

Nursing Readiness: Active Duty vs Army Reserve

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Introduction

The purpose of this study was to apply a psychometric tool for readiness assessment, the Readiness Estimate and Deplorability Index (READI), to new Army Nurse Corps (ANC) officers attending the U.S. Army Medical Department (AMEDD) Officer Basic Course (OBC). Because of increases in the number and duration of deployment missions, Army leadership needs to ensure that ANC officers are prepared to perform skills and functions critical to patient care in a field environment. The READI is a survey questionnaire of self-reported competencies and behaviors based on six dimensions of readiness: clinical nursing competency, operational competency, survival skills, personal and psychological readiness, leadership and administrative support, and group integration and identification. Convenience samples of 118 active duty and 53 Reserve Component ANC officers enrolled in the OBC participated in completing the instrument.

Analyses reported here were limited to the first three READI dimensions. Results for both groups indicated that the internal consistency of item responses was found to be highly stable and reliable as assessed by Cronbach's coefficient alpha (from .74 to .95). These findings offer evidence for the expanded application of the READI model to differing ANC populations to provide meaningful and consistent assessments of readiness. Comparative results were summarized by a series of newly developed graphic panoramic displays (GPDs). The U.S. Army Reserve nurses reported significantly higher levels of clinical and operational nursing competency than active

duty nurses. However, the trend was reversed for items within the soldier survival skill dimension. Findings from this study provide definitive evidence for the utility of GPD comparisons of cohort groups to identify readiness differences between groups and provide detailed indicators in formulating readiness forecasts and training needs in preparation for future deployments.

Today's AMEDD personnel face a wide variety of missions. In addition to caring for service members and other eligible beneficiaries during peacetime, medical units must train and prepare to support deployed forces around the world. Medical units have typically focused training on supporting conventional warfare operations, where emphasis is placed on rapid triage, resuscitation, stabilization, and evacuation. However, in recent years, many medical deployments are supporting military operations other than war (OOTW), such as peacekeeping, humanitarian assistance, and disaster relief.¹⁻⁷ Although there have been elements of combat risk in these missions, logistical support and community health needs have become equally important.^{8,9}

Given the increased frequency of military OOTW, ANC officers face greater opportunities to be deployed today and in the foreseeable future. Nurses need to periodically assess their individual readiness competency to ensure that they are prepared should they be called to deploy in support of a wide range of missions.

Although 76% of Army nurses are assigned to fixed-facility hospitals with computerized and automated equipment, their primary mission is to be prepared to

support deployed forces during military operations. Prior to the Gulf conflict, it was believed that everyday clinical experience in medical treatment facilities (MTFs) prepared nurses to provide care when deployed.¹⁰ However, according to testimony before a congressional subcommittee, it was discovered during Operation Desert Storm that "many doctors and nurses had not participated in field training and were not familiar with their unit's mission or...supplies and equipment in the field hospital."¹¹ The lessons of medical experiences in the Gulf have also been discussed by Newman and France, and recently revisited by Bell, Amoroso, and Williams; both sources underscore the vital and crucial role of readiness in deployment.^{12,13}

Shortly after the Gulf war experience, the senior leadership of the ANC recognized that there existed a need for readiness training at all levels.¹⁴⁻¹⁶ Zadinsky reported that most nurses displayed a need for more training in subjects such as field medical equipment and evacuation, skills that are not performed in daily operations of MTFs.¹⁰ Those findings also noted that many nurses believed that they did not have the opportunity to practice and become proficient in the skills that they must perform when deployed.

The AMEDD responded to the renewed focus on readiness. The Defense Medical Readiness Training Institute prepares tri-service medical personnel for future operations with training programs such as the Combat Casualty Care Course, Combined Humanitarian Assistance Readiness Training, and the Joint Trauma Training Center.¹⁷ The Readiness Training Program for Nursing Personnel was implemented to enhance the competencies in those nursing skills performed in a field environment as well as proficiencies in battle-focused settings.¹⁸ Specific concerns for readiness issues pertaining to Reserve Component nurses as well as active duty ANC personnel have also been recognized.¹⁹

Military operational readiness is defined as "the capability of a unit/formation, ship, weapon, or equipment to perform the missions or functions for which it is organized or designed."²⁰ Zadinsky defined military nursing readiness as the "ability of nursing personnel to perform skills and functions critical to their patient care role in a deployed or field status."¹⁰ It is measured in terms

of individual competency, which can range from knowing how to do a skill very well to not knowing how to do it at all. In order to clarify the concept of individual U.S. Army nursing readiness, Reineck conducted a nursing focus group study that defined individual nursing readiness as "a dynamic concept with dimensions at the individual, group and system levels, which together, influence one's ability to prepare to accomplish the mission."¹⁶ Six dimensions of individual military nursing readiness were identified: clinical nursing competency, operational nursing competency, soldier survival skills, personal/psychological/physical readiness, leadership and administrative support, and group integration and identification.

