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14. ABSTRACT The objective of the study was to evaluate the effectiveness of two Web-based brief interventions (BIs) for reducing stress and substance use among active duty and National Guard military personnel. The interventions were designed to (1) educate personnel about the use of substances as a poor coping mechanism for stress reactions and (2) boost resilience to stress, thereby reducing the tendency to self-medicate through substance use. Volunteers from two separate states (N=320) completed a brief Web assessment for alcohol use and current stressors and stress reactions. Participants were randomly assigned to one of three intervention conditions: Wait-list control, Stress BI, or Stress plus Substance Use BI. We consider the intervention to have been successful in producing significant reductions in PTSD symptoms, stressors, and stress reactions for all three intervention groups at the 6-month follow-up assessment. While there was a significant decrease in alcohol use at 6 months for all three groups, the sample had very low rates of alcohol use at baseline so there was little room for change.					
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# 1. Introduction

In today's environment, decision makers who want to determine whether to adopt new health care interventions require evidence that the interventions make sense fiscally as well as medically. The estimated societal costs for returning veterans with PTSD or depression over the first 2 years after deployment are between \$4 billion and \$6.2 billion. The continued rise in health care costs could affect other Department of Defense (DoD) programs and could potentially affect areas related to military capability and readiness. Studies have examined the cost-effectiveness of brief interventions (BIs) in civilian settings with regard to many behaviors and the consequences of behavior and have found BIs to be cost-effective. The objective of the study was to evaluate the effectiveness of two Web-based BIs in reducing stress and substance use among post-deployment active duty and National Guard military personnel. One intervention focused only on stress and stress reactions, the other on stress plus substance use. The BIs were compared to a wait-list control group. The overriding objective of this research was to reduce stress reactions and substance abuse. These data are vital to understanding additional steps the military might take in addressing issues of behavioral health, such as developing new, more broadly focused treatment interventions, and starting additional prevention approaches and programs. In addition to providing outcome data, the research provides information on the cost, cost-effectiveness, and cost-benefit of the interventions. The tested intervention shifts the locus of care from the treatment of illness to the promotion of psychological health and resilience. The intervention used an emerging approach (the Web) that is also based on active and effective programs to enhance combat effectiveness, organizational health, and overall well-being of warriors and families. Finally, in an era of financial accountability, it is important that studies document the resources needed to build and maintain interventions. Thus, the information from the cost study will be available to decision makers to appropriately budget for setting up and implementing the interventions.



## **2. Body**

This section of the report describes the research accomplishments associated with each task outlined in the approved Statement of Work (SOW). The SOW can be found in Appendix A.

### **Activity 1. Develop Web-Based Assessment Materials (Months 1–3)**

During Months 1-3, we finalized the assessments for screening, demographics, economic questions, deployment experiences, stress, substance use, and mental health. We also completed the coding specifications for all assessments for use with Hatteras system.

### **Activity 2. Prepare Recruitment and Marketing Materials (Months 1–3)**

We drafted a marketing brochure and a poster for participant recruitment. Materials were distributed at National Guard Armories once they were onboard for the study. In anticipation of recruiting both active duty and reserve personnel, we developed materials for both populations.

### **Activity 3. Prepare Intervention Materials (Months 1–5)**

Both the alcohol and stress components included feedback on current functioning. We developed separate feedback forms for alcohol and stress based on the assessment materials and the information that was relevant to current functioning.

We reviewed both alcohol and stress intervention websites for content and developed our interventions based on current information. The intervention components contained pages of information and interactive activities for how to reduce alcohol use and how to deal with stress.

### **Activity 4. Obtain Study Approvals (Months 6-24)**

Our approval process was lengthy and included several drafts of the consent form and protocol. We received approval from the RTI IRB and HRPO.

We worked with a number of states to gain approval for access to personnel. We received letters of support from the TN National Guard, GA National Guard, WA National Guard, NC National Guard, Twentynine Palms Marine Corps base, and joint base Lewis-McChord.

We also worked with AL, AZ, HI, and ND National Guard organizations to obtain support for the project but it did not move forward in those states.

We tried gaining support for the project at Camp Lejeune and Tripler Army Medical Center.

We tried working with the Army ASAP to determine feasibility of rolling out to all Army ASAP programs. Although there had been initial interest from the Army ASAP, we did not receive confirmation of support for the project on an Army-wide basis and were only

able to access Joint Base Lewis-McChord (JBLM) for advertising the project in the ASAP offices. However, JBLM did not refer any participants.

We had several amendments to the IRB protocol. First, we sought (and received) approval to provide compensation for participation. National Guard (NG) participants were able to claim \$15 gift cards for completing each assessment for a total of \$60. HRPO did not approve payment to active duty participants so their consent form remained unchanged. Second, we revised the NG consent form to include compensation information. Third, we revised the recruiting materials to be more streamlined and to include information about Amazon gift card compensation for NG participation.

### **Activity 5. Develop Web Site (Months 6-18)**

We set up a website for the project at: [SUSTAIN.rti.org](http://SUSTAIN.rti.org). This entailed significant work noted here:

- Create the project website shell and database
- Complete the Draft Process Flow documentation
- Draft Database Diagram
- Research skins for portal look/feel
- Web portal skins purchased, and customization of the portal skin
- Update validation rules for screening rules/process
- Developed spec documentation for the Feedback Reports
- Complete development of the respondent screens to progress the user from screener to baseline completion
- Complete development and programming of all Alcohol and Stress interventions
- Complete final internal (RCD) testing of the follow-up survey instrument
- Complete final beta testing of all modules linked together as an entire system.

### **Activity 6. Pilot Intervention (Months 20-22)**

Because of the delays in obtaining study approvals we opted to substitute beta testing for the pilot test. Both internal and external testing were completed.

### **Activity 7. Participant Recruitment (Months 27-56)**

We completed recruitment of 320 participants in September 2016. Recruitment increased significantly in the last year of the project after adding the North Carolina Army National Guard.

We received two no cost extensions (12 month and 5 month) in order to extend data collection and have time to focus on follow-up assessments and data analyses.

With revised power calculations estimating a sample size of 300, we estimate that we will reach that number by August 2016. The revised N will still allow full modeling of the results and comparisons by state, gender, deployment status, stress level, and baseline alcohol use. We were able to exceed that number and recruit 320.

All of the participants were from the NC or GA Army National Guard. Despite having provided in-person briefings to WAARNG and JBLM they did not enroll any participants. Likewise, Twentynine Palms did not provide any participants even with multiple communications offering to provide support and to conduct a briefing on the installation.

The initial recruitment effort entailed sending recruitment brochures and posters to points of contact at armories for dissemination to their service members. The brochures described the study and both the brochures and posters provided the study website that enabled individuals to obtain additional information including study eligibility. These recruitment materials were also sent to the organizations' medical and behavioral health professionals to enable them to suggest study participation to their clients. Since these activities yielded no response, the co-principal investigator, Dr. Strange, a former member of the Georgia Army National (GaARNG), worked with its leadership to identify opportunities to provide an onsite in-person introduction to the Study to service members in its various military units throughout the state. This introduction consisted of a review of the information provided on the study brochure. Over a several month period, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups. Study information was also provided on the GaARNG website and Facebook Page. Since the enrollment continued to be limited, recruit efforts were halted and requests were made to the RTI IRB and HRPO to provide a \$15 participant incentive, in the form of an Amazon gift card, at completion of each assessment tool, at baseline, and at 1, 3, and 6 month followup, for a maximum of \$60. In addition approval was requested to replace the recruitment brochure with a card format that presented a briefer description of the study and included information about the incentive.

#### **Activity 8. Data Analysis (Months 61-66)**

Study data were cleaned and prepared for analysis. We tested relevant models for examining hypotheses related to program efficacy, how effects were obtained (mediation), and differences in effectiveness (moderation). The primary analyses centered on recent expansions of longitudinal growth modeling (LGM), a technique that allows for the assessment of drinking trajectories over time and the factors that are associated with those changes in alcohol use (i.e., intervention condition). Interim data were analyzed for presentation at national conferences.

Bivariate correlations revealed that, not surprisingly, current stressors, stress reactions, and posttraumatic stress symptoms were all highly correlated (all  $r$ 's > 0.60). Additionally, benefit finding was negatively related to current stressors, stress reactions, and posttraumatic stress symptoms. All three stress measures (current stressors, stress reactions, and posttraumatic stress symptoms) were related to lower ratings of quality of

life, but higher levels of benefit finding were associated with higher quality of life (see Baseline Resilience manuscript in Appendix E).

Results of analyses of variance showed that participants who reported a combat deployment also reported significantly more current stressors, stress reactions, and posttraumatic stress symptoms than those who had never deployed, as well as a lower quality of life. However, those who had experienced a combat deployment also reported significantly more benefit finding than those who had never deployed.

The outcome results from the study show that all three groups improved outcomes. For the waitlist control, for example, there was a 2.47 unit reduction in stress at the mean. Moreover, regression-to-the-mean in findings is unlikely because the intervention was offered during the course of participants' normal lives, rather than being anchored on any meaningful event, such as participants reporting for treatment at a health clinic. Because the waitlist control completed only the assessment but also experienced improved outcomes, we speculate that it is possible that some questions in the assessment were responsible for the improved outcomes

#### **Activity 9. Economic Evaluation (Months 58-66)**

We gathered data throughout the study period to conduct the cost, cost-effectiveness, and cost-benefit analyses for the economic evaluation. For the cost-effectiveness analysis, we combine information on the efficacy of the intervention and the cost of each intervention. For the cost-benefit analysis, we will further combine information gathered on the economic outcomes. An economic report can be found in Appendix B.

For the economic evaluation, we assessed the time and value of the time that National Guard members spent participating in SUSTAIN. For the main analyses we compared the costs of the three intervention arms. The median value for the non-research assessment cost of the waitlist control was \$4.85, and the median value for assessment plus intervention was \$5.12 and \$5.60 for the stress only and stress plus alcohol groups.

Although at one month there was no association between the interventions and the outcome findings, there is little doubt that assessments for stress and alcohol are worth pursuing. The economic evaluation provides estimates of the implementation plus assessment, with an attempt to exclude the artificial research costs of it being a study. Despite the fact that the assessment comprised the majority of costs, the estimates suggests relatively little participant burden of assessment, at a median of between \$4.24 and \$4.85 across study arms.

Given the large proportion of time and cost accounted for by the assessment, it is possible that any improvement in outcome for each study arm was influenced by the assessment, or an assessment-only effect. An additional finding in the economic evaluation was in the sub-analysis that speculated as to whether there was an effect associated with assessment only. All three study arms showed improved in outcome. Because all study arms were offered the same assessment, it was not possible to isolate which parts of the assessment were associated with improvements in outcome. For this reason, the sub-analysis included all assessment costs. The speculative finding was that if the change over time is interpreted as evidence of an assessment-only effect, the associated cost of the

assessment ranged from just over \$7.30 to just under \$9.00 at the median. Moreover, when taken at the mean, the estimates suggest that a one unit improvement in the total stress reaction score costs just over \$4 (see full manuscript in Appendix B).

**Activity 10. Report and Manuscript Preparation (Months 12, 24, 36, 48, 60-66)**

A number of quarterly and annual reports, conference presentations, installation briefings, and manuscripts were prepared to ensure broad dissemination of the study findings. We prepared brief reports for each state separately (Georgia and North Carolina) with information on their state's personnel and a combined report for the National Guard Bureau. It should be noted that frequently military organizations provide personnel and never receive information about their populations. We were committed to providing at least summary data on our participants. These reports can be found in Appendix C. The MHSRS poster is attached as Appendix D. Two additional draft manuscripts are included as Appendix E. Copies of presentations at annual IPR meetings are in Appendix F.

### **3. Key Research Accomplishments**

This section briefly notes in bulleted format the research accomplishments achieved under the grant. These accomplishments included the following:

- Developed briefing materials and presented briefings to key personnel and base command personnel to build support for the study.
- Obtained letters of support from base commanders at each installation.
- A recruitment poster, brochures, and card-sized handouts were developed for recruiting participants.
- A comprehensive web-based assessment of alcohol use, stress, and stress reactions was developed.
- Web-based interactive intervention materials were developed for reducing alcohol use and stress.
- We worked with National Guard Bureau (NGB) and received an endorsement letter for the project from NGB Chief Surgeon. This letter was used as we tried to engage additional states.
- We enrolled a final N of 320.
- Poster presentation at the Military Health Systems Research Symposium.
- We presented findings at each annual IPR meeting.
- Edited and cleaned data from the baseline survey, and 1-, 3-, and 6-month follow-up surveys.
- Generated three manuscripts for submission to peer-reviewed publications focusing on data collected as part of this project. Nearly complete drafts have been prepared for all manuscripts. Manuscripts will be finalized and submitted to journals before the end of 2017.

## **4. Reportable Outcomes**

### **4.1 Briefings and Symposia**

- Brown, J.M. *Combat Stress and Substance Abuse Intervention*. Presented at the annual Interim Progress Report meeting, Fort Detrick, MD.
  - Interim Progress Report meeting, Fort Detrick, MD, August, 2012
  - Interim Progress Report meeting, Fort Detrick, MD, September, 2013
  - Interim Progress Report meeting, Fort Detrick, MD, September, 2014
  - Interim Progress Report meeting, Fort Detrick, MD, October, 2015
  - Interim Progress Report meeting, Fort Detrick, MD, September, 2016
- State Report – Georgia Army National Guard
- State Report – North Carolina Army National Guard
- National Guard Bureau Report

### **4.2 Poster Presentation**

Brown, J.M., Williams, J., Strange, L., & Zemonek, R. (August, 2016). A web-based intervention for alcohol and stress. Presented at: The Military Health System Research Symposium, Kissimmee, FL.

### **4.4 Publications under Internal Editorial Review**

Three publications have been prepared: one is currently under internal editorial review and two will be ready for internal editorial review within the next two month.

- Cowell, A., Wedehase, B.J., & Brown, J.M. (draft). The costs of using a web-based brief intervention for stress and problem drinking in the Army National Guard.
- Morgan, J., Bray, R.M., & Brown, J.M. (draft). Resilience as a threat-activated protective factor against alcohol-related consequences in the Army National Guard.
- Brown, J.M., Morgan, J., Bray, R.M., Strange, L. (draft). Deployment-related differences in posttraumatic stress symptoms and benefit finding in the Army National Guard.

## 5. Conclusion

This study sought to empirically assess the effectiveness of two brief, web-based motivational interventions compared with a delayed feedback (wait-list) control group in the Army National Guard. We evaluated the short-term effectiveness of two interventions with military personnel. We tested the effects of an intervention focusing on stress reduction and an intervention focusing on stress reduction plus alcohol use reduction. Preliminary data indicate that all three interventions resulted in decreased stress reactions but alcohol use of the sample was very low at baseline so fewer significant reductions were found. These findings are tempered by a relatively low follow-up rate (75%). However, analyses revealed that those not completing follow-up assessments were no different from those who provided follow-up data on any of the stress or alcohol use variables at baseline. The results are particularly exciting as this is one of the first true tests of a dual focused web-based intervention and we were able to demonstrate that it is possible not only to engage personnel in the intervention, but to produce results similar to those found with individual brief intervention.

One moderator of the treatments was found. When resilience coming into the intervention is high, both interventions had a larger effect on dropping alcohol-related consequences than wait-list control. When problem recognition is high, the GMI treatment does not have distinguishable effects from SAAS on binge drinking. This suggests that GMI may have its greater efficacy in reducing binge drinking through raising the level of problem recognition. Unfortunately, we did not have a post-intervention measure of problem recognition to confirm this.

We also conducted research to estimate of the costs of starting up and implementing the intervention. All three groups took similar amounts of time and cost to complete the assessment, with a median time of about 12.5 minutes and median cost of about \$4.50. The intervention took less time than the assessment, with the median intervention times in the stress-only group and stress and alcohol groups being 1.73 minutes and 2.38 minutes. Some participants took much longer to complete the intervention (up to 69.06 minutes for the stress only group and 46.76 minutes for the stress and alcohol group), while other participants did not view the intervention at all. Regardless of study group, the time and cost of completing SUSTAIN did not impose a large time burden on participants: the median time to complete the assessment and intervention was less than 16 minutes and less than six dollars per participant. The time and cost of the assessment were the majority of the total time and cost for the two active intervention arms. The assessment comprised 83% of the \$5.12 median cost for the stress group and 76% of the \$5.60 median cost for the stress plus alcohol group.

There are three additional broad contributions to the literature from the cost analyses. First, by presenting costs for a provider that is not a physician, the current estimates help expand the brief intervention cost literature to settings that present opportunities to intervene in stress reduction and problem drinking. Second, separately estimating start-up costs from implementation costs is important because, in addition to the magnitude of costs, decision makers need to understand the structure and timing of costs. Like most other settings in society, the military has relatively scarce treatment resources and must prioritize and plan appropriately. Client costs are critical because they may represent barriers to treatment in some settings and in some settings—such as at some military bases—they are a real cost to the employer. A web-based intervention provides a low cost alternative to traditional care.



Stress reactions and alcohol use are major health and readiness issues in the U.S. military. These issues among military personnel are implicated in lowered work performance, accidents and injury, and serious problems with others and the law. The current study builds on available military intervention Web sites in a number of important ways. First, it expands the scope to include both stress reactions and substance use; second, it focuses on a secondary prevention effort with high-risk individuals (i.e., post-deployment personnel who are experiencing stress reactions and problematic drinking); third, it provides a skills development intervention while all reviewed Web-based interventions offer primarily education; fourth, it provides a rigorous test of the intervention in a high-risk group; and finally, it develops a module the military can use that focuses on stress drinking moving beyond traditional drinking interventions. These interventions could be implemented in the spectrum of prevention to treatment and delivered before deployment, during deployment, and immediately after deployment. Information learned about mediating and potential moderating factors will help identify specific groups at greatest risk for adverse consequences. Moreover, because the interventions are brief and Web-based, they have the potential to reach a large number of Service members who need help, at minimal cost to the military.

It is worth noting that enrollment in the study was surprisingly slow for the first four years of the study. We did everything possible to increase enrollment and finally had success after including the North Carolina Army National Guard and re-briefing units in the Georgia Army National Guard. We had three sites that were briefed and appeared to be very interested but never enrolled any participants: Joint Base Lewis McChord, Twentynine Palms Marine Corps Base, and the Washington State Army National Guard. In addition, the South Dakota Army National Guard, Alabama Army National Guard, and the Tennessee Army National Guard did not maintain contact with study personnel – we assumed they were not interested in moving forward. However, we exceeded our enrollment goal of 300 by having 320 participants complete the baseline assessment. We were very proactive in identifying avenues for participants.

This study suggests that web-based brief interventions can be effective in this population. All three interventions were successful in reducing stress, and alcohol use and consequences at follow up. There are a number of additional steps that the military may take in reducing these problems: (1) screen individuals for alcohol use history and strongly encourages those who are regular drinkers to stop or reduce their use before entering the military; (2) encourage military leaders during basic training to clearly communicate that personnel should develop stress reduction habits and moderate their drinking when they enter the regular force; (3) strive to create the impression among junior enlisted personnel that the military supports getting help with stress reduction and alcohol problems; and (4) provide tested, proven stress and alcohol reduction programs during basic training and afterwards; (5) reduce drinking among military leaders—or at least reduce the perception among junior enlisted personnel that their military leaders drink heavily; and (6) reduce the stigma surrounding seeking treatment for stress and substance abuse problems so that more personnel will seek help when they need it.

## **6. Appendices**

Appendix A – SOW\_Revised\_2016

Appendix B – SUSTAIN Economic paper

Appendix C – SUSTAIN State and NGB Reports

Appendix D – MHSRS poster (August 2016)

Appendix E – SUSTAIN Manuscripts

Appendix F – IPR Meeting Slides (2012, 2013, 2014, 2015, 2016)

## **Appendix A: Statement of Work**

## **Statement of Work (SOW): Combat Stress and Substance Abuse Intervention**

### **Activity 1. Develop Web-Based Assessment Materials (Months 1–3)**

In collaboration with advisors and consultants, RTI International will finalize all assessment materials and develop the Web-based assessment instrument that will provide both baseline and follow-up data for the analyses.

### **Activity 2. Prepare Recruitment and Marketing Materials (Months 1–3)**

In collaboration with installations, we will develop recruitment and marketing materials that are informative and appropriate for the population. We will coordinate with the installation commanders and points of contact (POCs) to conduct briefings at each installation, with the goal of informing all active duty personnel about the study and encouraging their participation. This will include regular update briefings to leadership.

### **Activity 3. Prepare Intervention Materials (Months 1–5)**

The Web-based intervention application will be adapted to include military-specific content (e.g., graphics, feedback on military-specific drinking norms based on our previous research), a military-oriented interface, graphics of younger adults, and an interactive goal-setting component. The full intervention consists of modules for assessment, individualized feedback, and/or goal setting that will be developed and finalized prior to human subjects review submissions.

### **Activity 4. Obtain Study Approvals (Months 6-24)**

We will prepare and submit Institutional Review Board (IRB) packages to RTI, Service-specific, and DoD human subjects review committees.

### **Activity 5. Develop Web Site (Months 6-18)**

We will develop a project Web site that will include not only the intervention and data collection tools, but also information on the nature of the program, including sponsorship, purpose, time requirements, and benefits of participation.

### **Activity 6. Pilot Intervention (Months 20-22)**

We will conduct a pilot test of the intervention to ensure smooth operation of all systems. Testing individuals will be drawn from health care staff and other active duty personnel. Data from the pilot testing will not be maintained or used for any analyses.

### **Activity 7. Participant Recruitment (Months 27–56)**

Participant recruitment will begin as soon as all approvals are obtained and will continue through Month 51 of the project. Follow-up data collection will continue through Month 57.

### **Activity 8. Data Analysis (Months 61-66)**

Once collected, study data will be cleaned and prepared for analysis. We will test relevant models for examining hypotheses related to program efficacy, how effects were obtained (mediation), and differences in effectiveness (moderation). The primary analyses will center on recent expansions of longitudinal growth modeling (LGM), a technique that allows for the assessment of drinking trajectories over time and the factors that are associated with those changes in alcohol use (i.e., intervention condition). Interim data will be analyzed for presentation at national conferences.

**Activity 9. Economic Evaluation (Months 58-66)**

We will gather data throughout the study period and conduct the cost, cost-effectiveness, and cost-benefit analyses for the economic evaluation. For the cost-effectiveness analysis, we will combine information on the efficacy of the intervention and the cost of each intervention. For the cost-benefit analysis, we will further combine information gathered on the economic outcomes.

**Activity 10. Report and Manuscript Preparation (Months 12, 24, 36, 48, 60-66)**

A number of annual reports, conference presentations, installation briefings, and manuscripts will be prepared to ensure broad dissemination of the study findings.

## **Appendix B – SUSTAIN Economic paper**

## Overview

The economic evaluation assesses the value of the resources used for the two active intervention arms, stress and stress plus alcohol, relative to the waitlist control. If either of the active interventions is effective at the one-month follow-up point relative to the waitlist control condition, we also assess the trade-off between the extra resources spent on the intervention and the associated improvement in effectiveness.

We also demonstrate that, even if neither of these two interventions improves outcomes at one month relative to waitlist control, the cost data are still useful to decision-makers. In a sub-analysis, we provide estimates of the cost of achieving the improvement over time, assuming that the assessment itself has an impact on outcome.

The economic evaluation includes only the time National Guard service members spend on SUSTAIN and excludes other costs incurred by the National Guard. Service members participating in SUSTAIN spend their own time to take the assessment and intervention, and this is time that service members could spend in work or leisure. This time is by far the majority of the cost of SUSTAIN. Once the intervention is developed, other costs such as the ongoing costs accruing to the National Guard for implementing SUSTAIN—hosting and maintaining the website—are minimal.

## Methods

*Table 2* describes the participant count for the sample used in the economic evaluation. The number of participants falls greatly from assessment through to the stress intervention and then the alcohol intervention. Respondents that failed to complete all sections were still included in this cost analysis, but with the uncompleted sections recorded as taking zero minutes to complete.

**Table 2.** Count of participants, by component and study group

Component	Waitlist	Stress-only	Stress & Alcohol
Assessment	108	103	109
Stress Intervention	N/A	88	90
Alcohol Intervention	N/A	N/A	43

N/A for not applicable; these sections are not completed by the study group.

SUSTAIN comprises three components: an assessment, a stress intervention, and an alcohol intervention. Each component contains multiple sections. The stress & alcohol study group completes all components, the stress-only study group completes the assessment and the stress intervention only, and the waitlist control group completes only the assessment. The assessment includes a screener to determine if the participant is eligible for the study and a baseline survey.

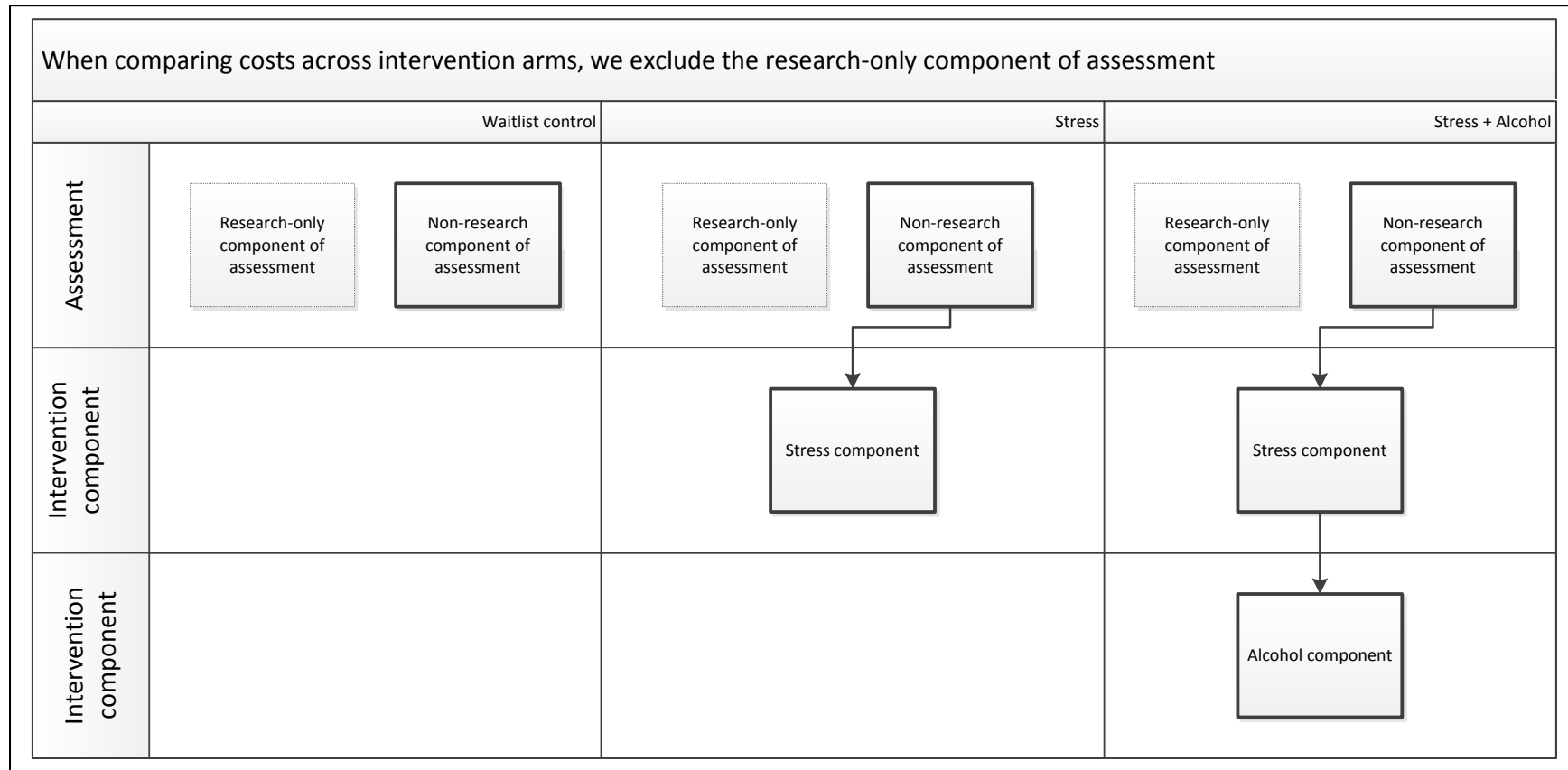
To estimate the cost of SUSTAIN, we first collected time estimates for the three study groups and applied wage rates to calculate costs. We then calculated summary statistics by study group to determine the average time and cost associated with completing the SUSTAIN intervention. We used MicroSoft Excel and Stata MP 14 for data cleaning and analyses.

When comparing the intervention cost across programs, we only include those components of the intervention that would be included if the intervention were implemented in the real-world (*Figure 1*). Thus, we exclude all questions in the assessment that only support the purposes of research. Because the total assessment was long relative to the sections that follow the assessment, this exclusion would have a large impact on the total time to complete the intervention. Examples of research-only sections in the assessment include questions regarding income and employment, deployment status, and demographic information. The non-research questions in the assessment are used to tailor the intervention to the participant and include alcohol and stress screenings and additional questions regarding drinking behaviors. They are used to create custom feedback reports on the participant's stress levels and alcohol use and



present materials relevant to the participant's stress and alcohol use. ***Table 2*** lists each component and sections of the SUSTAIN and identifies which portions are completed by each study group.

