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**Family as a Total Package: Restoring and Enhancing Psychological
Health for Citizen Soldiers and Families
(FAMPAC)**

**Cooperative Agreement Number W81XWH-11-2-0108
Annual Report Number 3
March 14, 2014**

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A. INTRODUCTION

The **overall objectives** of this study are to: **(I)** demonstrate the effectiveness of the Yellow Ribbon Reintegration Program (YRRP); and **(II)** examine the role and potential of the YRRP as a post-deployment, community-building platform to restore and to enhance the psychological health of service members and their family members. The National Defense Authorization Act in 2008 (P.L. 110-181) mandated a nation-wide expansion of the YRRP; it represents one of the DoD's responses to the reintegration needs of returning service members and their families.

Following from these overall objectives, study **specific aims** are: **(1)** demonstrate the efficacy of the YRRP as a military family-centered reintegration training program; **(2)** examine enhanced learning effects due to family member participation in the YRRP; **(3)** identify program components and contexts that enhance self-efficacy for restoring and enhancing psychological health; **(4)** identify the psychological health, family, and other reintegration needs, and service use, and barriers to care among service members and families; **(5)** identify dyadic relations which decrease the chance of service members' long-term psychological injuries; and **(6)** deliver recommendations to develop evidence-based, family, postvention resiliency-building programs tailored to YRRP.

The **study design** consists of: **(i)** collecting on-site short surveys at the beginning and end of each 30-day (T2 & T3) and 60-day (T5 & T6) post-deployment YRRP (SOW Task 3); **(ii)** conducting telephone based followup surveys with service members and their spouses/partners who attended YRRP. In addition, we recruit service members who may have not attended a YRRP (T4) (SOW Task 3); and **(iii)** conducting a second, in-depth followup interview (T7) approximately 4 months after T4 (SOW Task 4). Further, data from the YRRP on-site short surveys will be augmented by the analysis of After Action Reports (AAR) collected by the Missouri National Guard (MONG) at T3 & T6 (SOW Task 3).

A fully executed modification of the basic award (no cost extension) of this study was approved on December 24, 2014 by Contract Specialist is Mr. Josh McKean. The modification extends the study to a fourth year to meet the SOW goals and the specific aims of the study. In this Year 3 annual report, while we focus on the progress made for this reporting period (February 15, 2013 to February 27, 2014), we also include cumulative progress made since the study began (February 15, 2011), as appropriate.

B. BODY

The Principal Investigator (PI) and project manager (PM) have provided all requested and required documents to CDMRP, U.S. Army Medical Research Acquisition Activity (USAMRAA), and U.S. Army Medical and Research and Materiel Command (USAMRMC) Human Research Protection Office (HRPO) both before and since the award date for this project. All quarterly and annual progress reports were submitted on time for the first, second, and third year of the study.

B1. Statement of Work (SOW) Tasks 1 and 2.

SOW Task 1 items (instrumentation, human subject approvals, and start up) and Task 2 items (staffing, training, and other preparations to implement fieldwork) were completed during the first two quarters of Year 1. Staffing to replace existing positions continued in year 2 and year 3 as needed.

SOW Task 1 includes maintaining IRB approval to conduct human subject research. We obtained initial approval from Washington University's Human Research Protection Office (HRPO) / Institutional Review Board (IRB) on November 9, 2010 in advance of the award date. Initial approval from the USAMRMC HRPO was obtained on March 31, 2011, while annual continuing review was obtained from USAMRMC HRPO December 14, 2011, January 29, 2013, and November 21, 2013. In addition, the study received IRB approval from the VA St. Louis Health Care System (initial contingent approval on February 1, 2012). This IRB oversight was

necessitated by the fact that the PI and several investigators / staff members either have a joint appointment or a Work without Compensation (WOC) status with VA St. Louis Health Care System, Research Service. The FAMPAC study currently has Washington University IRB approval until August 17, 2014 and VA St. Louis Health Care System IRB approval until December 4, 2014.

SOW Task 2 includes collaborator and staff meetings to facilitate the project. Communication and coordination were maintained with the Missouri National Guard liaisons for the project and the Missouri National Guard YRRP Operational Team across Years 1-3 of this study. Collaborator meetings occurred on a quarterly basis. Routine lab meetings, FAMPAC fieldwork specific meetings, and other related data collection specific meetings were also held during Years 1-3. Further, over the course of the study, fieldwork staff met weekly with the Fieldwork Coordinator to ensure the project achieved SOW data collection goals. Ad hoc, topic specific meetings focusing on SOW Tasks 5 (data analysis) and 6 (dissemination) were also held throughout Years 1-3.

The strategy of quarterly collaborator meetings supplemented by subgroup and ad hoc meetings was judged optimal and has been successful in meeting the evolving needs of the study for Years 1-3. We plan to continue ad hoc meetings during the 4th year of the FAMPAC study to address specific issues such as data collection, data cleaning, data analysis, and publication and other dissemination efforts.

Data entry programs for on-site YRRP short surveys, the database for scheduling and tracking participants, and the web-assisted telephone survey modules for the T4 interviews were developed during the first quarter. A major revision to telephone instruments was completed in September 2011 after the initial stage of data collection.

B2. SOW Task 3 and 4: 30- day YRRP, 60-day YRRP, the first telephone followup interviews (T4) and the second and final followup interviews (T7).

Several Task 3 items started during the first quarter of this study, over two months ahead of schedule. Task 3 activities related to accrual of research subjects were concluded in December 2013 on schedule. Task 4 (T7, followup interviews) data collection activities are still in progress so as to maximize the followup interview participation rate.

