

## Development of a Proxy Measure of Veteran Community Integration: A Preliminary Report

Linda Resnik<sup>1,2,\*</sup>,  
Pam Steager<sup>1</sup> and  
Matthew Borgia<sup>1</sup>

### Abstract

**Background:** The Community Reintegration Measure for Injured Service Members (CRIS) assesses issues in community participation specific to injured service members. The CRIS may have limited usefulness where illness or disability prevents completion, patients have limited insight, or symptoms/stigma distort self-report. Thus, an alternative approach to measurement using proxies is needed.

**Purpose:** The objectives were to 1) create and pilot test a proxy version the CRIS, which we called the CRIS/P; 2) create and pilot test a measure of proxy satisfaction with veteran community integration.

**Methods:** The study involved cognitive testing and a reliability study. Participants were caregivers of veterans. cognitive testing was conducted with 10 caregivers. The refined measures were administered to 24 caregivers, 23 completed measures twice within a week. Analyses of scale internal consistency led to refinements. Test-retest reliability was examined using ICC. Differences between CRIS/P Satisfaction and Proxy Satisfaction were examined.

**Results:** ICCs of CRIS/P were 0.96, 0.95, 0.91 and Cronbach's alphas were 0.95, 0.95 and 0.96 for Extent, Perceived Limitation and Satisfaction, respectively. The final Proxy Satisfaction scale consists had an ICC of 0.97 and a Cronbach alpha of 0.97. CRIS/P satisfaction scale was strongly correlated with the Proxy Satisfaction ( $r=0.78$ ), CRIS/P scores were significantly higher than Proxy Satisfaction for the full measure and for 11 items.

**Conclusion:** Preliminary analyses support internal consistency and test-retest reliability of the CRIS/P and Proxy Satisfaction scales and suggest that proxies are less satisfied with veteran participation than their ratings of Veteran's satisfaction with participation.

**Keywords:** Social integration; Disability evaluation; Veteran; Caregiver; Participation

- 1 Providence VA Medical Center, 830 Chalkstone Avenue, Providence, RI02908, USA
- 2 Health Services, Policy and Practice, Brown University, Providence, RI, USA

**Corresponding author:** Linda Resnik

✉ Linda.Resnik@va.gov

Providence VA Medical Center, 830 Chalkstone Avenue, Providence, RI02908, USA.

**Tel:** 401-273-7100-2368

**Citation:** Resnik L, Steager P, Borgia M (2017) Development of a Proxy Measure of Veteran Community Integration: A Preliminary Report. Trauma Acute Care Vol.2 No.6: 64.

**Received:** December 11, 2017; **Accepted:** December 18, 2017; **Published:** December 21, 2017

### Introduction

Community reintegration is a primary intervention goal for veterans with disabling physical conditions and mental disorders; and thus a priority area for outcomes assessment in the Department of Veterans Affairs (VA). The need for measurement of veteran community integration has been highlighted by reports of challenges in post-deployment reintegration for

veterans deployed in Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND), military campaigns collectively classified under the umbrella of "the Global War on Terror" (GWOT). A national survey of OEF/OIF veterans found that 25% reported difficulties in major life domains [1]. Amongst GWOT Veterans seeking care at VA facilities 40% experience a variety of community integration problems, such as difficulties with relationships, struggling to hold a job,

and increased isolation [1,2]. Roughly 96% were interested in treatment for community integration issues [2]. About 50% of OEF/OIF Veterans participating in a large clinical trial reported reintegration difficulties [1].

Traumatic injuries are frequently accompanied by mental health disorders, such as posttraumatic stress disorder (PTSD), depression, and anxiety [3]. Many more service members, not classified as “wounded in action”, have been diagnosed with traumatic brain injury (TBI) and/or PTSD. An estimated 15-19% of OEF/OIF/OND service members sustained a TBI during deployment [4]. As of May 7, 2014, TBI was diagnosed in over 300,000 U.S. service members [2]. TBI/Polytrauma is associated with cognitive, psychosocial, and behavioral problems, including memory deficits, attention difficulties, and irritability. Amongst OEF/OIF Veterans, 89% with a TBI diagnosis had a comorbid mental health diagnosis; 73% of those diagnoses were PTSD. Prevalence estimates of post-deployment PTSD range from 5-20% of OEF/OIF Veterans, translating to 100,000-400,000 recent combat Veterans with PTSD. PTSD is associated with diminished quality of life and multiple problems in community integration such as aggressive behavior, domestic violence, ineffective parenting, unsafe driving, unemployment, and social alienation [5,6].

