

The Readiness Estimate and Deployability Index

A Self-assessment Tool for Emergency Center RNs in Preparation for Disaster Care

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Readiness to perform emergency healthcare in an austere environment such as a disaster depends on the preparation of the individual professional nurses and team. A research program, made up of studies and products centered on individual readiness to perform nursing care in austere environments, is described in this article. Brief, easy-to-complete instruments to assess nurses' readiness along 6 dimensions are described with respect to their conceptual background and reliability and validity testing. A brief history of the research program and an invitation to visit the new Web site <http://shelob.uthscsa.edu/READI/splash.html> and to provide feedback are included. **Key words:** *austere environment, clinical competency, individual readiness, readiness for disaster*

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The new Web site is the culmination of a research program that began in 1996, with funding support from the US Congress, and was administered by the Tri-Service Nursing Research Program and the Henry M. Jackson Foundation for the Advancement of Military Medicine. The research program was also supported by funding from the Delta Alpha Chapter, Sigma Theta Tau International Honor Society of Nursing, the Rosemary Kerr McKeivitt Memorial Faculty Research Award, and from, the Department of Acute Nursing Care, The University of Texas Health Science Center School of Nursing. A hallmark of the READI program is mentoring of registered nurses completing graduate education. Schools included the University of Texas Health Science Center at San Antonio (thanks to Capt Jack Smith, USAF, NC); the University of Tennessee, Chattanooga (thanks to CPT Felicia Rivers, US, ANC); and the US Army-Baylor University Program in Health Care Administration (thanks to LT Lonnie Hosea, NC, USN). Statistical expertise and support of Dr Kenneth Finstuen is also acknowledged. Acknowledgement is also extended to Dr Lynne Connelly for her support with expert panels during concept clarification phase, to Dr Barbara Covington for information technology support, to Ms Heather Cura for professional Web services, and to Ms Linda Dzieranowski for excellent help with the article preparation.

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ARE you ready? Your emergency center may be ready, but are you? Registered nurses and other healthcare professionals face the unprecedented likelihood of providing care in disaster situations, now even in the homeland. A self-assessment tool is available for RNs to estimate their level of individual readiness (IR) to perform nursing care in austere environments or disaster situations. The Readiness Estimate and Deployability Index (READI), a package of several related instruments, is the centerpiece of a new Web site <http://shelob.uthscsa.edu/READI/splash.html>.

The READI is a self-assessment of a nurse's readiness to perform nursing care in austere environments where sophisticated equipment and the high technology of modern emergency centers may not exist. The 4 versions of the READI (for Army, Air Force, Navy, and civilian nurses) were tested and refined with numerous samples of practicing clinical nurses in both fixed hospitals and mobile hospitals throughout the US Department of Defense and the private sector.

This article will describe the background of the READI, information about the testing of

the READI instruments, and a brief history of the READI. The article concludes with an invitation for emergency nursing personnel to visit the Web site and provide feedback.

BACKGROUND

Presidential proclamation

President George W. Bush stated, "I have a message for our military: Be ready. I've called the Armed Forces to alert, and there is a reason. The hour is coming when America will act, and you will make us proud."¹(p3) The significance of the readiness instrument package is that it responds directly to the president's proclamation. Perceived readiness is a critical attribute of all nurses that, because of America's war on terrorism, will require continuous measurement and estimation. A conceptual understanding of perceived readiness was completed and an instrument was designed to index the attribute of perceived readiness. The assessment of perceived readiness should precede the design of programs and experiences to assist individuals to achieve enhanced readiness. The President made it exquisitely clear that being ready is an immediate national priority.

Conceptual perspectives on readiness

Readiness was reported in the literature with respect to readiness to accept responsibility and readiness to learn. Readiness to accept responsibility, to comply with a therapeutic regimen, or readiness to learn procedures associated with managing a chronic disease is among common concepts that are related. For example, Johnson and Mass² described readiness as preparedness to assume responsibility for the healthcare of a family member or significant other in the home. Another example of readiness in the clinical environment is Guglielmino's Self-directed Learning Readiness Scale.³ A third example of readiness as a broad clinical concept is the readiness of AIDS patients to incorporate major daily lifestyle changes into their daily regimen.⁴ The point is that readiness is a term commonly used in other contexts, even

in clinical settings, and generally means a state of preparedness for something about to happen.