Based on these six dimensions of individual readiness, Reineck et al developed the READI, funded by the Henry M. Jackson Foundation for the Advancement of Military Medicine and the Tri-Service Nursing Research Program.^{21,22} Results of this initial pilot research were presented at the 10th Annual Asia-Pacific Military Medicine Conference in Singapore.²³ The index consists of 61-scaled attitude question items that assesses self-reported readiness competencies in each of six dimensions of readiness identified by the nursing focus group. In subsequent field trials, the READI was administered to three groups of Army nurses (total=93) representing both TDA and TOE units and was found to provide valid and reliable measures of individual nursing readiness. Comparative results from these trials were presented at the Association of Military Surgeons of the U.S., Karen A. Reider 13th Annual Nursing Research Poster Session.²⁴

Although READI results were found to be consistent in field trials, 74 of the 93 nurses (83%) who participated in that initial application of the instrument were in the grade of captain. This is not entirely representative of the active duty ANC population, of which only 31% are in the grade of captain. Thus, the question was posed as to whether the READI provided meaningful results when administered to other cohort groups, such as new ANC officers; and, if so, what were the readiness competencies of these new ANC officers? Kovats and Morris studied a cross-sectional sample of 118 OBC students, predominantly lieutenant-grade nurses, and compared READI profiles to previous field trial profiles.^{25,26} They found the READI to have similar levels of rating reliability and

psychometric properties across all nurses sampled. They concluded that the READI is applicable to diverse populations of all active duty ANC. The purpose of this study was to document a follow-on comparison of those 118 active duty OBC nurses with a sample of Reserve Component OBC nurses.

Method

Data collection was conducted by direct survey of a convenience sample of 118 ANC officers at the end of the core program of the AMEDD OBC and another survey of 53 Reserve Component officers. The OBC is conducted at the U.S. Army Medical Department Center and School at Fort Sam Houston, TX. All incoming AMEDD officers attend the 8-week long core program that instructs new officers in the performance of common soldier and officer-specific skills and provides an introduction and application of the concepts of combat health support. At the conclusion of the core program, nurses attend a separate, 2-week Nurse Corps Track which introduces the new Army Nurses to field nursing, deployment readiness, and other professional development issues. At the conclusion of the track, nurses are assigned to their first duty station, Reservists return to their sponsoring units and to their civilian nursing jobs.

Near the completion of the OBC, participants were briefed as to the purpose of the study. They were informed that participation was voluntary and all individual responses would be kept confidential. The survey questionnaire was then administered to the volunteering participants in a group setting. Completion time of the questionnaire items ranged from 30 to 45 minutes.

The READI questionnaire consisted of 61 scaled attitude items and 12 self-reported behavioral indicators, grouped by the six dimensions of readiness: clinical nursing, operational nursing, soldier survival skills, personal/physical/psychological readiness, leadership and administrative support, and group integration and identification. Additional items included 12 demographic information questions and six, short multiple-choice scenario questions. Due to space limitations, the analysis results of survey responses for this report were limited to the first three dimensions of the survey: clinical nursing, operational nursing, and soldier survival skills.

Analysis and Statistical Procedures. Data items were coded and entered into the Statistical Package for the Social Sciences data analysis program (SPSS version 10.0.5). Entries were double checked to ensure accurate data input. Scaled-attitude items were grouped by the readiness dimension they represented and Cronbach's alpha was computed for each dimension to assess inter-item reliability. Descriptive statistics were calculated and visually summarized as a series of unique GPDs. Inferential statistical comparisons were conducted with the Analysis of Variance (ANOVA).