Although community reintegration care is an integral goal of VA care and is emphasized in areas of physical medicine & rehabilitation, mental health, and primary care, there is no system-wide, standardized approach to its measurement. Yet, measurement is essential for developing and testing interventions targeting enhanced participation, documenting clinical program effectiveness and tracking population health. In 2010, the VA Working Group on Community Integration, agreed that the construct of participation as defined by the WHO’s International Classification of Health and Function (ICF) [7] was an appropriate conceptual framework for defining and measuring community integration [8].

Considerable advances have been made in the measurement of veteran community integration using Patient self-report measures (PROMS) developed based on the ICF framework. The Community Reintegration Measure for Injured Service Members (CRIS) [7] and the computer adaptive test version, the CRIS-CAT [9], were developed to assess issues specific to injured service members. The CRIS demonstrated good reliability, construct and predictive validity in samples of Iraq and Afghanistan war-era veterans [10]. PROMS, by definition, represent the patient’s perspective, a necessary and important metric of community integration. However, in clinical situations where illness or disability prevents completion of PROMS, or the patient has limited insight, or symptoms or stigma distort self-report, reliance on self-report alone is not possible or advisable. Yet, excluding data from these types of patients would bias results of research studies, and leave clinicians without important data. Thus, an alternative or additional measurement approach to community reintegration measurement using proxies is needed.

Furthermore, authorities strongly recommend that in assessment of patients with PTSD or TBI information obtained via patient

self-report and/or, clinician rating should be supplemented, whenever possible with collateral data from friends, family members, coworkers, or supervisors [6,11]. Given that health care utilization is influenced by proxy perceptions and clinicians routinely consider data from multiple sources in making care decisions, proxy ratings may provide an important source of information in many other situations. Thus, the objectives of this study were to 1) create and pilot test a proxy version the CRIS, which we called the CRIS/P; 2) create and pilot test a measure of proxy satisfaction with Veteran community integration.

## Impact and Implications

Although community reintegration is an important rehabilitation goal, standardized approaches to its measurement are limited.

Two new proxy measures related to Veteran community integration were developed and validated.

Proxy ratings can be used by clinicians may provide important information for clinical decision-making.

## Methods

### Conceptual framework

In this study, we utilized the measurement tool that was developed using the proxy-proxy perspective as defined by Pickard and Knight in 2005 to develop the CRIS/P [12]. Pickard and Knight introduced a framework for proxy measures that included two types of measures which they called 1) a “proxy-patient” measure in which the proxy rates responses according to how he/she thinks that the patient would respond; and 2) a “proxy-proxy” measure in which the proxy rates responses from their own perspective.

Historically, few measures have been developed using a clear framework and specific set of instructions. Instead, most proxy measures use the same measurement instrument for both patient and proxy with no explicit instruction given regarding the perspective from which the proxy is to complete the measure. In some cases, proxy measures have altered wording so that the questions are framed in the third person when asking the proxy, but they do not provide any explicit instruction regarding the proxy perspective. However, there is ample evidence that the type of perspective that the proxy takes influences their ratings of disability and quality of life, and thus is associated with the inter-rater gap between proxy and patient perspective. Pickard’s study of Veterans with cancer found statistically significant differences in scores on the EQ-5D and Cancer Quality of Life Questionnaire between a proxy-proxy and proxy-patient version with the proxy-patient version more closely correlated with the patient self-report [13]. Lobchuk compared 3 types of proxy measures (neutral, proxy-patient and proxy-proxy perspectives) in a study of cancer patients and reported that the proxy-patient responses were more strongly correlated with patient responses [14]. McPhail’s study of proxy-patient agreement on the Euroqol-5D in geriatric rehabilitation patients found strong agreement between proxy-patient assessments and patient self-report at discharge across all cognition levels.

## The CRIS measure

The CRIS measure has three sub-scales, each measuring a different dimension of participation. Each of the sub-scales is comprised of items drawn from the 9 activity and participation content domains (or chapters), defined by the ICF. The Perceived Limitations to Participation subscale assesses veteran's perceived limitations in participation." The Extent of Participation subscale assesses how often veterans experience a challenge in participation. The Satisfaction with Participation subscale assesses veterans' level of satisfaction with participation. The instrument measures objective and subjective elements of participation and includes items related to negative as well as positive aspects of participation [15]. Prior research showed that the scales had good reliability, a broad spectrum of item difficulty, and evidence of concurrent and construct validity [10,15].

