, Specialty (ER, ICU) OR and Recovery	Senior Executives

Table 3. Eligible Study Sample by Group and Site

Healthcare Professional Group	Alberta Acute Care Site				Total
	Capital Health Site 1	Capital Health Site 2	Calgary Health Site 1	Calgary Health Site 2	
Nurses[1]	94	101	106	90	391
Allied Providers	89	91	90	88	358
Physicians	44	31	9	10	94
Clinical Specialists	26	32	30	30	118
Managers	27	30	24	16	97
Total	**280**	**285**	**259**	**234**	**1058**

[1]Registered Nurses and Licensed Practical Nurses

3.3.2 Data acquisition

The University of Alberta Population Research Laboratory (PRL) was contracted to provide the following services for the AKUTE study: develop a final paper-based and on-line version of the ACT, administer the survey, perform initial processing and cleaning of the data, and provide an electronic database in SPSS format with an accompanying survey codebook. The PRL developed the on-line survey using *The Survey System* – Version 9.0 for Windows (Creative Research Systems, Petaluma, CA) which was located on a secure web server at the University of Alberta. The five forms of ACT were formatted and entered into *The Survey System* as separate studies. Each study had its own database for purposes of correspondence, reminders, response rates and completed surveys.

In collaboration with decision makers in the two health regions surveyed, participant (n=1,058) lists of professionals in each of the five categories (nurses, allied providers, physicians, clinical specialists, and managers) from the four participating sites were made available to the PRL. All 1,058 individuals included on the participant list were assigned passwords with five characters (e.g., HWGZQ) by the PRL. The passwords served multiple purposes in the study. They were used by the participants to access on-line versions of the survey, and to complete it over more than one session if they wished. They also allowed for confidentiality and anonymity of survey responses and for performing random cleaning checks on the paper surveys. The PRL research coordinator also used the passwords to update sample numbers, send out reminder letters, and match completed surveys to the four sites.

The data collection phase for the pilot commenced on October 28, 2006. On October 29, 2006 survey packages were couriered to nurses and allied health professionals by the PRL. These packages included a unique password in a letter and a printed questionnaire for each participant. Potential participants could return the completed printed questionnaire to the PRL in a prepaid postage return envelope, or access their survey form on-line using the unique password supplied to them in the letter included in their survey package. Two printed reminders were mailed to the nurses and allied health professionals who did not respond, either by mail or on-line. The second reminder to nurses and allied health professionals included a letter and a reprint of the questionnaire. The other professional groups (physicians, clinical specialists, and managers) were sent email invitations to complete their on-line only. The procedure for them to begin the survey was simply to click on an automatic link with an embedded password. Two email reminders were sent to the physicians, clinical specialists, and managers. Data collection officially closed on January 12, 2007 for all participants.

3.3.2.1 Response rate

To determine the level of participation in the study, the PRL calculated an overall response rate and response rates for each professional group using the following formula:

$$\text{Response Rate} = \frac{\text{Completed Surveys}}{\text{(Completes + (Refusals + Incompletes + Non-Response - Return to Sender/Wrong Address)}}$$

The overall response rate for the study was 43% (n=453). Response rates by professional groups are shown in Table 4.

Table 4. Response Rate by Provider Group

Professional Group	Response Rate
Nurses	43%
Allied Providers	52%
Physicians	38%
Clinical Specialists	39%
Managers	39%

3.3.3 Data processing and cleaning

Data coding and data entry were embedded simultaneously within the data collection phase for the on-line surveys. During on-line survey completion, responses were entered directly into a group-specific database (e.g., on-line physician surveys were entered into the physician database, on-line nurse surveys were entered into the nurse database, and so forth) according to available code choices on the computer screen. Paper surveys were coded manually and entered into either the nurse or allied provider databases by PRL staff. Only nurses and allied providers were given a paper-based option. The PRL used SPSS for Windows software program to clean and process both the data imported from the on-line surveys and the data imported manually from the paper surveys. The cleaning occurred concurrently with data collection. The PRL then provided the research team with a merged data file (i.e., all five provider groups in one file) in SPSS format (with variable names and labels), and the completed paper surveys. Initial coding checks, tracking, and correcting of coding errors were also provided by the PRL in the form of a preliminary codebook.

Following receipt of the merged dataset from the PRL, additional data processing and cleaning were completed by KUSP staff. SPSS for Windows was also used to process and clean the data in-house. A detailed codebook was established which indicated coding options (including missing and not applicable) for all ACT items. Some codes were developed as part of ACT and were presented as response categories to the respondents. Others (e.g., missing, not applicable) were developed after the ACT had been administered.

In-house data cleaning involved several steps: frequency checks, random error checks, and use of special SPSS syntax. The first step in the in-house cleaning process was the generation of frequency tables for all variables in the dataset to check for missing, wildcard and out of range values, and skip patterns. Following these frequency checks, a random check for errors in data entry from the paper surveys was completed. All of the paper surveys were numbered (001-297). A computer generated random sample of 10% of the paper surveys was then selected and a basic error check of all items performed. Any systematic error noted was rectified. An overall pre-specified error rate of less than 5% was required. As a result, three random sample checks were required. Corrections to coding errors were made and noted when it was deemed logical to do so. All errors, corrections, and related decisions were recorded in tracking tables and a study *data preparation log* file. Following the three random error checks on the paper surveys, frequency tables for all variables in the dataset were again run to check for missing, wildcard and out of range values. The final step in the cleaning process was the use of special SPSS add-on software called “Validate Data”. This special software was used to identify suspicious and invalid cases, variables, and data values. SPSS command syntax was used to check the survey variables to ensure the following minimum conditions were met:

- Maximum percentage of system/or user defines missing value in a given variable = 70%

- Maximum percentage of cases in a single category = 95%
- Maximum percentage of categories with a count of 1 = 90%
- Check for variables with no variations and
- Flag empty cases: i.e., cases with all relevant variables are missing or blank

Again, based on findings from use of the above software and syntax, corrections to coding errors were made when it was deemed logical to do so. All errors, corrections and related decisions were recorded in tracking tables and the study *data preparation log* file.

Further cleaning involved a detailed exploration of the missing data, do not know responses, and outliers. A frequency list for the missing and "do not know" responses was prepared and a report generated entitled "Report of Completeness and Outliers".

3.3.4 Data products

Upon completion of data processing and cleaning the following items were created and saved on the KUSP server:

- Master SPSS dataset and accompanying PRL codebook
- Cleaned Master SPSS dataset with variable labels, value labels, and missing value specifications (after in-house cleaning)
- Index SPSS dataset with variable labels, value labels, and missing value specifications and also reverse coded variables and derived variables
- Master index ACT survey and accompanying master index ACT survey codebook created by KUSP
- Electronic file in Excel with responses to open ended variables

The master datasets, in a single data file, contain responses for each participant on all ACT items. The index dataset, in addition to containing responses for each participant on all ACT items, also contains initial recoding of negative worded variables, and the addition of derived variables (as explained in section 4.3.1 of this report). The index dataset also has matching word documents: the index survey and the index codebook. All analyses were conducted from the index dataset.