**Figure 1.** Costs included for the main SUSTAIN analyses



Note: Costs included are outlined in bold, costs excluded are outlined with a dashed line

**Table 2.** SUSTAIN Components by Study Group

Component	Waitlist	Stress-only	Stress & Alcohol
<u>1. Assessment</u>			
a. Research-only	●	●	●
b. Non research	●	●	●
<u>2. Stress Intervention</u>			
a. Feedback Report		●	●
b. Module 1		●	●
c. Module 2		●	●
d. Module 3		●	●
e. Action Plan		●	●
<u>3. Alcohol Intervention</u>			
a. Feedback Report			●
b. Module 1			●
c. Module 2			●
d. Module 3			●
e. Action Plan			●

We estimated the total time for each participant by estimating the participant's time in each component, which in turn meant estimating the time in each section. Many of these estimates did not have sufficient study data and were imputed (Table 3). The SUSTAIN system automatically captures each participant's start time, and we calculated the elapsed time between start times to determine the time spent on each section. Because only the start time is automatically recorded, however, there are no data on the length of time spent on the final completed sections. These final sections are the Stress Action Plan for the stress-only group or the Alcohol Action Plan for the stress & alcohol group. We therefore imputed all instances of these final sections.

**Table 3.** Number of Participants with Any Imputed Data by Study Group

Component	Waitlist	Stress-only	Stress & Alcohol
<u>1. Assessment</u>			
a. Research-only	9	3	9
b. Non research	15	16	20
<u>2. Stress Intervention</u>			
a. Feedback Report		14	10
b. Module 1		8	7
c. Module 2		1	0
d. Module 3		34	35
e. Action Plan		35	2
<u>3. Alcohol Intervention</u>			
a. Feedback Report			6
b. Module 1			7
c. Module 2			1
d. Module 3			15
e. Action Plan			14

We imputed the Stress Action Plan time for the stress-only group and the Alcohol Action Plan time for the stress & alcohol group by multiplying the median time per Action Plan item by the number of Action Plan items selected for each respondent. The Action Plans comprise several items for the respondent to review, with the number of items to review based on the number of items the respondent selected during the preceding modules. Using the Stress Action Plan for the stress & alcohol group, we divided each participant's total time for this section by the number of selected items to determine the median time per Action Plan item.

Aside from imputing for every final section in SUSTAIN, we also imputed time whenever respondents either did not fully complete the SUSTAIN or completed sections out of order. Imputation was based on how long the individual spent on the previous section. To impute the Module 1 time we used predicted values based on robust regression of Module 1 time on Feedback Report time and a study group indicator. We use robust regression because of the considerable number of outliers in the data; the approach uses a distance-based method of excluding gross outliers from the analysis and then weighted estimates to address other outliers.

We applied the same robust regression approach for missing Module 2 times using the Module 1 time as the dependent variable, and for missing Module 3 times using the Module 2 time as the dependent variable. We reviewed fitted values from the regressions to ensure appropriate model specification. This forward rolling regression approach—where the time from one module informs the imputation for the time in the next—was used to account for correlations between the timing of sections.

To impute for Stress or Alcohol Feedback Report time, we predicted values from robust regression of Feedback Report time on non-research assessment time and a study group indicator. We could not use the forward rolling regression approach for the Stress or Alcohol Feedback Reports. The Stress Feedback Report is the first intervention section viewed, so no previous intervention section time is available to use in the imputation. Some participants who viewed the Alcohol Feedback Report did not complete the full stress intervention so no single stress intervention section time could be used in the imputation.

We also used imputation to address instances of unrealistically long times to complete sections, where respondents presumably had left the SUSTAIN website open but were not actively involved in the intervention. We replaced these outliers with imputed values using the robust regression approach described above. For the stress & alcohol sections, outliers were defined as sections taking longer than two hours. For the non research component of the assessment section, outliers were defined as single-question sections taking longer than three minutes and as multiple-question sections taking longer than fifteen minutes. Outliers for the full screener and baseline survey were defined as 20 minutes and 180 minutes, respectively. Outliers in the assessment section were imputed using robust regression with other assessment section times as dependent variables and the missing section time as the independent variable. Outliers

in the full screener and baseline survey time were imputed using robust regression with other assessment section times as dependent variables and the missing screener/baseline survey time as the independent variable.

We multiplied each respondent's time by the respondent's wage to determine the cost of completing each SUSTAIN section. For civilian respondents, we obtain the respondents' hourly wage from the research-only portion of the assessment section and applied that wage rate. For military respondents, we applied the average military pay for National Guard service members. We then calculated summary statistics by study group and section to determine the average time and cost associated with completing the SUSTAIN intervention.

In a sub-analysis, we estimated the total time to complete the assessment—which summed the research-only and non-research time—to estimate the cost of a potential assessment-only intervention (*Figure 2*). It should be noted that this approach to estimating costs is different from the main analysis, where we included only the non-research costs of assessment. For the sub-analysis the study design does not allow us to isolate which part of the assessment is associated with improvement over time for the waitlist control group.

**Figure 2.** Costs included for the sub-analysis examining assessment-only as a potential intervention

When comparing the cost of assessment only to changes in outcome over time, we include both the research-only and non-research components of the assessment			
	Waitlist control	Stress	Stress + Alcohol
Assessment	<div> <div>Research-only component of assessment</div> <div>Non-research component of assessment</div> </div>	<div> <div>Research-only component of assessment</div> <div>Non-research component of assessment</div> </div>	<div> <div>Research-only component of assessment</div> <div>Non-research component of assessment</div> </div>
Intervention component		<div>Stress component</div>	<div>Stress component</div>
Intervention component			<div>Alcohol component</div>

Note: Costs included are outlined in bold, costs excluded are outlined with a dashed line

## Results

### Main Analysis

*Table 4* presents the estimates for the time and cost to complete the assessment and interventions in a real-world implementation, without a research component of the assessment. In all cases, the median time and cost is lower than the mean, suggesting the distributions are skewed right. High standard deviations relative to the mean, particularly for the interventions, indicate a wide variation in the time to complete. There are also wide spreads between the minimums and maximums values, with the means and medians closer to the minimum values. The results suggest that most respondents completed the SUSTAIN relatively quickly. Also, even after making statistical adjustments for outliers, a few respondents some outliers are evident. Some of the skew in the distribution is because some respondents only completed the assessment and not the interventions (which explains the zero minimum times and cost for the stress-only and stress and alcohol groups). Because of the skew in the data and wide variation, we use median values as a measure of central tendency.



**Table 4.** Time in minutes and cost of completing SUSTAIN for all respondents excluding research-only sections of assessment, by study group (2016\$)

	N	Mean	(Std. Dev)	Median	Minimum	Maximum
<b>Waitlist Control</b>						
<i>Time</i>						
Assessment	108	13.43	(5.99)	12.36	4.43	44.98
<i>Cost</i>						
Assessment	108	\$5.67	(\$3.72)	\$4.85	\$1.37	\$20.11
<b>Stress-Only Group</b>						
<i>Time</i>						
Assessment	103	13.03	(5.07)	12.43	3.85	27.56
Intervention	103	5.27	(10.73)	1.73	0.00	69.06
Total	103	18.30	(12.53)	14.60	6.11	83.18
<i>Cost</i>						
Assessment	103	\$5.12	(\$3.42)	\$4.24	\$0.97	\$23.32
Intervention	103	\$2.21	(\$5.65)	\$0.61	\$0.00	\$41.29
Total	103	\$7.33	(\$7.23)	\$5.12	\$1.15	\$49.73
<b>Stress &amp; Alcohol Group</b>						
<i>Time</i>						
Assessment	109	14.18	(7.13)	12.62	4.70	35.74
Intervention	109	6.03	(9.13)	2.38	0.00	46.76
Total	109	20.21	(12.70)	15.80	6.04	68.19
<i>Cost</i>						
Assessment	109	\$5.90	(\$5.00)	\$4.24	\$0.55	\$32.45
Intervention	109	\$2.65	(\$4.61)	\$0.80	\$0.00	\$27.69
Total	109	\$8.55	(7.88)	\$5.60	\$0.60	\$44.68

All three groups took similar amounts of time and cost to complete the assessment, with a median time of about 12.5 minutes and median cost of about \$4.50. The intervention took less time than the assessment, with the median intervention times in the stress-only group and stress and alcohol groups being 1.73 minutes and 2.38 minutes. Some participants took much longer to complete the intervention (up to 69.06 minutes for the stress only group and 46.76 minutes for the stress and alcohol group), while other participants did not view the intervention at all. Regardless of study group, the time and cost of completing SUSTAIN did not impose a large

time burden on participants: the median time to complete the assessment and intervention was less than 16 minutes and less than six dollars per participant.

The time and cost of the assessment were the majority of the total time and cost for the two active intervention arms. The assessment comprised 83% of the \$5.12 median cost for the stress group and 76% of the \$5.60 median cost for the stress plus alcohol group.

We did not compute a full cost-effectiveness analysis that formally assesses the trade-off among costs and outcomes across the three study groups because the main study found that the waitlist control significantly reduced drinking compared to the other two, active intervention groups at one month. Thus, the waitlist control group is dominant. We did, however, compute the full cost of assessment in sub analysis.

#### Sub-analysis: potential assessment-only effect on outcome

The outcome results from the study (above) show that all three groups improved outcomes. For the waitlist control, for example, there was a 2.47 unit reduction in stress at the mean. Moreover, regression-to-the-mean in findings is unlikely because the intervention was offered during the course of participants' normal lives, rather than being anchored on any meaningful event, such as participants reporting for treatment at a health clinic. Because the waitlist control completed only the assessment but also experienced improved outcomes, we speculate that it is possible that some questions in the assessment were responsible for the improved outcomes. In the sub-analysis, we estimated the complete costs of the assessment. This cost estimate is derived differently from that in the main analysis because it includes the research-only components of the assessment in addition to the non-research components (*Table 5*).

**Table 5.** Time in minutes and cost of completing SUSTAIN assessment including research-only sections, by study group (2016\$)

	N	Mean	(Std. Dev)	Median	Minimum	Maximum
<b>Waitlist Control</b>						
Time	108	25.03	(15.79)	19.79	9.22	112.57
Cost	108	\$10.20	(\$7.66)	\$8.98	\$2.08	\$54.39
<b>Stress-Only Group</b>						
Time	103	25.92	(16.66)	21.73	7.30	118.73
Cost	103	\$10.37	(\$10.34)	\$7.37	\$1.75	\$87.30
<b>Stress &amp; Alcohol Group</b>						
Time	109	28.46	(20.87)	22.05	9.87	134.22
Cost	109	\$11.48	(\$10.32)	\$8.18	\$0.84	\$52.23

The full assessment including research-only sections took between 19 and 22 minutes to complete and at a cost of between seven and nine dollars per participant at the median. Although the mean is skewed upward because of outliers, it can be used with the improvement in outcome over time to estimate the additional cost per unit outcome. The estimates suggest that for the waitlist control, the \$10.20 assessment may be associated with a 2.47 unit improvement in stress reaction, which means that one unit of stress reaction improvement costs \$4.13. Thus, if it is plausible that the SUSTAIN assessment alone is associated with improvements in outcomes, these findings indicate that it requires a modest time commitment and participant cost for National Guard service members.

## Discussion

For the economic evaluation, we assessed the time and value of the time that National Guard members spent participating in SUSTAIN. For the main analyses we compared the costs of the three intervention arms. The median value for the non-research assessment cost of the waitlist control was \$4.85, and the median value for assessment plus intervention was \$5.12 and \$5.60 for the stress only and stress plus alcohol groups.

Although at one month there was no association between the interventions and the outcome findings, there is little doubt that assessments for stress and alcohol are worth pursuing.

The economic evaluation provides estimates of the implementation plus assessment, with an attempt to exclude the artificial research costs of it being a study. Despite the fact that the assessment comprised the majority of costs, the estimates suggest relatively little participant burden of assessment, at a median of between \$4.24 and \$4.85 across study arms.

Given the large proportion of time and cost accounted for by the assessment, it is possible that any improvement in outcome for each study arm was influenced by the assessment, or an assessment-only effect. An additional finding in the economic evaluation was in the sub-analysis that speculated as to whether there was an effect associated with assessment only. All three study arms showed improved outcome. Because all study arms were offered the same assessment, it was not possible to isolate which parts of the assessment were associated with improvements in outcome. For this reason, the sub-analysis included all assessment costs. The speculative finding was that if the change over time is interpreted as evidence of an assessment-only effect, the associated cost of the assessment ranged from just over \$7.30 to just under \$9.00 at the median. Moreover, when taken at the mean, the estimates suggest that a one unit improvement in the total stress reaction score costs just over \$4.

## **Appendix C: State and NGB Reports**

State Report – North Carolina Army National Guard

State Report – Georgia Army National Guard

National Guard Bureau Report

2017



# Combat Stress and Substance Abuse Intervention

STATE REPORT  
NORTH CAROLINA



March 2017

*Prepared by RTI International*

*RTI International is a trade name of Research Triangle Institute*

March 24, 2017

RTI International owes a debt of gratitude to all the men and women who made possible the successful completion of the SUSTAIN study on Combat Stress and Substance Abuse Interventions. From unit commanders to major commands' S-1s and S-3s, to the senior leadership at the State level, as well as those who participated in the survey, we thank you for your support of the study.

Data collected for this survey provide an assessment of the individual-level influences on stress and substance use. The data will be used to better understand the nature, causes, and consequences of alcohol abuse and to help evaluate and guide prevention programs and policy. Data will also provide some insight into what might work to relieve stress and keep alcohol use at safe levels.

We express appreciation to you for your assistance in identifying installations and arranging for facilities to conduct group introductions to the study. In taking these responsibilities and completing the tasks, you played a critical role in the success of data collection at your installations.

RTI is grateful to you for your contribution to the study's success. We are proud to be able to provide you with information that is specific to your State's installations. Thank you very much for your assistance on this very important project.

Very respectfully,



Janice M. Brown, Ph.D., Principal Investigator



Laura B. Strange, Ph.D., R.N., Co-Investigator

## 1. Introduction and Background

Most soldiers who experience combat deployment will not develop full criteria for post-traumatic stress disorder (PTSD). Combat and operational stress reactions (COSRs), however, are common and include a broad area of functioning. COSRs manifest in ways that may affect every day functioning of combat veterans without necessarily resulting in clinical diagnosis of mental disorders. Top levels of military medical commands have acknowledged that almost all combat Veterans experience some degree of COSR, including lack of sleep, irritability, and other responses (Hoge et al., 2007). For most persons, the emotional effects of traumatic events tend to subside after several months. However, individuals may increase substance use to suppress these symptoms, both as a short-term coping mechanism or as a long-term suppression mechanism. Among the military, impediments to seeking health care for combat-related stress responses include stigma, embarrassment, time off from work, and other factors. Web-based interventions provide a private and convenient approach and should facilitate access to care (Hoge et al., 2004) by reducing the stigma and common barriers associated with seeking treatment. Such an intervention is critical and timely, not only for active duty military personnel but particularly for members of the Army National Guard (ARNG) who face additional reintegration challenges because they may lack the social support buffer offered to active duty personnel.

The intervention RTI developed and tested was synergistic with the overall Defense Center of Excellence (DCoE) mission and its emphasis on broad aspects of well-being. Our research directly addressed the area of psychological health and resilience by focusing on those at highest risk for comorbid conditions of stress disorders and

substance abuse problems. The focus was specifically on stress and coping, substance use, and improvement of wellness and resiliency in a post-deployment sample. Our goals were to promote readiness, health, and wellness through effective treatment of stress disorders and substance abuse and to minimize the negative consequences to the individual, military, and family.

Major objectives of the intervention were as follows:

- to evaluate the effectiveness of two web-based brief interventions for reducing stress reactions and substance abuse among two populations of post-deployment military personnel
- to test factors that may mediate responses to the interventions and provide knowledge of the change process that will lead to a better understanding of *how* the brief interventions lead to behavior change
- to assess the cost and cost-effectiveness of the interventions to describe what resources are needed to put the interventions in place and the costs to maintain the interventions on an ongoing basis

### *1.1 Importance to National Guard and Reserve*

At certain times, members of the Guard and Reserve made up nearly half the troops fighting in Iraq. The stress experienced by National Guard personnel is thought to be greater than their active duty counterparts. This may be due to several factors, one of which is the change in mission expected by those who signed up for National Guard duty. Traditionally, most National Guard personnel served “1 weekend a month, 2 weeks a year,” although personnel in highly



operational or high-demand units served far more frequently. A significant number also serve in a full-time capacity in roles such as Active Guard and Reserve (AGR) or Air Reserve Technician or Army Reserve Technician (ART). The “1 weekend a month, 2 weeks a year” slogan has lost most of its relevance since the start of the wars in Iraq and Afghanistan; at the end of 2007, nearly 28% of total U.S. forces in those countries consisted of mobilized personnel of the National Guard and other Reserve components (Hosek et al., 2006).

In addition, units or individuals can be assigned to work alongside troops from different branches of the Service with very different cultures, where the same level of camaraderie they have come to expect from their peers is often lacking. National Guard and Reserve forces also face added stress due to the expectation of suddenly reintegrating into society following their combat deployment. Whereas active duty military members return to their regular assignments, working with those with whom they were deployed, National Guard members most typically disband within days of returning from combat and may not have any daily contact with those with whom they served or any other combat veterans. Thus, they lack the social support buffer of their active duty peers.

### ***1.2 The Cost-Effectiveness of Brief Interventions***

In today’s environment, decision makers who want to determine whether to adopt new health care interventions require evidence that the interventions make sense fiscally as well as clinically. The estimated societal costs for returning Veterans with PTSD or depression over the first 2 years after deployment are between \$4 billion and \$6.2 billion (Tanielian & Jaycox, 2008). The continued rise in health care costs could affect other Department of Defense (DoD)

programs and could potentially affect areas related to military capability and readiness. Studies have examined the cost-effectiveness of brief interventions (BIs) in civilian settings with regard to many behaviors and the consequences of behavior, including sexually transmitted disease (e.g., Gift et al., 2005), smoking (Ruger et al., 2008), and behaviors leading to cardiovascular disease (e.g., Groeneveld, Proper, Van Der Beek, Van Duivenbooden, & Van Mechelen, 2008), and have found BIs to be cost-effective.

### ***1.3 Psychiatric Comorbidity in Military Populations***

Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. In a recent report, a substantial number of veterans from Afghanistan and Iraq deployment met screening criteria for co-occurring mental health problems (Seal et al., 2008). Often, the substance abuse problem is a result of PTSD symptoms, and this temporal understanding can be helpful in identifying onset, assessment, and shaping of treatment programs (Tanielian & Jaycox, 2008). By assessing pre-deployment and post-deployment substance use and mental health problems, this study is aiding in identifying a timeline for symptom development.

### ***1.4 Combat Exposure and Substance Use Disorders***

Among current military personnel, studies have found that heavy-drinking rates were highest among individuals who had deployed in the past year compared with those who had deployed more than 36 months before the survey (Bray et al., 2006; Federman, Bray, & Kroutil, 2000). Exposure to combat in Iraq and Afghanistan has been linked to high rates of substance abuse on return from deployment, particularly among

soldiers and Marines (Milliken et al., 2007). Felker and colleagues (2008) reported that 11% of deployed Operation Iraqi Freedom (OIF) military personnel had severe alcohol abuse problems.

## **2. Sampling Design**

The target population for this study consisted of National Guard service members in North Carolina and Georgia at the time of data collection (December 2014 through August 2016). Following Human Research Protection Office (HRPO) approval, the senior leadership of the Georgia Army National Guard and the North Carolina Army National Guard agreed to allow access to their personnel for potential inclusion in the study.

In addition, a letter of endorsement was received from the Army National Guard Chief Surgeon (Vice National Guard Bureau Surgeon).

The initial recruitment effort entailed sending recruitment brochures and posters to points of contact at armories for dissemination to their service members. The brochures described the study and both the brochures and posters provided the study website that enabled individuals to obtain additional information including study eligibility. These recruitment materials were also sent to the organizations' medical and behavioral health professionals to enable them to suggest study participation to their clients. Since these activities yielded no response, the co-principal investigator, Dr. Strange, a former member of the Georgia Army National (GaARNG), worked with its leadership to identify opportunities to provide an onsite in-person introduction to the Study to service members in its various military units throughout the state. This introduction consisted of a review of the information provided on the study brochure.

Over a several month period, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups. Study information was also provided on the GaARNG website and Facebook Page. Since the enrollment continued to be limited, recruitment efforts were halted and requests were made to the RTI Institutional Review Board (IRB) and HRPO to provide a \$15 participant incentive, in the form of an Amazon gift card, at completion of each assessment tool at baseline, and at 1, 3, and 6 month follow-up, for a maximum of \$60. In addition, approval was requested to replace the recruitment brochure with a card format that presented a briefer description of the study and included information about the incentive.

Following these approvals, the in-person study introduction, with distribution of the study information card, resumed at GaARNG units throughout the state during drill weekends and annual training periods, from October 2014 – August 2016, with a significant increase in the recruitment rate. The final GaARNG sample size was 198 service members.

Following approval from the leadership of the North Carolina Army National Guard, the in-person study introduction, with distribution of the information card, was conducted with its units from November 2015 – August 2016. The final sample from the NCARNG was 121 service members. The recruitment of selected participants was completed without incident. In total, 320 service members participated in the surveys and intervention.

## **3. Characteristics of Respondents**

A total of 320 individuals completed or partially completed questionnaires. Table 1 presents the distributions of respondents by age, gender, and other sociodemographic characteristics.

## **4. Key Definitions and Measures**

### **4.1 Sociodemographic Characteristics**

The sociodemographic characteristics examined in this report include gender, paygrade, race/ethnicity, marital status, and deployment history. Definitions of these different characteristics are described below.

**Gender:** Gender was defined as male or female.

**Race/Ethnicity:** Following the current U.S. Bureau of the Census classification, personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians).

**Education:** Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates.

**Age:** Age of respondents was defined as current age at the time of the survey. Estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older.

**Paygrade:** Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1-W5/O1-O6.

**Marital Status:** Marital status was divided into two groups: Married or Living as Married and Not Married (including

personnel who were single, widowed, or divorced).

**Deployment:** Deployment was defined as prior deployment experiences. Categories were Not Previously Deployed, Noncombat Deployed (with no prior combat deployments) and Combat Deployed (including multiple deployments).

**State:** State was defined as the state in which the service member was currently serving.

### **4.2 Alcohol Use Measures**

**Symptoms of Dependence:** The measure of symptoms of alcohol dependence was determined using the Alcohol Use Identification Test (AUDIT). The AUDIT was developed by the World Health Organization as a simple method of screening for excessive drinking and to assist in brief assessment. The AUDIT consists of 10 questions, each scored from 0 to 4, with a total score ranging from 0 to 40. Scores between 8 and 15 are indicative of *hazardous drinking*, scores between 16 and 19 suggest *harmful drinking*, and scores of 20 or above clearly warrant further diagnostic evaluation for *alcohol dependence*.

**Days Drinking:** The measure of days drinking refers to the number of days the service member drank in the past 30 days.

**Average Number of Drinks:** The average drinks measure refers to the number of drinks on a typical drinking day reported by the service member in the past 30 days.

**Days Drunk:** Days drunk measures how often the service member drank enough alcohol to feel drunk during the past 30 days.

**Binge Drinking:** The number of days the service member had 5 or more drinks on one occasion during the past 30 days.

**Others' Drinking Habits:** The number of drinks the service member reports thinking other people of the same age and gender have on a daily basis.

**Serious Consequences:** The measure of alcohol-related serious consequences refers to the occurrence of the following problems in the past 30 days:

- driven a car after drinking too much to drive safely
- felt sick or thrown up after drinking
- been late for duty because of drinking, a hangover, or an illness caused by drinking
- gotten into physical fights when drinking
- had relationship problems because of drinking
- neglected obligations to self, work, or family for 2 or more days in a row because of drinking
- gotten into sexual situations later regretted because of drinking
- been arrested for drunken driving or other drunken behavior
- been unable to remember part of a prior evening after drinking
- needed more alcohol to feel any effect or could no longer get drunk on the amount of alcohol that used to get one drunk
- had a headache or hangover the morning after drinking

#### ***4.3 Mental Health Measures***

##### **Posttraumatic Stress Symptoms:**

Posttraumatic stress symptoms were measured using the Posttraumatic Stress Disorder Checklist – Military Version (PCL-M). The PCL-M is a 17-item measure assessing the frequency of problems and

complaints in response to a stressful military experience. Scores range from 17 to 85 with scores over 43 indicating probable PTSD.

**Resilience:** Resilience was measured with the Conner-Davidson Resilience Scale (CD-RISC). The CD-RISC contains 25 items, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is rated based on how the participant has felt over the past month. The total score ranges from 0–100, with higher scores reflecting greater resilience.

**Benefit Finding:** Benefit Finding was measured using the Benefit Finding Scale (BFS), which contains 17 items, and each item expresses some potential benefit that might be derived from a specific experience. The scale was made specific by referring to deployment experiences and assesses meaning in terms of personal significance. Responses were rated on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The items assessed benefits in a variety of domains, including acceptance of life's imperfections, becoming more cognizant of the role of other people in one's life, and developing a sense of purpose in life.

**Stress Reactions:** A list of 20 common Stress Reactions were measured in the domains of thoughts, behaviors, emotions, and physical reactions. Service members reported how much they experienced a reaction to each stressor over the past 30 days, on a scale of 0 (none) to 3 (a lot). Scores range from 0 to 60.

##### **Number of Reported Current Stressors.**

Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et

al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none (0), a little (1), some (2), a lot (3) and does not apply (-9). Scores range from 0 to 72.

## **5. Table Descriptions**

Table 5.1 presents percentages of personnel by gender, age, race/ethnicity, education, marital status, pay grade, and deployment history for the full sample of participants.

Table 5.2 shows the average rating of alcohol use and mental health measures, including symptoms of dependence, days drinking, average number of drinks, days drunk, binge drinking, others' drinking habits, and serious consequences, as well as posttraumatic stress symptoms, resilience, benefit finding, stress reactions, and current stressors for the full sample of participants.

Table 5.3 displays the percentage of personnel from your state by gender, age, race/ethnicity, education, marital status, pay grade, and deployment history.

Table 5.4 presents data on the average rating of alcohol use and mental health measures, including symptoms of dependence, days drinking, average number of drinks, days drunk, binge drinking, others' drinking habits, and serious consequences, as well as posttraumatic stress symptoms, resilience, benefit finding, stress reactions, and current stressors for the participants in your state.

Table 5.5 displays the average scores on alcohol use and mental health measures by deployment history for participants in your state.

Table 5.6 shows the average scores on alcohol use and mental health measures at baseline and 1-month follow-up for military personnel in your state.

**Table 5.1** SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

Sociodemographic Characteristics	Frequency ( <i>n</i> )	Percent (%)
<b>Gender</b>		
Female	96	30.0
Male	224	70.0
<b>Race/Ethnicity</b>		
White	199	64.0
Black	72	23.2
Hispanic	23	7.4
Other	17	5.5
<b>Education</b>		
High school or less	38	11.9
Some college	156	48.8
College graduate or higher	124	38.8
<b>Age</b>		
18-20	19	5.9
21-25	63	19.7
26-34	123	38.4
35-60	114	35.6
<b>Paygrade</b>		
E1-E3	29	9.1
E4-E6	189	59.4
E7-E9	48	15.1
W1-W5/O1-O6	52	16.3
<b>Marital Status</b>		
Married or living as married	202	63.4
Single/Divorced/Widowed	117	36.6
<b>Deployment</b>		
Not previously deployed	105	32.9
Noncombat deployed	28	8.8
Combat deployed	187	58.4
<b>State</b>		
Georgia	198	62.1
North Carolina	121	37.9

Note: Table displays the percentage of military personnel by sociodemographic characteristics for the full sample. Definitions of sociodemographic characteristics are given in Section 4.1. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.2 ALCOHOL USE AND MENTAL HEALTH IN STUDY PARTICIPANTS**

<b>Alcohol Use and Mental Health</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Alcohol Use</b>		
Symptoms of Dependence	4.60	3.93
Days Drinking	6.24	6.69
Average Number of Drinks	2.70	1.76
Days Drunk	1.58	2.87
Binge Drinking	1.18	2.85
Others' Drinking Habits	3.47	2.48
Serious Consequences	1.44	2.72
<b>Mental Health</b>		
Posttraumatic Stress Symptoms	28.77	12.63
Resilience	71.05	18.15
Benefit Finding	42.54	14.67
Current Stressors	12.51	8.87
Stress Reactions	15.35	12.11

Note: Table displays the average scores on alcohol use and mental health measures for military personnel for the full sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.3** SOCIODEMOGRAPHIC CHARACTERISTICS OF NORTH CAROLINA PERSONNEL

Sociodemographic Characteristics	Frequency ( <i>n</i> )	Percent (%)
<b>Gender</b>		
Female	38	31.4
Male	83	68.6
<b>Race/Ethnicity</b>		
White	77	68.1
Black	21	18.6
Hispanic	8	7.1
Other	7	6.2
<b>Education</b>		
High school or less	11	9.1
Some college	69	57.0
College graduate or higher	41	33.9
<b>Age</b>		
18-20	4	3.3
21-25	25	20.7
26-34	52	43.0
35-60	40	33.1
<b>Paygrade</b>		
E1-E3	12	9.9
E4-E6	74	61.2
E7-E9	18	14.9
W1-W5/O1-O6	17	14.1
<b>Marital Status</b>		
Married or living as married	76	62.8
Single/Divorced/Widowed	45	37.2
<b>Deployment</b>		
Not previously deployed	34	28.1
Noncombat deployed	9	7.4
Combat deployed	78	64.5

Note: Table displays the percentage of military personnel by sociodemographic characteristics for the NC sample. Definitions of sociodemographic characteristics are given in Section 4.1. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.