## Study design

The study had two phases. The first phase was cognitive testing of the newly developed CRIS/P and Proxy Satisfaction measures. The second phase was a reliability study of the final measures.

## Sample

Participants in both phases were caregivers of veterans recruited through local VA health professionals, advertisements, press-releases and online posting sites. Eligible participants met the following inclusion criteria: ages 18-80, spouse, partner or loved one (parent, sibling or other caregiver) of a veteran with mental or physical health problem(s) that were treated within the DoD and/or VA health care systems for mental and/or physical health problem(s), able to understand the requirements of the study and provide informed consent. Phase II participants were excluded if they were unable to commit to attending two visits within a one week period.

## Phase I: Cognitive Testing

### 5.1 Data collection

Prior to data collection all CRIS items and instructions were revised into proxy-proxy formats by members of the research team. Additionally, the CRIS satisfaction scale was revised to address caregivers own satisfaction with elements of their veteran's participation. The content of the proxy items was designed to mirror that of the original items, but differ by including proxy specific instructions. Several alternatives for item stems, response categories and wording were generated and discussed by the study team and a plan was developed to test the alternatives in cognitive interviewing.

Participants took part in a single session of about 1.5 h in which they reviewed and discussed the proxy items. Each cognitive testing session covered between 10-20 items in each of the three CRIS-scales. Participants were instructed to answer the items from their own perspective and then were asked to answer the same item using the alternative different wording and response formats. After completing the survey items participants were probed on the wording and format. Respondents were asked to

talk about their response process including their comprehension of the item, their ability to recall the answer, and their strategy of retrieving information related to the question. Specific probes asked questions such as: Do the questions mean the same thing to you? If not, why not? Is one clearer/easier for you to understand? If so, which one? What makes it clearer (easier) for you? What were you thinking or feeling when you heard it that made the second way less clear? Was there a format of the question that you preferred? Was there a particular format of the question that you disliked or found confusing? Which one and why?

## Cognitive testing data analysis and item revision

All cognitive interviews were audiotaped. Two analysts (the original interviewer) and a second qualitative analyst listened to the audiotapes to extract responses to the above items. The proportion of participants who indicated a preference for each type of response was tallied. Suggestions for additional item revisions based on participants' responses were also documented. These findings were discussed with the Principal Investigator and decisions on the best wording and format of items were made. Data analysis, item revision and data collection was an iterative process. The results of each cognitive testing session were debriefed and alternative wording of items or response generated. These refinements in the wording of items were then cognitively tested in subsequent interviews. The final result of the cognitive testing phase was a refined preliminary CRIS/P survey that was then used in Phase II.

## Results

### Phase I: Cognitive testing

Cognitive testing was conducted with 10 participants who were caregivers of male veterans (**Table 1**). 30% of veterans were from the Vietnam era, 20% from the Gulf War, 20% from OEF/OIF, and 10% from other eras. All caregiver participants were female, 90% were white, 10% black, 90% non-Hispanic, 10% Hispanic. 90% were spouses and lived with the veteran. All saw their Veteran on a daily basis. Refinements to the CRIS-Proxy item set were made resulting in the version used in Phase II testing.

### Phase II: Pilot Testing

#### Data collection

The preliminary CRIS/P and the Proxy Satisfaction measure were administered to 24 caregivers. Twenty three completed the measure on two occasions within 7 days. Basic information regarding the proxy and Veteran's age, gender, race, relationship, employment status and medical and mental health history was also collected.

#### Data analysis

The characteristics of participants and scores of the CRIS/P and Proxy Satisfaction items and subscales were examined descriptively. Responses to items pertaining to employment and parenting were missing for the majority of respondents because

**Table 1:** Demographics of participants in each of the samples.

	Cognitive interview sample N=10	Internal consistency sample N=24	Reliability Sample N=23
	Mn (SD) Range	Mn (SD) Range	Mn (SD) Range
<b>Proxy Age</b>	53.3 (15.8) 31-77	59.5 (12.5) 32-78	59.0 (12.5) 32-78
<b>Veteran Age</b>	57.8 (20.2) 27-94	66.2 (15.0) 27-94	65.4 (14.8) 27-94
	N (%)	N (%)	N (%)
<b>Proxy Gender</b>			
<b>Male</b>	0 (0)	0 (0)	0 (0)
<b>Female</b>	10 (100)	24 (100)	23 (100)
<b>Veteran Gender</b>			
<b>Male</b>	10 (100)	24 (100)	23 (100)
<b>Female</b>	0 (0)	0 (0)	0 (0)
<b>Proxy Race</b>			
<b>White</b>	9 (90)	24 (100)	23 (100.0)
<b>Hispanic Ethnicity</b>	1 (10)	0 (0)	0 (0)
<b>Living with Veteran</b>			
<b>No</b>	1 (10)	3 (12.5)	3 (13.0)
<b>Yes</b>	9 (90)	21 (87.5)	21 (87.0)