Data collection began on April 30, 2011 with attendance at the first 30-day YRRP event. The first 60-day YRRP event occurred June 4, 2011. The Washington University research team attended a total of 26 YRRP events Years 1-3 of this study. These were all post-deployment YRRPs held for the Missouri National Guard, the population of the FAMPAC study. We conducted short, pre- and post-surveys at the YRRP events with Guard members and their supporters. In addition, we enrolled participants for the followup portion of the FAMPAC study at YRRPs. The followup portion consists of two telephone interviews designated as T4 and T7. T4 is the first followup interview: it was conducted an average of 3.6 months after deployment for service members. The T7 telephone interview has been conducted an average of 4.4 months after the baseline interview (or an average of 7.7 months post-deployment) for service members.

T4 interviews began on June 17, 2011 (SOW Month 5, on schedule). Followup T7 telephone interviews (Task 4) began on schedule on November 1, 2011 (SOW Month 9).

Table 1 (Section G) provides accrual numbers for each of the sample groups across relevant data points (T2-T3, T4, T5-T6, and T7). This table is structured in a format consistent with the Statement of Work (SOW) for easy comparison. Table 1 has three columns consisting of previous quarterly reported cumulative accrual numbers (Month 33), the current annual reporting period cumulative accrual numbers (Month 36), and the final sample size goals for the study. **Figure 1** (Section G) shows current sample accrual of Table 1 data in a flow chart format. It should be noted that Figure 1 reports both pre-survey (T2 and T5) and post-survey (T3 and T6) accrual numbers, while Table 1 reports only pre-survey accrual numbers for simplicity. **Figures 2-5** (Section G) show the accrual telephone followup trajectories for T4 (first in-depth

interview) and T7 (2nd in-depth interview) in comparison with SOW goals across the 3-year fieldwork duration.

Table 1 shows the sample accrual SOW goals being met and exceeded as follows: SOW goal of 1,800 surveys for T2 (pre-survey for the 30-day YRRP) met with 1,839 total surveys collected, T4 interviews (SOW goal 800) met with 831 interviews completed, and T7 interviews (SOW goal 610) met with 664 interviews completed.

As shown in Table 1, the T5 cumulative accrual number (pre-survey for the 60-day YRRP event) did not reach the original SOW goal. The decision to intentionally forego this goal was reached earlier when we realized the assumption of the participation rate at T5-T6 (second YRRP weekends) was unrealistically too high. We assumed the same number of participants as those participating in the first (30-day) pre-surveys. In reality, the T5 participation rates were lower. Further power analysis indicated sufficient power for main outcome variables across four time periods from these short surveys. Thus we requested a modest SOW change to stop accrual of T5 participants, in part to also conserve resources. This request was approved in December 2013. The number of participants who filled out T5 are: service member actual n=926 (T5 SOW service member n=1,200); supporter actual n=467 (T5 SOW supporter n=600). On the other hand, the T6 (post-survey at 60-day YRRP) numbers have exceeded the SOW goals as follows: service member actual n=624 (T6 SOW service member n=600); supporter actual n=346 (T6 SOW supporter n=300). (See Figure 1).

Figure 2 (T4, first in-depth interview) and Figure 4 (T7, 2nd followup in-depth interview) show monthly accruals of service members in comparison with monthly SOW goals from June 2011 to December 2013. Figures 3 and 5 show the same for supporters. It is clear from these figures that service member accrual fell behind schedule for both T4 and T7 interviews for periods of time, while supporter accrual was on or ahead of schedule over this duration. This is because supporters participated at a higher rate than service members and accrual of service members was largely dependent upon the demobilization schedule of the Missouri National Guard (e.g. no units were scheduled to return for certain periods of time which caused accrual of service members to fall behind schedule). However, the accrual of service members was back on track in November 2012 for T4 interviews and April 2013 for T7 interviews because of several large units that returned.

By study design, the T7 interview is a followup interview only for those who complete a T4. Our target projection for the T4 to T7 followup rate was 76% according to SOW sample sizes. Our current T7 followup rate is 80% (79% for service members and 83% for supporters). Further, 30 more T7 interviews are scheduled over the next 2-3 months (these are from T4 interviews completed in late 2013). If all 30 interviews are completed, our overall T7 followup rate will increase to 84%, exceeding our original projections by 8%.

Quality assurance efforts to ensure the integrity of the data are fully developed and implemented. Data cleaning will continue in Year 4 of this study.

B3. SOW Tasks 5 and 6: data analysis and dissemination.

These tasks are in progress and will continue throughout the remainder of the study duration. A summary of analyses conducted to date is provided below in Section C. Section D focuses on dissemination efforts.

C. KEY RESEARCH ACCOMPLISHMENTS

The references for the citations in this section can be found in Section F (listed in alphabetical order of the first author).

C1. Perceived utility of YRRP by participants.

Using data from the YRRP post-surveys, Scherrer et al. (under review) examined the perceived utility of the YRRP's delivery of information and assistance across the domains of education, health, employment, legal and family concerns during the post-deployment reintegration period as assessed at the end of the weekend YRRP.

The results show that:

- Service members and supporters most often endorsed education needs being met (76.8% and 78.2% respectively) and were least likely to endorse legal needs being met (63.5% and 60% respectively). **(Aim 1)**
- Significantly more supporters than service members ($p < 0.0001$) reported that the YRRP was the first time they learned of available services across all domains. Results suggest the YRRP fills gaps in supporter knowledge and provides needed information and resources to most National Guard families 2-4 months after a deployment. **(Aim 2)**
- Service members were significantly more likely than supporters to report concerns about education, employment, and health; while supporters were significantly more likely to report concerns about family. **(Aim 1)**

C2. Short-term effectiveness of YRRP.

Using data from the YRRP pre- and post-surveys, Price et al. (in preparation, American Journal of Public Health) examined short-term self-efficacy improvement towards post-deployment reintegration and reduction in perception of stigma toward mental health using a pre- and post-training assessment paradigm.

The results show that:

- The knowledge and ability aspects of self-efficacy regarding reintegration and psychological health improved at the end of each YRRP event and over the two repeated YRRP event exposures. **(Aim 1)**
- Family members' initial gain was greater than service members. **(Aim 2)**
- Attitude toward stigma of mental illness did not improve as a result of participating in YRRP training, and this was observed both for service members and their family members. **(Aim 1)**

This is at the final preparation stage; the manuscript is being reworked for consistency of analysis methods across multiple samples.