**Table 5.4 ALCOHOL USE AND MENTAL HEALTH IN NORTH CAROLINA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Alcohol Use</b>		
Symptoms of Dependence	5.02	3.96
Days Drinking	6.14	6.18
Average Number of Drinks	2.67	1.44
Days Drunk	1.67	2.58
Binge Drinking	1.36	2.96
Others' Drinking Habits	3.35	2.45
Serious Consequences	1.69	3.02
<b>Mental Health</b>		
Posttraumatic Stress Symptoms	27.44	11.58
Resilience	72.24	16.54
Benefit Finding	42.00	14.85
Current Stressors	12.46	9.46
Stress Reactions	14.53	11.43

Note: Table displays the average scores on alcohol use and mental health measures for military personnel in the NC sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.5****MEAN SCORES (AND STANDARD ERRORS) ON KEY VARIABLES BY DEPLOYMENT STATUS IN NORTH CAROLINA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Full Sample (<i>n</i> = 320)</b>		<b>Not Deployed (<i>n</i> = 105)</b>		<b>Combat Deployed (<i>n</i> = 187)</b>	
Posttraumatic Stress Symptoms	27.4	(11.6)	23.9	(9.1)	29.0	(12.2)
Symptoms of Alcohol Dependence	5.0	(4.0)	5.0	(3.7)	4.8	(4.1)
Current Stressors	12.5	(9.5)	11.5	(10.3)	13.1	(9.2)
Stress Reactions	14.5	(11.4)	11.6	(10.9)	15.7	(11.5)
Average Number of Drinks	2.7	(1.4)	2.8	(1.3)	2.5	(1.4)
Days Drinking	6.1	(6.2)	6.6	(6.2)	5.6	(5.7)
Days Drunk	1.7	(2.6)	2.3	(3.2)	1.3	(1.9)
Binge Drinking	1.4	(3.0)	1.8	(3.8)	1.0	(2.2)
Serious Consequences	1.7	(3.0)	2.4	(4.1)	1.3	(2.5)
Resilience	72.2	(16.5)	73.9	(19.0)	70.4	(15.5)
Benefit Finding	42.0	(14.9)	38.6	(14.5)	42.2	(15.1)

Note: Table displays the average scores on alcohol use and mental health measures by deployment status for military personnel in the NC sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.6****MEAN SCORES (AND STANDARD ERRORS) FOR OUTCOMES AT BASELINE AND 1-MONTH FOLLOW-UP IN NORTH CAROLINA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Baseline</b>		<b>1-Month</b>	
Symptoms of Alcohol Dependence (AUDIT-C)	3.3	(2.1)	2.2	(2.0)
Current Stressors	12.5	(9.5)	8.8	(8.2)
Stress Reactions	14.5	(11.4)	11.5	(10.7)
Average Number of Drinks	2.7	(1.4)	2.4	(1.2)
Days Drinking	6.1	(6.2)	5.5	(5.7)
Days Drunk	1.7	(2.6)	1.4	(2.6)
Binge Drinking	1.4	(3.0)	1.2	(2.5)
Serious Consequences	1.7	(3.0)	1.1	(1.8)

Note: Table displays the average scores on alcohol use and mental health measures at baseline and 1-month follow-up for military personnel in the NC sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

We consider the intervention to have been successful in reducing stress and stress reactions. While there was some decrease in alcohol use, the sample had very low rates of alcohol use at baseline so there was not much room for change.

2017



# Combat Stress and Substance Abuse Intervention

STATE REPORT  
**GEORGIA**



March 2017

*Prepared by RTI International*

*RTI International is a trade name of Research Triangle Institute*

March 24, 2017

RTI International owes a debt of gratitude to all the men and women who made possible the successful completion of the SUSTAIN study on Combat Stress and Substance Abuse Interventions. From unit commanders to major commands' S-1s and S-3s, to the senior leadership at the State level, as well as those who participated in the survey, we thank you for your support of the study.

Data collected for this survey provide an assessment of the individual-level influences on stress and substance use. The data will be used to better understand the nature, causes, and consequences of alcohol abuse and to help evaluate and guide prevention programs and policy. Data will also provide some insight into what might work to relieve stress and keep alcohol use at safe levels.

We express appreciation to you for your assistance in identifying installations and arranging for facilities to conduct group introductions to the study. In taking these responsibilities and completing the tasks, you played a critical role in the success of data collection at your installations.

RTI is grateful to you for your contribution to the study's success. We are proud to be able to provide you with information that is specific to your State's installations. Thank you very much for your assistance on this very important project.

Very respectfully,



Janice M. Brown, Ph.D., Principal Investigator



Laura B. Strange, Ph.D., R.N., Co-Investigator

## 1. Introduction and Background

Most soldiers who experience combat deployment will not develop full criteria for post-traumatic stress disorder (PTSD). Combat and operational stress reactions (COSRs), however, are common and include a broad area of functioning. COSRs manifest in ways that may affect every day functioning of combat veterans without necessarily resulting in clinical diagnosis of mental disorders. Top levels of military medical commands have acknowledged that almost all combat Veterans experience some degree of COSR, including lack of sleep, irritability, and other responses (Hoge et al., 2007). For most persons, the emotional effects of traumatic events tend to subside after several months. However, individuals may increase substance use to suppress these symptoms, both as a short-term coping mechanism or as a long-term suppression mechanism. Among the military, impediments to seeking health care for combat-related stress responses include stigma, embarrassment, time off from work, and other factors. Web-based interventions provide a private and convenient approach and should facilitate access to care (Hoge et al., 2004) by reducing the stigma and common barriers associated with seeking treatment. Such an intervention is critical and timely, not only for active duty military personnel but particularly for members of the Army National Guard (ARNG) who face additional reintegration challenges because they may lack the social support buffer offered to active duty personnel.

The intervention RTI developed and tested was synergistic with the overall Defense Center of Excellence (DCoE) mission and its emphasis on broad aspects of well-being. Our research directly addressed the area of psychological health and resilience by focusing on those at highest risk for comorbid conditions of stress disorders and

substance abuse problems. The focus was specifically on stress and coping, substance use, and improvement of wellness and resiliency in a post-deployment sample. Our goals were to promote readiness, health, and wellness through effective treatment of stress disorders and substance abuse and to minimize the negative consequences to the individual, military, and family.

Major objectives of the intervention were as follows:

- to evaluate the effectiveness of two web-based brief interventions for reducing stress reactions and substance abuse among two populations of post-deployment military personnel
- to test factors that may mediate responses to the interventions and provide knowledge of the change process that will lead to a better understanding of *how* the brief interventions lead to behavior change
- to assess the cost and cost-effectiveness of the interventions to describe what resources are needed to put the interventions in place and the costs to maintain the interventions on an ongoing basis

### *1.1 Importance to National Guard and Reserve*

At certain times, members of the Guard and Reserve made up nearly half the troops fighting in Iraq. The stress experienced by National Guard personnel is thought to be greater than their active duty counterparts. This may be due to several factors, one of which is the change in mission expected by those who signed up for National Guard duty. Traditionally, most National Guard personnel served “1 weekend a month, 2 weeks a year,” although personnel in highly

operational or high-demand units served far more frequently. A significant number also serve in a full-time capacity in roles such as Active Guard and Reserve (AGR) or Air Reserve Technician or Army Reserve Technician (ART). The “1 weekend a month, 2 weeks a year” slogan has lost most of its relevance since the start of the wars in Iraq and Afghanistan; at the end of 2007, nearly 28% of total U.S. forces in those countries consisted of mobilized personnel of the National Guard and other Reserve components (Hosek et al., 2006).

In addition, units or individuals can be assigned to work alongside troops from different branches of the Service with very different cultures, where the same level of camaraderie they have come to expect from their peers is often lacking. National Guard and Reserve forces also face added stress due to the expectation of suddenly reintegrating into society following their combat deployment. Whereas active duty military members return to their regular assignments, working with those with whom they were deployed, National Guard members most typically disband within days of returning from combat and may not have any daily contact with those with whom they served or any other combat veterans. Thus, they lack the social support buffer of their active duty peers.

### ***1.2 The Cost-Effectiveness of Brief Interventions***

In today’s environment, decision makers who want to determine whether to adopt new health care interventions require evidence that the interventions make sense fiscally as well as clinically. The estimated societal costs for returning Veterans with PTSD or depression over the first 2 years after deployment are between \$4 billion and \$6.2 billion (Tanielian & Jaycox, 2008). The continued rise in health care costs could affect other Department of Defense (DoD)

programs and could potentially affect areas related to military capability and readiness. Studies have examined the cost-effectiveness of brief interventions (BIs) in civilian settings with regard to many behaviors and the consequences of behavior, including sexually transmitted disease (e.g., Gift et al., 2005), smoking (Ruger et al., 2008), and behaviors leading to cardiovascular disease (e.g., Groeneveld, Proper, Van Der Beek, Van Duivenbooden, & Van Mechelen, 2008), and have found BIs to be cost-effective.

### ***1.3 Psychiatric Comorbidity in Military Populations***

Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. In a recent report, a substantial number of veterans from Afghanistan and Iraq deployment met screening criteria for co-occurring mental health problems (Seal et al., 2008). Often, the substance abuse problem is a result of PTSD symptoms, and this temporal understanding can be helpful in identifying onset, assessment, and shaping of treatment programs (Tanielian & Jaycox, 2008). By assessing pre-deployment and post-deployment substance use and mental health problems, this study is aiding in identifying a timeline for symptom development.

### ***1.4 Combat Exposure and Substance Use Disorders***

Among current military personnel, studies have found that heavy-drinking rates were highest among individuals who had deployed in the past year compared with those who had deployed more than 36 months before the survey (Bray et al., 2006; Federman, Bray, & Kroutil, 2000). Exposure to combat in Iraq and Afghanistan has been linked to high rates of substance abuse on return from deployment, particularly among

soldiers and Marines (Milliken et al., 2007). Felker and colleagues (2008) reported that 11% of deployed Operation Iraqi Freedom (OIF) military personnel had severe alcohol abuse problems.

## **2. Sampling Design**

The target population for this study consisted of National Guard service members in North Carolina and Georgia at the time of data collection (December 2014 through August 2016). Following Human Research Protection Office (HRPO) approval, the senior leadership of the Georgia Army National Guard and the North Carolina Army National Guard agreed to allow access to their personnel for potential inclusion in the study.

In addition, a letter of endorsement was received from the Army National Guard Chief Surgeon (Vice National Guard Bureau Surgeon).

The initial recruitment effort entailed sending recruitment brochures and posters to points of contact at armories for dissemination to their service members. The brochures described the study and both the brochures and posters provided the study website that enabled individuals to obtain additional information including study eligibility. These recruitment materials were also sent to the organizations' medical and behavioral health professionals to enable them to suggest study participation to their clients. Since these activities yielded no response, the co-principal investigator, Dr. Strange, a former member of the Georgia Army National (GaARNG), worked with its leadership to identify opportunities to provide an onsite in-person introduction to the Study to service members in its various military units throughout the state. This introduction consisted of a review of the information provided on the study brochure.

Over a several month period, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups. Study information was also provided on the GaARNG website and Facebook Page. Since the enrollment continued to be limited, recruitment efforts were halted and requests were made to the RTI Institutional Review Board (IRB) and HRPO to provide a \$15 participant incentive, in the form of an Amazon gift card, at completion of each assessment tool at baseline, and at 1, 3, and 6 month follow-up, for a maximum of \$60. In addition, approval was requested to replace the recruitment brochure with a card format that presented a briefer description of the study and included information about the incentive.

Following these approvals, the in-person study introduction, with distribution of the study information card, resumed at GaARNG units throughout the state during drill weekends and annual training periods, from October 2014 – August 2016, with a significant increase in the recruitment rate. The final GaARNG sample size was 198 service members.

Following approval from the leadership of the North Carolina Army National Guard, the in-person study introduction, with distribution of the information card, was conducted with its units from November 2015 – August 2016. The final sample from the NCARNG was 121 service members. The recruitment of selected participants was completed without incident. In total, 320 service members participated in the surveys and intervention.

## **3. Characteristics of Respondents**



A total of 320 individuals completed or partially completed questionnaires. Table 1 presents the distributions of respondents by age, gender, and other sociodemographic characteristics.

## **4. Key Definitions and Measures**

### **4.1 Sociodemographic Characteristics**

The sociodemographic characteristics examined in this report include gender, paygrade, race/ethnicity, marital status, and deployment history. Definitions of these different characteristics are described below.

**Gender:** Gender was defined as male or female.

**Race/Ethnicity:** Following the current U.S. Bureau of the Census classification, personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians).

**Education:** Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates.

**Age:** Age of respondents was defined as current age at the time of the survey. Estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older.

**Paygrade:** Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1-W5/O1-O6.

**Marital Status:** Marital status was divided into two groups: Married or Living as Married and Not Married (including

personnel who were single, widowed, or divorced).

**Deployment:** Deployment was defined as prior deployment experiences. Categories were Not Previously Deployed, Noncombat Deployed (with no prior combat deployments) and Combat Deployed (including multiple deployments).

**State:** State was defined as the state in which the service member was currently serving.

### **4.2 Alcohol Use Measures**

**Symptoms of Dependence:** The measure of symptoms of alcohol dependence was determined using the Alcohol Use Identification Test (AUDIT). The AUDIT was developed by the World Health Organization as a simple method of screening for excessive drinking and to assist in brief assessment. The AUDIT consists of 10 questions, each scored from 0 to 4, with a total score ranging from 0 to 40. Scores between 8 and 15 are indicative of *hazardous drinking*, scores between 16 and 19 suggest *harmful drinking*, and scores of 20 or above clearly warrant further diagnostic evaluation for *alcohol dependence*.

**Days Drinking:** The measure of days drinking refers to the number of days the service member drank in the past 30 days.

**Average Number of Drinks:** The average drinks measure refers to the number of drinks on a typical drinking day reported by the service member in the past 30 days.

**Days Drunk:** Days drunk measures how often the service member drank enough alcohol to feel drunk during the past 30 days.

**Binge Drinking:** The number of days the service member had 5 or more drinks on one occasion during the past 30 days.

**Others' Drinking Habits:** The number of drinks the service member reports thinking other people of the same age and gender have on a daily basis.

**Serious Consequences:** The measure of alcohol-related serious consequences refers to the occurrence of the following problems in the past 30 days:

- driven a car after drinking too much to drive safely
- felt sick or thrown up after drinking
- been late for duty because of drinking, a hangover, or an illness caused by drinking
- gotten into physical fights when drinking
- had relationship problems because of drinking
- neglected obligations to self, work, or family for 2 or more days in a row because of drinking
- gotten into sexual situations later regretted because of drinking
- been arrested for drunken driving or other drunken behavior
- been unable to remember part of a prior evening after drinking
- needed more alcohol to feel any effect or could no longer get drunk on the amount of alcohol that used to get one drunk
- had a headache or hangover the morning after drinking

#### ***4.3 Mental Health Measures***

##### **Posttraumatic Stress Symptoms:**

Posttraumatic stress symptoms were measured using the Posttraumatic Stress Disorder Checklist – Military Version (PCL-M). The PCL-M is a 17-item measure assessing the frequency of problems and

complaints in response to a stressful military experience. Scores range from 17 to 85 with scores over 43 indicating probable PTSD.

**Resilience:** Resilience was measured with the Conner-Davidson Resilience Scale (CD-RISC). The CD-RISC contains 25 items, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is rated based on how the participant has felt over the past month. The total score ranges from 0–100, with higher scores reflecting greater resilience.

**Benefit Finding:** Benefit Finding was measured using the Benefit Finding Scale (BFS), which contains 17 items, and each item expresses some potential benefit that might be derived from a specific experience. The scale was made specific by referring to deployment experiences and assesses meaning in terms of personal significance. Responses were rated on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The items assessed benefits in a variety of domains, including acceptance of life's imperfections, becoming more cognizant of the role of other people in one's life, and developing a sense of purpose in life.

**Stress Reactions:** A list of 20 common Stress Reactions were measured in the domains of thoughts, behaviors, emotions, and physical reactions. Service members reported how much they experienced a reaction to each stressor over the past 30 days, on a scale of 0 (none) to 3 (a lot). Scores range from 0 to 60.

##### **Number of Reported Current Stressors.**

Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et

al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none (0), a little (1), some (2), a lot (3) and does not apply (-9). Scores range from 0 to 72.

## **5. Table Descriptions**

Table 5.1 presents percentages of personnel by gender, age, race/ethnicity, education, marital status, pay grade, and deployment history for the full sample of participants.

Table 5.2 shows the average rating of alcohol use and mental health measures, including symptoms of dependence, days drinking, average number of drinks, days drunk, binge drinking, others' drinking habits, and serious consequences, as well as posttraumatic stress symptoms, resilience, benefit finding, stress reactions, and current stressors for the full sample of participants.

Table 5.3 displays the percentage of personnel from your state by gender, age, race/ethnicity, education, marital status, pay grade, and deployment history.

Table 5.4 presents data on the average rating of alcohol use and mental health measures, including symptoms of dependence, days drinking, average number of drinks, days drunk, binge drinking, others' drinking habits, and serious consequences, as well as posttraumatic stress symptoms, resilience, benefit finding, stress reactions, and current stressors for the participants in your state.

Table 5.5 displays the average scores on alcohol use and mental health measures by deployment history for participants in your state.

Table 5.6 shows the average scores on alcohol use and mental health measures at baseline and 1-month follow-up for military personnel in your state.

**Table 5.1** SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

Sociodemographic Characteristics	Frequency ( <i>n</i> )	Percent (%)
<b>Gender</b>		
Female	96	30.0
Male	224	70.0
<b>Race/Ethnicity</b>		
White	199	64.0
Black	72	23.2
Hispanic	23	7.4
Other	17	5.5
<b>Education</b>		
High school or less	38	11.9
Some college	156	48.8
College graduate or higher	124	38.8
<b>Age</b>		
18-20	19	5.9
21-25	63	19.7
26-34	123	38.4
35-60	114	35.6
<b>Paygrade</b>		
E1-E3	29	9.1
E4-E6	189	59.4
E7-E9	48	15.1
W1-W5/O1-O6	52	16.3
<b>Marital Status</b>		
Married or living as married	202	63.4
Single/Divorced/Widowed	117	36.6
<b>Deployment</b>		
Not previously deployed	105	32.9
Noncombat deployed	28	8.8
Combat deployed	187	58.4
<b>State</b>		
Georgia	198	62.1
North Carolina	121	37.9

Note: Table displays the percentage of military personnel by sociodemographic characteristics for the full sample. Definitions of sociodemographic characteristics are given in Section 4.1. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.2 ALCOHOL USE AND MENTAL HEALTH IN STUDY PARTICIPANTS**

<b>Alcohol Use and Mental Health</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Alcohol Use</b>		
Symptoms of Dependence	4.60	3.93
Days Drinking	6.24	6.69
Average Number of Drinks	2.70	1.76
Days Drunk	1.58	2.87
Binge Drinking	1.18	2.85
Others' Drinking Habits	3.47	2.48
Serious Consequences	1.44	2.72
<b>Mental Health</b>		
Posttraumatic Stress Symptoms	28.77	12.63
Resilience	71.05	18.15
Benefit Finding	42.54	14.67
Current Stressors	12.51	8.87
Stress Reactions	15.35	12.11

Note: Table displays the average scores on alcohol use and mental health measures for military personnel for the full sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.3** SOCIODEMOGRAPHIC CHARACTERISTICS OF GEORGIA PERSONNEL

Sociodemographic Characteristics	Frequency ( <i>n</i> )	Percent (%)
<b>Gender</b>		
Female	58	29.3
Male	140	70.7
<b>Race/Ethnicity</b>		
White	121	61.4
Black	51	25.9
Hispanic	15	7.6
Other	10	5.1
<b>Education</b>		
High school or less	27	13.8
Some college	87	44.4
College graduate or higher	82	41.8
<b>Age</b>		
18-20	15	7.5
21-25	38	19.2
26-34	71	35.9
35-60	73	36.9
<b>Paygrade</b>		
E1-E3	17	8.7
E4-E6	115	58.7
E7-E9	30	15.3
W1-W5/O1-O6	34	17.3
<b>Marital Status</b>		
Married or living as married	126	63.6
Single/Divorced/Widowed	72	36.4
<b>Deployment</b>		
Not previously deployed	71	35.9
Noncombat deployed	19	9.6
Combat deployed	108	54.5

Note: Table displays the percentage of military personnel by sociodemographic characteristics for the GA sample. Definitions of sociodemographic characteristics are given in Section 4.1. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.4 ALCOHOL USE AND MENTAL HEALTH IN GEORGIA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Alcohol Use</b>		
Symptoms of Dependence	4.35	3.91
Days Drinking	6.32	7.02
Average Number of Drinks	2.71	1.94
Days Drunk	1.53	3.04
Binge Drinking	1.08	2.79
Others' Drinking Habits	3.55	2.51
Serious Consequences	1.29	2.52
<b>Mental Health</b>		
Posttraumatic Stress Symptoms	29.63	13.22
Resilience	70.23	19.08
Benefit Finding	42.78	14.58
Current Stressors	12.58	8.53
Stress Reactions	15.89	12.53

Note: Table displays the average scores on alcohol use and mental health measures for military personnel in the GA sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.5****MEAN SCORES (AND STANDARD ERRORS) ON KEY VARIABLES BY DEPLOYMENT STATUS IN GEORGIA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Full Sample (<i>n</i> = 320)</b>		<b>Not Deployed (<i>n</i> = 105)</b>		<b>Combat Deployed (<i>n</i> = 187)</b>	
Posttraumatic Stress Symptoms	29.6	(13.2)	25.3	(10.8)	33.4	(14.4)
Symptoms of Alcohol Dependence	4.4	(3.9)	4.0	(3.2)	4.8	(4.4)
Current Stressors	12.6	(8.5)	10.7	(7.8)	14.0	(8.9)
Stress Reactions	15.9	(12.5)	13.1	(11.0)	17.5	(12.6)
Average Number of Drinks	2.7	(1.9)	2.7	(1.9)	2.9	(2.1)
Days Drinking	6.3	(7.0)	5.2	(5.3)	7.0	(7.5)
Days Drunk	1.5	(3.0)	1.3	(2.3)	1.5	(3.2)
Binge Drinking	1.1	(2.8)	0.7	(1.4)	1.5	(3.6)
Serious Consequences	1.3	(2.5)	1.5	(3.0)	1.3	(2.2)
Resilience	70.2	(19.1)	69.1	(19.3)	71.4	(18.4)
Benefit Finding	42.8	(14.6)	38.8	(12.5)	45.5	(14.6)

Note: Table displays the average scores on alcohol use and mental health measures by deployment status for military personnel in the GA sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.



**Table 5.6****MEAN SCORES (AND STANDARD ERRORS) FOR OUTCOMES AT BASELINE AND 1-MONTH FOLLOW-UP IN GEORGIA PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Baseline</b>		<b>1-Month</b>	
Symptoms of Alcohol Dependence (AUDIT-C)	3.0	(2.1)	2.3	(2.1)
Current Stressors	12.6	(8.5)	10.2	(9.0)
Stress Reactions	15.9	(12.5)	13.8	(13.2)
Average Number of Drinks	2.7	(1.9)	2.6	(1.7)
Days Drinking	6.3	(7.0)	6.4	(6.2)
Days Drunk	1.5	(3.0)	1.2	(2.0)
Binge Drinking	1.1	(2.8)	1.1	(2.2)
Serious Consequences	1.3	(2.5)	0.8	(1.8)

Note: Table displays the average scores on alcohol use and mental health measures at baseline and 1-month follow-up for military personnel in the GA sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

We consider the intervention to have been successful in reducing stress and stress reactions. While there was some decrease in alcohol use, the sample had very low rates of alcohol use at baseline so there was not much room for change.

2017



# Combat Stress and Substance Abuse Intervention

**NATIONAL GUARD BUREAU**



March 2017

*Prepared by RTI International*

*RTI International is a trade name of Research Triangle Institute*

March 24, 2017

RTI International owes a debt of gratitude to all the men and women who made possible the successful completion of the SUSTAIN study on Combat Stress and Substance Abuse Interventions. From the National Guard Bureau to unit commanders to major commands' S-1s and S-3s, to the senior leadership at the State level, as well as those who participated in the survey, we thank you for your support of the study.

Data collected for this survey provide an assessment of the individual-level influences on stress and substance use. The data will be used to better understand the nature, causes, and consequences of alcohol abuse and to help evaluate and guide prevention programs and policy. Data will also provide some insight into what might work to relieve stress and keep alcohol use at safe levels.

We express appreciation to you for your assistance in identifying installations and providing a letter of introduction to the study.

RTI is grateful to you for your contribution to the study's success. We are proud to be able to provide you with information about the participants and the outcome of the study. Thank you very much for your assistance on this very important project.

Very respectfully,

A handwritten signature in black ink that reads "Janice M. Brown". The signature is fluid and cursive, with a long horizontal stroke at the end.

Janice M. Brown, Ph.D., Principal Investigator

A handwritten signature in black ink that reads "Laura B. Strange". The signature is fluid and cursive, with a long horizontal stroke at the end.

Laura B. Strange, Ph.D., R.N., Co-Investigator

## 1. Introduction and Background

Most soldiers who experience combat deployment will not develop full criteria for post-traumatic stress disorder (PTSD). Combat and operational stress reactions (COSRs), however, are common and include a broad area of functioning. COSRs manifest in ways that may affect every day functioning of combat veterans without necessarily resulting in clinical diagnosis of mental disorders. Top levels of military medical commands have acknowledged that almost all combat Veterans experience some degree of COSR, including lack of sleep, irritability, and other responses (Hoge et al., 2007). For most persons, the emotional effects of traumatic events tend to subside after several months. However, individuals may increase substance use to suppress these symptoms, both as a short-term coping mechanism or as a long-term suppression mechanism. Among the military, impediments to seeking health care for combat-related stress responses include stigma, embarrassment, time off from work, and other factors. Web-based interventions provide a private and convenient approach and should facilitate access to care (Hoge et al., 2004) by reducing the stigma and common barriers associated with seeking treatment. Such an intervention is critical and timely, not only for active duty military personnel but particularly for members of the Army National Guard (ARNG) who face additional reintegration challenges because they may lack the social support buffer offered to active duty personnel.

The intervention RTI developed and tested was synergistic with the overall Defense Center of Excellence (DCoE) mission and its emphasis on broad aspects of well-being. Our research directly addressed the area of psychological health and resilience by focusing on those at highest risk for comorbid conditions of stress disorders and

substance abuse problems. The focus was specifically on stress and coping, substance use, and improvement of wellness and resiliency in a post-deployment sample. Our goals were to promote readiness, health, and wellness through effective treatment of stress disorders and substance abuse and to minimize the negative consequences to the individual, military, and family.

Major objectives of the intervention were as follows:

- to evaluate the effectiveness of two web-based brief interventions for reducing stress reactions and substance abuse among two populations of post-deployment military personnel
- to test factors that may mediate responses to the interventions and provide knowledge of the change process that will lead to a better understanding of *how* the brief interventions lead to behavior change
- to assess the cost and cost-effectiveness of the interventions to describe what resources are needed to put the interventions in place and the costs to maintain the interventions on an ongoing basis

### *1.1 Importance to National Guard and Reserve*

At certain times, members of the Guard and Reserve made up nearly half the troops fighting in Iraq. The stress experienced by National Guard personnel is thought to be greater than their active duty counterparts. This may be due to several factors, one of which is the change in mission expected by those who signed up for National Guard duty. Traditionally, most National Guard personnel served “1 weekend a month, 2 weeks a year,” although personnel in highly

operational or high-demand units served far more frequently. A significant number also serve in a full-time capacity in roles such as Active Guard and Reserve (AGR) or Air Reserve Technician or Army Reserve Technician (ART). The “1 weekend a month, 2 weeks a year” slogan has lost most of its relevance since the start of the wars in Iraq and Afghanistan; at the end of 2007, nearly 28% of total U.S. forces in those countries consisted of mobilized personnel of the National Guard and other Reserve components (Hosek et al., 2006).

In addition, units or individuals can be assigned to work alongside troops from different branches of the Service with very different cultures, where the same level of camaraderie they have come to expect from their peers is often lacking. National Guard and Reserve forces also face added stress due to the expectation of suddenly reintegrating into society following their combat deployment. Whereas active duty military members return to their regular assignments, working with those with whom they were deployed, National Guard members most typically disband within days of returning from combat and may not have any daily contact with those with whom they served or any other combat veterans. Thus, they lack the social support buffer of their active duty peers.