these questions were not applicable to their Veteran. Therefore, these sparsely populated items were removed to enable scale analyses. The item to test, item to total and scale alphas of each of CRIS/P subscale at the first test administration was examined. After inspection of results, items with correlations below 0.1 were eliminated. Several items with low item-total correlations (0.1-0.2) were retained because of their conceptual importance. The internal consistency analyses were then rerun with the truncated item set.

Test re-test reliability of individual items was examined for all items that had a minimum of 7 respondents using the Shrout and Fleiss intra-class correlation coefficient (type 3,1), a two-way mixed model, single measure of reliability. Items with missing data, but considered conceptually important were then added back into the item set in order to calculate test-retest reliability of the full summary scales. Intra-class correlation coefficients (ICCs) from these models were used to calculate the standard error of measurement (SEM) and minimal detectable change (MDC) for each CRIS/P subscale. Proxy Satisfaction was compared with the CRIS/P Satisfaction scale using pairwise Pearson correlations and paired t-tests for each item and the summary scores.

## Results

### Phase II: Pilot testing

Twenty four proxy respondents completed the first survey administration and 23 proxy respondents (100% female), approximately 87% of whom lived with their Veteran completed the second survey (**Table 1**).

### Internal consistency and test-retest reliability

The final CRIS/P measure (Appendix 1) includes 3 subscales: a 48 item Extent of Participation scale, a 51 item Perceived limitations scale, and a 48 item Satisfaction with participation scale. The final Satisfaction of the Proxy measure includes 48 items. The items that were removed from the preliminary scales due to poor fit or  $ICC < 0.1$  (N=5 items) are shown in **Table 2**. The items that were

removed from internal consistency analysis due to low response rate (3-5 items per scale), but were later added back and thus were included in the analysis of internal consistency and test-retest reliability are shown in **Table 3**. ICCs of remaining items within the subscales (those items completed by more than 6 respondents) ranged from 0.20-0.98, 0.38-0.98, and 0.25-0.87 for Extent, Perceived Limitation and Satisfaction respectively. ICCs for the items of the Proxy Satisfaction scale ranged from 0.58-0.92. ICCs of the summary scores for each of the CRIS/P subscales were 0.96, 0.95, 0.91 (**Table 4**) and Cronbach's alphas were 0.95, 0.95 and 0.96 for Extent, Perceived Limitation and Satisfaction, respectively. MDC 90 was estimated to be 4.7, 6.4 and 6.2 points, for the Extent, Perceived Limitation and Satisfaction scales respectively. The final Proxy Satisfaction scale had a Cronbach alpha of 0.97, an ICC of 0.97 and an MDC of 4.7 points.

### Comparison of satisfaction scales

Scores of the CRIS/P Satisfaction scale were significantly higher than scores of the Proxy Satisfaction measure for 11 items and the overall summary scores (**Table 5**). Proxy satisfaction was significantly correlated ( $r: 0.43-0.86, p < 0.05$ ) with veteran satisfaction on 34 of the 47 items (**Table 6**) and the summary scores were strongly correlated ( $r=0.78, p < 0.0001$ ).

## Discussion

We developed and pilot tested a proxy measure of veteran community integration, the CRIS/P that utilized a "proxy-proxy" perspective. Our preliminary analyses showed that the new measure had excellent internal consistency and test-retest reliability. We believe that this measure, when completed by a family or caregiver informant who knows the veteran well, has the potential to provide important, additional information beyond patient self-report to expand upon or clarify the veteran perspective. It is well known that patient reported measures of community reintegration have limitations, particularly for persons who lack insight or have communication or cognitive impairments, a particular concern for persons with head injuries

**Table 2:** Items removed from refined CRIS/P scales due to poor inter-item, item to total correlations or ICC<0.1.

CRIS/P Scale	Prompt
Extent of Participation	How often would you say:
	If Veteran has children:your Veteran spent quality time with his/her children? his/her drinking alcohol or using drugs caused him/her to have trouble with family or friends?
Perceived Limitations	How much would you agree or disagree with these statements about your Veteran:
	Others expressed distress while being a passenger in his/her car.
	S/he had financial problems because s/he was careless with money or didn't pay his/her bills on time. S/he felt s/he spent too much time alone.