3.3.5 Data archiving

Data products (including the master and index datasets) resulting from this study have been saved on the KUSP server. The intention is to also digitally archive them using the Networked Social Science Tools and Resources (NESSTAR) software package, enabling a dynamic relationship between the study's metadata and data. Upon completion of the documentation, and after a period of exclusive investigator access, the digital archive will be stored on either the University of Alberta's data library server or in the newly forming data environment in KUSP and the Faculty of Nursing. In the meanwhile, any inquiries regarding data access should be forwarded to Dr. Carole A. Estabrooks at (780) 492-3451 or by email at carole.estabrooks@ualberta.ca.

4.0 Pilot Test Results

4.1 Demographics

4.1.1 Gender

Overall, 73.5% of the healthcare professionals studied were female while a quarter (24.9%) were male. Table 5 shows the gender distribution by professional group. Higher proportions of females comprised all professional groups except for physicians (94.4% male).

Table 5. Gender Distribution by Professional Group

		Nurses	Allied Providers	Physicians	Clinical Specialists	Managers	Total
N (% of total sample)		152 (33.6)	181 (40.0)	36 (7.9)	46 (10.1)	38 (8.4)	453 (100)
Gender [N, (%)]	Male	12 (7.9)	62 (34.3)	34 (94.4)	3 (6.5)	2 (5.3)	113 (24.9)
	Female	139 (91.4)	115 (63.5)	2 (5.6)	41 (89.1)	36 (94.7)	333 (73.5)
	Missing Values	*1 (0.7)*	*4 (2.2)*	*0*	*2 (4.3)*	*0*	*7 (1.6)*

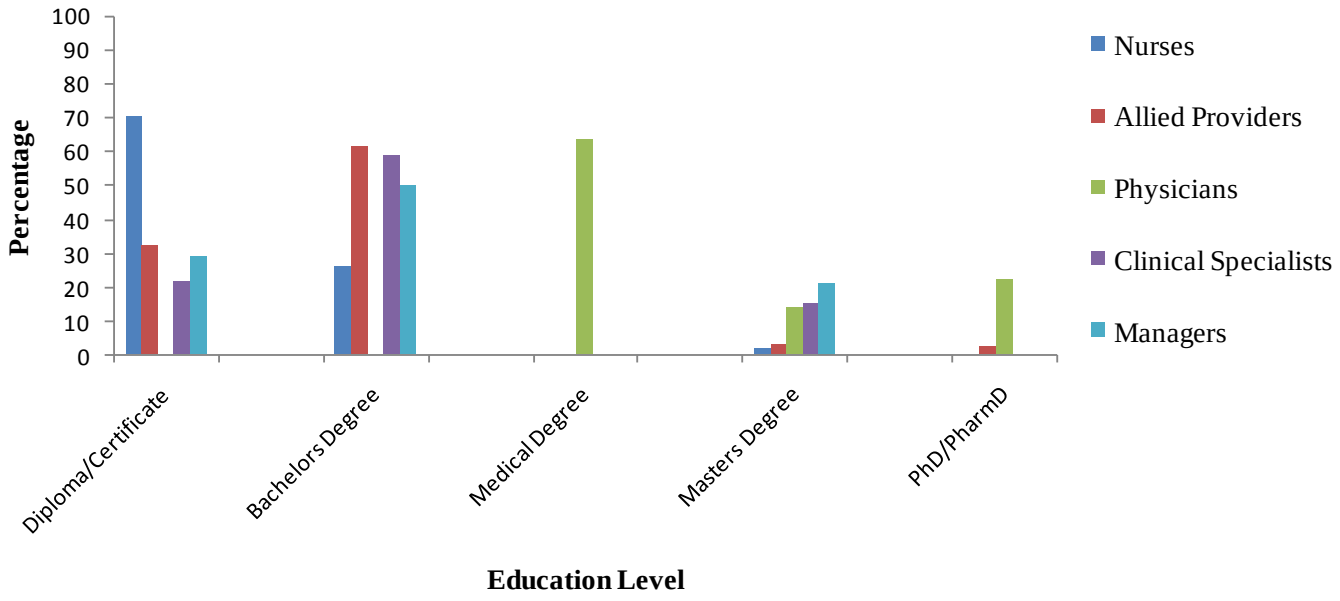
4.1.2 Education

The majority of respondents indicated their highest level of education was either a diploma/certificate (41.1%) or a bachelor's degree (43.5%). Table 6 and Figure 2 displays the education level distribution by professional group. A high proportion of diploma/certificate education comprised the nurse group (70.4%) while bachelor's degree education comprised the majority of the allied provider (61.3%), clinical specialist (58.7%) and manager (50.0%) groups. For the physicians, a medical degree comprised the highest level of education for the majority (63.9%). PhD/PharmD-level education made up 2.6% across all five professional groups.

Table 6. Education Distribution by Professional Group

		Nurses	Allied Providers	Physicians	Clinical Specialists	Managers	Total
Education Level [N, (%)]	Diploma/Certificate	107 (70.4)	58 (32.0)	0	10 (21.7)	11 (28.9)	186 (41.1)
	Bachelors Degree	40 (26.3)	111 (61.3)	0	27 (58.7)	19 (50.0)	197 (43.5)
	Medical Degree	0	0	23 (63.9)	0	0	23 (5.1)
	Masters Degree	3 (2.0)	5 (2.8)	5 (13.9)	7 (15.3)	8 (21.1)	28 (6.2)
	PhD/PharmD	0	4 (2.2)	8 (22.2)	0	0	12 (2.6)
	Missing Values	*2 (1.3)*	*3 (1.7)*	*0*	*2 (4.3)*	*0*	*7(1.5)*

Figure 2. Bar Chart of Education Level by Professional Group



4.1.3 Experience

The number of years of experience varied by professional group, from a low of 5.4 years (managers) to a high of 18.7 years (clinical specialists). Table 7 shows the experience distribution by professional group.

Table 7. Experience by Professional Group

	Nurses	Allied Providers	Physicians	Clinical Specialists	Managers
Number of Years of Experience [mean, (SD)]	18.1 (12.3)	14.6 (9.8)	13.8 (10.1)	18.7 (9.9)	5.4 (5.8)

4.2 Psychometric analysis

4.2.1 Item reduction

Within the ACT, there are eight hypothesized dimensions of context: (1) leadership (2) culture (3) evaluation (4) slack (5) structural and electronic resources (6) information sharing interactions (7) information sharing activities and (8) information sharing social processes, each having its own scale within the tool. While there are also a few single items within the tool (e.g., job satisfaction, adequate knowledge for one's job) hypothesized to measure context, only the eight scales listed above were examined psychometrically.

4.2.1.1 Missing data

We used the commonly chosen listwise deletion to deal with missing data as it has several advantages. In particular, under the assumption that data are missing completely at random, it leads to unbiased parameter estimates. However, there were a few variables within the ACT with

large amounts of missing data (greater than 10%). Listwise deletion here would result in a dramatic decrease in the sample size we would have available for analysis. Therefore, a better way to address the missing data issue with respect to these variables was to remove them from analyses. Also, given one of our goals of this study was to produce the shortest instrument feasible, these variables were also deleted from the final resulting ACT. Table 8 lists the variables that were removed from the ACT due to large amounts of missing data.