Results

Demographic characteristics of the groups are presented in Table 1. Of the sample of 118 active duty nurses, nearly all were assigned to TDA units (79.7%) in the Medical Command (68.7%) and held the rank of lieutenant (94.1%). About two-thirds were female. In terms of nursing background, most were medical surgical nurses (87.3%) with an average of less than a year (.67) of experience. By comparison, of the sample of 53 U.S. Army Reserve nurses from various units, 98.1% were lieutenants, but over half were males. Nursing experience for the Reservists was somewhat different than active duty, with about one-third medical surgical, and 45.3% as either nurse anesthetists or critical care nurses reporting an average of 5.74 years of experience; about 8½ times more nursing experience than the active duty group.

Reliability of READI Item Ratings. Reliability results for each group were computed for the three READI dimensions using Cronbach's coefficient alpha and ranged from .74 to .95. Specific coefficients for active duty nurses obtained .95 for clinical nursing, .78 for operational nursing, and .91 for soldier survival skills. Similar indices emerged for U.S. Army Reserve nurses with .90 for clinical nursing, .74 for operational nursing, and .94 for soldier survival skills. These results were comparable to the demonstrated internal consistencies found by Reineck et al in an earlier study of active duty, predominantly Captain (O-3) ANC officers, and provide evidence that average ratings from the READI instrument are meaningful, consistent, and stable across several diverse ANC groups.²¹

Item Descriptive Statistics and GPDs. Figures 1

Variables		Active Duty n	percent	Reserve Component n	percent
Military Background					
Type unit *					
Fixed (TDA)	94	79.7		13	24.5
Field (TOE)	6	5.1		12	22.6
Unknown	18	15.2		28	52.9
Assignment					
Medical Command	81	68.7		-	-
Force Command	11	9.3		-	-
U.S. Army - Europe	6	5.1		-	-
8th Army - Korea	3	2.5		-	-
U.S. Army Reserve	12	10.2		53	100.0
Other	5	4.2		-	-
Military Rank					
Second Lieutenant	109	92.4		35	66.0
First Lieutenant	2	1.7		17	32.1
Captain	7	5.9		1	1.9
Gender					
Female	77	65.3		30	56.6
Male	41	34.7		23	43.4
Ethnicity					
White	80	67.8		43	81.2
Black	17	14.4		4	7.5
Asian	6	5.1		2	3.8
Other	15	12.7		4	7.5
Nursing background					
Medical Surgical	103	87.3		20	37.7
Nurse Anesthetist	-	-		11	20.8
Critical Care Nurse	4	3.4		13	24.5
Nurse Practitioner	4	3.4		1	1.9
Emergency Nurse	-	-		4	7.5
Perioperative Nurse	2	1.7		2	3.8
Psychiatric Nurse	-	-		2	3.8
No response	5	4.2		-	-
Total years nursing experience**					
Mean (year)	.67			5.74	
Standard Deviation	2.33			6.26	

n = 118 active duty and 53 U.S. Army Reserve Component OBC U.S. Army nurses. Note: * Types of Units: TDA (fixed facilities), (field type units)

** Total years includes both civilian and military experience

Table 1. Descriptive Statistics of Demographic Variables Administration of the Readiness (READI) Instrument

through 3 present the computed item averages and standard deviations for the READI ratings of both nursing groups. At the top of each figure is a GPD which depicts a comparison of group average rating profiles plotted across specific READI items. The unique, innovative GPD concept for READI results was developed by Reineck et al

resulting from a graphics workshop conducted by Edward Tufte of Yale University.²¹ The GPDs incorporate two graphics principles, dimensionality and resolution.²⁷⁻²⁹ The competency rating value dimension is indexed on the vertical axis; competency ratings could range from a low of one to a high of five. An item dimension is arrayed on

the horizontal axis and indexed to READI questionnaire statements below. Trace lines on the GPD show the plotted averages of items, one profile line for each group. Resolution, or amount of information graphically displayed, is shown by profile lines and the corresponding numeric reported means and standard deviations for groups in columns next to each READI item. Overall, average competency ratings for both nurse groups fell between 1.5 to 4.5, with item standard deviations of about one scale point. Use of the GPDs offers specific comparative information at a glance, easy to read with plotted responses relative within and between READI questionnaire sections. Use of GPD reporting has been successful in presenting READI results in a number of scientific and military medical settings.^{21,23-26}

Clinical Nursing Competency. As shown in Figure 1, respondents reported moderate-to-high degrees of competency in calculating intravenous (IV) drips and burn patient body surface area, and conducting physical exams and assessments. Lower competencies were reported in field clinical documentation, care of nuclear, biological, and chemical and ballistic missile injuries, use of the field ventilator, and caring for refugees. Rating profiles for Reservists were generally about one scale point higher than profiles reported by active duty nurses.