**Table 3:** Items removed only from initial internal consistency analyses due to missingness.

CRIS/P Scale	Prompt
Extent of Participation	How often would you say
	If Veteran is working:your Veteran (s/he) had major conflict with his/her supervisor?
	If Veteran is working:others at work complained about the way s/he did his/her job, for example, that s/he talked too much, or they didn't like the way s/he behaved? Your Veteran fulfilled all of the duties of his/her job?
Perceived Limitations	How much would you agree or disagree with these statements about your Veteran
	If Veteran is working: S/he did his/her job well.
	If Veteran is working: S/he had no problem getting his/her work done in his/her job.
	If Veteran is working: S/he got along with his/her supervisor.
	If Veteran is working: S/he got along with people at his/her work. S/he felt discriminated against in getting a job.
Satisfaction	How satisfied do you think your Veteran was with the way
	If Veteran has children or step-children under 18: that s/he met his/her children's or step-children's needs?
	If working: his/her relationship with his/her supervisor at work?
	If working: his/her relationships with people at work? If subject works alone, circle "99" for Not Applicable
	If working: the number of hours that s/he worked? If working: his/her job performance?
Proxy Satisfaction	How satisfied were YOU with:
	If Veteran has children or step-children under 18: that s/he met his/her children's or step-children's needs?
	If working: his/her relationship with his/her supervisor at work?
	If working: his/her relationships with people at work? If subject works alone, circle "99" for Not Applicable
	If working: way the number of hours that s/he worked? If working: his/her job performance?

**Table 4:** ICCs for test-retest reliability, and Minimal Detectable Change of CRIS/P and Proxy Satisfaction Scales.

CRIS/P Scale	Visit 1 Mean (sd)	Visit 2 Mean (sd)	ICC (3,1)	95% CI	MDC90
Extent of Participation	44.2 (10.7)	44.8 (10.4)	0.96	0.92-0.98	4.7
Perceived Limitations	43.1 (11.9)	43.8 (12.5)	0.95	0.89-0.98	6.4
Satisfaction	49.6 (8.6)	50.5 (9.5)	0.91	0.81-0.96	6.2
Proxy Satisfaction	45.7 (11.1)	47.1 (12.0)	0.97	0.92-0.99	4.7

and serious mental illness. It is also recognized that family members and caregivers play an important role in facilitating Veteran reintegration.

Strength of our study was that it utilized caregivers, not clinicians, to develop and pilot test a proxy measure of community integration. Although clinicians and caregivers may have divergent opinions about patient functioning, we believe that the most reliable proxies are persons who spend considerable time with the patient and are familiar with their routine task performance [16]. Compared to such proxies, clinicians have less visibility into the daily life of patients because they do not have the opportunity to observe role functioning and participation

in society outside of a limited encounter in the clinical setting. Even when clinicians observe patient performance in the clinic, there may be discordance between their ratings and patient self-reported difficulty in instrumental daily activities such as using the telephone, doing light housework and shopping, preparing meals, handling finances, and managing medications [17]. A study comparing ratings of instrumental activity of daily living (IADL) performance by patients and proxies, found that patients and proxies were more concordant with a criterion measure (in-home performance of IADL) than were clinician ratings based on judgment of patient impairments or observation of performance of tasks in a hospital setting [16]. A systematic review of studies