Table 8. Variables Removed due to Missing Data

Concept	Item	Total Sample Size	No. of Missing Responses	Missing Percent
Leadership	Acts on values even if it is at a personal cost	453	88	19.4%
Information Sharing Interactions	Interact with knowledge broker	453	42	9.3%
Information Sharing Activities	Engage in other activities	453	326	72.0%
Structural and Electronic Resources	Other resources	453	428	94.5%
Information Sharing Social Processes	Individuals who do not participate in group activities will be criticized by others in the group	453	48	10.6%

4.2.1.2 Descriptive and item-total statistics

The second stage in the item reduction process was to examine descriptive statistics and item-total statistics for the eight hypothesized dimensions of context. Descriptive statistics (e.g., variance, mean, response rate) were generated for each item to ensure a high amount of variance and middle range mean scores as well as sufficient endorsement frequency. Item-total statistics, including item-total correlations and scale alpha values (if items were deleted) were reviewed for each of the eight dimensions to assist with item reduction. Items that correlated with the total score below 0.4 were considered for deletion. Items that caused a significant decrease in scale alpha values if they were deleted were also considered for deletion.

Item distribution of the original 76 ACT items (for the 8 hypothesized dimensions of ACT) showed a modest amount of variance and middle range mean scores. A total of 22 items were deleted based on insufficient endorsement frequency and an examination of bivariate item correlations and item-total statistics. An initial factor analysis using Principal Components Analysis (PCA) with listwise deletion was run on the remaining 54 ACT items. Criterion was set that items should load with factors at 0.35 or above. The factor analysis identified 3 additional items for deletion because of poor loadings with ACT dimensions and/or intrinsic difficulties with the items (e.g. double-barrelled item, duplication with other items). A further item was identified for re-conceptualization because it appeared to be cross-loading between dimensions and was theoretically better aligned in a different dimension [i.e., one “slack” item (on space as a resource) loading with information sharing activities] (See Table 9).

Requests for a copy of the final resultant acute care version of ACT should be made to Dr. Carole A. Estabrooks at (780) 492-3451 or by email at carole.estabrooks@ualberta.ca.

Table 9. Summary of Item Reduction for Hypothesized ACT Dimensions

Dimension	Number of Items			
	Starting number	**Number deleted following initial item reduction** (missing data, item-total statistics)	**Number deleted/added after initial PCA**	**Final number**
Leadership	10	-4		6
Culture	8	-3	-1	4
Evaluation	7	-1		6
Slack	9 Total		-1	3
Staffing	3		(Transferred to	
Time	5		Information	4
Space	1		Sharing	
			Activities)	0
Structural and Electronic Resources	13	-2		11
Information Sharing Interactions	9	-1		8
Information Sharing Activities	8	-3	+1	6
Information Sharing Social Processes (Social Capital)	12 Total			
Profession	6	-2	-1	3
Team	6	-6[1]		0
Total	**76**	**76-22 = 54**	**3 deleted + 1 transferred to another category = 51 items**	**51**

[1] The same 6 questions were asked twice, once with respect to an individual's profession and a second time with respect to the interdisciplinary team. Missing values and item-total statistics were best for the interdisciplinary team. Therefore, the profession scale (6 items) was dropped.

4.2.2 Factor Analysis on Reduced ACT

Following item reduction, the resultant ACT was a 51-item composite measure representing 8 hypothesized dimensions of context of organizational context: (1) leadership (6 items), (2) culture (4 items), (3) evaluation (6 items), (4) structural and electronic resources (11 items), (5) slack (7 items), (6) information sharing interactions (8 items), (7) information sharing activities (6 items), and (8) information sharing social processes (3 items). To explore the underlying dimensional structure of ACT we used factor analysis with PCA. A PCA analysis creates distinct factors by allowing the first factor to account for the maximum amount of variance within the data, and then each succeeding factor extracting the maximum of the remaining unexplained variance. In our analysis, factors with eigenvalues greater than 1 were extracted. Varimax rotation with Kaiser normalization was used to enhance interpretability of findings. The factor analysis reported here is on the final 51 items (after the item reduction and re-conceptualization reported in 4.2.1 occurred).

A fourteen-factor solution that accounted for a total of 69.97% of the variance of 'organizational context' was produced. The factor loadings and percentage of variance explained (for each factor and cumulatively) for organizational context as measured the ACT are summarized in Tables 10a to 10c. The first two factors (eigenvalues of 4.641 and 4.435) comprised the concepts of *evaluation* and *leadership* and accounted for the majority of the variance at 20.52% and 8.68%, respectively. *Information sharing interactions* was represented in the third and eighth factors (eigenvalues of 3.249 and 2.269) and accounted for 6.19% and 3.23% of the variance respectively. The fourth and fifth factors (eigenvalues of 2.740 and 2.601) represented two sub-dimensions of *slack*: staffing and time. These sub-dimensions accounted for 5.00% and 4.29% of the variance respectively. *Structural resources* were represented in the sixth and seventh factors (eigenvalues of 2.328 and 2.267) as well as the thirteenth (eigenvalue of 1.594) and fourteenth factors (eigenvalue of 1.519) and accounted for 4.26% (factor 6), 3.47% (factor 7), 2.05% (factor 13), and 2.01% (factor 14) of the variance. The ninth factor, *culture* (eigenvalue of 2.202), accounted for 2.75% of the variance; while the tenth factor, *information sharing social processes* (eigenvalue of 2.096), accounted for 2.63%. *Information sharing activities* split into two factors, eleven and twelve (eigenvalues of 1.990 and 1.751), and accounted for 2.59% and 2.30% of the variance respectively.

4.2.3 Internal reliability

Internal consistency (reliability) was examined using Cronbach's Alpha (α) for each core scale (α range = .647 – .915). Table 11 displays the Cronbach Alpha coefficients for the eight hypothesized context dimensions. All dimensions were near or exceeded the acceptable standard (0.70) for new scales.

4.3 Bivariate analysis

4.3.1 Derived scores for the hypothesized context dimensions

For each hypothesized context dimension there are several items to measure the individual dimension. To facilitate the analysis of the relationships between the hypothesized context dimensions and between each dimension and our dependent variable, knowledge translation, we combined the individual items within each dimension (after item reduction) to calculate derived scores. The derivations are based on one of two methods as follows:

1. The first method is the *mean score method*, where we used the mean of the variables as the derived score. This method was used with the following hypothesized context dimensions in the ACT: leadership, culture, evaluation, slack, and information sharing social processes.
2. The second method is the *count method*. In the count method, we first recoded the scores of each individual item as follows: if the respondent self-reported using the item frequently or very frequently, they were given a score of 1 (using the item) while if they self-reported never, rarely, or occasionally using the item they were given a score of 0 (not using the item). The total derived score for the context dimension then becomes the sum of the individual items. This method was used with the following hypothesized context dimensions in the ACT: structural and electronic resources, information sharing interactions, and information sharing activities.

To facilitate the analysis process, we also recoded some of the demographic variables; namely health group (into variables for nurses, allied providers, physicians, clinical specialists, and managers), education (into one variable to reflect highest level obtained), gender (into variables for male and female) and years of experience (into year categories).