In the military arena, readiness was described⁵ as the ability of the soldier to leave home for areas unknown, for indefinite periods of time, to perform multiple physically demanding tasks in austere environments. Readiness in the military is divided conceptually into IR and collective readiness. Individual readiness is an attribute at the level of an individual person, while collective readiness refers generally to the readiness of a group or other aggregate. This article focuses on IR.

Individual readiness within the military medical community is often described as a concept comparable to the term medical readiness. Medical readiness can be considered as encompassing the ability to mobilize, deploy, and sustain field medical services and support for any operation requiring military services, to maintain and project the continuum of healthcare resources required to provide for the health of the force, and to operate in conjunction with military healthcare.⁶

It is important to draw the distinction between IR and medical readiness. Individual readiness is considered in terms of the rich complexity (eg, the 6 dimensions in the READI) of all it means to be prepared for deployment. In contrast, medical readiness can mean either readiness of the medical personnel to effectively deploy or, in some circles, the level of health of the deployed personnel. Again, the focus of the READI is perceived as IR along 6 dimensions, which are (1) clinical competency, (2) operational competency, (3) survival skills, (4) personal, psychological, and physical readiness, (5) group integration and identification, and (6) leadership and administrative support.

The pioneer work of Fullerton and Ursano⁷ explored the behavioral and psychological responses affecting health and performance in the high-stress chemical and biological warfare environment. They conducted a week-long observation study of 37 National Guard soldiers and concluded that the responses

to the chemical and biological environment were as follows: claustrophobia, difficulties with masks, overheating, feeling of failure, increased risk associated with dedication to the group, dehydration secondary to alcohol use, failure to recognize danger, and anxiety. They suggested that further study should test the benefit of leader alertness, flexibility, ongoing availability, and willingness to engage in immediate problem solving.

Other capabilities such as adaptation skills are also important. Operation Restore Hope provided the opportunity for West and Clark⁸ to conduct oral history interviews with nurses redeployed from Somalia. The authors conducted 90 oral history interviews with Army Medical Department personnel who served during the bloody urban operation in Somalia. The authors described the necessity for deployed nurses to adapt to the filth, difficult living conditions, blowing sand, lack of supplies, discomfort, and danger. They found that the need for flexibility and innovation was clear to the deployed nurses. Expecting that everything one has in peacetime will be there in an austere theater of operations is unrealistic. The authors concluded their synthesis of the oral histories by stating that "An Army Nurse who deploys to the field must know basic soldier skills, such as use of weapons, personal defense, field craft, and how to provide nursing care to people of different cultures with different values."^{8(p183)} Personal accounts of those who viewed individual medical readiness firsthand helped form the conceptual foundation for items in the READI.

Physical problems may be compounded in deployment. A secondary analysis of registries containing data from 49,950 women who served in the Persian Gulf War was conducted. Responses to war included heat stress, training-related injuries, diarrhea, respiratory disease, and gynecological complaints, which included uterine bleeding/amenorrhea, fungal vaginitis, and requests for oral contraceptive refills.⁹

In addition to the physical problems, there are psychological concerns. An understand-

ing of responses to deployment during Operation Provide Hope in Kazakhstan grew from the work of Britt and Adler.¹⁰ Responses included stress, isolation, and the use of a variety of coping mechanisms. Rosen, Weber, and Martin¹¹ studied 1060 male and 305 female soldiers in Army support units, investigating the experience of deployment. Respondents in their study voiced operational stress, job stress, and the influence of organizational unit climate in moderating the operational and job stressors.

Zadinsky¹² reported clinical nursing competency with deployable medical equipment. She described the training support package for the Army Nurse Readiness Training Program (RTP) developed to enhance field-nursing competency. The Readiness Training Program was a response to a widening gap between nursing practice in high-technology, automated fixed healthcare facilities and nursing practice in field medical treatment facilities.