C3. Identifying most useful YRRP program components.

We also conducted supplemental analysis of After Action Reports available from 2011 – 2013 for 30-day and 60-day YRRP events. AAR are collected by the Missouri National Guard Yellow Ribbon Operational Team at the conclusion of each YRRP event.

The results show that:

- Military One Source was rated beneficial by the greatest number of attendees (91%). Military One Source is a DoD funded resource which provides a variety of information and services to meet a broad range of concerns facing military families. **(Aim 3)**
- Other briefings endorsed as beneficial by nearly all attendees include: VA (88%), guest motivational speakers (88%), booth displays of vendors (88%), TriCare (87%), the Missouri National Guard Care Team (Chaplain brief) (86%), the Missouri Veterans Commission (86%), and the Veterans Business Administration (86%). **(Aim 3)**
- The resources and briefings with the least number of people endorsing them as beneficial include: employment (67%), colleges (71%), MOST 529 – (college savings plan) (72%), and legal (78%). We speculate that these briefings and resources are applicable only to a smaller sample of attendees, in contrast to other presentations and resources having more universal applicability. **(Aim 3)**

- Written comments from attendees were broad in scope and often mixed. One theme of note reflected that the information presented was too repetitive with information received or known already (e.g. “the presentations are done well, we've just already received the info multiple times”), while other comments gave high praise to the information presented at YRRP (e.g. Very good, got a lot of information and received answers to my questions, got names and numbers or resources on how to contact the right people to help.”) **(Aim 3)**

C4. Conceptualization of trauma spectrum disorders.

Building upon the premise of combat trauma leading (or precipitating) a variety of pathologies, Price et al. (forthcoming) conducted analysis from two cohorts: archived data of Vietnam veterans (Vietnam Era Study, VES), first examined in 1972 (n=642); and the current FAMPAC study data available by summer 2012 (n=159). Five overlapping trauma spectrum disorders (TSD) component measures were available in both datasets. Latent class profile analysis was applied to TSD components. Ordinal logistic regressions were used to estimate the association of combat exposure levels with class membership.

The results show that:

- Despite considerable differences in the two datasets, combat exposure levels discriminated TSD severity. The level of combat exposure was the only significant predictor of class membership controlling for socio-demographic characteristics. A higher level of combat exposure yielded a considerable increase in belonging to a higher-risk class: OR = 1.37 (CI 1.09-1.73) for VES and 1.66 (CI 1.35-2.04) for FAMPAC, *per one increase in combat exposure level* (range, 0-9 for VES and 0-14 for FAMPAC). **(Aim 4)**
- The results underscore the importance of both physical and psychiatric consequences of war trauma experiences as inter-dependent pathological stress reaction. At the same time, studies are needed to disentangle both environmental (exposure) and biological (vulnerability) factors that differentiate expressions of these pathologies.

C5. Negative impact of hazardous alcohol use on behavioral health care utilization.

Using a behavioral economic approach, Van den Berk Clark et al. (in final preparation, Social Science and Medicine) conducted analysis among service members to examine the interactive effect of hazardous alcohol use and PTSD symptoms stratified by combat exposure experience.

The results show that:

- Hazardous alcohol use was associated with reduced behavioral health services utilization with increased PTSD symptoms, however, only among those who experienced combat during the most recent deployment. **(Aim 4)**
- Hazardous alcohol use reduced the probability of behavioral health service utilization by 173% (marginal effect) while controlling for socio-demographics, PTSD symptoms, depression and barriers to care factors. **(Aim 4)**

This is at the final preparation stage; the manuscript is being revised using a combat stratification scheme.

C6. Employment, mental health and relational satisfaction.

Van den Berk Clark et al. (in preparation, Journal of Family and Economic Issues) examined the effects of combat, unemployment and psychological strain on relationship satisfaction among National Guard service members and their spouses or co-habiting partners.

Results showed that:

- Couples where service member had experienced recent combat were much more likely to have lower levels of education, to live in areas with higher unemployment, more likely to

be unemployed and more likely to experience psychological strain, including PTSD and depression **(Aim 5)**

- Relationship satisfaction was higher among individuals who were employed but lower among individuals with depression **(Aim 5)**
- When social support was added to the model, depression remained a significant predictor of relationship satisfaction but employment did not **(Aim 5)**

C7. Role of family disruption on post-deployment mental health: Balan et al. (presentation, December 2013) examined the role of family disruption on behavioral health problems. Specifically, aims were to examine the relationships between family disruptions, post-traumatic stress symptoms, and drinking and to examine the effects of disruption on families.

The results show that:

- Pre-deployment family disruption concerns are related to increased post-traumatic stress symptoms, increased drinking frequency, and problem drinking at post-deployment. The effect is independent of prior negative events, previous deployment, combat experiences, and depressive symptoms. **(Aim 4)**
- Further, actor-partner independence analysis on couples found that this effect was only tied to self-perception of disruption, but not for partners' perception. **(Aim 5)**

C8. Couple dyadic analysis of PTS symptoms and drinking level: Balan et al. (in preparation) examined the role of anticipated disruption before going on a mission in relation to post deployment behavioral health symptoms.

The results show that:

- Partners' anticipated family and life disruption concerns, PTSS and drinking levels were moderately correlated suggesting that there was a certain degree of concordance in post deployment behavioral health symptoms within couples **(Aim 5)**
- Service members' own anticipated family and life disruption predicted their post deployment drinking levels. **(Aim 4)**
- If service member and partners had similar concerns there was slightly higher concordance in drinking. This was marginally significant **(Aim 4)**

C9. Physical and mental health trajectory throughout the deployment cycle: Van den Berk-Clark et al. (in preparation for CPDD 2014) is examining physical and mental health trajectories throughout the deployment cycle among Guard members. A latent growth mixture model using physical and mental health and substance use measures of concern for three time periods (pre-deployment, during deployment and post deployment) was used to identify underlying trajectory groups. A multinomial mixed model was used to determine whether combat exposure, stress and other factors related to deployment predicted trajectory group membership.