**Table 5:** Comparison of CRIS/P Satisfaction and Proxy Satisfaction Ratings.

How satisfied was proxy/Veteran with?	N	Proxy Satisfaction Mn (SD)	CRIS/P Satisfaction Mn (SD)	p-value
his/her ability to learn new things?	22	4.7 (1.9)	4.2 (2.0)	0.0763
his/her ability to start basic everyday tasks and activities without being reminded?	23	4.7 (2.1)	4.4 (1.8)	0.4856
If Veteran is married or in a relationship, ask: his/her relationship with his/her spouse or significant other?	19	5.2 (1.6)	5.6 (1.1)	0.1036
his/her ability to think clearly and logically?	23	4.1 (1.9)	4.7 (1.8)	0.1024
his/her ability to think clearly while in a busy or noisy environment?	23	3.8 (1.8)	3.9 (1.9)	0.7651
his/her ability to make decisions?	23	4.2 (1.7)	4.5 (2.0)	0.4264
his/her ability to handle day to day problems?	22	4.2 (1.9)	4.2 (1.9)	0.8330
his/her ability to read long documents or books?	22	4.1 (1.8)	4.1 (2.2)	0.8703
his/her ability to understand material s/he has read?	22	4.7 (1.5)	4.8 (1.7)	0.8246
his/her ability to do two things at once such as doing a chore and having a conversation?	22	4.5 (1.8)	4.5 (1.9)	1.0000
his/her ability to do several things in a row such as following directions, or doing several tasks one after another?	22	4.2 (1.8)	3.9 (1.9)	0.1665
his/her ability to keep track of his/her daily tasks and activities?	22	4.5 (1.7)	4.3 (1.8)	0.5910
his/her ability to get and stay organized?	22	4.0 (1.9)	4.4 (1.8)	0.2313
the way s/he coped with life's ups and downs?	22	4.6 (1.7)	4.5 (1.3)	0.7103
the way that s/he participated in conversations?	22	4.9 (1.5)	5.5 (1.2)	0.0760
his/her ability to make him/herself understood?	22	5.1 (1.6)	4.8 (1.5)	0.2995
moving around or getting around indoors as s/he wanted to?	22	4.8 (1.8)	4.4 (1.8)	0.1441
the way s/he protected him/herself from harm?	21	5.0 (1.6)	5.4 (1.4)	0.1312
the way s/he managed his/her stress level?	22	4.6 (1.3)	5.0 (1.1)	0.0829
the way that s/he took care of his/her health?	22	4.4 (1.8)	5.4 (1.4)	0.0114
his/her ability to prepare meals?	22	4.0 (2.1)	4.7 (1.9)	0.0873
his/her personal cleanliness?	22	5.0 (1.9)	5.9 (1.2)	0.0014
his/her participation in exercise or light to moderate physical activity such as walking?	22	4.0 (1.8)	4.4 (1.7)	0.3710
his/her ability to control his/her intake of alcohol or use of drugs? (other than what has been prescribed for him/her)?	21	5.9 (1.8)	6.3 (1.4)	0.2680
his/her stress level while being a passenger in a car?	21	4.7 (1.6)	4.7 (1.6)	1.0000
his/her stress level while driving a car?	12	4.8 (1.4)	5.6 (0.9)	0.0341
his/her driving skills?	12	4.3 (2.0)	6.1 (0.7)	0.0089
how s/he took care of what s/he needed to do where s/he lived?	22	4.7 (1.6)	5.2 (1.5)	0.3073
the way s/he assisted others who lived with him/her?	20	5.0 (1.7)	5.3 (1.4)	0.4194
the way s/he got along with his/her family? When thinking of Veteran's family, please do not include spouse, significant other or children.	21	5.0 (1.5)	5.1 (1.2)	0.8333
the way s/he got along with people other than family?	22	5.2 (1.0)	5.7 (0.9)	0.0022
his/her ability to control his/her temper?	22	5.6 (1.2)	5.6 (0.9)	0.8330
his/her awareness of what other people were feeling?	22	4.1 (1.8)	5.0 (1.2)	0.0359
the way s/he got along with other people?	22	5.6 (1.1)	5.8 (1.0)	0.3287
the way s/he acted with friends and loved ones?	22	5.2 (0.3)	5.5 (0.3)	0.1294
the way s/he handled major conflicts with others?	22	4.6 (1.6)	5.1 (1.0)	0.1020
his/her relationships with people close to him/her?	22	4.7 (1.5)	5.6 (1.1)	0.0164
If Veteran has children or step-children under 18, ask: the way that s/he met his/her children's or step-children's needs?	2			
his/her participation in social gatherings?	21	4.0 (1.9)	5.0 (1.4)	0.0254
If working, ask: his/her relationship with his/her supervisor at work?	3			
If working, ask: his/her relationships with people at work?	3			
his/her level of involvement in hobbies?	22	4.1 (1.9)	4.9 (1.3)	0.0425
the amount of time s/he spent in recreational activities not including time spent watching TV?	22	3.5 (1.7)	4.8 (1.5)	0.0033
the way s/he kept up with the news?	22	5.1 (1.7)	6.1 (0.9)	0.0018
If working, ask: the number of hours that s/he worked?	3			
If working, ask: his/her job performance?	3			
his/her ability to manage his/her money by paying bills or by keeping track of his/her expenses?	22	4.0 (2.2)	4.7 (1.8)	0.0355
total score	23	46.5 (10.8)	48.9 (8.2)	0.0191