Table 10a. ACT Factor Analysis (Factors 1-3)

Dimension, Items	Factor Loadings			% Explained Variance (Cumulative)
	Factor 1	Factor 2	Factor 3	
EVALUATION				
I routinely receive information on my team's performance on data like…..	.772			20.52
Our team routinely discusses this data informally	.735			(20.52)
Our team has a scheduled formal process for discussing this data	.738			
Our team routinely formulates action plans based on the data	.816			
Our team routinely monitors our performance …	.825			
Our team routinely compares our performance with others	.799			
LEADERSHIP				
Looks for feedback to ideas and initiatives even when it is difficult to hear		.848		8.68
Focuses on successes and potential rather than failures		.746		(29.20)
Calmly handles stressful situations		.698		
Actively listens, acknowledges, and then responds to requests and concerns		.872		
Actively mentors and coaches individual and team performance		.780		
Effectively resolves conflicts that arise		.775		
INFO. SHARING INTERACTIONS (TYPE 1)				
Research nurse or coordinator			.710	6.19
Any clinical educator/instructor/nurse specialist/nurse educator			.571	(35.39)
Quality improvement representative			.723	
Someone who *champions* research and its translation in practice			.713	
A strong advocate of medical and health care innovation			.692	

Table 10b. ACT Factor Analysis (Factors 4-8)

Dimension, Items	Factor Loadings					% Explained Variance (Cumulative)
	4	5	6	7	8	
SLACK (STAFFING)						
…We have enough staff to get the *necessary w*ork done	.826					5.00 (40.39)
…We have enough staff to deliver *optimal* (quality) care	.877					
…We have enough staff to get the best *patient outcomes*	.868					
SLACK (TIME)						
...have 'down time'…?		.749				4.29 (44.68)
...have 'time' to look something up…?		.785				
...have 'time' to talk to someone about *new knowledge*?		.713				
...have 'time' to talk to someone about *plan of care…?*		.529				
STRUCTURAL RESOURCES (TYPE 1)						
A library			.627			4.26 (48.94)
Journals			.826			
Continuing education			.653			
STRUCTURAL RESOURCES (TYPE 2)						
Computerized decision support				.393		3.47 (52.41)
Policies and procedure manual				.831		
Practice guidelines/Protocols				.843		
INFO. SHARING INTERACTIONS (TYPE 2)						
Colleagues in my identical field					.787	
Physicians/or for physicians – with nurse providers					.752	3.23 (55.64)
Other health care providers or for educators –nurses					.730	

Table 10c. ACT Factor Analysis (Factors 9-14)

Dimension, Items	Factor Loadings						% Explained Variance (Cumulative)
	9	10	11	12	13	14	
CULTURE							
I receive recognition from others …	.624						2.75 (58.39)
I am a member of a supportive work group	.631						
My organization effectively balances best…	.565						
Our team is clear on what patients want …	.639						
INFO. SHARING SOCIAL PROCESSES							
…Share information with others in the group		.790					2.63 (61.02)
…Other groups share information with…		.742					
…The aim of group exchanges is to help others		.726					
INFORMATION SHARING ACTIVITIES (TYPE 1)							
Use of space			.659				2.59 (63.61)
Patient rounds			.643				
Family conferences			.673				
INFO. SHARING ACTIVITIES (TYPE 2)							
Team meetings				.372			2.30 (65.91)
'Hallway talk'				.788			
Informal bedside teaching sessions				.589			
STRUCTURAL RESOURCES (TYPE 3)							
Reminder systems					.469		2.05 (67.96)
Notice boards					.444		
In-services/workshops					.774		
STRUCTURAL RESOURCES (TYPE 4)							
Text books						.518	2.01 (69.97)
The internet						.601	

Table 11. ACT Internal Reliability

ACT Dimension	Internal Reliability coefficient
Evaluation	.915
Leadership	.914
Slack	.844
Information Sharing Interactions	.836
Information Sharing Social Processes (Social Capital)	.763
Culture	.746
Structural and Electronic Resources	.755
Information Sharing Activities	.647

4.3.2 Reliability of aggregated scores

While the hypothesized context dimensions within ACT and our dependent variable, knowledge translation, were measured at the individual level, the unit of analysis in this study was the *hospital*. To create hospital-level scores, data collected at the individual-level were aggregated to the level of the hospital by calculating group means. One-way analysis of variance (ANOVA) was performed for each variable using the hospital as the group variable. The source table from the one-way ANOVA was used to calculate the following indices: (1) interclass correlation

ICC(1) = (BMS-WMS)/ (BMS+ [K-1] WMS), where BMS is the between-group mean square, WMS is the within-group mean square, and where K is the individual hospital group size (or number of respondents per hospital). The average K for unequal group size was calculated as K = (1/[N-1]) ($\sum$K-[$\sum K^2/\sum$K]) where N=4 (number of hospitals) for the sample; (2) interclass correlation ICC(2) = (BMS-WMS)/BMS; (3) η^2 = SSB/SST, where SSB is the sum of squares between groups and SST is the sum of squares total; and (4) ω^2 = (SSB – [N-1]WMS) / (SST+ WMS). Sometimes, BMS will be less than WMS (and thus the F-value will be less than 1), resulting in a negative estimate for both ICC (1) and ICC (2). This is a problem, because both theoretical values range from 0 to 1, by definition. The usual recommendation is to convert a negative estimate to zero in practice. When the F-value is less than 1, we will also have negative estimate of the ω^2 value. Conventionally, we also report this value as zero also.

ICC (1) is an estimate of individual score variability about the subgroup mean. That is, the ICC (1) index is used to assess perceptual agreement among individual responses within an observational group. Theoretical values of ICC (1) range between 0 and 1, with a value of 1 indicating perfect perceptual agreement among subjects within the same group. The literature suggests ICC (1) values from 0 to .5 justify a degree of perceptual agreement among group subjects. ICC (2) is an estimate of stability of aggregated data at the group level. It provides an index of mean subject reliability of the aggregated data and is interpreted as the extent to which similar mean scores would be obtained if subsequent samples of respondents were drawn repeatedly from the same group. ICC (2) values exceeding .6 justify aggregation of data at the group level. Eta-squared (η^2) is an indicator of validity and contributes to the proportion of variance in the dependent variable. Omega-squared ($\omega^{2)}$) provides the relative measure of the strength of aggregated data as an independent variable, and is used as an indicator of effect size. ω^2<0.06 refers to a small or no effect; 0.06< ω^2<.15 a medium effect; and ω^2>.15 a large effect.

Table 12 contains the reliability and validity values of the data aggregated at the hospital level. Most of the ICC (1) values were greater than zero, suggesting a degree of perceptual agreement existed among subjects from the same hospital. The relatively low ICC (1) values for most variables however indicates the intra-agreement among subjects was relatively weak. ICC (2) indices indicate good reliability for our knowledge translation variables [conceptual research utilization (CRU) and overall research utilization (ORU) in particular with p values <0.05 and ICC(2) values >0.60]. The relative effect sizes for both η^2 and ω^2 were smaller, suggesting that as data were aggregated, less information then optimal was carried up from the individual level to the hospital level.