Preliminary findings show that:

- The best fit four-class model identified a low risk group (n=260) (group 1), a high risk for smoking group (n=122) (group 2), a medium risk for mental health problems group (n=33) (group 3) and a high risk for physical and mental health problems group (n=52) (group 4). **(Aim 4)**
- Groups 3 and 4 experienced significant changes to physical and mental health during and after deployment. **(Aim 4)**
- Lower levels of education and higher post-deployment alcohol use are associated with membership in group 2, while higher levels combat exposure; stress and pre-deployment family disruption are associated with membership in groups 3 and 4.
- Membership in group 4 was associated with higher age and lower levels of social support. **(Aim 4)**

D. REPORTABLE OUTCOMES

Conference and meeting presentations are listed below. Publications in progress or under review are listed in Section F below.

2011

1. Price RK. Family as a Total Package (FAMPAC): Restoring and enhancing psychological health for citizen soldiers and families. Presented at the Annual Military Operational Medicine Research Program (MOMRP) / Joint Program Committee Military Operational Medicine (JPC5) In Progress Review (IPR) Meeting, July 2011.
2. Widner G, Matthieu MM, True WR, McGhee KL, Kilmer R., Proctor E, Schechtman K, Balan S, Swensen A & Price RK. Restoring and enhancing psychological health of Missouri's citizen soldiers and families: A university-military partnership. Washington University Institute for Public Health Fourth Annual Conference, October 2011.
3. Balan S, Widner G, Matthieu MM, True WR, McGhee KL, Kilmer R., Proctor E, Schechtman K, Swensen A & Price RK. Restoring and enhancing psychological health of Missouri's citizen soldiers and families: Preliminary findings from the first three phases. Washington University School of Medicine, Department of Psychiatry, Second Post- & Pre-doctoral Fellows Poster Symposium and Networking Event, October 2011.

2012

4. Price RK, Balan S, Widner G, True WR. Trauma spectrum disorder: Implications for substance abuse research on traumatized populations. Presentation at the College on Problems of Drug Dependence, 72nd Annual Scientific Meeting, Palm Spring, CA, June 2012.
5. Price RK, Family as a Total Package (FAMPAC): Restoring and enhancing psychological health for citizen soldiers and families. Oral presentation at the Military Operational Medicine Research Program (MOMRP), Family Prevention Research IPR, Ft. Detrick, MD, August 2012.
6. Van den Berk Clark C, Scherrer J, Shroff M, Balan S, Price RK. Economic hardship, psychological strain and relationship satisfaction among National Guard service members and their spouses. Presented at the Washington University in St. Louis, School of Medicine, Department of Psychiatry, Third Annual Post- & Pre-doctoral Fellows Poster Symposium and Networking Event, October 2012.

2013

7. Van den Berk-Clark C, Balan S, Widner G, & Price R. The marginal effects of hazardous alcohol use on health care utilization among National Guard service members. Poster presentation at the American Psychopathological Association Annual Meeting, March 2013; and Poster presentation at the College on Problems of Drug Dependence Annual Meeting, June 2013.
8. Balan S, van den Berk-Clark C, Shroff M, Widner G, Scherrer J, Price RL. Whose post-traumatic stress affects drinking levels: Couple dyad modeling of National Guard service members and their partners. Oral presentation at the College on Problems of Drug Dependence Annual Meeting, June 2013.
9. Balan S, van den Berk-Clark C, Widner G, Shroff M, Scherrer J, Price RK. Couple dyad modelling of posttraumatic stress symptoms and drinking levels among National Guard service members and their partners: Role of life/family disruption concerns. Poster Presentation at American Psychological Association Meeting, August 2013.
10. Price R. When soldiers come home: The science of war injuries from Vietnam to Afghanistan. Oral Presentation sponsored jointly by the St. Louis Academy of Sciences and Missouri History Museum, St. Louis, August 20, 2013.
11. Price R. Returning from war: The science of war's invisible wounds. Radio interview along with SFC Lora Finn and COL Gary Gilmore of the Missouri National Guard. St. Louis On The

Air (St. Louis Public Radio) on August 19, 2013. Available:

<http://news.stlpublicradio.org/post/returning-war-science-wars-invisible-wounds>

12. Balan S, van den Berk-Clark C, Widner G, Shroff M, Scherrer J, Price RK. Worrying about life and family disruptions before going to war: National Guard couples study. Poster presentation at Washington University's Department of Psychiatry Postdoctoral Symposium, October 1, 2013; Washington University's Institute for Public Health conference, October 15, 2013; and study Washington University Clinical Research Training Center Training Symposium and Poster Session, October 22, 2013.
13. Van den Berk-Clark C, Balan S, Shroff M, Widner G, Price RK. Clinical and social profile differences among National Guard service members utilizing behavioral health services through military, veteran and civilian providers. Poster presentation at Washington University's Department of Psychiatry Postdoctoral Symposium, October 1, 2013.
14. Price RK, van den Berk-Clark C. Invisible wounds from Vietnam to Afghanistan. Oral Presentation at the St. Louis Veterans Health Care Administration CEC Seminar Series, October 15, 2013.
15. "Outlook optimistic for returning US veterans: coming home 'broken' is not the norm," says expert. Washington University in St. Louis Newsroom, November 6, 2013. Also featured in "Afghanistan: after the War", Washington Magazine, October 2013.
16. Balan S. Coming home: Role of family disruption for behavioral health problems among National Guard. Oral presentation at the Department of Psychiatry Research Seminar, Washington University School of Medicine, St. Louis, December 4, 2013.
17. Price RK. Invisible wounds: From Vietnam to Afghanistan. Epidemiology Seminar, Department of Epidemiology, College of Public Health and Health Professionals & College of Medicine, University of Florida at Gainesville, December 9, 2013.