Operational Nursing Competency. Respondents reported moderate competencies in 12-lead electrocardiogram performance, medical evacuation, and echelons of care knowledge (see Figure 2). Slightly higher ratings were reported for field sanitation and reporting unlawful acts. The lowest ratings by both groups were concerned with setup of the deployable medical shelter. Reservists' profiles were about one-third of a point higher than active duty nurses on most items.

Soldier Survival Skills. As shown in Figure 3, all items but one were rated above the mid-point vertical response scale value of three. Higher ratings included competencies with weapons and navigation, while the lower item ratings centered on decontamination and, especially, communications equipment. Interestingly enough, the earlier trend of a higher Reservist profile is reversed for soldier survival skills, with active duty nurses reporting competency item averages of about half- to one-scale point higher than their counterparts.

Inferential Statistical Comparisons. Three separate, unweighted means, 2 x k split-plot ANOVA comparisons were computed to test for differences in average ratings between the two nursing groups, while simultaneously testing for differences within the various k-item ratings for the dimensions of the READI survey.³⁰ Table 2 presents the results for each of the three READI dimensions. As shown, statistically significant differences emerged between groups on all three sections with $F(1,169) = 41.45$ for clinical nursing, $F(1,169) = 4.17$ for operational nursing, and $F(1,169) = 7.33$ for soldier survival skills. Notice that average profiles for U.S. Army Reserve nurses were higher than active duty item ratings on the first two dimensions, but the trend was reversed for the third dimension (see Figures 1 through 3 for trends). Within subject comparisons of items also emerged as statistically significant, and displayed differences in all three READI sections. These results indicated that nurses indeed differentiated among items in terms of their strength of response in making ratings. Tests for interaction were also significant for section one, Clinical Nursing, and section three, Soldier Survival Skills, but did not emerge for section two, Operational Nursing. These results indicated that while overall average differences existed between nurse groups, those differences vary from item to item in sections one and three, but for section two, average item difference profiles between group means display nearly a constant pattern.

Discussion and Conclusions

This application of the READI to specific cohort groups adds to the body of knowledge about current readiness levels among the U.S. ANC. The READI provides accurate measurements for evaluating the readiness level of U.S. Army nurses within the scope of the clinical and soldier readiness skills.

In observing the computed alpha coefficients for the three sections examined, this study replicates findings from previous studies. These results strengthen and extend the general usability of the READI questionnaire, ensuring that collected responses show consistency of measurement across diverse types of ANC units. Results from the ANOVA tests clearly demonstrate the ability of the READI to detect differences in the levels of readiness between ANC groups. In regard to this finding, it may be

Effect Sources	SS	df	MS	F	
I. Clinical Nursing Competency					
Between subjects	(2663.06)	(170)			
Nurse Group (G)	525.81	1	525.81	41.58	<i>P<.001</i>
Residual between subjects	2137.25	169	12.65		
Within subjects	(4874.27)	(4446)			
k=27 Items (I)	1329.30	26	51.13	68.10	<i>P<.001</i>
Interaction G x I	246.02	26	9.46	12.60	<i>P<.001</i>
Residual within subjects	3298.95	4394	.75		
Total	7537.33	4616			
II. Operational Nursing Competency					
Between subjects	(636.19)	(170)			
Nurse Group (G)	15.30	1	15.30	4.17	<i>P<.05</i>
Residual between subjects	620.89	169	3.67		
Within subjects	(928.55)	(855)			
k=6 Items (I)	212.78	5	42.56	50.79	<i>P<.001</i>
Interaction G x I	7.76	5	1.55	1.85 n/s	
Residual within subjects	708.01	845	.84		
Total	1564.74	1025			
III. Soldier and Survival Skills					
Between subjects	(1453.16)	(170)			
Nurse Group (G)	60.39	1	60.39	7.33	<i>P<.05</i>
Residual between subjects	1392.75	169	8.24		
Within subjects	(1267.56)	(1710)			
k=11 Items (I)	161.18	10	16.12	25.96	<i>P<.01</i>
Interaction G x I	57.05	10	5.71	9.19	<i>P<.01</i>
Residual within subjects	1049.33	1690	.62		
Total	2720.72	1880			

Note: probability associated with F statistic comparisons, n/s not significant.