**Table 6:** Correlations between CRIS/P Satisfaction and Proxy Satisfaction Ratings.

How satisfied was Proxy/Veteran with	r	p
his/her ability to learn new things?	0.82	0.0000
his/her ability to start basic everyday tasks and activities without being reminded?	0.59	0.0028
If Veteran is married or in a relationship, ask: his/her relationship with his/her spouse or significant other?	0.77	0.0001
his/her ability to think clearly and logically?	0.64	0.0010
his/her ability to think clearly while in a busy or noisy environment?	0.72	0.0001
his/her ability to make decisions?	0.66	0.0006
his/her ability to handle day to day problems?	0.86	0.0000
his/her ability to read long documents or books?	0.81	0.0000
his/her ability to understand material s/he has read?	0.82	0.0000
his/her ability to do two things at once such as doing a chore and having a conversation?	0.86	0.0000
his/her ability to do several things in a row such as following directions, or doing several tasks one after another?	0.85	0.0000
his/her ability to keep track of his/her daily tasks and activities?	0.60	0.0029
his/her ability to get and stay organized?	0.79	0.0000
the way s/he coped with life's ups and downs?	0.38	0.0790
the way that s/he participated in conversations?	0.50	0.0168
his/her ability to make him/herself understood?	0.69	0.0003
moving around or getting around indoors as s/he wanted to?	0.70	0.0003
the way s/he protected him/herself from harm?	0.65	0.0014
the way s/he managed his/her stress level?	0.64	0.0012
the way that s/he took care of his/her health?	0.44	0.0402
his/her ability to prepare meals?	0.62	0.0020
his/her personal cleanliness?	0.79	0.0000
his/her participation in exercise or light to moderate physical activity such as walking?	0.43	0.0457
his/her ability to control his/her intake of alcohol or use of drugs? (other than what has been prescribed for him/her)?	0.55	0.0104
his/her stress level while being a passenger in a car?	0.78	0.0000
his/her stress level while driving a car?	0.50	0.0961
his/her driving skills?	0.25	0.4273
how s/he took care of what s/he needed to do where s/he lived?	-0.01	0.9568
the way s/he assisted others who lived with him/her?	0.49	0.0288
the way s/he got along with his/her family? When thinking of Veteran's family, please do not include spouse, significant other or children.	0.75	0.0001
the way s/he got along with people other than family?	0.76	0.0000
his/her ability to control his/her temper?	0.58	0.0044
his/her awareness of what other people were feeling?	0.30	0.1821
the way s/he got along with other people?	0.66	0.0008
the way s/he acted with friends and loved ones?	0.74	0.0001
the way s/he handled major conflicts with others?	0.52	0.0138
his/her relationships with people close to him/her?	0.31	0.1635
If Veteran has children or step-children under 18, ask: the way that s/he met his/her children's or step-children's needs?		
his/her participation in social gatherings?	0.33	0.1457
If working, ask: his/her relationship with his/her supervisor at work?		
If working, ask: his/her relationships with people at work?		
his/her level of involvement in hobbies?	0.56	0.0064
the amount of time s/he spent in recreational activities not including time spent watching TV?	0.36	0.0993
the way s/he kept up with the news?	0.67	0.0007
If working, ask: the number of hours that s/he worked?		
If working, ask: his/her job performance?		
his/her ability to manage his/her money by paying bills or by keeping track of his/her expenses?	0.74	0.0001
total score	0.79	0.0000

examining proxy-patient agreement on psychosocial functioning demonstrated better concordance between proxies and patients than between clinicians and patients, with a median correlation (studies with N>50) between proxies and patients and clinicians

and patients of 0.50 and 0.19 respectively [11].

Although our sample size was modest, we were able to demonstrate that the CRIS/P and Proxy Satisfaction measures

had good to excellent test-retest reliability and good internal consistency. However, pilot sample was a convenience sample consisting of all women, and no minorities. The majority of our participants lived with their veteran. Although we had some minority representation amongst participants in the cognitive testing phase, we cannot be certain that our pilot testing results are generalizable to male caregivers or caregivers from diverse racial or ethnic background. Further, research is needed to expand the sample to test reliability in a more heterogeneous group of caregivers.

Another limitation of the research is that we did not test the CRIS and the CRIS/P and Proxy Satisfaction measures in caregiver/veteran dyads and so we do not have an understanding of the relationship between caregiver and actual Veteran reported scores. Although we expect that there will be a moderate relationship between Veteran and caregiver perspectives on community integration, further research is needed to examine the concordance of proxy and Veteran perspectives on community integration as well as the factors associated with discordant perspectives.