### ***1.2 The Cost-Effectiveness of Brief Interventions***

In today’s environment, decision makers who want to determine whether to adopt new health care interventions require evidence that the interventions make sense fiscally as well as clinically. The estimated societal costs for returning Veterans with PTSD or depression over the first 2 years after deployment are between \$4 billion and \$6.2 billion (Tanielian & Jaycox, 2008). The continued rise in health care costs could affect other Department of Defense (DoD)

programs and could potentially affect areas related to military capability and readiness. Studies have examined the cost-effectiveness of brief interventions (BIs) in civilian settings with regard to many behaviors and the consequences of behavior, including sexually transmitted disease (e.g., Gift et al., 2005), smoking (Ruger et al., 2008), and behaviors leading to cardiovascular disease (e.g., Groeneveld, Proper, Van Der Beek, Van Duivenbooden, & Van Mechelen, 2008), and have found BIs to be cost-effective.

### ***1.3 Psychiatric Comorbidity in Military Populations***

Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. In a recent report, a substantial number of veterans from Afghanistan and Iraq deployment met screening criteria for co-occurring mental health problems (Seal et al., 2008). Often, the substance abuse problem is a result of PTSD symptoms, and this temporal understanding can be helpful in identifying onset, assessment, and shaping of treatment programs (Tanielian & Jaycox, 2008). By assessing pre-deployment and post-deployment substance use and mental health problems, this study is aiding in identifying a timeline for symptom development.

### ***1.4 Combat Exposure and Substance Use Disorders***

Among current military personnel, studies have found that heavy-drinking rates were highest among individuals who had deployed in the past year compared with those who had deployed more than 36 months before the survey (Bray et al., 2006; Federman, Bray, & Kroutil, 2000). Exposure to combat in Iraq and Afghanistan has been linked to high rates of substance abuse on return from deployment, particularly among

soldiers and Marines (Milliken et al., 2007). Felker and colleagues (2008) reported that 11% of deployed Operation Iraqi Freedom (OIF) military personnel had severe alcohol abuse problems.

## **2. Sampling Design**

The target population for this study consisted of National Guard service members in North Carolina and Georgia at the time of data collection (December 2014 through August 2016). Following Human Research Protection Office (HRPO) approval, the senior leadership of the Georgia Army National Guard and the North Carolina Army National Guard agreed to allow access to their personnel for potential inclusion in the study.

In addition, a letter of endorsement was received from the Army National Guard Chief Surgeon (Vice National Guard Bureau Surgeon).

The initial recruitment effort entailed sending recruitment brochures and posters to points of contact at armories for dissemination to their service members. The brochures described the study and both the brochures and posters provided the study website that enabled individuals to obtain additional information including study eligibility. These recruitment materials were also sent to the organizations' medical and behavioral health professionals to enable them to suggest study participation to their clients. Since these activities yielded no response, the co-principal investigator, Dr. Strange, a former member of the Georgia Army National (GaARNG), worked with its leadership to identify opportunities to provide an onsite in-person introduction to the Study to service members in its various military units throughout the state. This introduction consisted of a review of the information provided on the study brochure.

Over a several month period, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups. Study information was also provided on the GaARNG website and Facebook Page. Since the enrollment continued to be limited, recruitment efforts were halted and requests were made to the RTI Institutional Review Board (IRB) and HRPO to provide a \$15 participant incentive, in the form of an Amazon gift card, at completion of each assessment tool at baseline, and at 1, 3, and 6 month follow-up, for a maximum of \$60. In addition, approval was requested to replace the recruitment brochure with a card format that presented a briefer description of the study and included information about the incentive.

Following these approvals, the in-person study introduction, with distribution of the study information card, resumed at GaARNG units throughout the state during drill weekends and annual training periods, from October 2014 – August 2016, with a significant increase in the recruitment rate. The final GaARNG sample size was 198 service members.

Following approval from the leadership of the North Carolina Army National Guard, the in-person study introduction, with distribution of the information card, was conducted with its units from November 2015 – August 2016. The final sample from the NCARNG was 122 service members. The recruitment of selected participants was completed without incident. In total, 320 service members participated in the surveys and intervention.

## **3. Characteristics of Respondents**

A total of 320 individuals completed or partially completed questionnaires. Table 1 presents the distributions of respondents by age, gender, and other sociodemographic characteristics.

## **4. Key Definitions and Measures**

### **4.1 Sociodemographic Characteristics**

The sociodemographic characteristics examined in this report include gender, paygrade, race/ethnicity, marital status, and deployment history. Definitions of these different characteristics are described below.

**Gender:** Gender was defined as male or female.

**Race/Ethnicity:** Following the current U.S. Bureau of the Census classification, personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians).

**Education:** Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates.

**Age:** Age of respondents was defined as current age at the time of the survey. Estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older.

**Paygrade:** Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1-W5/O1-O6.

**Marital Status:** Marital status was divided into two groups: Married or Living as Married and Not Married (including

personnel who were single, widowed, or divorced).

**Deployment:** Deployment was defined as prior deployment experiences. Categories were Not Previously Deployed, Noncombat Deployed (with no prior combat deployments) and Combat Deployed (including multiple deployments).

**State:** State was defined as the state in which the service member was currently serving.

### **4.2 Alcohol Use Measures**

**Symptoms of Dependence:** The measure of symptoms of alcohol dependence was determined using the Alcohol Use Identification Test (AUDIT). The AUDIT was developed by the World Health Organization as a simple method of screening for excessive drinking and to assist in brief assessment. The AUDIT consists of 10 questions, each scored from 0 to 4, with a total score ranging from 0 to 40. Scores between 8 and 15 are indicative of *hazardous drinking*, scores between 16 and 19 suggest *harmful drinking*, and scores of 20 or above clearly warrant further diagnostic evaluation for *alcohol dependence*.

**Days Drinking:** The measure of days drinking refers to the number of days the service member drank in the past 30 days.

**Average Number of Drinks:** The average drinks measure refers to the number of drinks on a typical drinking day reported by the service member in the past 30 days.

**Days Drunk:** Days drunk measures how often the service member drank enough alcohol to feel drunk during the past 30 days.

**Binge Drinking:** The number of days the service member had 5 or more drinks on one occasion during the past 30 days.

**Others' Drinking Habits:** The number of drinks the service member reports thinking other people of the same age and gender have on a daily basis.

**Serious Consequences:** The measure of alcohol-related serious consequences refers to the occurrence of the following problems in the past 30 days:

- driven a car after drinking too much to drive safely
- felt sick or thrown up after drinking
- been late for duty because of drinking, a hangover, or an illness caused by drinking
- gotten into physical fights when drinking
- had relationship problems because of drinking
- neglected obligations to self, work, or family for 2 or more days in a row because of drinking
- gotten into sexual situations later regretted because of drinking
- been arrested for drunken driving or other drunken behavior
- been unable to remember part of a prior evening after drinking
- needed more alcohol to feel any effect or could no longer get drunk on the amount of alcohol that used to get one drunk
- had a headache or hangover the morning after drinking

#### ***4.3 Mental Health Measures***

##### **Posttraumatic Stress Symptoms:**

Posttraumatic stress symptoms were measured using the Posttraumatic Stress Disorder Checklist – Military Version (PCL-M). The PCL-M is a 17-item measure assessing the frequency of problems and

complaints in response to a stressful military experience. Scores range from 17 to 85 with scores over 43 indicating probable PTSD.

**Resilience:** Resilience was measured with the Conner-Davidson Resilience Scale (CD-RISC). The CD-RISC contains 25 items, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is rated based on how the participant has felt over the past month. The total score ranges from 0–100, with higher scores reflecting greater resilience.

**Benefit Finding:** Benefit Finding was measured using the Benefit Finding Scale (BFS), which contains 17 items, and each item expresses some potential benefit that might be derived from a specific experience. The scale was made specific by referring to deployment experiences and assesses meaning in terms of personal significance. Responses were rated on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The items assessed benefits in a variety of domains, including acceptance of life's imperfections, becoming more cognizant of the role of other people in one's life, and developing a sense of purpose in life.

**Stress Reactions:** A list of 20 common Stress Reactions were measured in the domains of thoughts, behaviors, emotions, and physical reactions. Service members reported how much they experienced a reaction to each stressor over the past 30 days, on a scale of 0 (none) to 3 (a lot). Scores range from 0 to 60.

##### **Number of Reported Current Stressors.**

Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et



al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none (0), a little (1), some (2), a lot (3) and does not apply (-9). Scores range from 0 to 72.

## **5. Table Descriptions**

Table 5.1 presents percentages of personnel by gender, age, race/ethnicity, education, marital status, pay grade, and deployment history for the full sample of participants.

Table 5.2 shows the average rating of alcohol use and mental health measures, including symptoms of dependence, days drinking, average number of drinks, days drunk, binge drinking, others' drinking habits, and serious consequences, as well as posttraumatic stress symptoms, resilience, benefit finding, stress reactions, and current stressors for the full sample of participants.

Table 5.3 displays the baseline and one-month follow-up outcomes for the full sample of participants.

**Table 5.1** SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

Sociodemographic Characteristics	Frequency ( <i>n</i> )	Percent (%)
<b>Gender</b>		
Female	96	30.0
Male	224	70.0
<b>Race/Ethnicity</b>		
White	199	64.0
Black	72	23.2
Hispanic	23	7.4
Other	17	5.5
<b>Education</b>		
High school or less	38	11.9
Some college	156	48.8
College graduate or higher	124	38.8
<b>Age</b>		
18-20	19	5.9
21-25	63	19.7
26-34	123	38.4
35-60	114	35.6
<b>Paygrade</b>		
E1-E3	29	9.1
E4-E6	189	59.4
E7-E9	48	15.1
W1-W5/O1-O6	52	16.3
<b>Marital Status</b>		
Married or living as married	202	63.4
Single/Divorced/Widowed	117	36.6
<b>Deployment</b>		
Not previously deployed	105	32.9
Noncombat deployed	28	8.8
Combat deployed	187	58.4
<b>State</b>		
Georgia	198	62.1
North Carolina	122	37.9

Note: Table displays the percentage of military personnel by sociodemographic characteristics for the full sample. Definitions of sociodemographic characteristics are given in Section 4.1. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.2 ALCOHOL USE AND MENTAL HEALTH IN STUDY PARTICIPANTS**

<b>Alcohol Use and Mental Health</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Alcohol Use</b>		
Symptoms of Dependence	4.60	3.93
Days Drinking/30	6.24	6.69
Average Number of Drinks	2.70	1.76
Days Drunk	1.58	2.87
Days Binge Drinking	1.18	2.85
Others' Drinking Habits	3.47	2.48
Serious Consequences	1.44	2.72
<b>Mental Health</b>		
Posttraumatic Stress Symptoms	28.77	12.63
Resilience	71.05	18.15
Benefit Finding	42.54	14.67
Current Stressors	12.51	8.87
Stress Reactions	15.35	12.11

Note: Table displays the average scores on alcohol use and mental health measures for military personnel for the full sample. Definitions of alcohol use and mental health are given in Section 4.2 and 4.3, respectively. Source: DoD SUSTAIN Survey of Stress and Alcohol among National Guard Personnel, 2016.

**Table 5.3****MEAN SCORES (AND STANDARD ERRORS) FOR OUTCOMES AT BASELINE AND 1-MONTH FOLLOW-UP AMONG ALL PERSONNEL**

<b>Alcohol Use and Mental Health</b>	<b>Baseline</b>		<b>1-Month</b>	
Symptoms of Alcohol Dependence (AUDIT-C)	3.1	(2.1)	2.3	(2.0)
Current Stressors	12.5	(8.9)	9.6	(8.7)
Stress Reactions	15.4	(12.1)	8.5	(6.2)
Average Number of Drinks	2.7	(1.8)	2.5	(1.5)
Days Drinking/30	6.2	(6.7)	6.0	(6.0)
Days Drunk	1.6	(2.9)	1.3	(2.2)
Days Binge Drinking	1.2	(2.8)	1.1	(2.3)
Serious Consequences	1.4	(2.7)	.9	(1.8)

We consider the intervention to have been successful in reducing stress and stress reactions. While there was some decrease in alcohol use, the sample had very low rates of alcohol use at baseline so there was not much room for change.

## **Appendix D: MHSRS Poster**

Brown, J.M., Williams, J., Strange, L., & Zemonek, R. (August, 2016). A web-based intervention for alcohol and stress. Presented at: the Military Health System Research Symposium, Kissimmee, FL.

# A Web-Based Intervention for Alcohol and Stress

Janice M. Brown,\* Jason Williams, Laura Strange, Rich Zemonek • RTI International, Research Triangle Park, NC

## 1. Background

- Combat and Operational Stress Reactions (COSRs) are expected and predictable emotional, intellectual, physical, and/or behavioral reactions.
- An estimated 20% to 30% of U.S. military personnel report significant psychological symptoms (including COSRs).
- Studies with soldiers have found that symptoms increase 3 to 6 months after returning from deployment.
- Among the National Guard, impediments to seeking health care for combat and operational related stress responses include lack of access to care, stigma, embarrassment, time off from work, and other factors.
- A web-based intervention provides a private and convenient approach and can facilitate access to care by reducing the stigma and common barriers associated with seeking treatment.

## 2. Methods

- We conducted a randomized, controlled trial with National Guard personnel comparing two web-based interventions to a wait list control:

  - Stress Only Feedback and Intervention
  - Stress plus Substance Use Feedback and Intervention
  - Delayed Feedback (Stress plus Substance Use Feedback and Intervention)

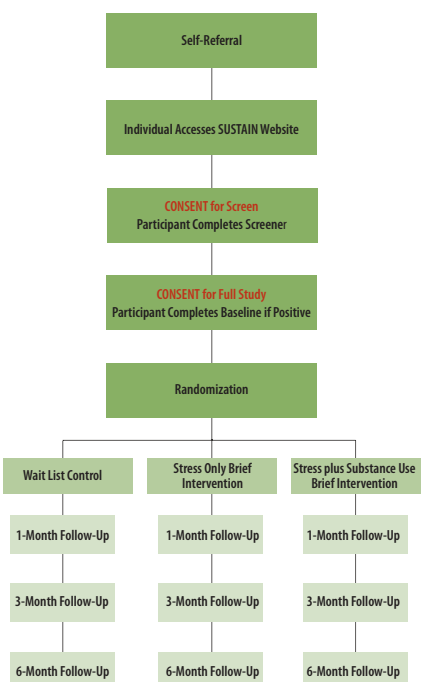
- Volunteers were recruited through in-person briefings at National Guard armories.
- Participants accessed the website, consented to the study, and completed a brief web assessment for alcohol use and current COSRs.
- The intervention materials were presented immediately upon completion of the baseline assessment.

## 2. Methods (continued)

### Marketing Poster



### Study Design



## 3. Results

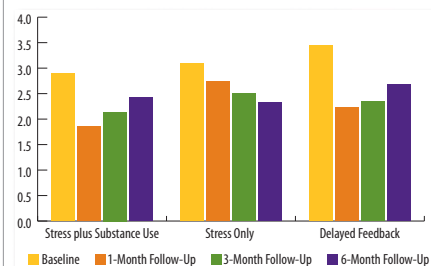
### Demographics

	All (272)	Stress Plus (95)	Stress Only (88)	Delayed Feedback (89)
Female	28.68	29.47	31.82	24.72
Male	71.32	70.53	68.18	75.28
E1-E3	8.89	10.64	5.75	10.11
E4-E6	59.63	59.57	60.92	58.43
E7-E9	13.70	11.70	17.24	12.36
O1-O3	11.85	9.57	13.79	12.36
O4-O6	4.44	6.38	2.30	4.49
Married	49.26	49.47	48.86	49.44
White	63.12	60.44	62.07	67.06
Black	23.57	25.27	26.44	18.82
Hispanic	7.60	7.69	5.75	9.41
Other	5.70	6.59	5.75	4.71

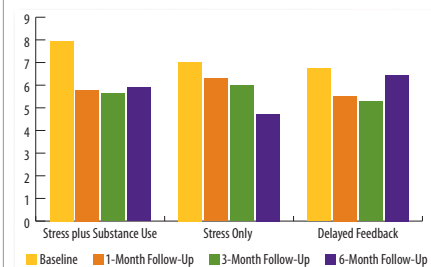
### Baseline Characteristics

	All (272)	Stress Plus (95)	Stress Only (88)	Delayed Feedback (89)
PCL				
17-29	34.85	35.56	33.72	35.23
30-43	51.89	50.00	55.81	50.00
44+	13.26	14.44	10.47	14.77
Stressors				
0-20	57.72	50.53	60.23	62.92
21-40	36.40	37.89	35.23	35.96
41-72	5.88	11.58	4.55	1.12
AUDIT (0-19)	4.63	3.91	5.19	4.82
COSR (0-20)	9.70	10.40	9.30	9.30

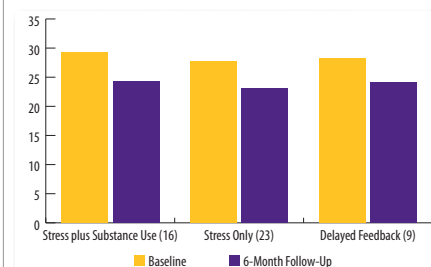
### Change in AUDIT-C Scores at 1-, 3-, and 6-Month Follow-Up



### Change in Stressors at 1-, 3-, and 6-Month Follow-Up



### Change in PCL Score from Baseline to 6-Month Follow-Up



## 4. Conclusions

- The key elements of this approach are consistent with motivational interventions and include:
  - Using a nonconfrontational approach
  - Helping participants perceive a discrepancy between their goals and their current stress level and/or alcohol use
  - Developing individualized alternatives for helping to change behavior
- The interventions were designed to increase awareness of behavior and consequences, facilitate comparison of oneself to a standard, and encourage the identification of strategies to reduce risks related to high stress levels (e.g., relaxation, exercise, effective communication) and consuming alcohol (e.g., pacing drinks, avoiding heavy drinking).
- We were able to demonstrate that a web-based intervention can have a significant impact on stress and alcohol use.
- These data are vital to understanding additional steps the military might take in addressing issues of behavioral health, such as developing new, more broadly focused treatment and prevention programs.

## Acknowledgments

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- Points of view are those of the authors and do not necessarily reflect the views of the U.S. Department of Defense.

## More Information

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## **Appendix E: Manuscripts**

Morgan, J., Bray, R.M., & Brown, J.M. (draft). Resilience as a threat-activated protective factor against alcohol-related consequences in the Army National Guard.

Brown, J.M., Morgan, J., Bray, R.M., Strange, L. (draft). Deployment-related differences in posttraumatic stress symptoms and benefit finding in the Army National Guard.

## **Resilience as a threat-activated protective factor against alcohol-related consequences in the Army National Guard**

Due to the current prolonged conflicts in Iraq and Afghanistan, members of the United States National Guard and Reserve (collectively, the Reserve Component) have shifted from a historically support-based role to an integral segment of combat efforts (Dunn, III, 2016). In fact, by the end of 2010, one-third of all service members who had deployed in support of Operation Enduring Freedom, Operation Iraqi Freedom, and/or Operation New Dawn were from the Reserve Component (Committee on the Assessment of the Readjustment Needs of Military Personnel, Veterans, and Their Families; Board on the Health of Select Populations; Institute of Medicine, 2013). Although stress is well-documented in military personnel, the stress experienced by National Guard personnel is thought to be greater than their active duty counterparts. This may be due to several factors, including the added difficulty of balancing civilian and military responsibilities, and increased pressure during reintegration and readjustment to civilian life following deployment. Additionally, active duty military members are more likely to remain in consistent contact with their “battle buddies” and other military support systems upon return from deployment, whereas National Guard service members typically return to civilian work duties while living in civilian housing, preventing daily contact with those with whom they served or any other combat veterans. Thus, they may lack the social support or institutional support afforded to their active duty peers.

Clinical and epidemiological research studies conducted on both civilian and military populations have documented high rates of comorbidity of stress disorders and substance use disorders. In one report, a substantial number of veterans from Afghanistan and Iraq met screening criteria for co-occurring mental health problems (Seal et al., 2008). Often, the



substance abuse problem is a result of PTSD symptoms, and this temporal understanding can be helpful in identifying onset, assessment, and shaping of treatment programs (Tanielian & Jaycox, 2008).

### **Characterizing Alcohol-related Serious Consequences**

It is widely understood that excessive alcohol use is an issue among military personnel (Bray et al., 2009, 2010). Indeed, the prevalence rates for illicit drug use among all military more than doubled between 2005 (5%) and 2008 (12%), and alcohol use has been steadily increasing (Bray et al., 2009). Additionally, excessive alcohol use in the military has been linked to serious consequences and loss of productivity, both of which are detrimental to retention and readiness (Bray, Brown, & Williams, 2013; Mattiko, Olmsted, Brown, & Bray, 2011). While much of the research has focused on alcohol dependence, alcohol misuse, or binge drinking, it is necessary to measure alcohol-related behaviors and consequences as well. It is the measurement of these behaviors that best quantify the cost to military readiness.

### **Stress and Sociodemographic Characteristics as Risk Factors for Alcohol Misuse**

Several sociodemographic characteristics have been identified as risk factors for alcohol misuse in the military, including single marital status (Ferrier-Auerbach et al., 2009; Fertig & Allen, 1996), male gender (Bray et al., 2013; Green, Beckham, Youssef, & Elbogen, 2014; Naimi et al., 2003; Nolen-Hoeksema, 2004), younger age (Bray et al., 2003, 2013; Ferrier-Auerbach et al., 2009; Green et al., 2014; Stahre, Brewer, Fonseca, & Naimi, 2009), lower levels of education (Ames & Cunradi, 2004; Bray et al., 2003), and White race (Bray et al., 2003; Naimi et al., 2003; Nolen-Hoeksema, 2004) or Hispanic ethnicity (Bray et al., 2013).

Although some studies have examined the link between stress and alcohol use in the military (e.g., Bray, Fairbank, & Marsden, 1999), the majority of research has focused on the

link between alcohol use and PTSD, or traumatic stress, specifically (Schumm & Chard, 2012). Scientific evidence suggests that there is indeed a link between PTSD and alcohol use or misuse, and particular PTSD symptom clusters that may be the greatest risk factors (Jakupcak et al., 2010; Shipherd, Stafford, & Tanner, 2005). Possible PTSD in active-duty service members has been related to several alcohol use outcomes, including heavy drinking, binge drinking, and harmful alcohol use (Bray et al., 2013). The scant research that has been published in regards to stress and alcohol showed that men in the military experiencing high levels of stress at work were more likely to drink heavily, but there was no relationship found between alcohol use and stress for military women (Bray et al., 1999).

## **Resilience**

There has been a shift in the fields of psychology and mental health, from a focus on treating pathology after it arises to developing and reinforcing positive skills and resources that contribute to resilience before serious problems develop (Peterson & Seligman, 2004). The term “resilience” is frequently used as a generic or imprecise term to indicate an overarching priority for developing and maintaining a fit military. Resilience has multiple definitions, but the one that guides our work is that it is a set of factors that enables good outcomes in spite of serious threats. Resilience is the ability to cope effectively with life challenges. The construct of psychological resilience is thought to be a more stable set of positive coping skills that protect against the development of traumatic stress (Charuvastra & Cloitre, 2008; Hoge, Terhakopian, Castro, Messer, & Engel, 2007; King, King, Fairbank, Keane, & Adams, 1998) and depression (Southwick, Vythilingam, & Charney, 2005). Resilience has been shown to protect against the development of PTSD following combat in Vietnam veterans (King et al., 1998; Waysman, Schwarzwald, & Solomon, 2001) and Army Reserve soldiers (Bartone, 1999). In other words,

resilience is the ability to persist in the face of challenges and to bounce back from adversity—concepts inherent in military service. The January 2011 issue of *American Psychologist* was devoted to the topic of resilience in military populations and, as noted, one of the biggest challenges facing the military today may be the development of a more resilient military force (Casey, 2011). This issue also described the military's current efforts to increase resilience (Lester, McBride, Bliese, & Adler, 2011).

In their comprehensive review of this literature, Koenig, McCullough, and Larson (2001) found that indicators of higher levels of *spirituality* were frequently associated with higher levels of well-being, lower rates of serious psychological problems and drug/alcohol abuse, greater marital stability and satisfaction, and even greater longevity in the general population. Resilient persons tend to have greater feelings of *personal control* and are more open to change and challenges in life. Studies have also shown that resilience predicts better *health* and fewer symptoms in soldiers exposed to a range of *stressors* (Bartone, 2005). In a study of older Reserve/National Guard OEF/OIF veterans, those with PTSD scored significantly lower on a measure of resilience

The aim of this paper is to describe risk factors for alcohol-related serious consequences in a study of Army National Guard service members, as well as the role of resilience in protecting against these risks.

## **Methods**

### **Participants**

Participants ( $N = 320$ ) were invited to the study through an onsite in-person introduction to National Guard service members in military units throughout two southern states. This introduction consisted of a review of the information provided on a study brochure. From

December 2014 through August 2016, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups.

## **Measures**

**Demographics.** Standard demographic and background data were obtained. Information included age, gender, race/ethnicity, education, marital status, rank, and state of service. Gender was defined as male (1) or female (0). For the purposes of describing the sample, we followed the current U.S. Bureau of the Census classification and personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians). For the purposes of the regression modeling, we divided race into White (1) and non-White (0), and ethnicity into Hispanic (0) and Non-Hispanic (1). Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates. Age of respondents was defined as current age at the time of the survey. For descriptive statistics, estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older. Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1-W5/O1-O6. Marital status was divided into two groups: Married or Living as Married (1) and Not Married (0) (including personnel who were single, widowed, or divorced). State was defined as the state in which the service member was currently serving.

**Alcohol-Related Serious Consequences.** The measure of alcohol-related serious consequences refers to the occurrence of the following problems in the past 30 days (a) driven a

car after drinking too much to drive safely; (b) felt sick or thrown up after drinking; (c) been late for duty because of drinking, a hangover, or an illness caused by drinking; (d) gotten into physical fights when drinking; (e) had relationship problems because of drinking; (f) neglected obligations to self, work, or family for 2 or more days in a row because of drinking; (g) gotten into sexual situations later regretted because of drinking; (h) been arrested for drunken driving or other drunken behavior; (i) been unable to remember part of a prior evening after drinking; (j) needed more alcohol to feel any effect or could no longer get drunk on the amount of alcohol that used to get one drunk; and (k) had a headache or hangover the morning after drinking. Responses were measured on a 4-point scale of zero times (0), one time (1), two times (2), and three or more times (3). Scales were summed to create a total number of alcohol-related consequences experienced in the prior month, with a range of 0-33. The maximum score in the sample was 26.

**Number and Intensity of Stressors.** Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none at all (0), a little (1), some (2), a lot (3) and does not apply (-9). Scores range from 0 to 72. In the current sample, internal consistency for this scale was good (Cronbach's  $\alpha = 0.85$ ).

**Resilience.** Resilience was measured with the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). The CD-RISC contains 25 items geared toward measuring an individual's ability to "bounce back" following stressors, all of which carry a 5-point range of

responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is rated based on how the subject has felt over the past month. Example items include “I am able to adapt when change occur” and “Having to cope with stress can make me stronger.” The total score ranges from 0–100, with higher scores reflecting greater resilience. Internal reliability for CD-RISC scores was excellent in this sample (Cronbach’s  $\alpha = 0.96$ ).

### **Statistical Analyses**

All data were analyzed using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA). Descriptive statistics were run to describe the sample and estimate average levels of alcohol-related serious consequences, stressors, and resilience. Bivariate correlations were analyzed to assess collinearity and identify significant associations. We then conducted a multiple regression to predict alcohol-related serious consequences using PROC SURVEYREG, with sociodemographic characteristics such as age, marital status, gender, ethnicity, race, education, and deployment history, as well as level of reported stressors and resilience, as predictors. Next, a simple moderation analysis was performed using the Hayes PROCESS macro for mediation, moderation, and conditional process analyses, specifically Hayes’ Model 1 (Hayes, 2013). See Hayes (2013) for the statistical model and equation of this simple moderation model. Bias-corrected 95% bootstrap confidence interval estimates of the indirect effects using 10,000 bootstrap samples were obtained, and normal theory (Sobel) tests for indirect effects were also calculated (Hayes, 2013) (see Figure 1).

## Results

### Descriptive and Bivariate

A total of 320 National Guard members from two southern states were included in this study (62.1% Georgia; 37.9% North Carolina). The majority of the sample was White, male, and had completed at least some college. The average participant age was 32.10 years ( $SD = 8.65$ ) and most were E4-E6. Almost two-thirds of the sample was married or living as married and one-third had not previously deployed (see Table 1). Results of bivariate Pearson correlations statistically significant correlations between stressors and resilience ( $r = -0.39, p < .001$ ), stressors and alcohol-related consequences ( $r = 0.30, p < .001$ ), and resilience and alcohol-related consequences ( $r = -0.24, p < .001$ ).