Table 12. Reliability and Validity of Data Aggregated at Hospital Level

	F-value	BMS	WMS	ICC(1)	ICC(2)	η^2	ω^2
Eight Hypothesized Dimensions of Context							
Culture	1.667	0.883	0.530	0.007	0.400	0.013	0.005
Leadership	2.422**	1.742	0.719	0.016	0.587	0.020	0.012
Evaluation	0.909	0.690	0.758	0.000	0.000	0.008	0.000
Slack	1.609	3.290	2.045	0.006	0.379	0.013	0.005
Structure Resources	1.526	8.599	5.634	0.006	0.345	0.013	0.004
Information Sharing Interactions	0.793	2.967	3.739	0.000	0.000	0.007	0.000
Information Sharing Social Process	1.126	0.409	0.363	0.001	0.112	0.009	0.001
Information Sharing Activities	0.078	0.187	2.400	0.000	0.000	0.001	0.000
Single-Item (additional) Context Concepts							
Adequate Knowledge	1.136	0.510	0.449	0.001	0.120	0.009	0.001
Job Satisfaction	0.220	0.182	0.829	0.000	0.000	0.002	0.000
Non-Context (Burnout)							
Burnout (Exhaustion)	0.116	0.174	1.503	0.000	0.000	0.001	0.000
Burnout (Cynicism)	0.617	0.814	1.318	0.000	0.000	0.005	0.000
Burnout (Efficacy)	1.155	1.210	1.048	0.002	0.134	0.009	0.001
Non-Context (Dependent Variable – Knowledge Translation)							
IRU	1.527	2.991	1.959	0.006	0.345	0.012	0.004
CRU	2.947*	5.077	1.723	0.021	0.661	0.024	0.016
PRU	1.320	1.584	1.199	0.004	0.243	0.011	0.003
ORU	2.960*	5.238	1.769	0.021	0.662	0.024	0.016

*.significant at p=.05 and **.significant at p=.10

4.3.3 Tests of difference

4.3.3.1 By hospital site

Table 13 displays the mean/median scores and the test of difference statistic values (by hospital site) for the eight context dimensions and for select additional variables (including our knowledge translation variables) contained within the ACT. Mean scores (ANOVA, F Test Statistic) are used for all variables except for the three context variables for which our derived score was based on the "count method": structural and electronic resources, information sharing interactions and information sharing activities. For these three variables the median is presented along with the test statistic value from a nonparametric test of difference (Kruskal Wallis, Chi-Square Test Statistic).

ANOVA showed a statistically significant difference in leadership scores between the four hospitals with hospital 4 receiving the lowest (least positive) leadership score (mean = 3.58, SD

= 0.92) compared to the remaining 3 hospitals [hospital 1: mean = 3.83, SD = 0.87; hospital 2: mean = 3.83, SD = 0.90; hospital 3: mean = 3.93, SD = 0.70). Statistically significant differences by hospital site were also noted in the dependent knowledge translation variables. Conceptual research utilization (CRU) was higher in hospital 3 (mean = 3.05, SD = 1.31) compared to the remaining 3 hospitals [hospital 1: mean = 2.59, SD = 1.27; hospital 2: mean = 2.84, SD = 1.36; hospital 4: mean = 2.51, SD = 1.29). Similarly, overall research utilization (ORU) was also higher in hospital 3 (mean = 3.42, SD = 1.17) compared to the remaining 3 hospitals [hospital 1: mean = 2.93, SD = 1.39; hospital 2: mean = 3.13, SD = 1.41; hospital 4: mean = 2.87, SD = 1.30). While not statistically different from the other hospital sites, hospital 3 also had the highest scores for instrumental research utilization (IRU) (mean = 3.22, SD = 1.33) and persuasive research utilization (PRU) (mean = 1.90, SD = 1.22).

4.3.3.2 By Professional Group

Table 14 displays the mean/median scores and the test of difference statistical values (by professional group) for the eight context dimensions and for select additional variables (including our knowledge translation variables) contained within the ACT. Again, mean scores (ANOVA, F Test Statistic) are used for all variables except for the three context variables for which our derived score was based on the "count method". For these variables the median is presented along with the test statistic value from a nonparametric test of difference (Kruskal Wallis, Chi-Square Test Statistic).

ANOVA showed a statistically significant difference in leadership and evaluation scores between the five professional groups with managers receiving both the highest leadership (mean = 4.21, SD = 0.55) and evaluation (mean = 3.31, SD = 0.71) scores. Nurses received the lowest leadership score (mean = 3.62, SD = 1.01) while allied providers received the lowest evaluation score (mean = 2.78, SD = 0.83) followed closely by nurses (mean = 2.84, SD = 0.94). The Kruskal Wallis test of difference also showed statistically significant differences between the professions with respect to: structural resources, information sharing interactions, and information sharing activities. Clinical specialists scored the highest with respect to the use of structural and electronic resources (median = 8.00) while physicians scored the lowest (median = 4.00). Managers scored the highest in participating in information sharing interactions (median = 4.00) while nurses and allied providers reported participating in the fewest information sharing interactions (median = 2.00). Managers, physicians, and allied providers tied for participating

Table 13. Tests of Difference by Hospital Site

	Mean (SD) / Median					ANOVA/Kruskal Wallis	
	Whole Sample	Hospital 1	Hospital 2	Hospital 3	Hospital 4	F-Statistic/ Chi Square	p-value
Eight Hypothesized Dimensions of Context							
Culture	3.71 (0.73)	3.73 (0.67)	3.78 (0.63)	3.74 (0.84)	3.55 (0.77)	1.667	.174
Leadership	3.80 (0.85)	3.83 (0.87)	3.83 (0.90)	3.93 (0.70)	3.58 (0.92)	2.422	.066
Evaluation	2.88 (0.87)	2.86 (0.91)	3.01 (0.84)	2.81 (0.85)	2.83 (0.89)	.909	.437
Slack	5.63 (1.43)	5.67 (1.41)	5.72 (1.35)	5.75 (1.53)	5.32 (1.43)	1.609	.187
Information Sharing Social Processes	3.92 (0.66)	3.92 (0.60)	3.97 (0.54)	3.95 (0.66)	3.81 (0.66)	1.126	.339
Structural and Electronic Resources	5.00	4.00	5.00	5.00	6.00	5.193	.158
Information Sharing Interactions	3.00	3.00	2.00	3.00	2.00	2.717	.437
Information Sharing Activities	3.00	3.00	3.00	3.00	2.50	0.307	.959
Single-Item (additional) Context Concepts							
Adequate Knowledge	4.25 (0.69)	4.27 (0.69)	4.17 (0.67)	4.34 (0.64)	4.14 (0.88)	1.136	.334
Job Satisfaction	3.91 (0.90)	3.95 (0.89)	3.93 (1.04)	3.92 (0.87)	3.86 (0.82)	.219	.883
Non-Context (Burnout)							
Burnout (Exhaustion)	2.85 (1.21)	2.88 (1.34)	2.78 (1.27)	2.83 (1.20)	2.84 (1.03)	.116	.951
Burnout (Cynicism)	2.75 (1.14)	2.72 (1.17)	2.67 (1.14)	2.75 (1.16)	2.89 (1.11)	.617	.604
Burnout (Efficacy)	4.67 (1.03)	4.67 (1.01)	4.79 (1.03)	4.70 (0.95)	4.52 (1.10)	1.155	.327
Non-Context (Dependent Variable – Knowledge Translation)							
IRU	2.99 (1.38)	2.82 (1.49)	3.04 (1.36)	3.22 (1.33)	2.85 (1.40)	1.527	.207
CRU	2.75 (1.31)	2.59 (1.27)	2.84 (1.36)	3.05 (1.31)	2.51 (1.29)	2.947	.033
PRU	1.70 (1.09)	1.59 (1.03)	1.69 (1.11)	1.90 (1.22)	1.65 (1.01)	1.320	.268
ORU	3.07 (1.33)	2.93 (1.39)	3.13 (1.41)	3.42 (1.17)	2.87 (1.30)	2.960	.032

Note: ANOVA (F-statistic) used to compare means; Kruskal-Wallis (chi-square) used to compare medians.
Denotes statistically significant differences among sites.