We hope that the CRIS-CAT/P and accompanying Proxy Satisfaction measure will be valuable tools for clinical care providers and researchers focusing on post-deployment health, mental health and rehabilitation. These measures are particularly important to the VA given the expectation that veterans and,

whenever possible, family members should be involved (with the veteran's consent) in treatment planning.

## Conclusion

This paper reported on the development and pilot testing of a proxy measure of veteran community integration, the CRIS/P and an accompanying measure of Proxy Satisfaction with veteran participation. Analyses support the internal consistency and test-retest reliability of the measures. The CRIS/P consists of 3 subscales: a 48 item Extent of Participation scale, a 51 item Perceived limitations scale, and a 48 item Satisfaction with participation scale. The Proxy Satisfaction measure consists of a 48 item scale. Findings suggest a strong correlation between CRIS/P Satisfaction scale and the Proxy Satisfaction scale, although Proxy ratings of their satisfaction with veteran participation were lower overall and on 23% of items.

## Acknowledgements

This research was supported by VA RR&D A9264-S and CIN 13-419. The information in this manuscript does not necessarily reflect the position or policy of the government; no official endorsement should be inferred. The view(s) expressed herein are those of the author(s) and do not reflect the official policy or position of the U.S. Government.

## References

- Sayer NA, Noorbaloochi S, Frazier P, Carlson K, Gravely A, et al. (2010) Reintegration problems and treatment interests among Iraq and Afghanistan combat veterans receiving VA medical care. *Psychiatr Serv* 61: 589-597.
- Defense and Veterans Brain Injury Center (2014) DoD Numbers for Traumatic Brain Injury. Retrieved May 7, 2014.
- Sayer NA (2012) Traumatic brain injury and its neuropsychiatric sequelae in war veterans. *Annu Rev Med* 63: 405-419.
- Galarneau MR, Woodruff SI, Dye JL, Mohrle CR, Wade AL (2008) Traumatic brain injury during Operation Iraqi Freedom: findings from the United States Navy-Marine Corps Combat Trauma Registry. *J Neurosurg* 108: 950-957.
- Negrusa B, Negrusa S (2014) Home front: post-deployment mental health and divorces. *Demography* 51: 895-916.
- Rodríguez JR, Quiñones-Maldonado R, Alvarado-Pomales A (2009) Military suicide: factors that need to be taken into consideration to understand the phenomena. *Bol Asoc Med P R* 101: 33-41.
- World Health Organization (2001) International Classification of Functioning, Disability, and Health Geneva: World Health Organization.
- Chen KL, Wang HY, Tseng MH, Shieh JY, Lu L (2013) The Cerebral Palsy Quality of Life for Children (CP QOL-Child): evidence of construct validity. *Res Dev Disabil* 34: 994-1000.
- Resnik L, Tian F, Ni P, Jette A (2012) Computer-adaptive test to measure community reintegration of Veterans. *J Rehabil Res Dev* 49: 557-566.
- Resnik L, Gray M, Borgia M (2011) Measurement of community reintegration in sample of severely wounded servicemembers. *J Rehabil Res Dev* 48: 89-102.
- Karches KE, Chung GS, Arora V, Meltzer DO, Curlin FA (2012) Religiosity, spirituality, and end-of-life planning: a single-site survey of medical inpatients. *J Pain Symptom Manage* 44: 843-851.
- Pickard AS, Knight SJ (2005) Proxy evaluation of health-related quality of life: a conceptual framework for understanding multiple proxy perspectives. *Medical care* 43: 493-499.
- Pickard AS, Lin HW, Knight SJ, Sharifi R, Wu Z, et al. (2009) Proxy assessment of health-related quality of life in african american and white respondents with prostate cancer: perspective matters. *Med care* 47: 176-183.
- Ustün TB, Chatterji S, Bickenbach J, Kostanjsek N, Schneider M (2003) The International Classification of Functioning, Disability and Health: a new tool for understanding disability and health. *Disabil Rehabil* 25: 565-571.
- White DB1, Cua SM, Walk R, Pollice L, Weissfeld L, et al. (2012) Nurse-led intervention to improve surrogate decision making for patients with advanced critical illness. *Am J Crit Care* 21: 396-409.
- Jensen-Dahm C, Vogel A, Waldorff FB, Waldemar G (2012) Discrepancy between self- and proxy-rated pain in Alzheimer's disease: results from the Danish Alzheimer Intervention Study. *J Am Geriatr Soc* 60: 1274-1278.
- Gray HM, LaPlante DA, Shaffer HJ (2012) Behavioral characteristics of Internet gamblers who trigger corporate responsible gambling interventions. *Psychol Addict Behav* 26: 527-535.