### Multivariate

Table 2 provides the results of the regression model with stressors, resilience, age, marital status, gender, ethnicity, race, education, and deployment history predicting serious alcohol-related consequences. Overall, the model predicting alcohol-related consequences was significant and accounted for 22.9% of the variance,  $F(9, 315) = 3.44, p < .001, R^2 = .229$ . After controlling for race, education, and deployment history, several variables emerged as significant predictors, including stressors, resilience, age, marital status, gender, and ethnicity (see Table 2). Specifically, higher stressors, lower resilience, younger age, being unmarried and not living as married, being male, and identifying as non-Hispanic were associated with higher levels of serious alcohol-related consequences (see Table 2).

Finally, results of our moderation analysis revealed that when resilience, stressors, and the resilience x stressors interaction term were entered simultaneously into a predictive model of serious alcohol-related consequences, resilience was no longer a significant predictor ( $p = .743$ ),

but stressors ( $\beta = 0.21$ ,  $SE = .05$ ,  $t = 4.04$ ,  $p < .001$ ) and the interaction term were ( $\beta = -0.01$ ,  $SE = .01$ ,  $t = -2.73$ ,  $p = .007$ ). Simple slopes for the association between stressors and alcohol-related consequences were tested for low (-1 SD below the mean), medium (mean), and high (+1 SD above the mean) levels of resilience. The association between stressors and alcohol-related consequences was significant for both the medium ( $\beta = 0.10$ ,  $SE = .02$ ,  $t = 5.02$ ,  $p < .001$ ) and low levels of resilience ( $\beta = 0.06$ ,  $SE = .02$ ,  $t = 3.25$ ,  $p = .001$ ), but not for high resilience ( $\beta = 0.02$ ,  $SE = .03$ ,  $t = 0.87$ ,  $p = .386$ ). Additionally, the slope for low resilience was stronger than that for medium levels of resilience. Figure 1 plots this interaction.



Table 1. *Demographic characteristics of the sample.*

<b>Sociodemographic Characteristics</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
<b>Gender</b>		
Female	96	30.0
Male	224	70.0
<b>Race/Ethnicity</b>		
White	199	64.0
Black	72	23.2
Hispanic	23	7.4
Other	17	5.5
<b>Education</b>		
High school or less	38	11.9
Some college	156	48.8
College graduate or higher	124	38.8
<b>Age</b>		
18-20	19	5.9
21-25	63	19.7
26-34	123	38.4
35-60	114	35.6
<b>Paygrade</b>		
E1-E3	29	9.1
E4-E6	189	59.4
E7-E9	48	15.1
W1-W5/O1-O6	52	16.3
<b>Marital Status</b>		
Married or living as married	202	63.4
Single/Divorced/Widowed	117	36.6
<b>Deployment</b>		
Not previously deployed	105	32.9
Noncombat deployed	28	8.8
Combat deployed	187	58.4
<b>State</b>		
Georgia	198	62.1
North Carolina	121	37.9

Table 2. *Predictors of alcohol-related serious consequences.*

Parameter	Model Statistics				
	B	$\beta$	SE	<i>t</i>	<i>p</i>
Intercept	2.43	0	1.01	2.41	.017
Stressors	0.09	.29	0.03	2.60	.001
Resilience	-0.02	-.14	0.01	-2.05	.041
Age	-0.04	-.13	0.02	-2.24	.026
Marital Status	-1.46	-.26	0.37	-3.98	<.001
Gender	1.20	.20	0.33	3.61	<.001
Ethnicity	0.21	.05	0.10	2.22	.027
Race	-0.10	-.03	0.16	-0.66	.511
Education	0.14	.08	0.09	1.54	.124
Deployment History	-0.09	-.02	0.40	-0.24	.813

*Note.* *N* = 316.

Figure 1  
*Conceptual model for simple moderation.*

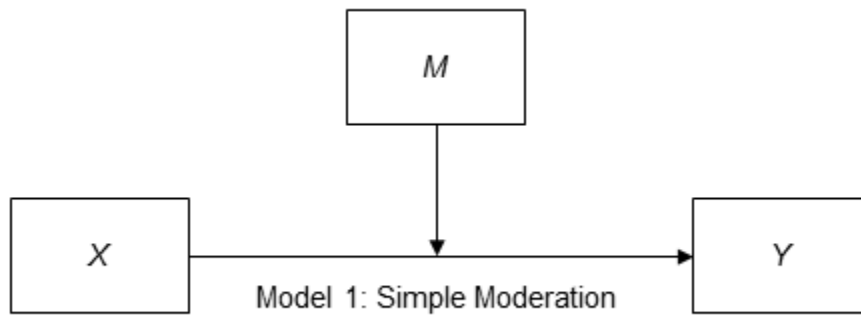
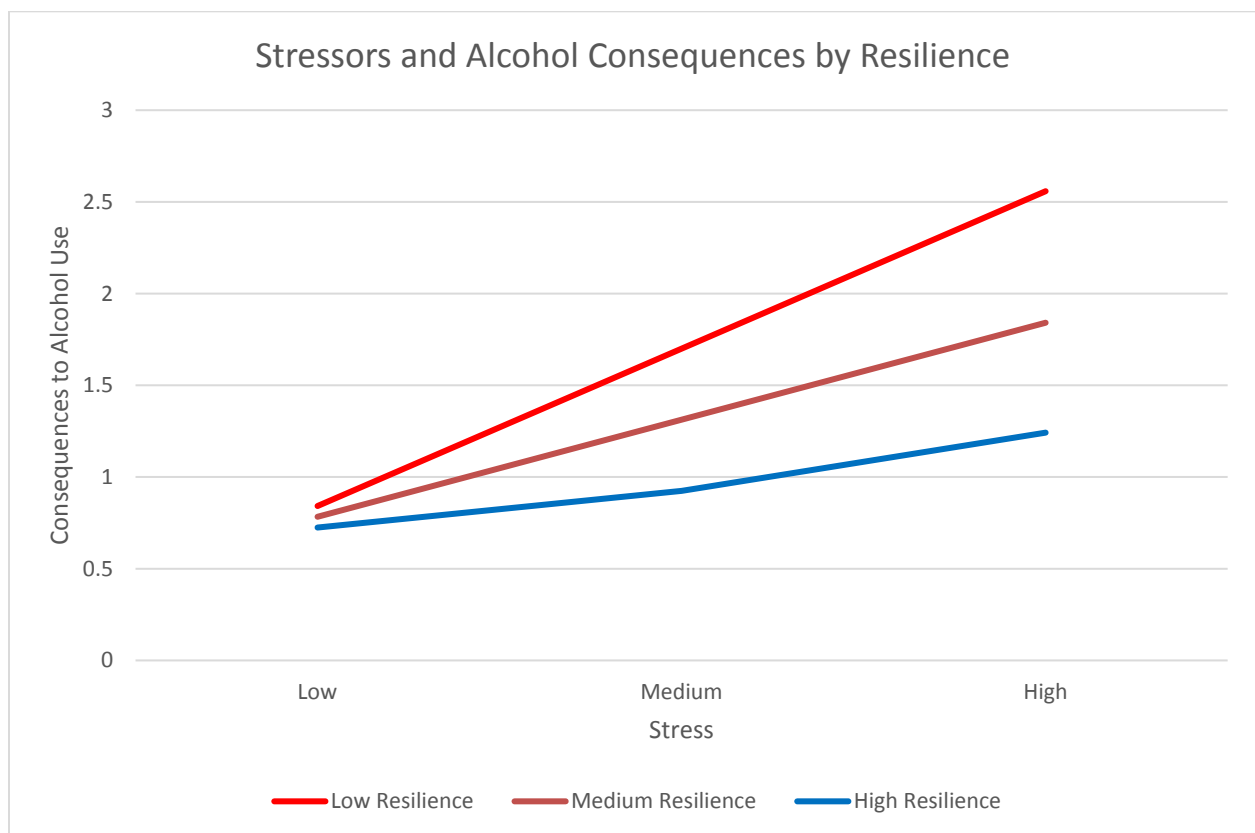


Figure 2  
*Moderation effect of resilience on the relationship between stressors and alcohol consequences*



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## **Deployment-related differences in posttraumatic stress symptoms and benefit finding in the Army National Guard**

During the conflicts in Iraq and Afghanistan, members of the National Guard and other Reserve forces worked alongside active duty service members, played a central role in the war effort, and at times comprised a significant portion of the fighting force. At the end of 2007, nearly 28% of total U.S. forces in Iraq and Afghanistan consisted of mobilized personnel of the National Guard and other Reserve components with more than 250,000 having been deployed to Iraq and Afghanistan between 2001 and 2007 (Department of Defense, 2008).

Despite the large involvement of National Guard and other Reserve forces in Iraq and Afghanistan, relatively little research has examined the stressors of these Reserve Component service members, especially those in the National Guard, and their responses to those stressors. A number of studies, however, have examined mental health problems such as Posttraumatic stress disorder (PTSD) and depression (Gorman, Blow, Ames, & Reed, 2011; Interian, Kline, Callahan, & Losonczy, 2012; Kim, Thomas, Wilk, Castro, & Hoge, 2010) that are often associated with high stress levels. Thomas et al. (2010) found that rates of PTSD and depression remained relatively stable among active duty soldiers, but increased among National Guard soldiers from 3- to 12-months after deployment to Iraq suggesting that Guard members may be at increased risk of problems over time.

In general, military stress can have multiple sources including operational tempo, pre-deployment preparations, deployment experiences, and post-deployment reintegration. The stress experienced by National Guard personnel is thought to be greater than their active duty counterparts. This may be due to several factors, one of which is the change in mission expected by those who signed up for Guard duty. Traditionally, most National Guard personnel served “1

weekend a month, 2 weeks a year,” although personnel in highly operational or high-demand units serve far more frequently. A significant number also serve in a full-time capacity in roles such as Active Guard and Reserve (AGR) or Air Reserve Technician or Army Reserve Technician (ART). The “1 weekend a month, 2 weeks a year” slogan has lost most of its relevance since the start of the wars in Iraq and Afghanistan.

Another reason National Guard forces are subject to experiencing additional stress is that they are often assigned to duties that may be very different from those for which they were trained. Such assignments could include convoys, prison guards, or mortuary duties. In addition, units or individuals can be assigned to work alongside troops from different branches of the Service with very different cultures, where the same level of camaraderie they have come to expect from their peers is often lacking. National Guard forces may also face added stress due to the expectation of suddenly reintegrating into society following their combat deployment. Whereas active duty military members return to their regular assignments, working with those with whom they were deployed, National Guard members most typically disband within days of returning from combat and may not have any daily contact with those with whom they served or any other combat veterans. Thus, they may lack the social support buffer of their active duty peers.

Extant research has shown that military members experience PTSD at higher rates than their civilian counterparts (Gradus, 2016). The lifetime prevalence of PTSD among adult Americans has been estimated at 6.8% (Kessler, Berglund, et al., 2005), with past year prevalence being estimated at 3.5% (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). In contrast, the prevalence rates of PTSD among those serving in Operation Enduring Freedom and Operation Iraqi Freedom have additionally been reported at 13.8% (Tanielian & Jaycox, 2008).



Rates of PTSD have also been found to be higher after return from a deployment to Iraq or Afghanistan than prior to deployment, suggesting that deployment is a risk factor for the development of PTSD among military service members (Hoge et al., 2004). Rates of PTSD also seem to increase from immediately following deployment to six months post-deployment, and this is particularly true for National Guard and Reserve Component service members (Milliken, Auchterlonie, & Hoge, 2007).

Concurrent with findings of mental health problems associated with combat deployments, evidence is also accumulating that many military personnel are also able to deal with extraordinarily adverse events, including deployment, and experience positive outcomes such as benefit finding and posttraumatic growth (for a review, see Schok, Kleber, Elands, & Weerts, 2008). Increased appreciation in life following service, for example, has been reported by more than 85% of post-9/11 Veterans in a population-based sample, and that increased appreciation in life has been related to happiness and well-being (Morgan, Desmarais, & Neupert, 2017). It is important to note that stress reactions and growth outcomes are not mutually exclusive; in fact, they can, and often do, coexist (Morgan, Desmarais, Mitchell, & Simons-Rudolph, in press; Tedeschi & Calhoun, 2004). A recent study also showed that a stressful experience, such as deployment, may act as the impetus for both distress and growth, but that they may operate simultaneously in opposing directions to affect overall satisfaction with life (Morgan et al., in press). These results suggested that while PTSD symptoms are predictive of lower overall well-being, the experience of posttraumatic growth is predictive of higher well-being, making the intentional facilitation of growth outcomes a possible point of intervention in the improvement of quality of life in military service members (Morgan & Desmarais, 2017).

The current scientific literature about distress and posttraumatic growth is limited in a number of important ways. First, as Schok and colleagues (2008) noted, many studies have failed to use standardized measures to assess growth outcomes. Secondly, most studies have failed to measure both growth and distress outcomes concurrently. Third, there is a need not only to measure both growth and distress outcomes, but also to examine their relation to more distal outcomes. Fourth and finally, no study has examined the effects of deployment on benefit finding and stress among the National Guard.

The overarching goal of the current paper was to explore the differences in current stressors, stress reactions, posttraumatic stress symptoms, benefit finding, and quality of life by deployment history in a sample of Army National Guard service members. In support of this goal, our specific aims were (1) to estimate rates of posttraumatic stress symptoms, benefit finding, current stressors, stress reactions, and quality of life in an Army National Guard sample; (2) examine relationships among these distress and growth constructs; (3) assess possible differences across these constructs by deployment history; and (4) examine the effects of growth and stress outcomes on quality of life. Figure 1 presents a conceptual view of the proposed relationships.

## **Methods**

### **Participants**

Participants ( $N = 320$ ) consisted of a convenience sample of National Guard members in military units throughout two southern states who volunteered to take part in the study. They were enrolled over a 20-month period from December 2014 to August 2016 as part of a larger clinical trial. They were invited to enroll in the study during an onsite in-person introduction which consisted of reviewing information provided on a study brochure. From December 2014

through August 2016, the study introduction was conducted at unit formations, soldier readiness processing (SRP) and Yellow Ribbon events, the annual chaplain training conference, meetings with medical and behavioral health providers, and family support groups. Subjects were eligible to take part in the study if they were current National Guard members, reported at least 2 stress reactions, and did not meet criteria for alcohol dependence. Data for the current analyses were restricted to responses from baseline survey questionnaires.

## **Measures**

**Demographics.** Standard demographic and background data were obtained. Information included age, gender, race/ethnicity, education, marital status, rank, and state of service. Gender was defined as male or female. Following the current U.S. Bureau of the Census classification, personnel were divided into four racial/ethnic groups: white, non-Hispanic; African American, non-Hispanic; Hispanic; and “other” (including all other persons not classified elsewhere, such as Native Americans or Asians). Education was defined as the highest level of educational attainment. Categories were high school or less, some college, and college degree or beyond. Personnel with General Equivalency Diplomas (GEDs) were classified as high school graduates. Age of respondents was defined as current age at the time of the survey. For descriptive statistics, estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older. Military paygrades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for commission officers and warrant officers were combined as W1-W5/O1-O6. Marital status was divided into two groups: Married or Living as Married and Not Married

(including personnel who were single, widowed, or divorced). State was defined as the state in which the service member was currently serving.

**Deployment History.** Deployment history (frequency, location, and duration) was assessed using a subset of items designed by the Land Combat Study Team at the Walter Reed Army Institute of Research (Hoge et al., 2004). These items characterize length and recency of deployment, deployment location, and number of deployments in the past 3 years. Deployment history was categorized as Not Previously Deployed, Noncombat Deployed (with no prior combat deployments) and Combat Deployed (including prior combat deployments).

**Number of Reported Stressors.** Number of reported stressors and sources of stress were assessed using the U.S. Naval Unit Behavioral Health Needs Assessment Survey (NUBHNAS; McAnany, Schmied, Booth-Kewley, Beckerley, & Taylor, 2014) adaptation of the Department of Defense Survey of Health Related Behaviors (Bray et al., 2009) items. This scale includes 24 items assessing potential work and family stress sources (e.g., having a permanent change of station [PCS] and conflicts between military and family responsibilities), each measured on a 4-point scale of none at all (0), a little (1), some (2), and a lot (3). Scores range from 0 to 72. In the current sample, internal consistency for this scale was good (Cronbach's  $\alpha = 0.85$ ).

**Stress Reactions.** A list of 20 common Stress Reactions were measured in the domains of thoughts, behaviors, emotions, and physical reactions. Example stress reactions included problems concentrating, restlessness or fidgeting, and having problems making decisions or processing information. Service members reported how much they experienced a reaction to each stressor over the past 30 days, on a scale of none (0), a little (1), some (2), and a lot (3). Scores range from 0 to 60. Stress reaction scores showed excellent internal reliability in this sample (Cronbach's  $\alpha = 0.94$ ).

**Posttraumatic Stress Symptoms.** Post-traumatic stress disorder symptoms (PTSD) were measured using the PTSD Checklist–Military version (PCL-M; Weathers, Huska, & Keane, 1991). The PCL-M is a 17-item questionnaire that asks about problems and complaints related to a stressful military experience. Respondents rated items on a 1–5 Likert scale which were then summed for a total score of 17–85. Persons scoring  $\geq 44$  were classified as screening positive for PTSD. In this sample, PCL scores showed excellent internal reliability (Cronbach's  $\alpha = 0.95$ ).

**Benefit Finding.** The Benefit Finding Scale (BFS; Antoni et al., 2001) contains 17 items, that express some potential benefit that might be derived from a specific experience. For the present study, the scale was made specific by referring to deployment experiences and assesses meaning in terms of personal significance. Responses were rated on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The items assessed benefits in a variety of domains, including acceptance of life's imperfections, becoming more cognizant of the role of other people in one's life, and developing a sense of purpose in life. Internal reliability of benefit finding scale scores in this sample was excellent ( $\alpha = .96$ ).

**Quality of Life.** Quality of life was measured using the EQ-5D-3L Health-Related Quality of Life Scale (Brooks, 1996). This scale measures five domains (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) by respondents classifying themselves as (a) having no problems (0), (b) having some or moderate problems (1), or (c) being unable to do/having extreme problems (3). The scale ranges from 0 to 10, with higher numbers indicating a greater number of problems. For analyses, this scale was recoded such that higher numbers indicate greater quality of life. As this scale is an index measure a quality of life issues, internal consistency was not calculated.

## **Statistical Analyses**

All data were analyzed using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA). In support of Aim 1, descriptive statistics were run to describe the sample and estimate average levels of posttraumatic stress symptoms, benefit finding, current stressors and stress reactions, and quality of life. To support Aim 2, bivariate correlations were analyzed to assess collinearity and identify significant associations. In support of Aim 3, analyses of variance were then conducted to examine differences in key variables by deployment status (combat deployed versus never deployed). Finally, in order to support Aim 4 and examine the role of different constructs on quality of life, we ran a multiple regression among only those with combat deployments, in which posttraumatic stress symptoms and benefit finding were regressed on quality of life.

## **Results**

### **Descriptive**

Table 1 presents the sociodemographic characteristics of the sample. As shown a total of 320 National Guard members from two southern states were included (62.1% Georgia; 37.9% North Carolina). The majority of the sample was White, male, and had completed at least some college. The average participant age was 32.10 years ( $SD = 8.65$ ) (not show in table) and most were E4-E6. Almost two-thirds of Guardsmen were married or living as married and one-third had not previously deployed.

### **Bivariate**

Bivariate correlations revealed that, not surprisingly, current stressors, stress reactions, and posttraumatic stress symptoms were all highly correlated (all  $r$ 's  $> 0.60$ ). Additionally, benefit finding was negatively related to current stressors, stress reactions, and posttraumatic stress symptoms. All three stress measures (current stressors, stress reactions, and posttraumatic

stress symptoms) were related to lower ratings of quality of life, but higher levels of benefit finding were associated with higher quality of life (see Table 2).

### **Multivariate**

Results of analyses of variance showed that participants who reported a combat deployment also reported significantly more current stressors, stress reactions, and posttraumatic stress symptoms than those who had never deployed, as well as a lower quality of life. However, those who had experienced a combat deployment also reported significantly more benefit finding than those who had never deployed (Table 3). Results of our multiple regression among combat Veterans significantly predicted quality of life issues ( $R^2 = 0.74$ ,  $F[2] = 229.80$ ,  $p < .001$ ), with posttraumatic stress symptoms predicting lower quality of life ( $\beta = 0.06$ ,  $t = 14.23$ ,  $p < .001$ ) and benefit finding predicting higher quality of life ( $\beta = -0.01$ ,  $t = -3.00$ ,  $p = .003$ ).

Table 1. *Sociodemographic characteristics of the sample.*

<b>Sociodemographic Characteristics</b>	<b>Sample (n)</b>	<b>Percent (%)</b>
<b>Gender</b>		
Female	96	30.0
Male	224	70.0
<b>Race/Ethnicity</b>		
White	199	64.0
Black	72	23.2
Hispanic	23	7.4
Other	17	5.5
<b>Education</b>		
High school or less	38	11.9
Some college	156	48.8
College graduate or higher	124	38.8
<b>Age</b>		
18-20	19	5.9
21-25	63	19.7
26-34	123	38.4
35-60	114	35.6
<b>Paygrade</b>		
E1-E3	29	9.1
E4-E6	189	59.4
E7-E9	48	15.1
W1-W5/O1-O6	52	16.3
<b>Marital Status</b>		
Married or living as married	202	63.4
Single/Divorced/Widowed	117	36.6
<b>Deployment</b>		
Not previously deployed	105	32.9
Noncombat deployed	28	8.8
Combat deployed	187	58.4
<b>State</b>		
Georgia	198	62.1
North Carolina	121	37.9



Table 2. *Bivariate correlations among mental health variables.*

	<b>Current Stressors</b>	<b>Stress Reactions</b>	<b>Benefit Finding</b>	<b>Quality of Life</b>
<b>PTS Symptoms</b>	0.66***	0.75***	-0.15**	-0.59***
<b>Current Stressors</b>		0.64***	-0.17**	-0.41***
<b>Stress Reactions</b>			-0.20**	-0.59***
<b>Benefit Finding</b>				0.18**

*Note.* PTS = posttraumatic stress.

\*\*\*  $p < .001$

\*\* $p < .01$

\* $p < .05$

Table 3. *Mean scores (and standard errors) on mental health measures by deployment status.*

<b>Mental Health</b>	<b>Full Sample (n = 320)</b>		<b>Not Deployed (n = 105)</b>		<b>Combat Deployed (n = 187)</b>	
Posttraumatic Stress Symptoms***	28.8	(0.71)	24.8	(1.20)	31.5	(0.90)
Current Stressors*	12.5	(0.50)	10.9	(0.86)	13.5	(0.64)
Stress Reactions**	15.4	(0.68)	12.6	(1.17)	16.7	(0.88)
Benefit Finding**	42.5	(0.83)	38.7	(1.49)	44.2	(1.06)
Quality of Life***	1.2	(0.07)	0.6	(0.12)	1.6	(0.09)

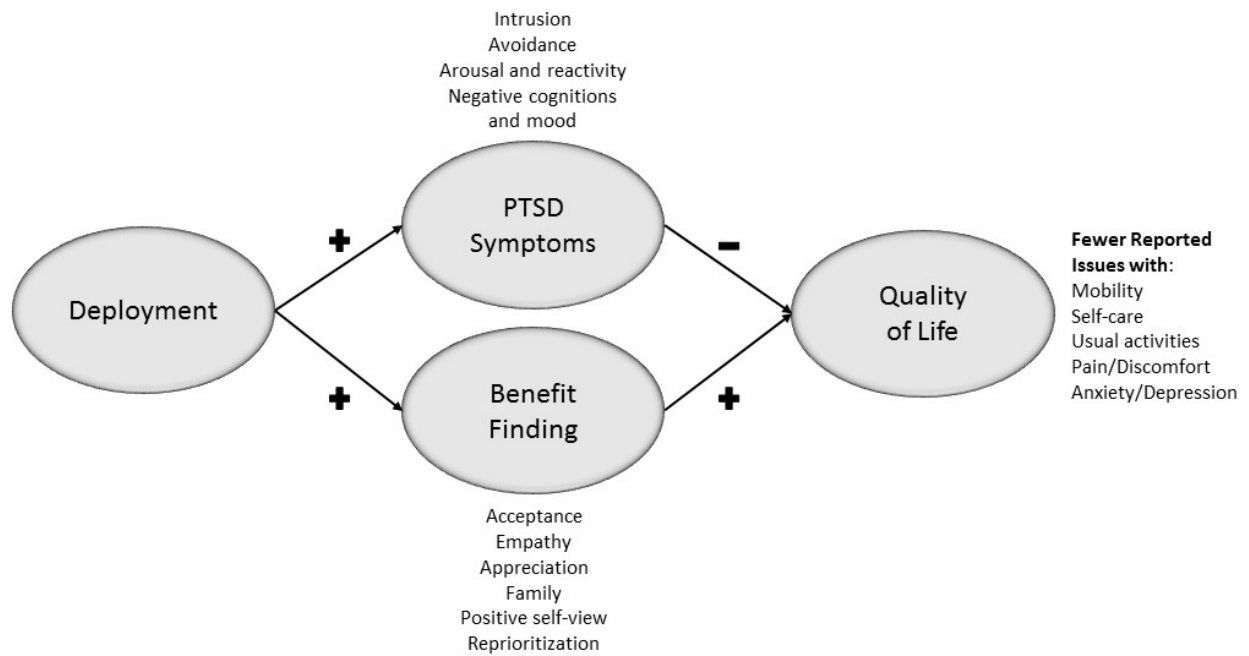
\*\*\*  $p < .001$

\*\*  $p < .01$

\* $p < .05$ .

For Quality of Life, higher numbers indicate lower quality of life.

Figure 1. Conceptual model of the relationships among deployment, PTSD symptoms, benefit finding, and quality of life.



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## **Appendix F: IPR Meeting Slides (2012, 2013, 2014, 2015, 2016)**



**Product Line  
Review (PLR)  
Meeting**

**Technology-  
Facilitated  
Monitoring and  
Treatment in  
Mental Health**

**21 August 2012**

**1**

# **Combat Stress and Substance Abuse Intervention**

**Janice M. Brown, PhD**

**9/15/11-10/14/15**

**\$1,884,551**

**Type of Funding: JPC5**



**Product Line  
Review (PLR)  
Meeting**

**Technology-  
Facilitated  
Monitoring and  
Treatment in  
Mental Health**

**21 August 2012**

**2**

## Military relevant issue to be solved

- Combat and Operational Stress Reactions - expected and predictable emotional, intellectual, physical, and/or behavioral reactions.
- Estimated 20% to 30% of US military personnel returning from current combat operations report significant psychological symptoms.
- Studies with soldiers have found that symptoms increase 3 to 6 months later.
- DODI: 6490.05
  - a. The Military Departments shall implement programs to enhance readiness, contribute to combat effectiveness, enhance the physical and mental health of military personnel, and prevent or minimize adverse effects associated with combat and operational stress.
  - b. The Military Departments' leadership shall foster an environment and climate of prevention and protection.





**Product Line  
Review (PLR)  
Meeting**

**Technology-  
Facilitated  
Monitoring and  
Treatment in  
Mental Health**

**21 August 2012**

**3**

# **Solution – SUSTAIN**

## **Substance Use and STress: An INtervention**

- **Web-based intervention**
  - Broad dissemination
  - Available 24/7
  - Reduces stigma
  - First line of defense
- **Primary focus on stress**
  - Deals with PTSD symptoms
  - Addresses current stressors
  - Includes a focus on COSRs
- **Secondary focus on alcohol use**
  - Harm reduction model



**Product Line  
Review (PLR)  
Meeting**

**Technology-  
Facilitated  
Monitoring and  
Treatment in  
Mental Health**

**21 August 2012**

**4**

## Project Description

- Intervention based on Motivational Interviewing (MI)
- Randomized, controlled trial of two web-based interventions with post-deployment active duty military personnel and National Guard personnel.
  - Stress Only
  - Stress plus Alcohol
- Comparison of treatment groups over four time points: baseline and 1-, 3-, and 6-month follow-up
- Intervention groups compared to a Wait List control group (intervention provided at 6-month follow-up)
- Cost analysis
  - Resources needed to put the interventions in place
  - Costs to maintain the interventions
  - Cost-benefit of the two interventions (Bang for your buck)



## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

21 August 2012

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# Marketing Poster



## SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

The SUSTAIN study is being undertaken to learn more about stress reactions among military personnel.

- All post-deployment Active Duty and Reserve Component personnel are encouraged to participate.
- This Installation is one of several that have been selected for this important research study.

**Participants will** receive a novel web-based study that is geared toward enhancing combat effectiveness, health, and overall well-being of warriors and families.

**All you need to participate is:**

- Internet access.
- A desire to help our fighting force become healthier and stronger.

Conducted by: RTI International  
Sponsored by: United States Army Medical Research and Materiel Command

**TO PARTICIPATE LOG ON AT: [SUSTAIN.RTI.ORG](http://SUSTAIN.RTI.ORG)**

For more information about the study, please call 1-800-647-9655 or email [Sustain@rti.org](mailto:Sustain@rti.org).