Table 14. Tests of Difference by Professional Group

	Mean (SD) / Median						ANOVA/Kruskal Wallis	
	Whole Sample	Nurses	Allied Providers	Physicians	Clinical Specialists	Managers	F-Statistic/ Chi Square	p-value
Eight Hypothesized Dimensions of Context								
Culture	3.72 (0.73)	3.79 (0.74)	3.62 (0.72)	3.80 (0.73)	3.83 (0.67)	3.69 (0.79)	1.461	.213
Leadership	3.80 (0.85)	3.62 (1.01)	3.78 (0.72)	3.95 (0.80)	4.05 (0.81)	4.21 (0.55)	4.705	.001
Evaluation	2.90 (0.88)	2.84 (0.94)	2.78 (0.83)	2.96 (1.00)	3.10 (0.79)	3.31 (0.71)	3.295	.011
Slack	5.64 (1.41)	5.50 (1.47)	5.80 (1.36)	5.47 (1.49)	5.49 (1.51)	5.73 (1.20)	1.196	.312
Information Sharing Social Processes	3.93 (0.60)	3.83 (0.64)	3.94 (0.59)	4.03 (0.57)	4.05 (0.50)	4.02 (0.55)	1.852	.118
Structural and Electronic Resources	5.00	5.00	5.00	4.00	8.00	6.00	41.671	.000
Information Sharing Interactions	3.00	2.00	2.00	3.00	3.00	4.00	29.976	.000
Information Sharing Activities	3.00	2.00	3.00	3.00	a[1]	3.00	10.769	.000
Single-Item (additional) Context Concepts								
Adequate Knowledge	4.25 (0.69)	4.32 (0.70)	4.20 (0.68)	4.33 (0.59)	4.30 (0.70)	4.08 (0.82)	1.359	.247
Job Satisfaction	3.91 (0.90)	3.82 (1.01)	3.90 (0.83)	4.08 (0.87)	4.00 (0.75)	4.00 (0.93)	.891	.469
Non-Context (Burnout)								
Burnout (Exhaustion)	2.85 (1.21)	2.98 (1.27)	2.89 (1.17)	2.77 (1.19)	2.58 (0.99)	2.47 (1.34)	2.009	.092
Burnout (Cynicism)	2.75 (1.14)	2.86 (1.21)	2.82 (1.13)	2.40 (0.87)	2.76 (1.17)	2.34 (1.05)	2.602	.036
Burnout (Efficacy)	4.67 (1.03)	4.76 (0.99)	4.57 (1.08)	4.97 (0.92)	4.61 (0.90)	4.61 (1.16)	1.560	.184
Non-Context (Dependent Variable – Knowledge Translation)								
IRU	2.99 (1.38)	3.20 (1.43)	2.91 (1.36)	2.37 (1.24)	3.44 (1.28)	2.68 (1.27)	4.398	.002
CRU	2.75 (1.31)	2.67 (1.39)	2.78 (1.31)	2.77 (1.14)	2.83 (1.39)	2.84 (1.14)	.231	.921
PRU	1.70 (1.09)	1.62 (1.09)	1.65 (1.06)	1.58 (0.97)	2.21 (1.24)	1.76 (1.00)	2.773	.027
ORU	3.07 (1.33)	2.98 (1.40)	3.11 (1.32)	3.34 (1.33)	3.26 (1.24)	2.72 (1.23)	1.397	.234

a[1] no valid cases due to list wise deletion

Note: ANOVA (F-statistic) used to compare means; Kruskal-Wallis (chi-square) used to compare medians.

Denotes statistically significant differences among sites.

in the highest number of information sharing activities (median = 3.00) while nurses reported participating in the fewest information sharing activities (median = 2.00). With respect to non-context variables in the ACT, scores on burnout (cynicism) were found to be statistically different between the professions with managers scoring the lowest (mean = 2.34, SD = 1.05) followed closed by physicians (mean = 2.40, SD = 0.87). Nurses scored the highest on this scale (mean = 2.86, SD = 1.21) followed rather closely by the remaining professions (allied providers: mean = 2.82, SD = 1.13; and clinical specialists: mean = 2.76, SD = 1.17). Significant differences using ANOVA were also noted in scored obtained on the dependent knowledge translation variables [instrumental research utilization (IRU) and persuasive research utilization (PRU)]. IRU was highest among clinical specialists (mean = 3.44, SD = 1.28) and lowest among physicians (mean = 2.37, SD = 1.24). Similarly, PRU was also highest among clinical specialists (mean = 2.21, SD = 1.24) and lowest among physicians (mean = 1.58, SD = 0.97).

4.3.4 Correlations

Tables 15 through 20 display the Pearson Product-Moment correlation coefficients for variables within the ACT (including the dependent knowledge translation variables) for the whole sample, nurses, allied providers, physicians, clinical specialists and managers respectively. It is important to note in interpreting these correlations the sample size for the pilot overall (n = 453), and in particular for physicians (n = 36), clinical specialists (n = 46), and managers (n = 38) were small.

Examining the sample as a whole, several contextual variables were significantly correlated with knowledge translation, as displayed in Table 15. Evaluation, participation in information sharing interactions, and use of structural and electronic resources were positively correlated (at significantly significant levels) with all four types of knowledge translation: instrumental research utilization, conceptual research utilization, persuasive research utilization, and overall research utilization. Additionally, engagement in information sharing social processes (social capital) and information sharing activities were positively correlated (at significantly significant levels) with three of the four types of knowledge translation: conceptual research utilization, persuasive research utilization, and overall research utilization. These findings indicate that a more positive context is associated with increased knowledge translation. Job satisfaction was not significantly correlated with knowledge translation. The efficacy subscale of the burnout inventory appended to the ACT was positively correlated (at significantly significant levels) with conceptual research utilization, persuasive research utilization, and overall research utilization. Furthermore, it was also positively (and significantly) correlated with all context variables contained within the ACT, indicating that a perception in oneself of being able to produce a desired effect is related to a positive work context and increased knowledge use in the workplace. The exhaustion and cynicism burnout subscales were also significantly (but negatively) correlated with the majority of work context variables, indicating more positive contexts were associated with less exhaustion and less cynicism towards one's work.

Similar trends, for the most part, were seen within the nurse sample. Fewer significant correlations however were found between contextual variables contained within the ACT and knowledge translation among the remaining four professional groups. For example, with the allied providers the only significant correlations between context and knowledge translation were between: (1) leadership and instrumental research utilization, (2) participation in information sharing interactions and instrumental research utilization, and (3) participation in information sharing interactions and persuasive research utilization. Significant correlations between context and knowledge translation for physicians were also minimal compared to those for the overall

sample and for nurses. In the physician group, positive correlations (at significant levels) occurred between the following: (1) evaluation and conceptual research utilization, (2) participation in information sharing interactions and instrumental research utilization, (3) use of structural and electronic resources and instrumental research utilization, and (4) participation in information sharing activities and persuasive research utilization. In the clinical specialist group, positive correlations (at significant levels) occurred between: (1) culture and persuasive research utilization, (2) evaluation and persuasive research utilization, and (3) participation in information sharing social processes and persuasive research utilization. No significant correlations between work context and knowledge translation were noted for the managerial group.