In peacetime, nursing personnel develop and sustain their competencies in entry-level and advanced clinical skills in their specialized areas of practice in fixed health care facilities. In the active component (AC) military nurses of the Department of Defense, most nursing personnel work in fixed facilities during peacetime. In the reserve component (RC), many nursing personnel work in civilian health care facilities during peacetime. In most of these military and civilian facilities, nursing personnel function in specialized clinical roles in a high technology automated environment.¹²

When in a deployed or field status, nursing personnel work in mobile facilities in a field environment. In this field environment, nursing personnel function in expanded clinical roles, performing skills they do not ordinarily perform in fixed facilities. Nursing personnel use more generalist nursing skills in a field environment, where they must provide nursing care for patients with a wide range of battle injuries and disease and nonbattle injuries. They must also function in the field environment without much of the automated equipment and specialized support services commonly available in fixed facilities.

Zadinsky¹² measured the competency of Army nurses and combat medics to perform important wartime clinical skills. She found a great need for wartime skills training laboratories to enable practicing nursing skills on field equipment, not common in the modern high-technology hospital setting.

Literature on IR

The conceptual work underlying the item development was published by Reineck.¹³ Reineck presented conceptual and psychometric work on readiness to national and international conferences. The research program has also resulted in initial tri-service adaptation of the READI for use in the US Air Force through psychometric testing of the Readiness Estimate and Deployability Index Revised for Air Force Nurses Short Form.¹⁴ A Navy version of the READI is in field testing phase.

Groundwork on development of the READI involved conducting 3 focus groups over the course of 1 year. Electronic brainstorming and traditional focus group methods were used to describe many of the concepts participants believed represented the essence of individual medical readiness. Preliminary studies in Phase I resulted in concept clarification, and Phase 2 involved READI construction and psychometric testing. Extensive validity testing involved input from an expert panel. Test-retest and internal consistency reliability testing were also completed.¹⁵ The READI is a valid and reliable instrument for estimating self-perceived state of IR among RNs.

Conceptual framework linking IR with stress resistance

Knowledge building in work completed by Dremsa-Collins¹⁴ related the IR construct to stress resistance introduced by Flannery.¹⁶ Knowledge of an individual's perceptions is important because, in addition to mastery of skills, self-perceptions influence members' state of stress resistance.¹⁶ Flannery's elements of mastery, attachment, and meaning are key attributes of the "stress-resistant person."^{16(p29)} "Reasonable mastery of daily events, caring attachment to others and a

meaningful purpose in life are the three basic domains that lead to good physical and mental health and a sense of well-being."¹⁶ For military nurses, preparing to participate in military deployments, the mastery of skills, attachment to others, and meaning in the experience are essential.

Investigators conducting a phenomenological study asked 22 nurse veterans, "What effect has your wartime experience had on your personal and professional nursing career?"^{17(p344)} "Feelings and experiences during and after the war were characterized as fatigue because of unrelenting physical and mental demands, confusion, fear, sadness, grief, revelation, guilt, and repression."¹⁷ The detrimental effects of grueling stressors these nurses and soldiers have encountered have resulted in a psychopathological condition known as post-traumatic stress disorder.¹⁸ Post-traumatic stress disorder may be caused by exposure to "a psychologically distressing event that is outside the usual range of human experience."¹⁹

Efforts must be made to prepare nurses in advance for the expectations and rigors of frequent military deployments. The nation needs nurses who are able to focus on the goals of the mission can interact appropriately with the stressful environment, meet professional demands, and maintain their physical and mental health. Use of Flannery's¹⁶ model of stress resistance provides one way to assess and devise preparation that will enable nurses to meet the challenges set before them by stressful deployments.