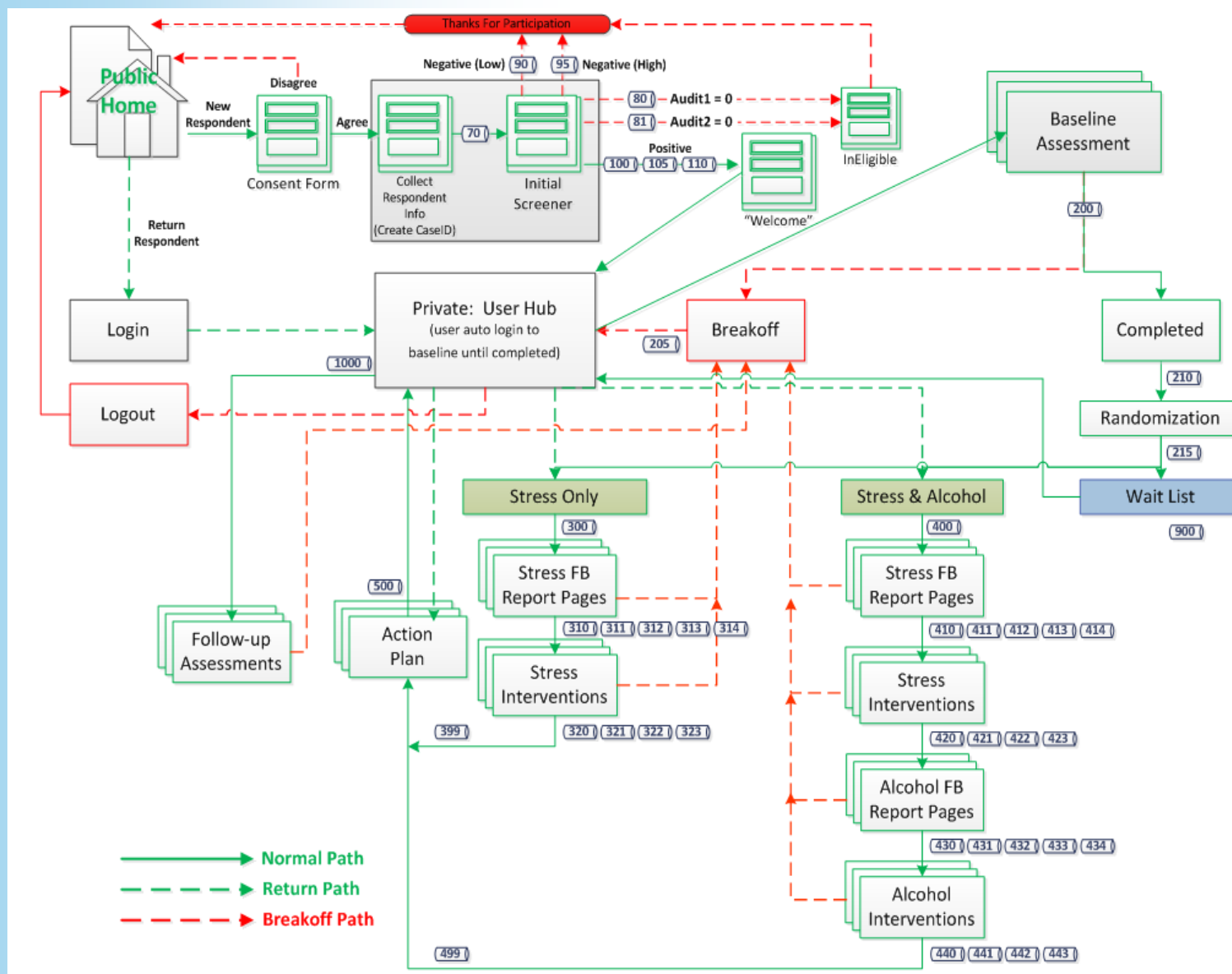
## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

21 August 2012

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# Project SUSTAIN Flow Diagram



Developed by Thomas Morgan



## Product Line Review (PLR) Meeting

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# Stress Feedback

## Stress Feedback Report

We want to provide you feedback on the assessment you've just taken. What follows is a summary of your personal responses and how you can use this information to manage your symptoms.

Your answers about stress were used to calculate a score of your risk of developing PTSD. Your score was **XX**

**#Sum(PCL1:PCL17#)**. (only show the text of the rating category the respondent scored in. Will display abbreviated text when user rolls over other categories)

17-29

**Low:** a person scoring in this range likely does not have PTSD. Most people have some stress-related reactions after a traumatic event and are likely to experience some temporary effects on feelings, thinking, and behavior. This is normal and is, in fact, valuable: increased alertness and decreased sleepiness, for example, are useful short-term responses to danger.

30-43

**Moderate:** a person scoring in this range may have PTSD. When in danger, it's natural to feel afraid. This fear triggers many split-second changes in the body to prepare to defend against the danger or to avoid it. This "fight-or-flight" response is a healthy reaction meant to protect a person from harm. People who have more symptoms of PTSD may feel stressed or anxious even when they're no longer in danger.

44+

**High risk:** a person scoring in this range may have significant symptoms of PTSD. It is normal to have stress reactions after a traumatic event and there are many different responses to crisis. Most people have intense feelings such as fear, guilt, or anger after a traumatic event but recover from the trauma; others have more difficulty recovering — especially those who have had previous traumatic experiences, who are faced with ongoing stress, or who lack support from friends and family — and will need additional help. If your reactions don't go away over time and they disrupt your life, you may have PTSD.





## Product Line Review (PLR) Meeting

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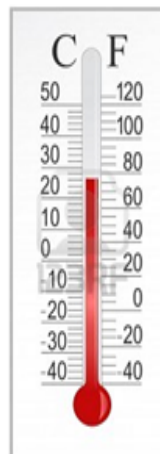
# Stress Feedback

## Stressors

You also answered questions about current stressors in your life. You indicated that you are experiencing a (low, moderate, high) (based on #Sum(Stressor1:Stressor24#) number of stressors.

Stress is defined as a feeling of emotional or physical tension. Emotional stress usually occurs when situations are considered difficult or unmanageable. Therefore, different people consider different situations as stressful.

Stress is a normal part of life. In small quantities, stress is good - it can motivate you and help you be more productive. However, too much stress, or a strong response to stress, is harmful. It can set you up for physical or psychological illnesses like infection, heart disease, or depression. Persistent and unrelenting stress often leads to anxiety and unhealthy behaviors like overeating and abuse of alcohol or drugs. (likely to replace thermometer with the colored block approach)



**Green (low) 0-20** Your results indicate that you are experiencing mild levels of stress. You may have already learned ways to reduce your stress.

**Yellow (moderate) 21-40** Your results indicate that you are experiencing moderate levels of stress and may need to learn about ways you can reduce your stress. Dealing with stress now when it's at a moderate level can help you avoid problems in the future.

**Red (high) 41-72** Your results indicate that you are currently experiencing high levels of stress. This level of stress puts you at risk for poor physical health, depression, and other problems such as sleep disruptions or increased anxiety. Working to reduce your stress may help you avoid developing additional problems.

(only show text for the range the respondent scores in)



## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

21 August 2012

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# Alcohol Feedback

## Respondent Alcohol Feedback Report

### Risks from Drinking

0 - 4	Moderate Drinking
5 - 15	Hazardous Drinking
16-19	Harmful Drinking
20+	Alcohol Dependence

Based on responses, your risk level is **< Sum #AUDIT1# to #AUDIT10# >**, which is considered **< Select RiskLevel From sustain\_AlcoholRiskLevel where (Sum #AUDIT1# to #AUDIT10#) between Min and Max >**.

**Insert #RiskLevelText #**

People who score in this range are at high risk of experiencing alcohol-related harm. Some people in this range may already be experiencing significant harm from their drinking such as problems in their relationships or injuries related to drinking.

Your results according to the AUDIT questionnaire suggest that you are at an increased risk of harming your health because of drinking. Hazardous drinking is also known as "risky drinking." This concept is similar to the idea of risky behavior. For example, smoking 20 cigarettes a day may not be accompanied by any present or actual harm, but we know it is hazardous.

If you are drinking in excess of 5 drinks per day for a male or more than 4 drinks a day for females, but not necessarily exceeding the weekly "sensible drinking" limit, you are also at increased risk of harm. Alcohol affects all parts and systems of the body and it plays a role in more than 60 different medical conditions including liver disease, cardiovascular disease, and certain forms of cancer.

If you are regularly drinking at a level that places you at increasing risk you might already have experienced problems like feeling tired or depressed, gaining extra weight, memory loss while drinking, sleeping poorly, and sexual difficulties.

If you are in this category, you are drinking hazardously. You may not be seeking treatment for an alcohol problem, even though you may realize that your drinking is putting you at risk. You therefore have a very important decision to make: whether to cut down on your drinking.

The main way to reduce your risk level is to reduce the number of drinks you consume per occasion. You may want to check out the tips section later for ideas on how to reduce your alcohol consumption.



## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

21 August 2012

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# Alcohol Feedback

## Calories from Drinking

Did you know that a glass of wine has the same calories as a slice of cake? How about a pint of beer - surprised to hear it's the caloric equivalent of a burger?

Wine, beer, spirits and all our favorite drinks are made by fermenting and distilling natural starch and sugar. Being high in sugar means alcohol contains lots of calories - 35 calories an ounce in fact, almost as many as pure fat!

Calories from alcohol are 'empty calories' - they have no nutritional value. Most alcoholic drinks contain traces of vitamins and minerals, but not usually in amounts that make any significant contribution to our diet.

It's not just the calories that are a problem for our waistlines, drinking alcohol reduces the amount of fat your body burns for energy. While we can store nutrients, protein, carbohydrates, and fat in our bodies, we can't store alcohol. So our systems want to get rid of it - and doing so takes priority. All of the other processes that should be taking place (including absorbing nutrients and burning fat) are interrupted.

Based on your responses, you take in  $\text{<\#DaysDx\# x \#AvDx\# x 150 (Calories per standard drink)>}$  calories per month from drinking alcohol.

Your caloric intake is the equivalent of eating  $\text{<\#DaysDx\# x \#AvDx\# x 150> / 400 \text{ calories (avg cheeseburger)>}}$  cheeseburgers per month.



If you wanted to burn these calories, you would need to run  $\text{<\#DaysDx\# x \#AvDx\# x 150/600 (calories per mile)>}$  hours per day. (burn rate of 600 calories per hour of running)





**Product Line  
Review (PLR)  
Meeting**

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# Stress Intervention

- Introduction to Stress Intervention/Understanding Your Stress
  - Stress basics – general parameters for “normal” stress
  - Types of stress responses & Combat Operational Stress Reactions (COSRs)
  - Managing stress (self vs. professional)
- Ways of Coping
  - Commonly-used coping strategies
  - Healthy vs. unhealthy coping strategies (Balance activity)
- Useful Coping Strategies – 4 As
  - Avoid unnecessary stress
  - Alter the situation
  - Adapt to the stressor/Accept the things you can’t change
  - Adopt a healthy lifestyle
- Your Action Plan



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# Alcohol Intervention

- **Should I Cut Down?**
  - Determining Risk
  - Comparison to the Norm
  - Blood Alcohol Level (Interactive calculation)
- **It's Up to You**
  - Your reasons for drinking
  - Pros and cons of cutting down (Balance activity)
- **Tips and Tools**
  - Tips for cutting down
  - Tools you can use (Protective Behavioral Strategies)
- **Your Action Plan**



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## Validation Strategy

- Longitudinal growth models (LGMs) for analyses of program effects.
  - LGMs estimate trajectories across time points and yield an estimate of initial status, as well as at least one slope that indicates the amount of change in the dependent variable trajectory for a set amount of change in the time scale.
- Structural equation modeling (SEM) to estimate mediation.
  - SEM will address questions about the pathways through which changes in substance use outcomes are achieved.

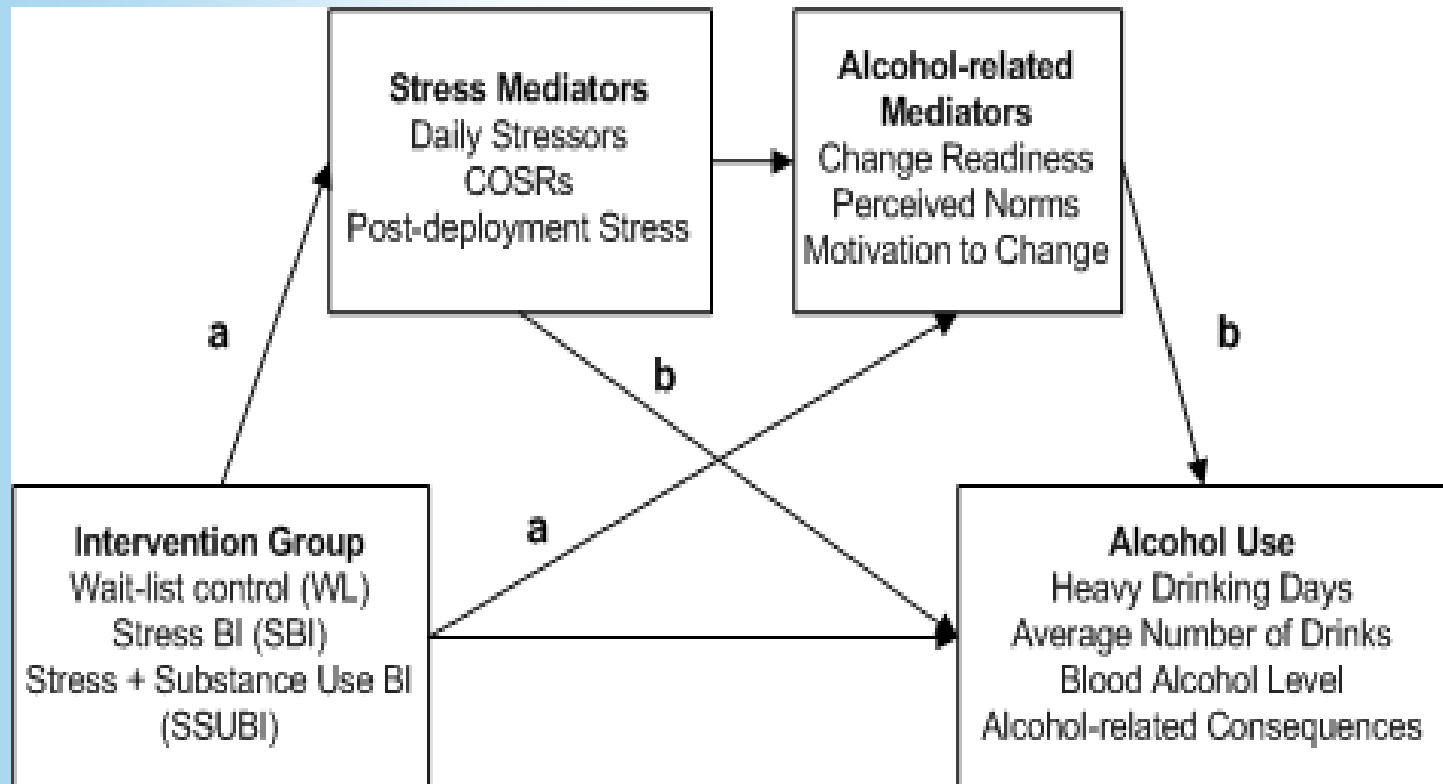


## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

21 August 2012

# Mediation Model of Program Effects



Point estimates for individual mediated effects (the effect of the intervention on a single outcome through a single mediator) will be estimated as  $ab$ , the product of the path from program to mediator (“ $a$ ”) and the path from mediator to an outcome (“ $b$ ”). Significance of mediated effects will be testing with confidence intervals around  $ab$  formed with the bias-corrected bootstrap.

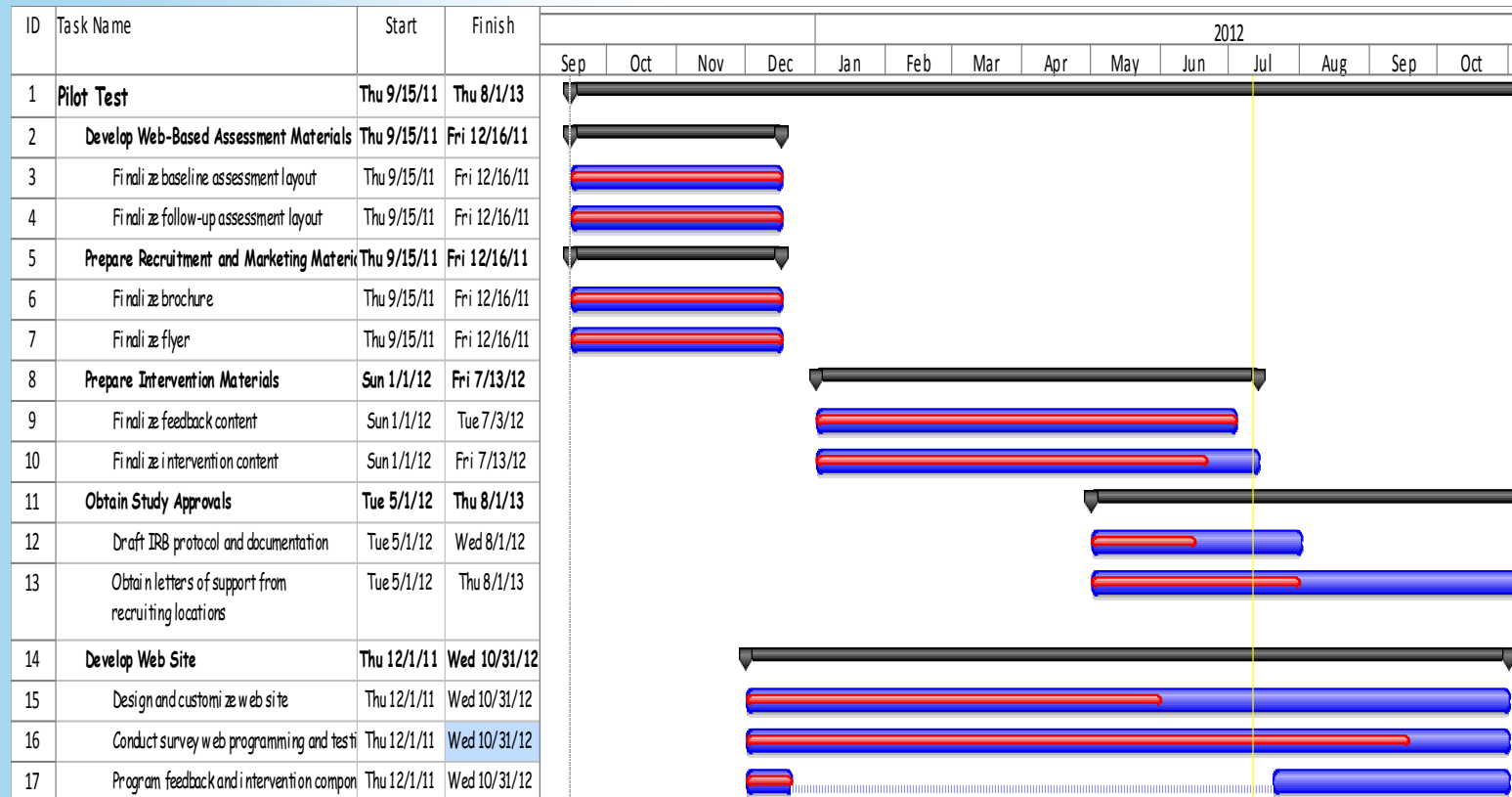


## Product Line Review (PLR) Meeting

## Technology- Facilitated Monitoring and Treatment in Mental Health

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# Research Development Timeline





**Product Line  
Review (PLR)  
Meeting**

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Mental Health**

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## Successes to Date

- Marketing materials completed
- Survey assessment and testing completed
- Feedback reports completed, programming begun
- Interventions completed, programming begun
- Two NG sites committed, third site in progress
- Three active duty sites in progress



**Product Line  
Review (PLR)  
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## Challenges

- Anticipate some IRB delays
  - Submission is contingent on a working website with full survey, feedback, and intervention components.
- Engaging active duty sites
  - Currently in talks with Ft. Lewis and Tripler AMC



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## What's Next

- **Activity 4: Obtain Study Approvals**  
(Months 1–12)
- **Activity 5: Continue Web Site Development**  
(Months 1–11)
- **Activity 6: Pilot Intervention**  
(Months 11–13)
- **Activity 7: Participant Recruitment**  
(Months 13–36)





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# Compare Competing Solutions

- Ongoing solutions pursued by others:
  - No comprehensive assessment, feedback, and intervention programs for both stress and alcohol.
  - Interventions focus on primarily on Cognitive-Behavioral solutions.
  - Vast majority of self-help protocols found on the Web have been subjected to little or no scientific evaluation.
  - Warrior Check-Up – telephone intervention for substance use.
- Market type: Military and civilian
- Market size:
  - 20-30% of post-combat military have psychological problems
  - 18% of US adults have anxiety disorders
  - 30% of US adults have alcohol abuse or alcohol dependence
- Competitors:
  - University researchers; Military researchers



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## Intellectual Property / Publications Deriving from this Project

- Finishing up Year 1 – no publications or presentations to date
- No intellectual property



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# Transition/ Business/ Marketing Plan

## ■ Transition

- Determine most effective intervention.
- Encourage ARNG to use/adopt effective arm and work to support adoption of the program (i.e., host website, train personnel).

## ■ Business

- Seek funding to conduct larger trial across all active duty components.
- Streamline interventions to focus on specific need.
- Refine/modify design to highlight findings from ARNG.

## ■ Marketing

- Publish results in peer reviewed journals.
- Present findings at professional association meetings.
- Prepare briefing reports for sites to gauge ongoing interest.
- Present briefings to DoD committees concerned with these issues.



Product Line  
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## Project Funding

<u>Current Budget</u>	<u>Expended Funds</u>	<u>%</u>
\$964,287	\$201,583	21%

Current budget includes funds for Year 2 – starts 9/15/2012

**Other Funding if applicable: NA**



**Product Line  
Review (PLR)  
Meeting**

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Mental Health**

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## **Additional Project Information**

**Lab/Company/Group: Research Triangle Institute**

**Principal Investigator: Janice M. Brown, Ph.D.**

**Government COR: Jay Shore, Ph.D.**

**Government Project Officer: Caitlin Buchheit**

**Contract Instrument: Cooperative Agreement**

**Period of Performance: 15 Sept 2011-14 Oct 2015**

**Contract Specialist: Catherine Henry**

**EDMS# :**

**Contract #: W81XWH-11-2-0197**

**\*\* To Be Completed by  
COR or Project Officer**

# Combat Stress and Substance Abuse Intervention

Janice M. Brown, PhD  
RTI International

Award Number(s): W81XWH-11-2-0197

Award Date(s): 9/15/11-9/14/15

Award Amount: \$1,884,551

Contract Officer Representative: Dr. Jay Shore

# Co-Investigators/Team

- Laura Strange, PhD – Co-Investigator
- Alex Cowell, PhD – Economist
- Richard Zemonek – Programmer
- Jason Williams – Statistician
- Carrie Borst – Project Manager

# Study Background/Rationale

- Combat and Operational Stress Reactions - expected and predictable emotional, intellectual, physical, and/or behavioral reactions.
- Estimated 20% to 30% of US military personnel returning from combat operations report significant psychological symptoms (including COSRs).
- Studies with soldiers have found that symptoms increase 3 to 6 months after returning home.
- Perceived stigma often keeps personnel from seeking help.



# Solution – SUSTAIN

## Substance Use and STress: An INtervention

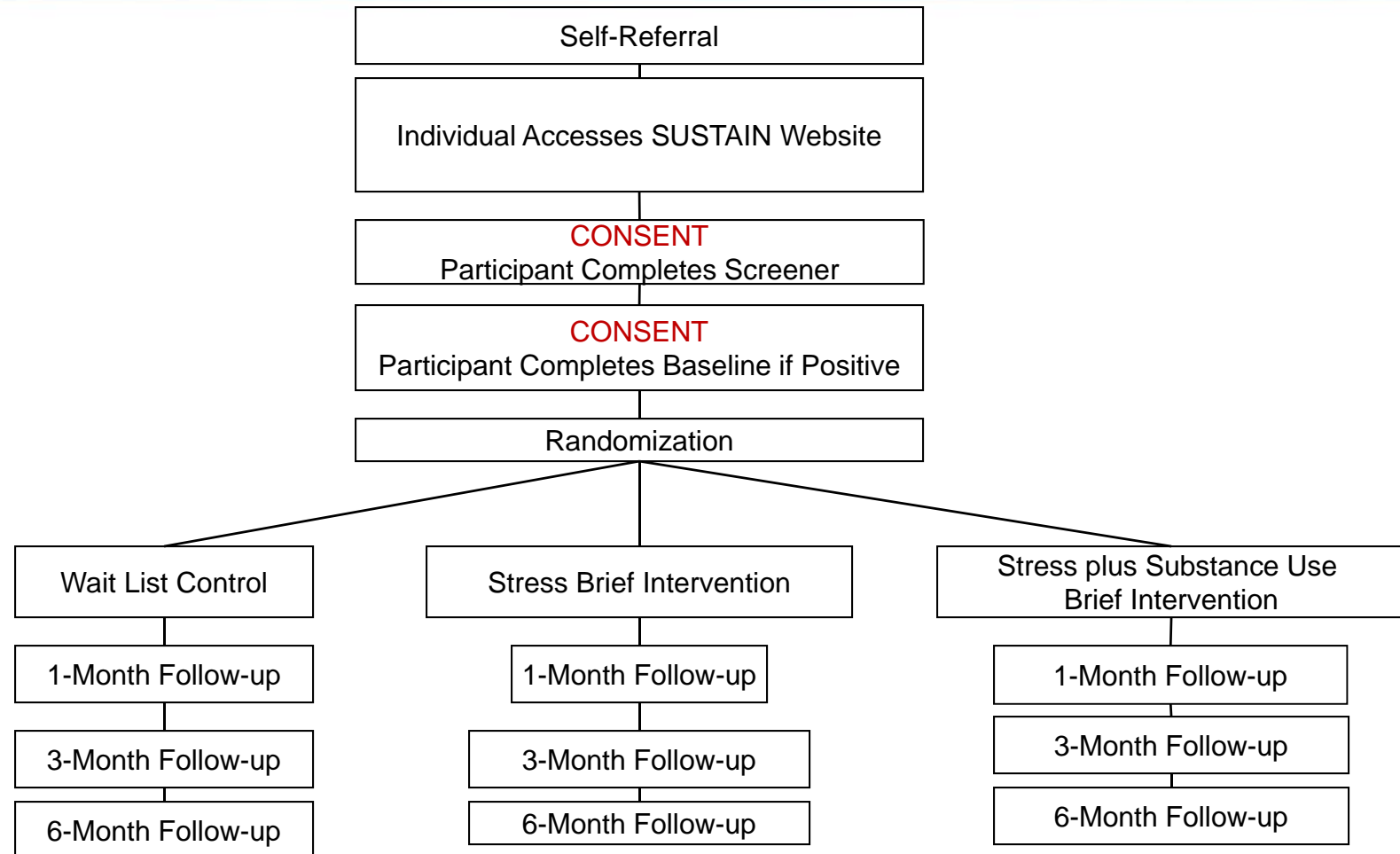
- Intervention based on Motivational Interviewing (MI)
- Randomized, controlled trial of two web-based interventions with active duty and National Guard personnel
  - Stress Only Intervention
  - Stress plus Alcohol Intervention
- Intervention groups compared to a Delayed Feedback control group (intervention provided at 6-month follow-up)
- Cost analysis
  - Resources needed to put the interventions in place
  - Costs to maintain the interventions
  - Cost-benefit of the two interventions (Bang for your buck)
- Adjunct to those currently receiving help
- Supports those who do not seek help because of perceived stigma

# Research Questions/Hypotheses

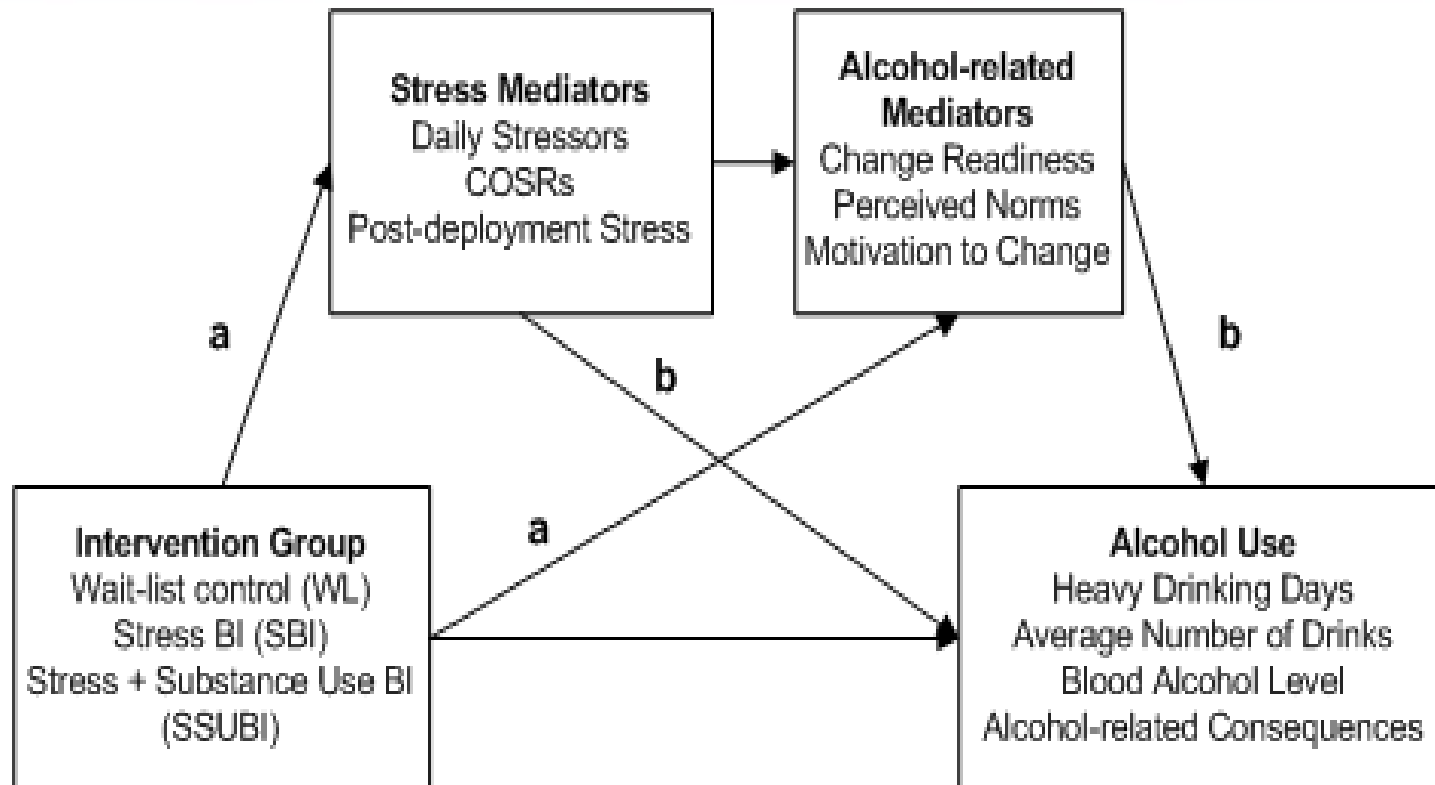
- **Hypothesis 1:** Both intervention groups will show reduction in COSRs over time compared with the wait list (WL) control group.
- **Hypothesis 2:** The stress plus substance use group (SSUBI) will show lower use of alcohol over time compared with the stress only group (SBI). Both groups will demonstrate lower substance use outcomes compared with the WL control group.
- **Hypothesis 3:** The SSUBI group will be cost-effective relative to SBI and WL groups.
- **Additional Analyses:** A number of individual-level factors (e.g., combat experiences, deployment history, unit cohesion) may interact with the interventions to attenuate responses to the interventions. These factors will be tested as moderators of the interventions' effectiveness. Factors that moderate effectiveness will help to identify *for whom* the interventions work.