Table 2. Inferential Statistical Tests for Differences Between Means of Nurse Groups and Within Mean Ratings of Items for Three Dimensions of the READI Instrument

speculated that this provides evidence of differences in recruiting trends, in that experienced nurses appear to have been targeted for initial entry into ANC Reserve units while less experienced nurses appear to be entering the ANC on active duty. Further, within ANOVA findings demonstrate the ability to measure detectable differences in terms of specific aspects of readiness as defined by the 44 items in this study.

The READI instrument has multiple applications. First and foremost, it can provide a quick assessment of the

nursing readiness level of a unit, whether a fixed medical treatment facility or a field hospital. Chief nurses, as well as commanders, can assess the readiness level of their nursing personnel to determine how the unit perceives its preparedness for deployment and to identify any needs that will require additional training in field nursing skills. In particular, the development of the unique GPDs used in this study provide quick, easy to read, comparative profiles of readiness in a visual format. Profiles may be used in a variety of ways. First, separate groups can be compared to each other as was used in this study. Second, both active

Section one: Clinical Nursing Competency (k=27 items)	Active Duty Mean	S.D.	Reservists Mean	S.D.
1 - Familiar with the different types of shock	3.5	.9	4.2	.8
2 - Competent in caring for hemorrhagic shock	3.0	1.0	4.2	1.0
3 - Competent in documenting in field environment	2.0	1.2	2.4	1.4
4 - Competent in IV drip calculations	3.6	1.1	4.3	1.0
5 - Competent in instituting standing orders	3.2	1.2	4.5	.8
6 - Understands and calculates body surface area burn patient	3.7	.9	4.1	.9
7 - Competence in deciding which patient is seen first	3.5	.9	4.2	.8
8 - Competence in performing ACLS protocol	2.4	1.3	4.1	1.2
9 - Competence in caring for life threatening injuries	2.8	1.1	4.1	.8
10 - Competence in caring for patient with NBC injuries	2.5	1.0	2.6	1.2
11 - Competence in caring for patient with ballistic missile injuries	2.0	1.1	2.5	1.2
12 - Competence in recognition of tension pneumothorax	2.8	1.3	4.0	1.1
13 - Competence in providing fluid resuscitation of burn patient	2.8	1.1	3.6	1.1
14 - Competence in using universal blood donor protocol	3.0	1.3	4.0	1.2
15 - Competence in caring for patients with disease and nonbattle injury	3.2	1.1	4.1	.8
16 - Competence in using field ventilator	1.7	1.0	2.7	1.3
17 - Competence in airway management	3.3	1.1	4.5	.9
18 - Competence in implementing triage categories	3.1	1.1	4.0	1.1
19 - Competence in assuming clinical team leadership	3.0	1.2	4.0	.8
20 - Competence in caring for refugees	2.3	1.2	2.4	1.1
21 - Competence in providing ante/post-partum care	3.2	1.2	2.4	1.1
22 - Competence in field infection control	3.2	1.1	3.4	1.0
23 - Competence in orthopedic nursing	2.9	1.1	3.5	1.0
24 - Competence in neurologic nursing	2.7	1.0	3.6	1.0
25 - Able to identify components of physical exam	3.7	1.1	4.2	.9
26 - Able to list five examination techniques to perform physical exam	3.4	1.3	3.8	1.1
27 - Able to perform a complete nursing assessment and interpret abnormal findings	3.7	1.0	4.4	.7

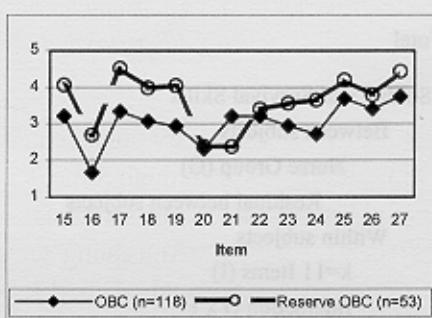
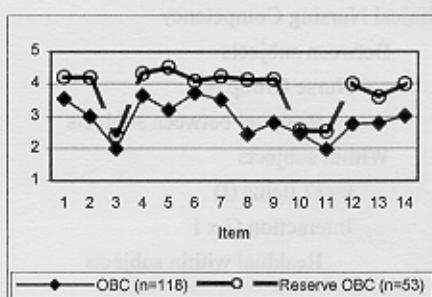


Figure 1. Panoramic display depicting READI profiles and a statistical comparison of active duty and U.S. Army Reserve nurses for self-reported clinical nursing competency (Items 1 through 27).