Two dimensions of Flannery's¹⁶ model of stress-resistant persons, "Mastery" and "Attachment," were found to be similar to 2 higher order factors of IR. The Skills factor, which includes dimensions of clinical competency, operational competency, and soldier survival skills, was similar to Flannery's¹⁶ concept of "Mastery." The Relationships factor, which includes dimensions of personal/psychosocial/physical readiness, leadership and administrative support, and group integration and identification, was similar to Flannery's concept of "Attachment." Specific

instructional interventions guided by Flannery's¹⁶ recommendations to better prepare nurses as stress-resistant persons would result in individuals who would be more likely to take action to fulfill the course requirements and specifications detailed by the military to prepare themselves for deployments. Interventions are to (a) decrease life stress by techniques to reduce the stress response, (b) improve competency in specific skills to gain reasonable mastery of the individual's job responsibility, and (c) help individuals develop attachments to group members with whom they may be working. Therefore, development of a valid and reliable self-assessment measure of military nurses' estimation of their readiness for deployments provides medical leaders with a diagnostic tool that can be used to pinpoint specific areas where preparation is needed.

Skills, knowledge, and abilities related to caring for patients in a deployed environment

Many illustrative articles identified skills, knowledge, and abilities related to caring for patients in a deployed environment. These skills, knowledge, and abilities can be categorized into clinical skills, survival skills, knowledge, abilities, and other factors bearing on readiness.

Once deployed, nurses can expect to encounter complex emergencies, orthopedic and burn patients,²⁰ as well as trauma cases and diseases and nonbattle injuries.^{8,13} Specific clinical skills in the literature include airway management, triage, interventions with chest tubes and intravenous catheters, hemorrhage control, and emergency care.^{20,21}

Survival skills are clearly essential to readiness. Specific skills identified in the literature are military skills including campsite selection, communication, transportation and map reading,²² weapons training,^{13,22} personal defense and fieldcraft,^{8,13} and survival training.²³ Baker and Ryals²² cited knowledge of the chain of command and the Geneva Convention as important to IR. Abilities include medical evacuation, supply and logistics,²⁰ multi-

cultural care,^{8,13} and hardiness to withstand physical and emotional stress.^{8,13,21} Other factors bearing on readiness include leader alertness, flexibility and availability,¹³ and conflicts between family and careers.²⁴

These articles provide evidence that nurses need a broad repertoire of clinical and tactical skills and abilities as well as personal hardiness to perform well in the deployed environment. The research into medical and nursing readiness identified clinical and operational skills as well as personal attributes that can be studied as variables when describing readiness.

Perception as a concept in the READI

The READI measures perceived nursing readiness. It is not intended as direct indicator of readiness. Rather, its intent is as a self-report measure of perceived readiness. Perception, a cognitive process, is a matter of organizing the information from the environment so that it makes sense.²⁵ Factors that influence perception include stereotyping, selectivity, self-concept, situation, needs, and emotions. These factors suggest some limitations to the READI. For example, respondents may have an emotional need to perform well and thus may overestimate readiness in certain areas of the self-report. Or, as another example, the situation of imminent deployment may lead a subject to respond with report of greater readiness to build self-confidence and master any anxiety. Still, despite these acknowledged aspects of a perceptual measure, an individual's perception is his or her reality. The individual's reality is what must be considered in developing readiness training and preparation programs.

A brief history of the READI

The idea for the READI emerged in 1996, shortly after the United States began to play a major role in sustained humanitarian operations. The threat changed from conventional war in the 1980s to low-intensity conflict in the 1990s. The low-intensity conflict, then, grew into global terrorism at the turn of the

21st century. The need for nurses to be ready to practice clinical nursing skills in austere environments on a moment's notice, treating not only wounds but nonbattle diseases also, is clear.

In 1996, the author of the READI asked subject matter experts having experience of previous deployment to detail their experiences. This was accomplished in professionally facilitated focus groups in 1996 and 1997 and funded by a grant from the TriService Nursing Research Program. Electronic brainstorming was used to capture the response of focus group members.