2014

18. Van den Berk-Clark C. Trauma and mental health outcomes after war. Oral presentation at the Department of Psychiatry Research Seminar, Washington University School of Medicine, St. Louis, January 29, 2014.
19. Price RK. Trauma spectrum disorder. Oral presentation at the Department of Psychiatry Research Seminar, Washington University School of Medicine, St. Louis, January 29, 2014.
20. Price RK, Balan S, Matthieu M. Trauma and post-traumatic stress disorder (PTSD) in women. Oral presentation to Saint Louis University, Department of Obstetrics, Gynecology, and Women's Health, St. Louis, February 21, 2014.

E. CONCLUSION

The evidence indicates that a large-scale, brief, secondary prevention program, such as the Yellow Ribbon Reintegration Program (YRRP) implemented for National Guard members and family members, is effective in the short-term in improving the sense of self-efficacy for handling post-deployment reintegration needs including psychological health needs. However, perception toward stigma appears to be deeply embedded in the culture of the military as well as in the community. It is more difficult to change the perceived stigma associated with psychological problems than self-efficacy.

Our data justify repeated YRRP events after demobilization. They also justify the costs for inclusion of family members in the YRRP events. Family members tend to gain more from YRRP than service members.

All presentations at YRRP are perceived as beneficial by the majority of service members and supporters attending. Further, those presentations addressing issues encountered by the majority of attendees (VA, TriCare, etc.) tend to have a greater proportion of participants endorsing them as beneficial, while those appealing to a smaller proportion of attendees (education, employment, legal) tend to have lower endorsement.

Telephone followup surveys assessing individual characteristics, psychological health and reintegration issues indicate an increased need for family-level prevention and intervention efforts because levels of stress and psychological strains impact post-deployment reintegration.

To date, several specific findings are noteworthy. Hazardous alcohol use is found to reduce behavioral health help seeking in proportion to the severity of posttraumatic stress (PTS) symptoms only among combat-experienced NG members, providing support for considerable self-medication in this sample. Male and female NG members experience similar combat experiences, except military sexual trauma which is significantly higher among female NG members. Family members concerns for deployments were considerably different from those of NG members in that different concerns appear to affect post-deployment reintegration and psychopathology in a different manner. In this sample, we found no evidence of “horizontal” transmission of PTS (from NG members to spouses) during the first few months after demobilization.

F. REFERENCES

Balan S. Coming home: Role of family disruption for behavioral health problems among National Guard. Oral presentation at the Department of Psychiatry Research Seminar, Washington University School of Medicine, St. Louis, December 4, 2013.

Balan S, van den Berk-Clark C, Shroff M, Scherrer J, Price, RK. How anticipated life and family disruption affects post traumatic stress and drinking levels in National Guard couples: Couple dyad analysis (in preparation).

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Scherrer J, Widner G, Shroff M, Matthieu M, Balan, S, van den Berk-Clark C, and Price RK. Assessment of a post-deployment Yellow Ribbon Reintegration Program for National Guard members and supporters (under review, *Military Medicine*).

Van den Berk-Clark C, Balan S, Shroff M, Widner G, & Price R. The impact of hazardous alcohol use on help seeking among military personnel with recent combat exposure (in final preparation, *Social Science and Medicine*).

Van den Berk-Clark C, Scherrer J, Widner G, Shroff M, Balan S, & Price R. Combat exposure, employment, psychological strain and relationship satisfaction among National Guard service members and their partners. (in preparation for resubmission, *Journal of Family and Economic Issues*).

Van den Berk-Clark C, Balan S, Scherrer J, Widner G, Shroff M, and Price RK. Role of substance abuse in physical and mental health trajectories throughout the deployment cycle: A National Guard study. (Abstract accepted to College on Problems of Drug Dependence Annual Meeting, June 2014).

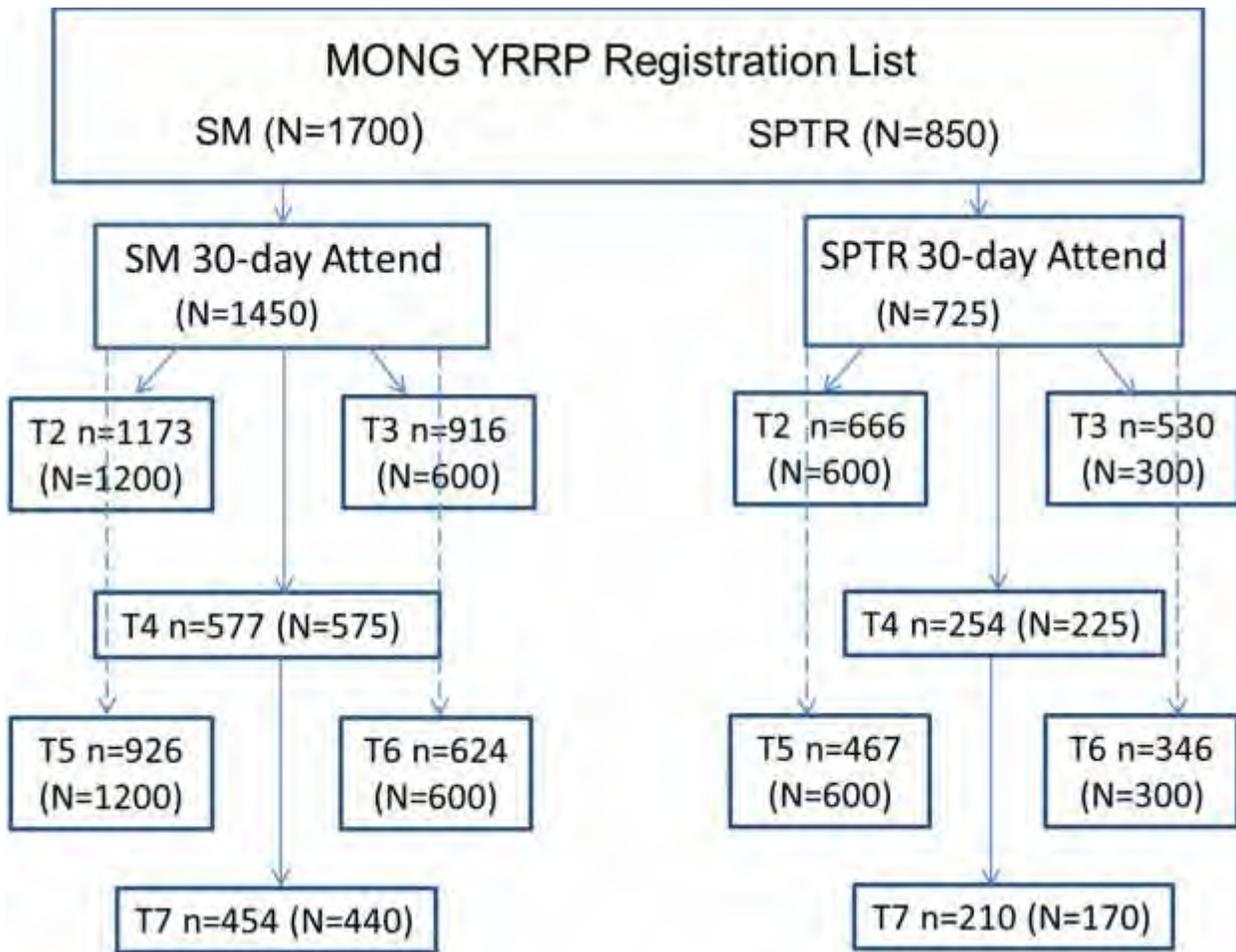
G. SUPPORTING DATA (Tables and Figures)