Section two: Operational Nursing Competency (k=6 items)	Active Duty Mean	S.D.	Reservists Mean	S.D.
1 - Competence in obtaining 12-lead EKG in given scenario	2.8	1.5	3.1	1.5
2 - Competence in evacuation procedures	2.5	1.1	2.8	1.1
3 - Competence in echelons of care operations	2.8	1.0	3.1	.9
4 - Level of competency in reporting unlawful acts	3.6	1.0	3.8	1.1
5 - Competence in field sanitation	3.6	.9	3.5	1.0
6 - Competence in DEPMEDS setup	2.0	1.3	2.5	1.3

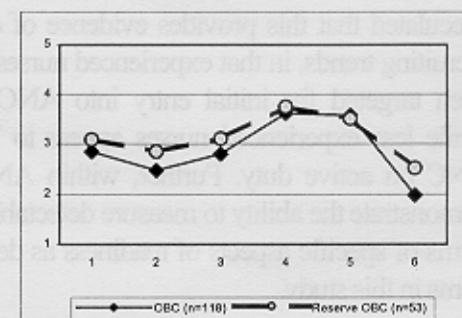


Figure 2. Panoramic display depicting READI profiles and a statistical comparison of active duty and U.S. Army Reserve nurses for self-reported operational nursing competency.

Section three: Soldier Survival skills (k=11 items)	Active Duty	Reservists	Mean	S.D.	Mean	S.D.
1 - Familiarity with M-16 rifle	4.3	1.0	3.3	1.7		
2 - Familiarity with 9mm pistol	3.6	1.1	3.8	1.2		
3 - Competence in defending self and patient if called to do so	3.9	1.1	3.7	1.4		
4 - Competence and confidence in protecting self with mask/MOPP	3.8	1.0	3.6	1.3		
5 - Competence in ability to navigate using a map and compass	4.2	.9	3.8	1.1		
6 - Competence in ability to maintain weapon in working order	4.1	1.1	3.4	1.6		
7 - Competence in ability to perform duties in adverse conditions	3.4	1.1	3.6	1.3		
8 - Competence in ability to decontaminate self and patient using decontamination equipment	3.2	1.1	3.0	1.3		
9 - Familiarity with status under Geneva Conventions	4.0	1.0	3.5	1.1		
10 -Competence in ability to resist enemy if captured	3.6	1.0	3.2	1.2		
11- Familiarity with standard Army communication equipment	3.3	1.1	2.5	1.4		

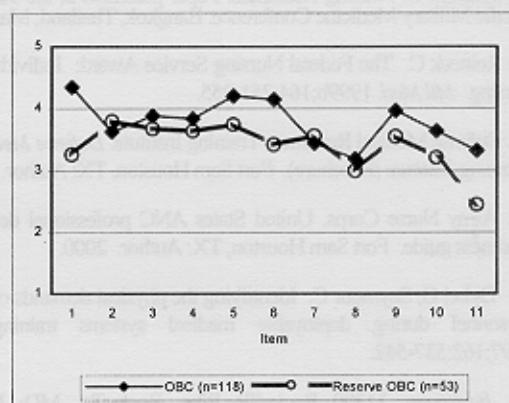


Figure 3. Panoramic display depicting READI profiles and a statistical comparison of active duty and U.S. Army Reserve nurses for self-reported soldier survival skills.

duty and U.S. Army Reserve units could plot before and after READI profiles through time to assess changes, training effectiveness, and to set goals. Third, comparing an individual nurse's READI rating scores to established unit or cohort profiles could be used to identify personal deployment needs, and could also suggest continuing education opportunities for individuals. Lastly, the READI could be used as a job preview mechanism for ANC recruiting activities. Further administrations are needed to chart benchmark nurse readiness profiles for different rank and experience levels to provide comparisons that impact readiness issues at the unit, corps, and medical command levels. Future applications of the READI to different cohort groups will help broaden and strengthen the reliability, validity, and usability of the instrument.

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