Text data from the focus groups were categorized into 6 conceptual dimensions of readiness. The principal investigator asked clinical nurses to write questionnaire items to assess the perceived competency along the 6 dimensions. The resulting pilot version of the READI was then sent to content experts for a determination of the relevance, clarity, and uniqueness of each item (content validity). A small group of Army Nurse Corps personnel was asked to take the READI on 2 measurement occasions to test for stability of responses over time (test-retest reliability). Adjustments were made on the READI after pilot testing. Results of psychometric testing, funded by a second grant from the Congressional TriService Nursing Research Program, are discussed in the article in military medicine.¹⁵

The READI was tested with deployed units in Europe and the United States, in the active and reserve components, with nurses in the practice environment as well as those completing their basic officer orientation, and with nurses in both fixed and mobile hospitals. The Air Force version was developed by LTC Terri Dremsa during her doctoral dissertation. A description of the Air Force testing of the READI was published in military medicine.²⁶ The civilian version of the READI was developed by Paula Chamberlain and Carol Reineck in 2003. The READI is poised to be an instrument with great value for assessment of individual nurses in the federal, state, and private sectors. It is evolving and can continually be improved.

The research program began with expert panels and progressed through instrument development and testing, and finally to web availability. After the concept clarification phase, Phase 2 of the congressionally sponsored research program proceeded "to establish a valid and reliable instrument for indexing the degree to which Army nursing personnel are prepared for the expectations and rigors of deployment."²⁷ Eight content-expert raters through a methodology proposed by Waltz, Strickland, and Lenz²⁸ established content validity. This methodology outlines a technique that evaluates scores designated by each expert on relevancy, clarity, and uniqueness for every instrument item. The READI was found to be representative of the desired domain by 71% of the raters, with suggestions for items to be deleted or added. All experts (100%) rated the READI as understandable, presented in a suitable format with clear instructions, and indicated an adequate range of possible responses.

Reliability estimates for internal consistency and test-retest were conducted. Internal consistency reliability testing is employed when the concern is with the consistency of performance of one group of individuals across the items on a single measure. Cronbach's α was used to assess the extent to which items in a subscale are consistent in eliciting similar responses. An α coefficient of .70 or higher was considered acceptable. Internal consistency (coefficient α) was estimated via a sample of Army practical nurses ($N = 31$) resulting in a mean α coefficient ($\alpha = .77$). Subscale measures were (a) clinical nursing competency ($\alpha = .88$), (b) soldier survivor skills ($\alpha = .94$), (c) personal/physical/psychological ($\alpha = .48$), and (d) leadership and administration ($\alpha = .77$). Test-retest reliability (Pearson's product-moment correlation) estimated the extent of the stability of responses over 2 weeks. Results indicated reliabilities ($P < .05$) as follows: (a) clinical nursing competency ($r = 0.71$), (b) operational competency ($r = 0.48$), (c) soldier/survival skills ($r = 0.83$), (d) personal/physical/psychological readiness

($r = 0.78$), (e) leadership and administration ($r = 0.69$), and (f) group identification and integration ($r = 0.69$). The operational competency scale reliability was in the moderate range ($r = 0.48$) because there were criterion-referenced knowledge questions mixed with norm-referenced self-report of competence. Personal/physical/psychological readiness scale internal consistency was in the moderate range ($\alpha = .48$) because of the heterogeneity of the items across 3 conceptual areas.

The readiness instruments presented on the Web site began in the Army (READI) and proceeded to the Air Force (US Air Force READI—Revised) and the Civilian Sector (READI-Civilian). Currently, the Navy READI (READI-NAV) is under development, thereby completing a valid and reliable readiness measure for

all nurse corps of the Department of Defense as well as for the private sector.

The Web site offers places to view the instruments, read the history of this research program, read journal articles about development and testing, and link to related Web sites. The READI instruments are in the public domain and available for your immediate use. In the future, it will be possible to enter responses online and request scoring services for individuals or units. For now, the web availability of the READI instruments is the current status of the work in progress.

Your comments and feedback about the Web site are welcome. Contact the author at reineck@uthscsa.edu or 210-567-5883. Thank you again for your concern that nurses throughout our nation be READI to perform nursing care wherever and whenever needed.

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