Table 1. Sample groups and Statement of Work (SOW) cumulative accrual goals (last updated 2/27/2014).

Sample groups and data collection points	Previous period cumulative accrual (Month 33)	Current reporting period cumulative accrual (Month 36)	Final sample size goals
T2-T3 30-day Pre- and Post-YRRP surveys ¹			
Service member	1173	1173	1200
Supporter	666	666	600
Combined	1839	1839	1800
T4 followup interviews			
Service member	568	577	575
Supporter	251	254	225
Combined	819	831	800
T5-T6 60-day Pre- and Post-YRRP surveys ¹			
Service member	929	926	1200
Supporter	469	467	600
Combined	1398	1393	1800
T7 followup interviews			
Service member	382	454	440
Supporter	209	210	170
Combined	591	664	610

Notes: 1. Numbers reported are based upon those respondents turning in T2 / T5 pre –surveys. T5 numbers reduced slightly from previous reporting period due to data cleaning.

Figure 1. FAMPAC sample flowchart & accrual (Feb 15, 2011 – Feb 27, 2014)



Notes: (1) SM=Service Member, SPTR=Supporter (2) n=current accrual sample size, N=goal sample size over course of study (3) T2, T3, T5, and T6 participants are not necessarily the same people. For example, some may have completed only T3 survey, but not T2, etc. (4) Some of those completing T5 and T6 surveys did not attend the 30-day YRRP.