Table 15. Correlations for Whole Sample (n=453)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.527**	1.00															
PRU	.314**	.335*	1.00														
ORU	.570**	.694*	286**	1.00													
Culture	.066	.026	.122*	.088	1.00												
Leader.	.075	.025	.117*	.102	.437**	1.00											
Eval.	.131*	.113*	.218**	.110*	.420**	.304**	1.00										
Interact.	.154**	.148*	.257**	.163**	.248**	.147**	.430**	1.00									
Slack	.048	-.032	.061	.059	.335**	.238**	.328**	.226**	1.00								
Str. Res.	.182**	.125*	.235**	.143**	.179**	.173**	.311**	.474**	.111*	1.00							
Social Processes	.074	.117*	.136*	.145**	.306**	.239**	.256**	.182**	.258**	.134*	1.00						
Activities	.092	.181*	.213**	.178**	.203**	.222**	.300**	.404**	.162**	.426**	.271**	1.00					
Adeq. Know	.107*	.018	.001	.071	.118*	.030	.112*	.047	.103*	.062	.061	-.012	1.00				
Job Sat	-.007	-.023	.058	.051	.414**	.375**	.250**	.170**	.366**	.109*	.228**	.115*	.280**	1.00			
Burnout Exhaust	.052	-.010	-.092	-.006	-.280**	-.204**	-.169**	-.115*	-.333**	-.132**	-.204**	-.086	-.043	-.446**	1.00		
Burnout Cynicism	.045	-.046	-.046	-.042	-.366**	-.300**	-.210**	-.245**	-.294**	-.197**	-.293**	-.205**	-.028	-.427**	.656**	1.00	
Burnout Efficacy	.098	.057	.153**	.135**	.334**	.185**	.235**	.183**	.178**	.103*	-.175**	.161**	.369**	.387**	-.196**	-.297**	1.00

*** = p<.05; ** = p<.01**

Table 16. Correlations for Nurses (n=152)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.538**	1.00															
PRU	.303**	.409**	1.00														
ORU	.617**	.746**	.310**	1.00													
Culture	.046	.052	.062	.193*	1.00												
Leader.	.093	-.057	.146	.127	.461**	1.00											
Eval.	.302**	.284**	.391**	.320**	.403**	.312**	1.00										
Interact.	.225**	.303**	.478**	.361**	.199*	.120	.353**	1.00									
Slack	.128	.065	.092	.168	.329**	.264**	.411**	.335**	1.00								
Str. Res.	.238**	.113	.280**	.197*	.105	.138	.236*	.433**	.114	1.00							
Social Processes	.177*	.163	.099	.261**	.355**	.250**	.332**	.255**	.346**	.175	1.00						
Activities	.261**	.299**	.367	.334**	.281**	.246*	.353**	.525**	.222*	.516**	.327**	1.00					
Adeq. Know	.224*	.004	.040	.212*	.172*	.023	.163	.155	.119	.113	.194*	.050	1.00				
Job Sat	-.020	-.038	.052	.136	.291**	.388**	.236*	.195*	.423**	.070	.320**	.101	.374**	1.00			
Burnout Exhaust	.032	.035	-.146	-.101	-.188*	-.178*	-.243*	-.119	-.476**	-.068	-.278**	-.051	-.127	-.479**	1.00		
Burnout Cynicism	.010	-.014	-.166	-.160	-.287**	-.263**	-.209*	-.216*	-.414**	-.210*	-.382**	-.212*	-.141	-.439**	.701**	1.00	
Burnout Efficacy	.141	.125	.265**	.262**	.383**	.262**	.396**	.337**	.359**	.271**	.287**	.277**	.407**	.482**	-.270**	-.379**	1.00

*** = p<.05; ** = p<.01**

Table 17. Correlations for Allied Providers (n=181)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.556**	1.00															
PRU	.314**	.296**	1.00														
ORU	.638**	.633**	.290**	1.00													
Culture	.138	.044	.093	.036	1.00												
Leader.	.164*	.150	.093	.142	.537**	1.00											
Eval.	.028	-.073	-.038	-.047	.473**	.220*	1.00										
Interact.	.179*	.075	.202*	.112	.247**	.050	.354**	1.00									
Slack	-.009	-.150	-.055	-.009	.324**	.212**	.344**	.215*	1.00								
Str. Res.	.151	.101	.156	.089	.249**	.205*	.353**	.480**	.217**	1.00							
Social Processes	.039	.126	.085	.138	.361**	.238**	.214*	.068	.141	.103	1.00						
Activities	.040	.064	.061	.027	.030	.095	.088	.254**	.032	.395**	.174*	1.00					
Adeq. Know	.096	.055	-.059	.079	.176*	.089	.061	-.066	.056	.051	-.044	-.016	1.00				
Job Sat	.049	-.015	-.024	-.012	.526**	.398**	.203*	.103	.319**	.211**	.183*	.090	.216**	1.00			
Burnout Exhaust	.090	.019	-.014	.105	-.301**	-.264**	-.115	-.086	-.299**	-.160*	-.255**	.005	-.028	-.409**	1.00		
Burnout Cynicism	.012	-.101	.012	.014	-.441**	-.310**	-.195*	-.275**	-.196*	-.306**	-.292**	-.080	.057	-.392**	.611**	1.00	
Burnout Efficacy	.131	.066	.031	.148	.314**.	.172*	.129	.070	.050	.079	.104	.076	.312**	.279**	-.116	-.237*	1.00

*** = p<.05; ** = p<.01**

Table 18. Correlations for Physicians (n=36)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.541**	1.00															
PRU	.241	.308	1.00														
ORU	.293	.710**	-.033	1.00													
Culture	-.163	.109	.139	.059	1.00												
Leader.	.028	-.065	.236	-.121	.535	1.00											
Eval.	.340	.427*	.287	.194	.475**	.505**	1.00										
Interact.	.379*	.195	-.060	.045	.352*	.449**	.648**	1.00									
Slack	.286	.143	.128	.112	.286	.158	.447*	.206	1.00								
Str. Res.	.354*	.316	.144	.105	.197	.104	.522**	.608**	.251	1.00							
Social Processes	.211	.311	.272	.043	.369*	.237	.438*	.363*	.303	.264	1.00						
Activities	.273	.259	.372*	.283	.452*	.437*	.658**	.297	.325	.343	.343	1.00					
Adeq. Know	.037	.111	.179	-.059	-.074	.004	.294	-.045	.458**	.270	.488**	.087	1.00				
Job Sat	.014	-.092	.032	.135	.558**	.604**	.387*	.313	.442*	.196	.039	.377*	.056	1.00			
Burnout Exhaust	.041	.023	-.017	.095	-.343*	-.216	-.034	.012	--.272	-.229	.130	-.116	-.118	-.410*	1.00		
Burnout Cynicism	.123	.149	.001	-.080	-.403*	-.556**	-.153	-.167	-.254	-.089	.203	-.281	.031	-.679**	.670**	1.00	
Burnout Efficacy	-.110	.123	.198	.104	.584**	.340	.455*	.384*	.323	.464**	.520**	.536**	.284	.443**	-.331*	-.397*	1.00