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# Study Design



# Mediation Model of Program Effects



Point estimates for individual mediated effects (the effect of the intervention on a single outcome through a single mediator) will be estimated as  $ab$ , the product of the path from program to mediator (“ $a$ ”) and the path from mediator to an outcome (“ $b$ ”). Significance of mediated effects will be tested with confidence intervals around  $ab$  formed with the bias-corrected bootstrap.

# Marketing Poster



**SUSTAIN**

Your Health ★ Your Relationships ★ Your Readiness

The SUSTAIN study is being undertaken to learn more about stress reactions among military personnel.

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- This installation is one of several that have been selected for this important research study.

**Participants will** receive a novel web-based study that is geared toward enhancing combat effectiveness, health, and overall well-being of warriors and families.

**All you need to participate is:**

- Internet access.
- A desire to help our fighting force become healthier and stronger.

**RTI**  
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Conducted by: RTI International  
Sponsored by: United States Army  
Medical Research and Materiel Command

**TO PARTICIPATE LOG ON AT: [SUSTAIN.RTI.ORG](http://SUSTAIN.RTI.ORG)**

For more information about the study,  
please call 1-800-647-9655  
or email [Sustain@rti.org](mailto:Sustain@rti.org).



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# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

[Module](#) ▸ [Stress Feedback](#)

[Joe Blow](#) [Logout](#)

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[Introduction](#) [Stress](#) [Stressors](#) [COSRs](#) [Personal Resources](#)

Based on your responses, you are currently experiencing a HIGH level of stress.

0-29

Low

30-43

Moderate

44+

High Risk

## HIGH LEVEL OF STRESS

A person scoring in this range may be having signs of significant stress related to their deployment or other traumatic experiences. It is normal to have stress reactions after extreme stress and there are many different responses to crisis. Many people have intense feelings such as fear, guilt, or anger after a traumatic event but recover from the experience; others have more difficulty recovering - especially those who have had previous stressful experiences, who are faced with ongoing stress, or who lack support from friends and family - and will need additional help. If your reactions don't go away over time and they disrupt your life, you may be at risk for developing PTSD.

### Symptoms of high levels of stress often include:

- **Fear or anxiety:** In moments of danger, our bodies prepare to fight our enemy, flee the situation, or freeze in the hope that the danger will move past us. But those feelings of alertness may stay even after the danger has passed. You may feel tense or afraid, be agitated and jumpy, or feel on alert all or most of the time.
- **Sadness or depression:** Sadness after an event may come from a sense of loss—of a loved one, of trust in the world, faith, or a previous way of life. You may have crying spells; lose interest in things you used to enjoy; want to be alone all the time; or feel tired, empty, and numb more than you used to.
- **Guilt and shame:** You may feel guilty that you did not do more to prevent the event. You may feel ashamed because during the event you acted in ways that you would not otherwise have done. You

Click the "Stressors" tab above to continue.

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# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

Module &gt; Stress 01

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<a href="#">Introduction</a>	<a href="#">The Basics</a>	<a href="#">What happens when you're stressed?</a>	<a href="#">Effects of Stress</a>	<a href="#">Handling Stress</a>
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## A Little Stress Goes a Long Way – The Basics

First, what do we know about stress? Stress is any type of physical, emotional, or psychological strain you experience because an event (or number of events) has upset your personal balance and makes you feel frustrated or threatened. There are two types of stress, and each type can occur across different lengths of time.

### Types of Stress



**Positive Stress** – fun and/or exciting stress, like preparing for a sports competition, starting a new job, or getting married



**Negative Stress** – what we normally think of when we think of “stress” – the bad kind; this can include situations like road rage in response to traffic jams or anger when dealing with a computer virus

### Time periods for stress:



**Short-term** – day-to-day stress that may include events like rushing to meet a tight deadline for work or arguing with your spouse or partner.



**Long-term** – “never-ending” stress where a person is constantly dealing with the situation and can’t seem to “escape” it, such as things like dealing with financial problems or chronic health issues

Now, based on these categories, think about what stresses you the most. Keep these examples in mind as you work through this stress program.





# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

[Next](#)

[Introduction](#) [Risks of Drinking](#) [The Four Cs](#) [Personal Strengths](#)

Based on responses, your risk level is **17**, which is considered **Harmful Drinking**.

0-4  
Low Risk  
Drinking

## Harmful Drinking

A person scoring in this range will already be experiencing significant alcohol-related harm. The harmful drinking category applies to people drinking over medically recommended levels, probably at somewhat higher levels than in hazardous drinking. It suggests that you are at higher risk of harming your health because of drinking.

5-15  
Hazardous  
Drinking

The problems that are being detected by you at this stage may be acute, such as an alcohol-related accident, acute pancreatitis or acute blood poisoning. You are also likely to have experienced feeling tired or depressed, gaining weight or having periods of memory loss when drinking. You may be sleeping poorly or having sexual difficulties. You may find it difficult to reduce or limit your drinking but there are useful strategies you can try. We will provide some of these tips later in this session.

**16-19**  
**Harmful**  
**Drinking**

If you are in this category, the amount you are drinking is likely to be causing you harm—in fact, it might even be having bad effects on your body that you are not aware of. You have a difficult decision to make: should I cut down on my drinking?

20+  
Alcohol  
Dependence

Click the "The Four C's" tab above to continue.



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# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

Module > Alcohol 01

Janice Brown [Logout](#)

[Next](#)[How Do I Measure Up?](#)[What type of drinker are you?](#)[Standard Drinks](#)[Staying Under the Limit](#)[Determining BAL](#)

## Staying Under The Limit

It doesn't take much to put you over the safe blood alcohol level (BAL) of 0.05%. Drinking up to the safe level means:

- Men of average size can drink up to two standard drinks in the first hour and no more than one standard drink per hour after.
- Women of average size should drink no more than one standard drink an hour.

## Your Drinking Compared to the Average Person's

Deciding whether you should cut down on drinking may not always be an easy decision. In addition to defining your personal drinking behavior and whether you are typically a low- or high-risk drinker, sometimes it helps to know how your drinking behavior compares to others to get an idea of where you measure up.



What you drink on average:	What you think others drink on average:	What others actually drink on average:
6	7	1

Are you surprised by this result? If so, it is important to remember that most people think others drink more than they actually do. On average, most people don't drink to get drunk.

With that in mind, your drinking appears to be significantly higher than others your age – lowering the number of drinks you have can lower your risk of experiencing alcohol-related problems.

Click the "Determining BAL" tab to continue.

# Current and Anticipated Challenges

- IRB Delays
  - Submission was contingent on a working website with full survey, feedback, and intervention components
  - Resubmission to address potential risks with increasing symptoms
  - Terminology concerns
- Engaging Sites
  - Currently in talks with Ft. Huachuca and WA ANG
  - IRB delays necessitate ongoing contact with recruited sites
- Next Steps
  - HRPO approval
  - Begin recruitment

# Study Progress to Date

- Marketing materials completed
- Survey assessments programmed and testing completed
- Feedback reports completed, programmed, and tested
- Interventions completed, programmed, and tested
- Two NG sites committed, third site in progress
- One active duty site committed, one site in progress
- RTI IRB approval received
- Documents submitted to HRPO

# Dissemination/Transition Plan

- Transition
  - Determine most effective intervention.
  - Encourage ARNG to use/adopt effective arm and work to support adoption of the program (i.e., host website, train personnel).
- Business
  - Seek funding to conduct larger trial across all active duty components.
  - Streamline interventions to focus on specific need.
  - Refine/modify design to highlight findings from ARNG.
- Dissemination
  - Publish results in peer reviewed journals.
  - Present findings at professional association meetings.
  - Prepare briefing reports for sites to gauge ongoing interest.
  - Present briefings to DoD committees concerned with these issues.



# Combat Stress and Substance Abuse Intervention

PI: Janice M. Brown, PhD  
Co-PI: Laura B. Strange, PhD  
RTI International

Award Number: W81XWH-11-2-0197  
Award Dates: 9/15/11-9/14/15  
Award Amount: \$1,884,551  
Contract Officer Representative:  
Dr. Dean Kilpatrick

RTI International is a trade name of Research Triangle Institute.

[www.rti.org](http://www.rti.org)

## Co-Investigators/Team

- Alex Cowell, PhD – Economist
- Richard Zemonek – Programmer
- Jason Williams – Statistician
- Carrie Borst – Project Manager

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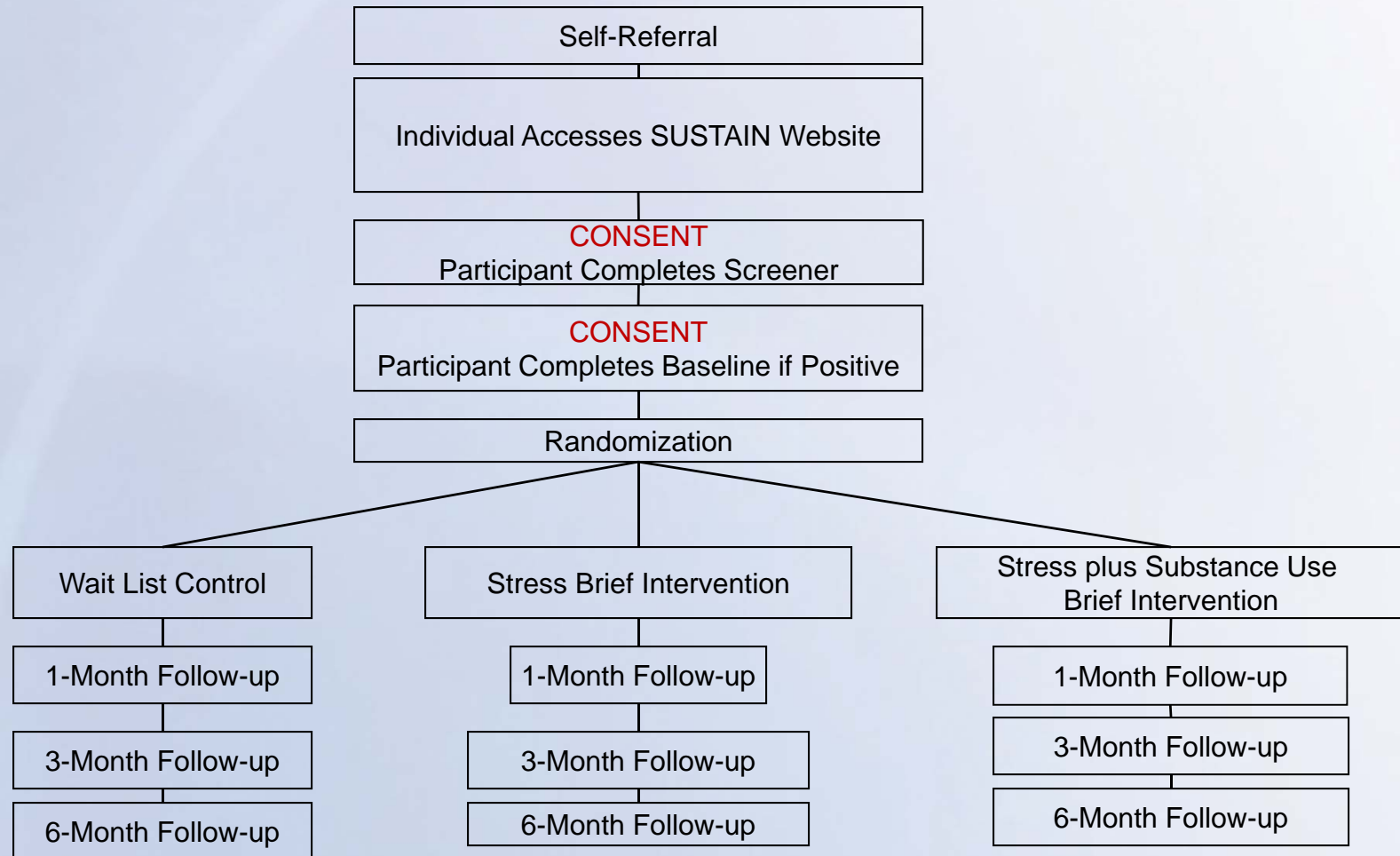
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## Research Questions/Hypotheses

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# Study Design



## Marketing Poster



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Conducted by: RTI International  
Sponsored by: United States Army  
Medical Research and Materiel Command

RTI INTERNATIONAL

Thursday, June 13, 2013

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Module



Module > Stress Feedback

Joe Blow Logout

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Introduction Stress Stressors COSRs Personal Resources

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30-43

Moderate

44+

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Click the "Stressors" tab above to continue.



Thursday, June 20, 2013

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# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

Module &gt; Stress 01

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Now, based on these categories, think about what stresses you the most. Keep these examples in mind as you work through this stress program.

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Thursday, June 13, 2013

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# SUSTAIN

Your Health ★ Your Relationships ★ Your Readiness

[Module](#) > [Alcohol Feedback](#)[Joe Blow](#) [Logout](#)[Next](#)[Introduction](#) [Risks of Drinking](#) [The Four Cs](#) [Personal Strengths](#)

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Low Risk  
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Drinking

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20+  
Alcohol  
Dependence

Click the "The Four C's" tab above to continue.

## Study Progress to Date

- HRPO approval received - October 2013
- Recruitment materials to the field (TN, WA, GA) - November/December 2013
- National Guard Bureau (NGB) endorsement –December 2013
- Intensive recruitment activities – Jan 2014- present
- Current sample 9

## Recruitment Activities

- Tennessee Army National Guard
  - Recruitment materials at PDHAs, Medical Command, with Behavioral Health Staff
- Georgia National Guard
  - Fragmentary order (FRAGO) - supporting program and directing recruitment materials in units
  - Briefings/brochure distribution – unit level, Yellow Ribbon, Chaplains, Behavioral Health Staff, Medical Command, Flight Surgeons, Soldier Readiness Processing (SRPs), Public Affairs Office (PAO)
- Warrior Transition Unit (WTU)/ Ft Gordon -  
Commander/Surgeon briefing/brochure distribution



## Current Challenges

- Recruitment
  - Addition of incentive
  - IRB approval request in process
  - HRPO approval required
  - Distribution of revised recruitment materials
  - Repeat briefings
  - Facebook/email blasts
- Engage Additional Sites

## Dissemination/Transition Plan

- Transition
  - Determine most effective intervention.
  - Encourage military services to use/adopt effective interventions and work to support adoption of the program (i.e., host website, train personnel).
- Business
  - Seek funding to conduct larger trial across all components.
  - Streamline interventions to focus on specific need.
- Dissemination
  - Publish results in peer reviewed journals.
  - Present findings at professional association meetings.
  - Prepare briefing reports for sites to gauge ongoing interest.
  - Present briefings to DoD committees concerned with these issues.



# Combat Stress and Substance Abuse Intervention

PI: Janice M. Brown, PhD  
RTI International

Award Number: W81XWH-11-2-0197  
Award Dates: 9/15/11-9/14/15, NCE: 9/14/16  
Award Amount: \$1,884,551  
Contract Officer Representative: Dr. Dean Kilpatrick  
Funding Agency: USAMRMC

RTI International is a trade name of Research Triangle Institute.

[www.rti.org](http://www.rti.org)

## Co-Investigators/Team

- Laura Strange, PhD – Co-Investigator
- Alex Cowell, PhD – Economist
- Richard Zemonek – Programmer
- Jason Williams – Statistician
- Carrie Borst – Project Manager

## Study Background/Rationale Statement of the Problem

- Combat and Operational Stress Reactions are expected and predictable emotional, intellectual, physical, and/or behavioral reactions.
- Estimated 20% to 30% of US military personnel returning from combat operations report significant psychological symptoms (including COSRs).
- Studies with soldiers have found that symptoms increase 3 to 6 months after returning home.
- Perceived stigma often keeps personnel from seeking help.
- Randomized, controlled trial of two web-based interventions with active duty and National Guard personnel.
  - Stress Only Intervention
  - Stress plus Alcohol Intervention

# Solution – SUSTAIN

## [Substance Use and STress: An Intervention]

### Military Relevance

- Intervention based on Motivational Interviewing (MI) principles
- Intervention groups compared to a Delayed Feedback control group (intervention provided at 6-month follow-up)
- Cost analysis
  - Resources needed to put the interventions in place
  - Costs to maintain the interventions
  - Cost-benefit of the two interventions (Bang for your buck)
- Adjunct to those currently receiving help
- Promotes readiness, health, and wellness through effective treatment of stress disorders and substance abuse
- Provides a skills development intervention while all reviewed web-based interventions primarily offer education

# Research Aims/Hypotheses

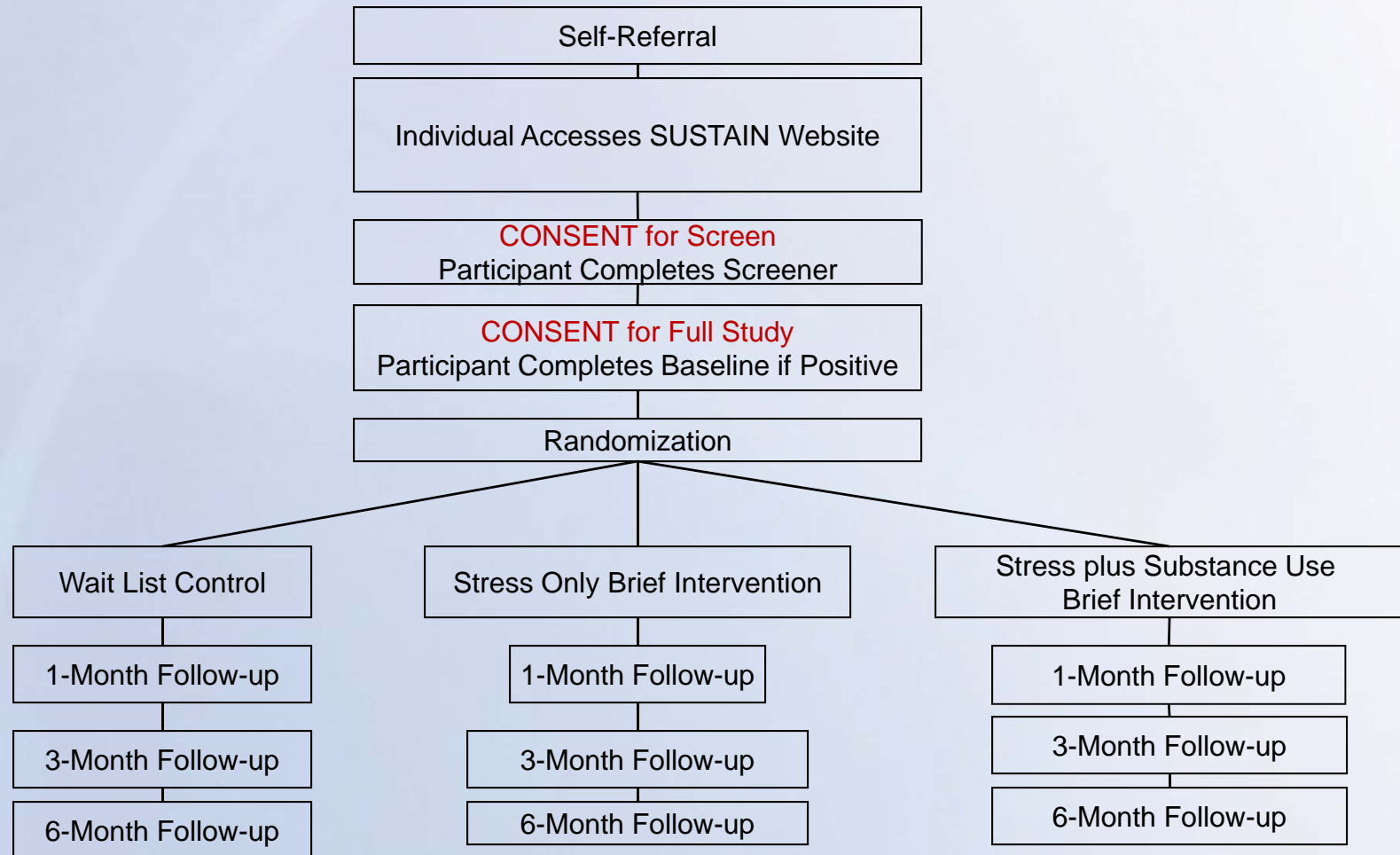
## AIMS

- **AIM 1:** To evaluate the effectiveness of two Web-based BIs for reducing stress reactions and substance abuse among two populations of post-deployment military personnel. One intervention will focus only on COSRs, the other on COSRs plus substance abuse. The interventions will be compared with a delayed feedback control group.
- **Aim 2:** To test factors that may mediate responses to the interventions. The assessment portion of the interventions will include measures of change factors to be tested as mediators of the interventions.
- **Aim 3:** To assess the cost and cost-effectiveness of the interventions. The cost analysis will describe what resources are needed to put the interventions in place and what it costs to maintain the interventions on an ongoing basis.

## Hypotheses

- **Hypothesis 1:** Both intervention groups will show reduction in COSRs over time compared with the delayed feedback control group.
- **Hypothesis 2:** The stress plus substance use group will show lower use of alcohol over time compared with the stress only group. Both groups will demonstrate lower substance use outcomes compared with the delayed feedback control group.
- **Hypothesis 3:** The stress plus substance use group will be cost-effective relative to stress only and delayed feedback groups.

# Study Design





## Marketing Poster



**SUSTAIN**

Your Health ★ Your Relationships ★ Your Readiness

The SUSTAIN study is being undertaken to learn more about stress reactions among military personnel.

- All post-deployment Active Duty and Reserve Component personnel are encouraged to participate.
- This installation is one of several that have been selected for this important research study.

**Participants will** receive a novel web-based study that is geared toward enhancing combat effectiveness, health, and overall well-being of warriors and families.

**All you need to participate is:**

- Internet access.
- A desire to help our fighting force become healthier and stronger.

**TO PARTICIPATE LOG ON AT: [SUSTAIN.RTI.ORG](http://SUSTAIN.RTI.ORG)**

**For more information about the study, please call 1-800-647-9655 or email [Sustain@rti.org](mailto:Sustain@rti.org).**

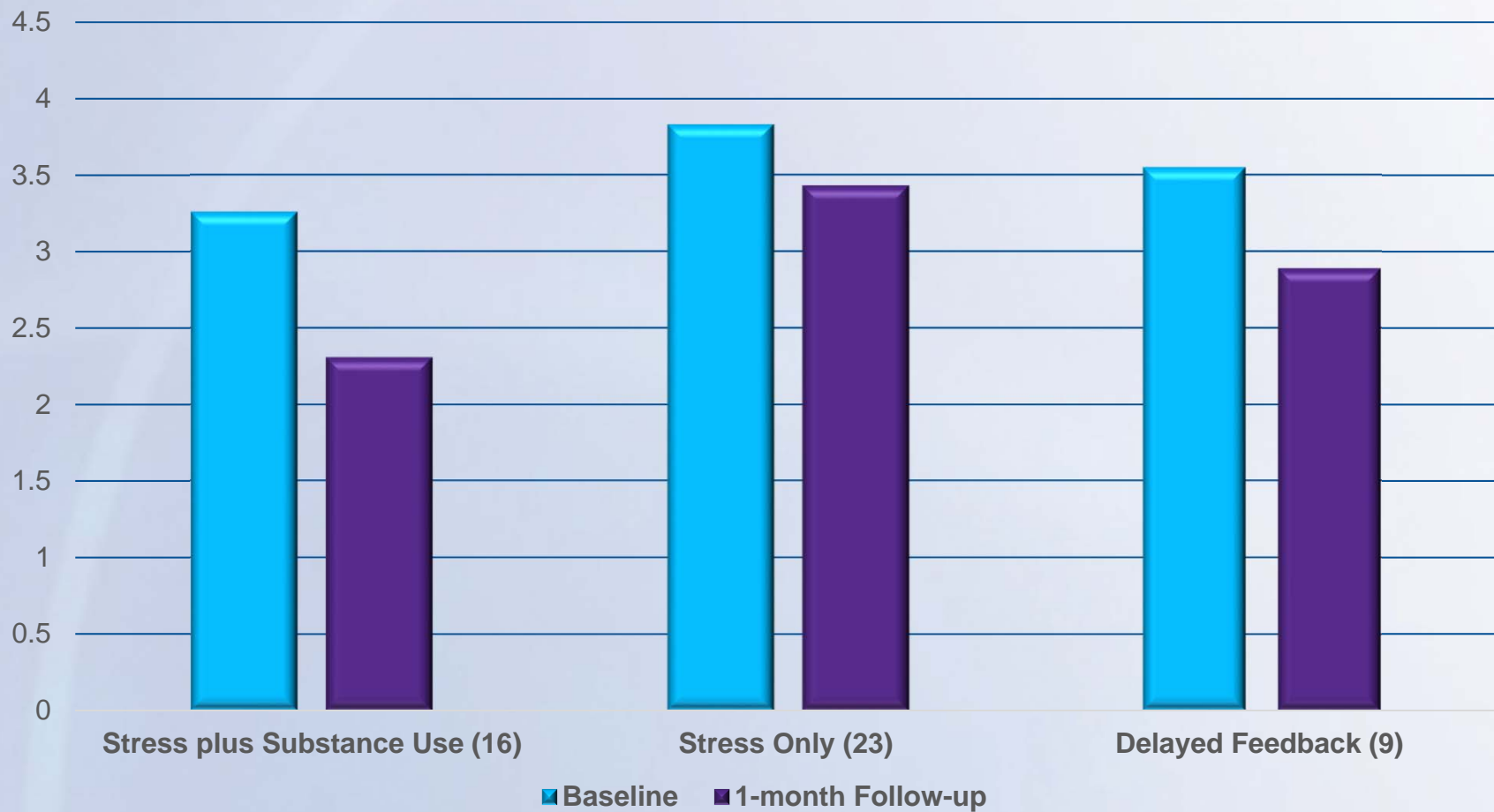
Conducted by: RTI International  
Sponsored by: United States Army  
Medical Research and Materiel Command