Figure 2. T4 Service Member accrual trajectory

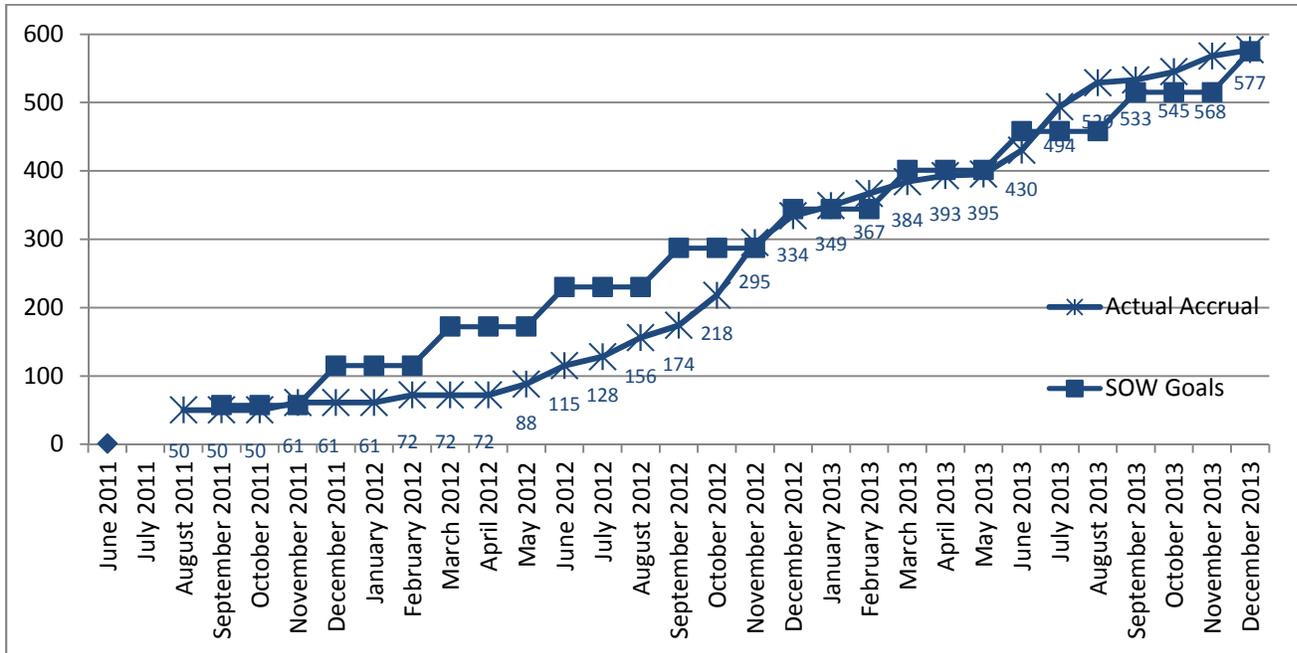


Figure 3. T4 Supporter accrual trajectory

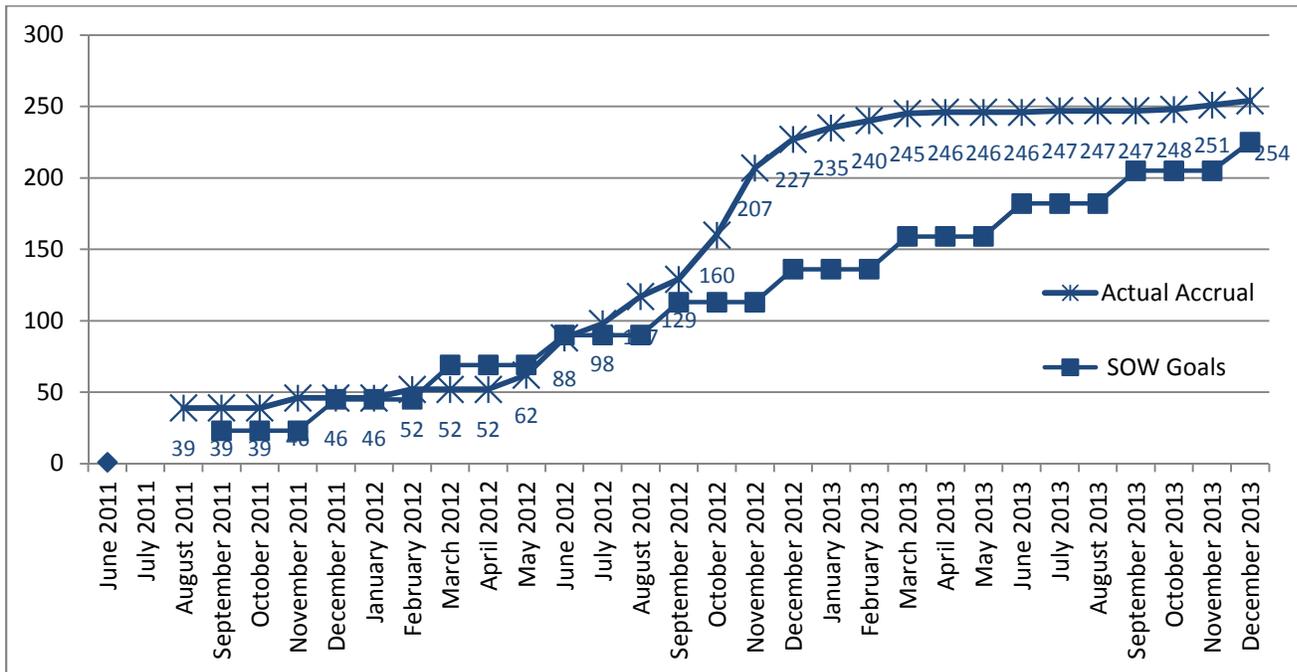


Figure 4. T7 Service Member accrual trajectory

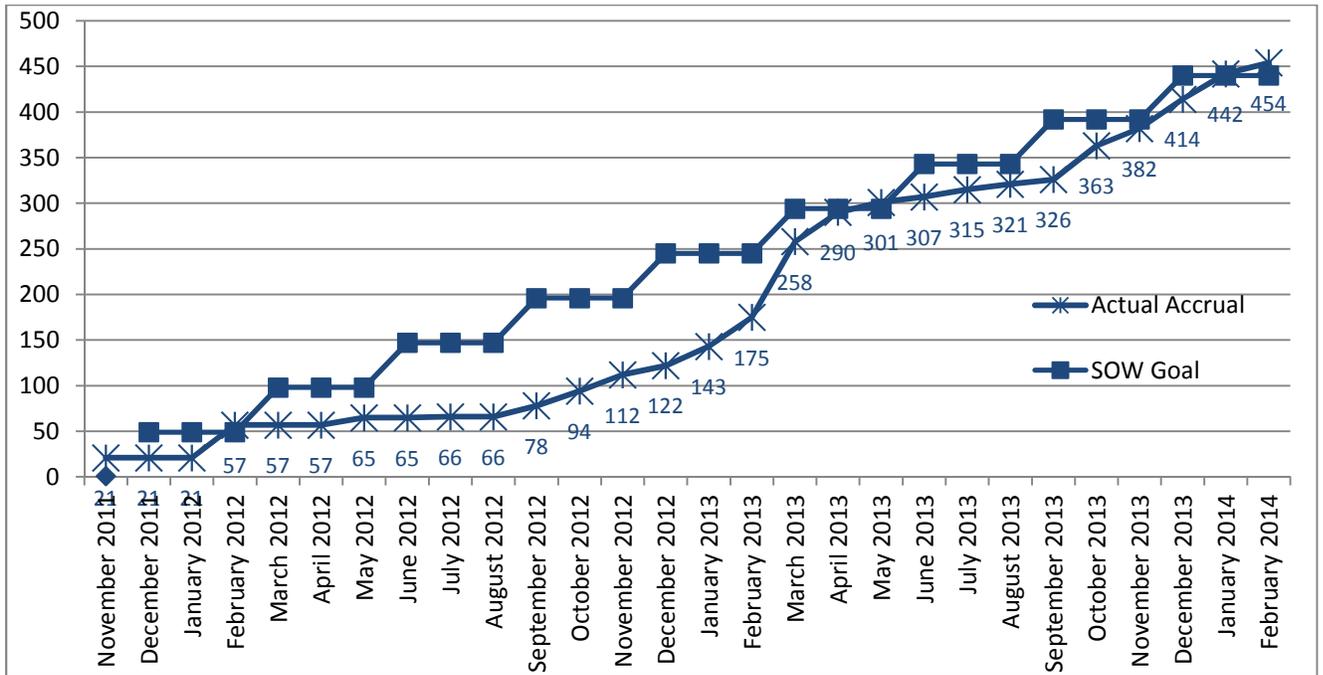
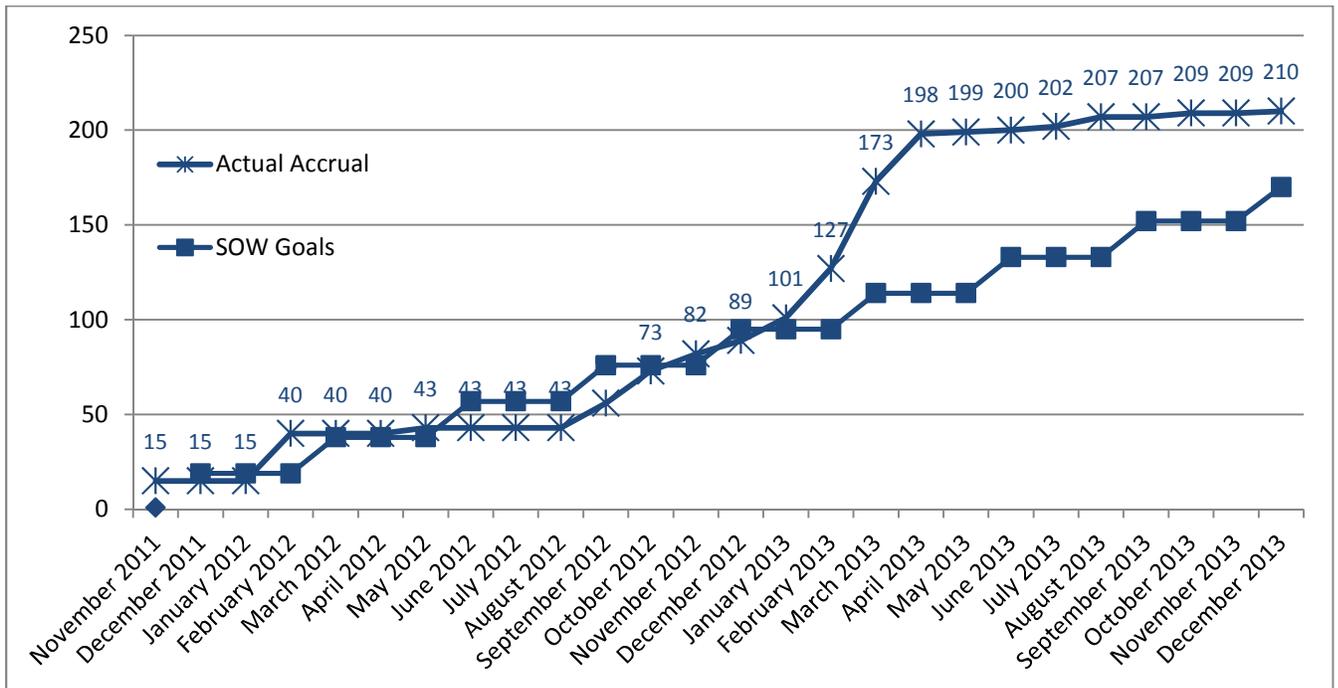


Figure 5. T7 Supporter accrual trajectory



H. APPENDIX COVER PAGE

Family as a Total Package: Restoring and Enhancing Psychological Health for Citizen Soldiers and Families

H1. Journal publications (under review and in final preparation; title page and abstract only).

- a. Price RK, Matthieu M, Widner G, van den Berk-Clark C, Balan S, Proctor E, and True W. Empowering National Guard members and their families after deployment: Effectiveness of a mandate reintegration program (in final preparation, *American Journal of Public Health*).
- b. Scherrer J, Widner G, Shroff M, Matthieu M, Balan S, van den Berk-Clark C, and Price RK. Assessment of a post-deployment Yellow Ribbon Reintegration Program for National Guard members and supporters (under review, *Military Medicine*).
- c. Van den Berk-Clark C, Balan S, Shroff M, Widner G, & Price R. The impact of hazardous alcohol use on help seeking among military personnel with recent combat exposure (in final preparation, *Social Science and Medicine*).
- d. Van den Berk-Clark C, Scherrer J, Widner G, Shroff M, Balan S, & Price R. Combat exposure, employment, psychological strain and relationship satisfaction among National Guard service members and their partners. (in preparation for resubmission, *Journal of Family and Economic Issues*).