*** = p<.05; ** = p<.01**

Table 19. Correlations for Clinical Specialists (n=46)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.612**	1.00															
PRU	.255	.352*	1.00														
ORU	.577**	.785**	.385*	1.00													
Culture	.045	-.130	.339*	-.070	1.00												
Leader.	.137	.080	.043	.197	.247	1.00											
Eval.	-.050	-.039	.348*	.043	.364*	.229	1.00										
Interact.	-.153	.026	.093	.043	.225	.047	.491**	1.00									
Slack	.093	.028	.244	.163	.503**	.309	.159	.108	1.00								
Str. Res.	.060	.172	.151	.196	.224	.006	.104	.453**	.113	1.00							
Social Processes	.072	.014	.415*	.028	.276	.108	.069	-.045	.352*	.094	1.00						
Activities	a	a	a	a	a	a	a	a	a	a	a	1.00					
Adeq. Know	-.277	-.118	.043	-.240	.175	.216	.171	.151	.189	.013	.022	a	1.00				
Job Sat	-.210	-.185	.231	-.187	.470**	.291	.448**	.302	.439**	-.085	.430**	a	.355**	1.00			
Burnout Exhaust	.193	.005	.044	.042	-.235	-.071	-.028	-.022	-.319*	.232	-.245	a	.092	-.389*	1.00		
Burnout Cynicism	.060	-.053	.056	.068	-.282	-.279	-.067	-.127	-.349*	-.076	-.154	a	.023	-.336*	.779**	1.00	
Burnout Efficacy	-.084	-.028	.200	-.081	.408**	.322	.312	.215	.270	.013	.130	a	.396**	.475**	-.185	-.121	1.00

*** = p<.05; ** = p<.01** a = cannot be computed because one of the variables is constant

Table 20. Correlations for Managers (n=38)

	IRU	CRU	PRU	ORU	Culture	Leader.	Eval.	Interact	Slack	Str. Res	Social Process	Activities	Adeq. Know	Job Sat.	Burnout Exhaust	Burnout Cynicism	Burnout Efficacy
IRU	1.00																
CRU	.397*	1.00															
PRU	.465**	.153	1.00														
ORU	.520**	.711**	.350*	1.00													
Culture	.015	-.023	.098	.102	1.00												
Leader.	-.206	-.297	.077	.003	.409*	1.00											
Eval.	-.163	.031	.194	.108	.339	.248	1.00										
Interact.	-.014	-.050	-.006	.100	.258	-.026	.315	1.00									
Slack	-.217	-.189	.213	-.222	.462**	.323	.092	.249	1.00								
Str. Res.	-.142	.090	.175	.245	.052	-.036	.332	.284	-.224	1.00							
Social Processes	-.214	-.325	-.034	-.183	-.078	.116	-.114	.128	.278	-.123	1.00						
Activities	-.215	.123	.098	.079	.478*	.021	.509**	.488**	.284	.302	.216	1.00					
Adeq. Know	.097	.080	-.029	-.082	-.234	-.091	-.027	.030	-.019	.060	-.153	-.107	1.00				
Job Sat	.057	.135	.200	.056	.342*	.018	.030	-.075	.209	-.018	-.129	-.159	.320	1.00			
Burnout Exhaust	-.223	-.325	-.292	-.337*	-.488**	.118	-.190	-.158	.014	-.235	.172	-.319	.023	-.514**	1.00		
Burnout Cynicism	.035	.002	-.057	.021	-.478**	-.219	-.384*	-.284	-.278	.050	-.283	-.421*	-.158	-.434**	.546**	1.00	
Burnout Efficacy	.189	-.191	.369*	-.137	.011	-.130	-.204	-.070	-.012	-.165	-.043	-.115	.467**	.398*	-.242	-.380*	1.00

*** = p<.05; ** = p<.01**

5.0 SUMMARY

This Technical Report is the first written summary of our work, based on the preliminary analysis of the data collected in the course of the AKUTE study. Its main purposes are (1) to serve as a frame of reference for the ACT (2) to serve a frame of reference for subsequent in-depth analysis of these data and (3) to create an initial dissemination vehicle for the study. The report is largely descriptive and aims at detailing the development and validation of the ACT and at enumerating key themes emerging from the findings.

The ACT was developed while balancing the requirements of reasonable instrument development principles and the practical realities of having to administer the tool to many participants in as short a time as feasible. The ACT was validated with five professional groups (nurses, allied providers, physicians, clinical specialists, and managers). The original ACT was reduced from 76 items to a 51-item composite measure representing eight hypothesized dimensions of organizational context: leadership, culture, evaluation, slack, structural and electronic resources, information sharing interactions, information sharing activities and information sharing social processes (social capital). Each dimension was found to be internally reliable (Cronbach's α range = .647-.915). Using PCA, a fourteen-factor structure representing the 8 organizational dimensions was confirmed.

Several key themes emerged from the bivariate analyses:

Hospital Variation. Results of comparison testing showed little statistically significant variation by hospital with respect to modifiable elements of organizational context; only leadership was different between the four hospitals. Hence, context may not differ significantly within healthcare regions. However, results did show significant variation by hospital in two of the four knowledge translation variables (conceptual research utilization and overall research utilization) indicating elements, other than context, may play a role in research utilization behaviours of healthcare professionals.

Professional Group Variation. Comparisons by professional group showed statistically significant differences between the five professional groups surveyed. The groups were significantly different with respect to several contextual elements (i.e., leadership, evaluation, structural and electronic resources, information sharing interactions, and information sharing activities) and with respect to knowledge translation (instrumental research utilization and persuasive research utilization). Managers consistently rated their hospital's context more favourability than the remaining professional groups while clinical specialists consistently reported higher research utilization than the other professional groups.

Correlations. Seven of the eight dimensions of the ACT hypothesized to measure organizational context were positively correlated at statistically significant levels with at least one of the four types of knowledge translation measured, and several contextual dimensions with three or all four of the types of the knowledge translation. For example, evaluation, information sharing interactions, and structural and electronic resources were correlated at statistically significant levels with all four types of knowledge translation. These findings suggest that a more positive context is associated with better knowledge translation. The only contextual dimension assessed in the ACT not correlated at a statistically significant level with knowledge translation was slack.

6.0 IMPLICATIONS AND FUTURE DIRECTIONS

The findings from the pilot data have important implications for the design and implementation of interventions to increase knowledge translation among the various groups of healthcare professionals that deliver patient care as well as to managers involved in making decisions that impact patient care. In particular, findings from this study suggest the need to tailor interventions to the professional group being targeted. Findings from this study also have implications for planning and setting up hospital structures to enhance the work environment, the transfer of knowledge within the work environment, and subsequently improve patient care and outcomes.

The ACT, developed and validated, for five professional groups in adult acute care, provides a reliable and valid means of assessing the characteristics of organizational context that may be modifiable and thus amendable to change. Since its initial development and validation, we have developed a pediatric acute care version with forms for each of the five professional groups examined in this report, and a long-term care (nursing home) version with a non-professional (i.e., healthcare aide) form in addition to the five professional forms. Thus, currently available for use are three ACT versions and 16 different forms. The pediatric ACT version is currently being used nationally and internationally (in Sweden) with plans also for its use in a second large Swedish study. The long-term care ACT version is being used nationally in a large Prairie study and internationally in a six country European Union 7th Framework study.

The ACT is copyright protected and therefore is not appended to this report. Inquiries regarding obtaining a copy of the tool should be made to Dr. Carole A. Estabrooks at (780) 492-3451 or by email: carole.estabrooks@ualberta.ca.