RTI INTERNATIONAL

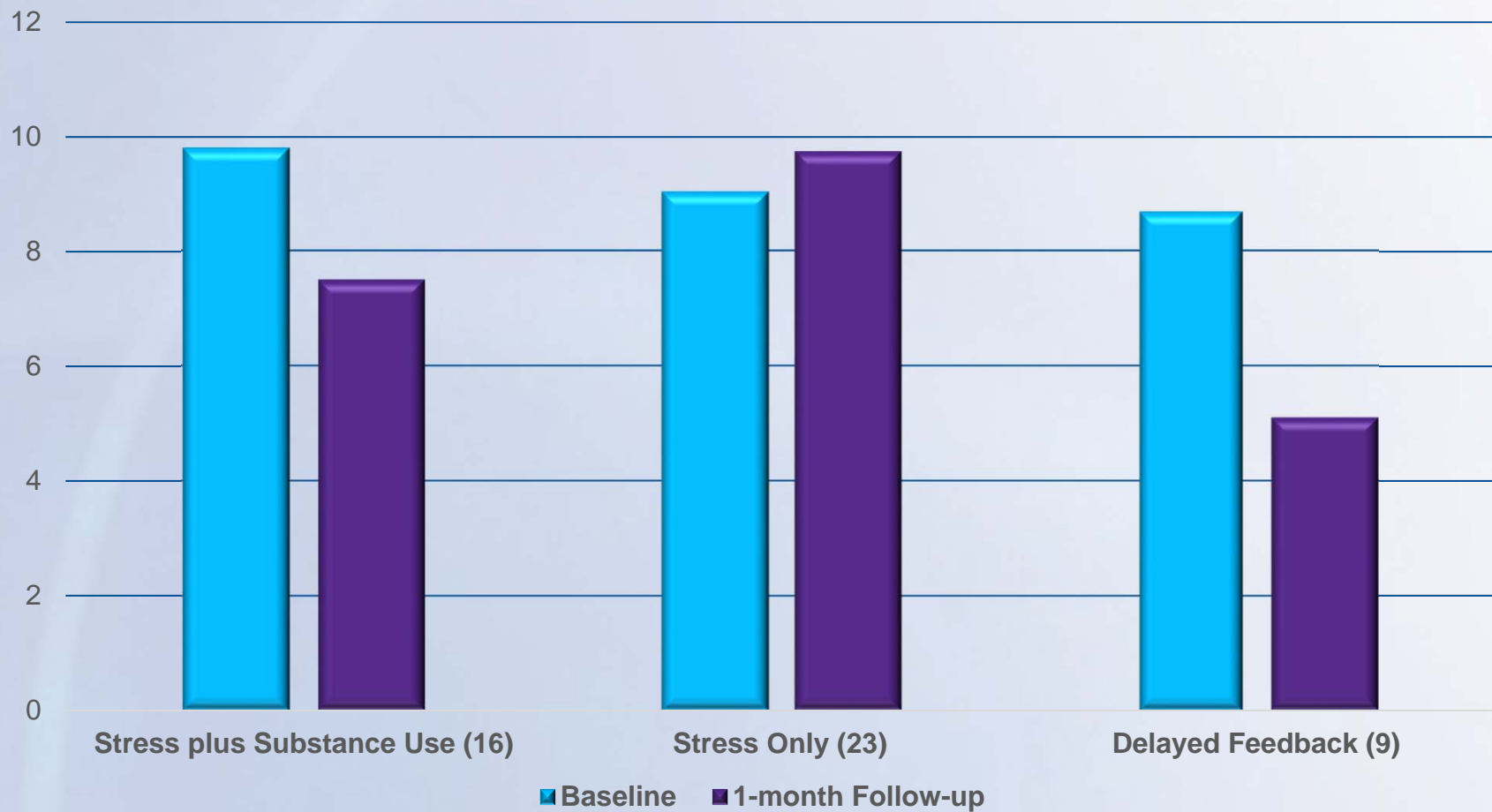
## Demographics and Baseline Characteristics

	All (92)	Stress Plus (34)	Stress Only (36)	Delayed FB (22)
Male	68.5	61.8	72.2	72.7
Female	31.5	38.2	27.8	27.3
E1-E3	13.5	12.1	11.4	19.0
E4-E6	60.7	60.6	60.0	61.9
E7-E9	9.0	9.1	14.3	
O1-O3	12.3	12.1	11.4	14.3
O4-O6	4.5	6.1	2.9	4.8
Married	45.1	44.1	44.4	47.6
PCL (17-81)	28.1	29.7	26.9	27.4
AUDIT (0-19)	4.63	3.91	5.19	4.82
COSR (0-20)	9.2	9.8	9.0	8.7

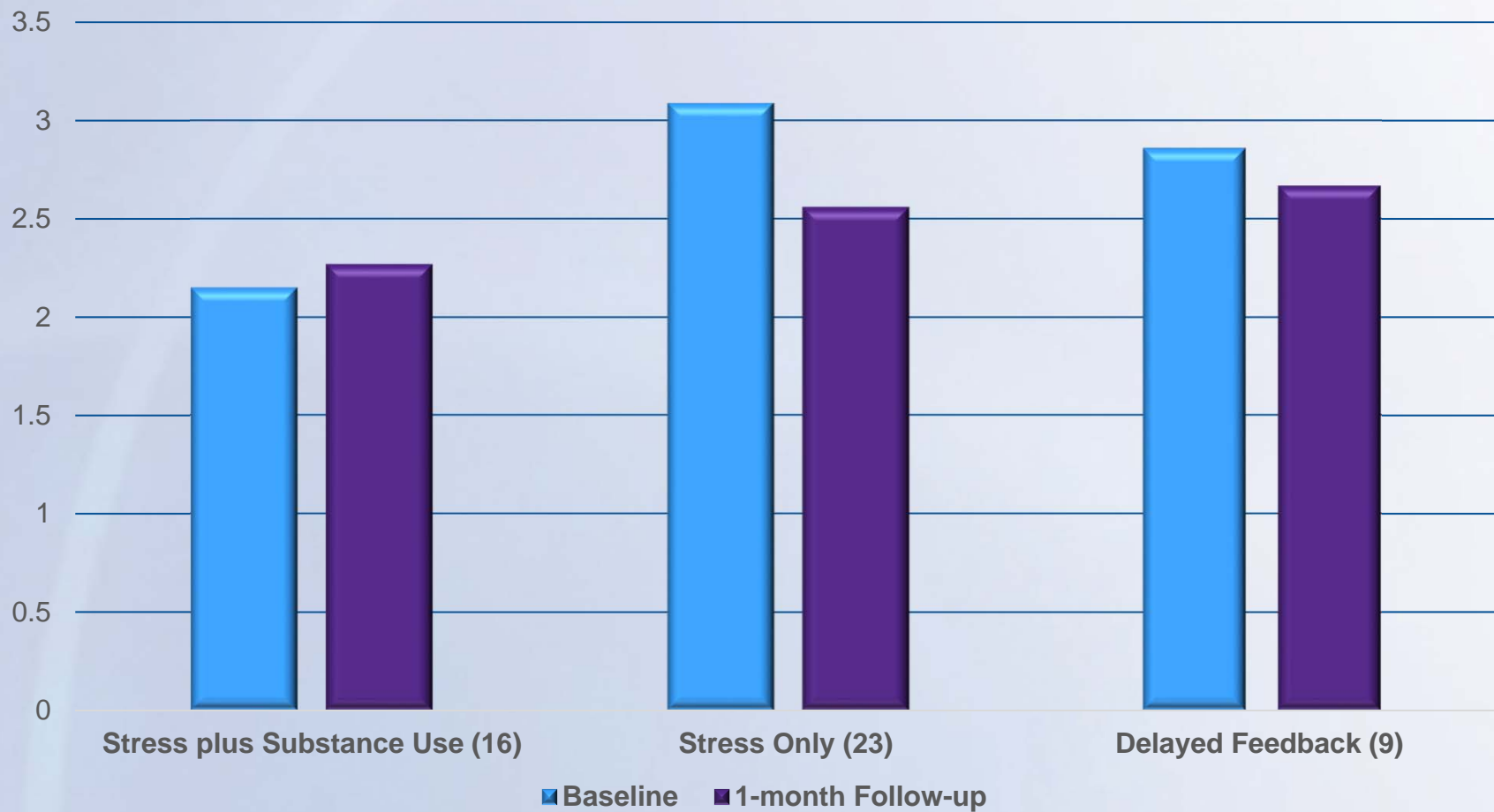
## Change in AUDIT-C Scores at 1 Month



## Change in COSR Scores at 1 Month



## Change in Average Number of Drinks at 1 Month



## Current Challenges

- **Recruitment**
  - Addition of incentive for National Guard participants
  - Distribution of revised recruitment materials
  - Repeat briefings
  - Recently added Marine Corps base
  - Recently added North Carolina National Guard
  - Working with Arizona National Guard
  
- **Follow-up Rate**
  - 60% at 1 month
    - 39% prior to incentive
    - 74% following incentive
  - 47% at 3 months (42% vs. 52%)

## Study Progress to Date

- HRPO approval received - October 2013
- Recruitment materials to the field (TN, WA, GA, JBLM) - November/December 2013
- National Guard Bureau (NGB) endorsement –December 2013
- Intensive recruitment activities – Jan 2014 - present
- Current sample 96 (all from Georgia National Guard)
- Enrollment

202		Accessed the website		
	96	Enrolled		23-WL; 37-SA;36-S
	25	BL not complete		
	10	Anomalies		Screen only/Bad email
	34	Ineligible		Low scores – no alcohol
	37	Did not complete screener		

## Recruitment Activities

- Georgia National Guard
  - Fragmentary order (FRAGO) - supporting program and directing recruitment materials in units
  - Briefings/brochure distribution – unit level, Yellow Ribbon, Chaplains, Behavioral Health Staff, Medical Command, Flight Surgeons, Soldier Readiness Processing (SRPs), Public Affairs Office (PAO)
- Warrior Transition Unit (WTU)/ Ft Gordon
  - Commander/Surgeon briefing/brochure distribution
- Twentynine Palms Marine Corps Base
  - Posters/brochure distribution in Behavioral Health, Family Advocacy, Community Counseling Center, Substance Abuse Counseling Center
- North Carolina National Guard
  - Briefing scheduled for October 5, 2015



## Dissemination/Transition Plan

- Transition
  - Determine most effective intervention.
  - Encourage military services to use/adopt effective interventions and work to support adoption of the program (i.e., host website, train personnel).
- Business
  - Seek funding to conduct larger trial across all military components.
  - Streamline interventions to focus on specific need.
- Dissemination
  - Publish results in peer reviewed journals.
  - Present findings at professional association meetings.
  - Prepare briefing reports for sites to gauge ongoing interest.
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Award Dates: 9/15/11-9/14/15, NCE: 3/14/17

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Co-Investigators: Laura Strange, Alex Cowell

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## Study Background/Rationale

- Combat and Operational Stress Reactions are expected and predictable emotional, intellectual, physical, and/or behavioral reactions to exposure to combat or other stressful military operations.
- Estimated 20% to 30% of US military personnel returning from combat operations report significant psychological symptoms (including COSRs).
- Studies with soldiers have found that symptoms increase 3 to 6 months after returning home.
- Perceived stigma often keeps personnel from seeking help.

## Solution – SUSTAIN

### [Substance Use and STress: An Intervention]

- Intervention based on Motivational Interviewing (MI) principles
  - Comprehensive assessment – alcohol use, current stressors, resilience, combat experiences
  - Objective feedback – visual report referencing norms
  - Goal setting – helps resolve ambivalence and choose goals related to areas of need
- Cost analysis
  - Resources needed to put the interventions in place
  - Costs to maintain the interventions
  - Cost-benefit of the two interventions (Bang for your buck)
- Adjunct to those currently receiving help.
- Promotes readiness, health, and wellness through effective treatment of stress disorders and substance abuse.
- Provides a skills development intervention while all reviewed web-based interventions primarily offer education or address only one issue.
- Requires fewer resources to treat a greater number of people.
- Maintains more intense interventions for personnel in greater need.

# Research Questions and Hypotheses

## AIMS

- **AIM 1:** To evaluate the effectiveness of two Web-based BIs for reducing stress reactions and substance abuse among two populations of post-deployment military personnel. One intervention will focus only on COSRs, the other on COSRs plus alcohol use. The interventions will be compared with a delayed feedback control group.
- **Aim 2:** To test factors that may moderate responses to the interventions. The assessment portion of the interventions will include measures to be tested as moderators of the outcomes.
- **Aim 3:** To assess the cost and cost-effectiveness of the interventions. The cost analysis will describe what resources are needed to put the interventions in place and what it costs to maintain the interventions on an ongoing basis.

## Hypotheses

- **Hypothesis 1:** Both intervention groups will show reduction in COSRs over time compared with the delayed feedback control group.
- **Hypothesis 2:** The stress plus substance use group will show lower use of alcohol over time compared with the stress only group. Both groups will demonstrate lower substance use outcomes compared with the delayed feedback control group.
- **Hypothesis 3:** The stress plus substance use group will be cost-effective relative to stress only and delayed feedback groups.

## Design and Methodology

- Randomized, controlled trial of two web-based interventions
  - Stress Only Intervention
  - Stress plus Alcohol Intervention
  - Delayed Feedback control group (Stress plus Alcohol Intervention at 6-month follow-up)
- Power
  - Updated power estimates were calculated using a final estimated sample of 300 (100 per group).
  - This sample size was used in power simulations comparing rate of change across two groups, each with an attrition rate of 25%. This is approximately the rate of those lost to any follow-up assessments in the current data.
  - Power reached .80 for this scenario with an effect size of approximately  $d = .6$ . At smaller effect sizes (.4 and .5) power was estimated to be approximately .42 and .61 respectively.
- Study sites
  - Georgia Army National Guard
  - North Carolina Army National Guard

## Measures/Analyses

- Measures
  - Combat and Operational Stress Reactions (COSR) – measures stress reactions specific to military service
  - Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) – alcohol use disorders
  - Alcohol-related consequences
  - Current Stressors – measures a range of stressors (financial, family, work, etc.)
  - PTSD Checklist – Civilian (PCL-C)
  - Conner-Davidson Resilience Scale - The CD-RISC contains 25 items
  - Benefit Finding Scale Antoni et al., 2001) contains 17 items, and each item expresses some potential benefit that might be derived from an experience
- Longitudinal growth models (LGMs) are the primary analysis model for evaluating treatment effects.
- Enable:
  - Estimation and comparison of group specific rates of change over time.
  - Inclusion of moderators of treatment effects and overall change.
  - Estimation of change over time in segments, nonlinear change, and other models of interest.

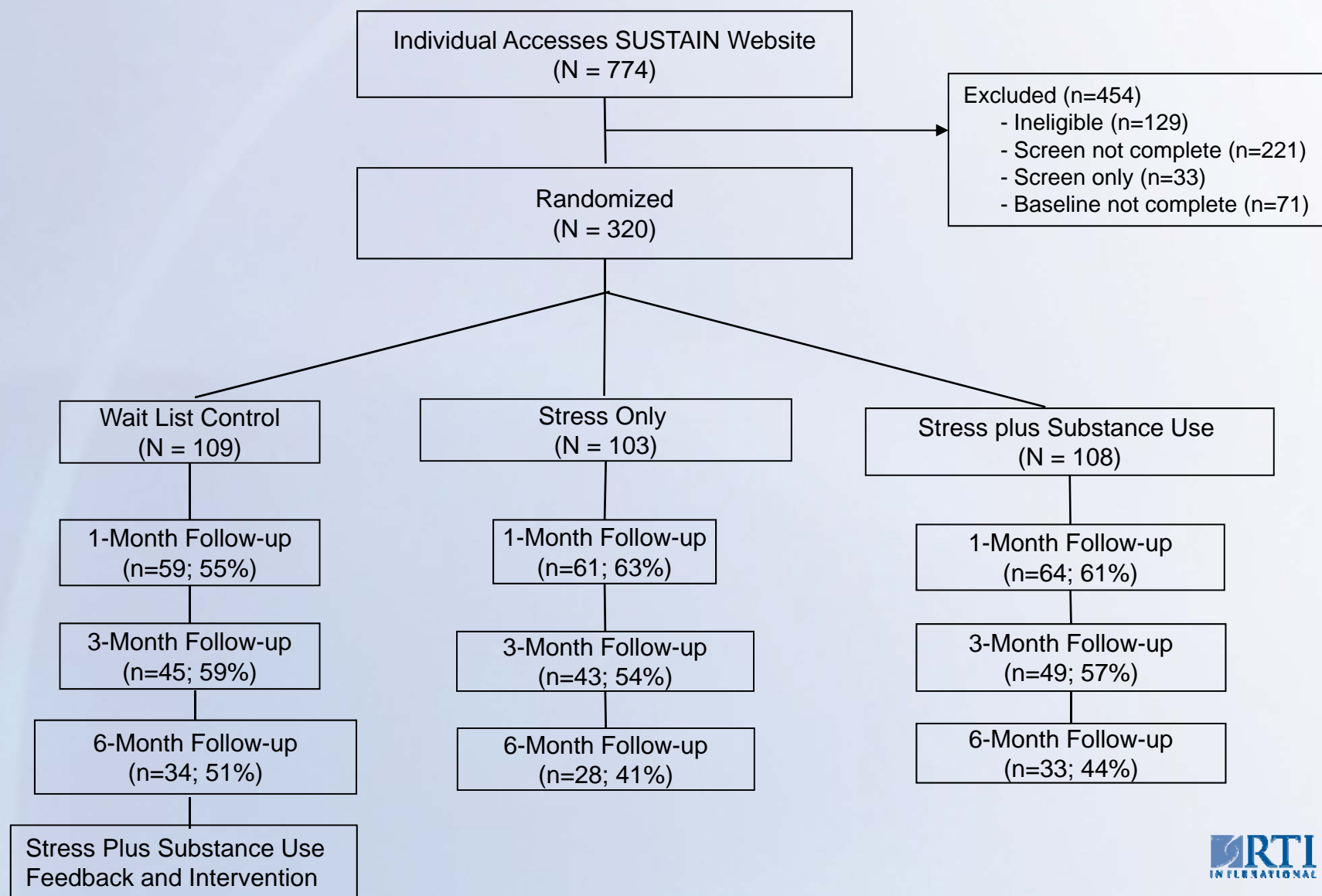


## Study Progress

- HRPO Approval – October 2013
- National Guard Bureau (NGB) endorsement –December 2013
- Recruitment – In-person briefings
  - Fragmentary order (FRAGO) - supporting program and directing recruitment materials in units
  - Briefings/brochure distribution – Unit level, Yellow Ribbon, Chaplains, Behavioral Health Staff, Medical Command, Flight Surgeons, Soldier Readiness Processing (SRPs), Public Affairs Office (PAO)
  - Warrior Transition Unit (WTU)/Ft Gordon
  - Commander/Surgeon briefing/brochure distribution
  - Addition of incentive for National Guard participants
  - Distribution of revised recruitment materials – streamlined from brochure to postcard
  - Repeat briefings
- Target N – 300
- Sample size - 320



# CONSORT Diagram



# Demographics

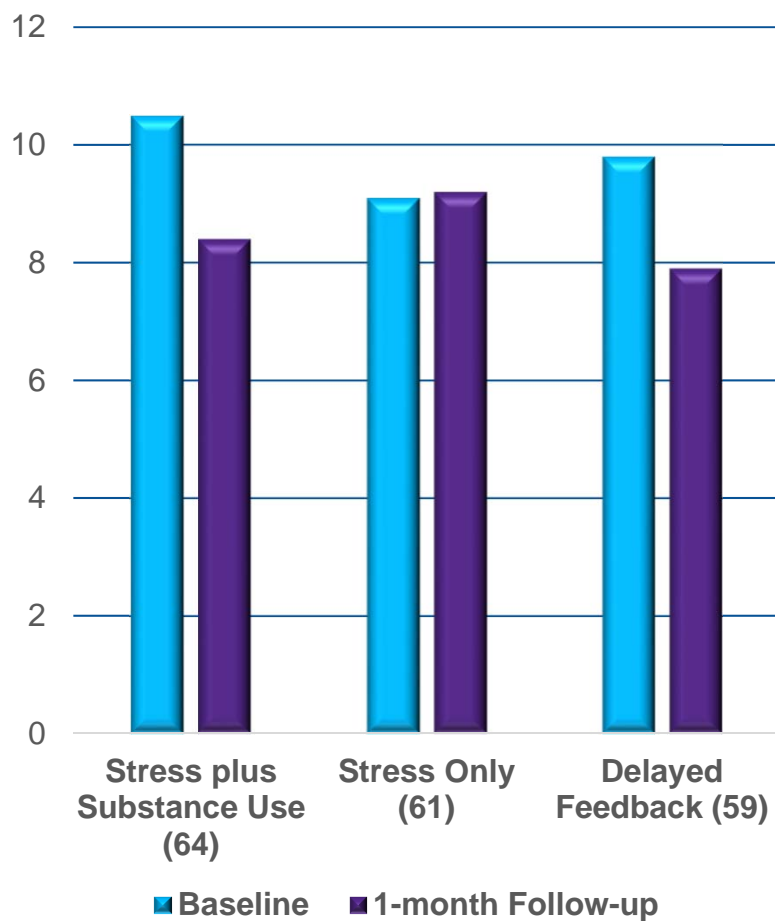
	All 317 (%)		Stress Plus 108 (%)		Stress Only 102 (%)		Delayed FB 107 (%)	
Male	96	(30.3)	35	(32.4)	35	(34.3)	26	(24.3)
Female	221	(69.7)	73	(67.6)	67	(65.7)	81	(75.7)
E1-E3	29	(9.2)	11	(10.3)	8	(7.9)	10	(9.3)
E4=E6	188	(59.7)	63	(58.9)	62	(61.4)	63	(58.9)
E7-E9	46	(14.6)	15	(14.0)	15	(14.8)	16	(14.9)
W1-W5	4	(1.3)	2	(1.9)			2	(1.9)
O1-O3	35	(11.1)	9	(8.4)	14	(13.9)	12	(11.2)
O4-O6	13	(4.1)	7	(6.5)	2	(1.9)	4	(3.7)
Married	156	(49.2)	55	(50.9)	47	(46.1)	54	(50.5)
White	196	(63.6)	61	(58.7)	63	(62.4)	72	(69.9)
Black	72	(23.4)	27	(25.9)	27	(26.7)	18	(17.5)
Hispanic	23	(7.5)	8	(7.7)	6	(5.9)	9	(8.7)

## Baseline Characteristics

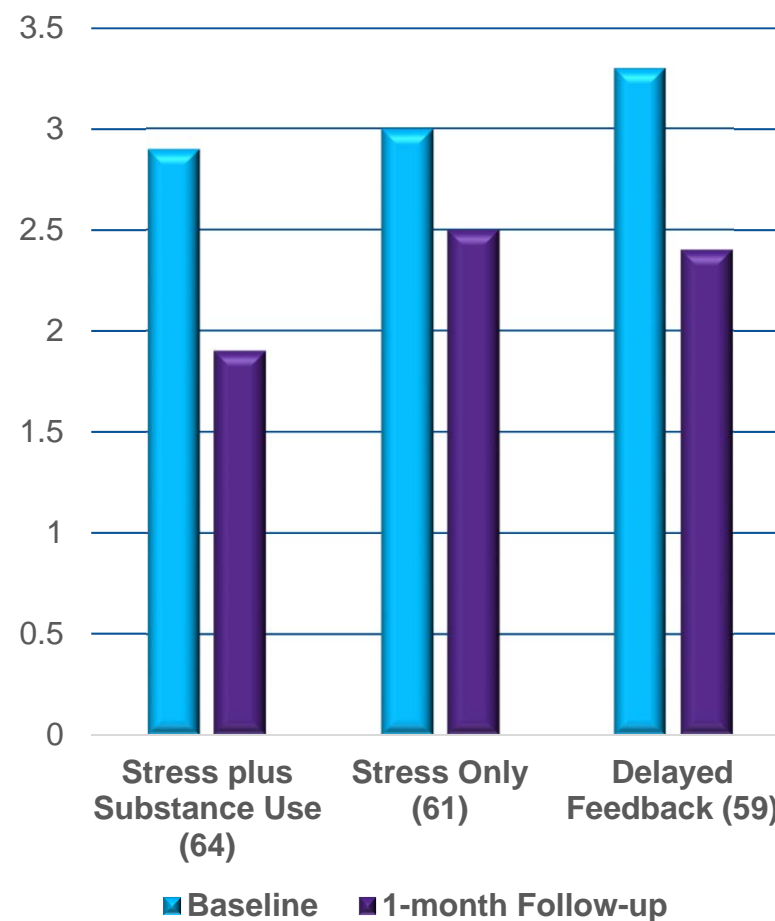
	All 317 (%)		Stress Plus 108 (%)		Stress Only 102 (%)		Delayed FB 107 (%)	
COSR	9.8	(5.7)	10.5	(5.8)	9.1	(5.5)	9.8	(5.7)
AUDIT-C	3.1	(2.1)	2.9	(2.1)	3.0	(2.1)	3.3	(2.0)
Not Deployed	105	(33.1)	38	(35.2)	36	(35.3)	31	(28.9)
Deployed	212	(66.9)	70	(64.8)	66	(64.7)	76	(71.1)
Low Stress Score: 0-20	181	(57.1)	53	(49.1)	63	(61.8)	65	(60.7)
Mod Stress Score: 21-40	113	(35.6)	41	(37.9)	34	(33.3)	38	(35.5)
High Stress Score: 41-72	23	(7.3)	14	(12.9)	5	(4.9)	4	(3.7)
Low PCL Score: 17-29	105	(34.2)	39	(38.2)	31	(31.3)	35	(33.0)
Mod PCL Score: 30-43	160	(52.1)	47	(46.1)	58	(58.6)	55	(51.9)
High PCL Score: 44+	42	(13.7)	16	(15.7)	10	(10.1)	16	(15.1)

# 1-Month Follow-Up Results

## Change in COSRs

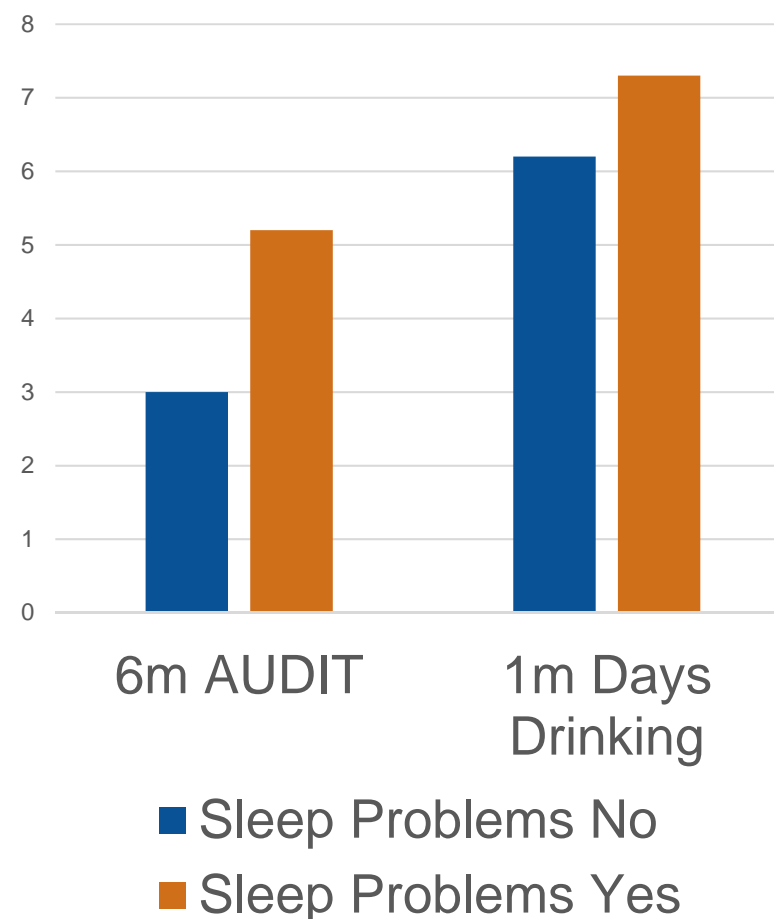


## Change in AUDIT-C



## Sleep and Alcohol

- Sleep problems = baseline PCL item 13 (Trouble falling or staying asleep) and/or screening COSR item 18 (Problems sleeping) with the most extreme response option.
- Regression models predicted alcohol use outcomes at each follow-up, with baseline alcohol use and a binary indicator of sleep problems.
- At 6 months, overall AUDIT was significantly higher in those with more severe sleep problems.
- At 1 month follow-up, those with more severe sleep problems reported significantly more drinking days in the past month.



## Deliverables/Challenges

### Presentations

- Military Health Systems Research Symposium, August 2016

### Product to be Delivered

- Knowledge products include, training manuals, clinical practice guidelines, algorithms, interventions
- Materiel products include, devices, medications, tools

### Impact of deliverable on service members, and/or their families

### Follow-ups

- Email system sends 3 follow-up emails
- Followed with personal email before window closes
- At least ONE FU assessment on 70% of sample

## Dissemination/Transition Plan

- Transition
  - Determine most effective intervention.
    - 1-month data – October 2016
    - 3-month data – December 2016
    - 6-month data – March 2017
  - Encourage military services to use/adopt effective interventions and work to support adoption of the program (i.e., host website, train personnel).
- Business
  - Seek funding to conduct larger trial across all military components.
  - Streamline interventions to focus on specific need.
- Dissemination
  - Publish results in peer reviewed journals.
  - Present findings at professional association meetings.
  - Prepare briefing reports for sites to gauge ongoing interest.

## Follow-on Work

- Next steps
  - Complete analyses to determine most effective approach
  - Analyze data for time spent on each component
- Proposal efforts
  - Develop more streamlined intervention
  - Add feedback and intervention material for sleep disturbances
- Funding agencies
  - NIMH
  - NIAAA