H2. Selected presentations.

- a. Balan S, van den Berk-Clark C, Shroff M, Widner G, Scherrer J, & RK Price. Whose post-traumatic stress affects drinking levels: Couple dyad modeling of National Guard service members and their partners. Oral presentation at the College on Problems of Drug Dependence Annual Meeting, June 2013.
- b. Price R. When soldiers come home: The science of war injuries from Vietnam to Afghanistan. Oral Presentation sponsored jointly by the St. Louis Academy of Sciences and Missouri History Museum, St. Louis, August 20, 2013.
- c. Van den Berk-Clark C, Balan S, Scherrer J, Widner G, Shroff M, & Price R. Profile classifications of deployment experiences among National Guard members using behavioral health services. Poster presentation at Washington University's Institute for Public Health Conference, October 15, 2013.
- d. Balan S. Coming home: Role of family disruption for behavioral health problems among National Guard. Oral presentation at the Department of Psychiatry Research Seminar, Washington University School of Medicine, St. Louis, December 4, 2013.
- e. Price RK, Balan S, and Matthieu M. Trauma and post-traumatic stress disorder (PTSD) in women. Oral presentation to Saint Louis University, Department of Obstetrics, Gynecology, and Women's Health, St. Louis, February 21, 2014.

Appendix H1

Appendix H1.a

RUNNING HEAD: EFFECTIVENESS OF A REINTEGRAION PROGRAM

Empowering National Guard Service Members and Their Families after Deployment:
Effectiveness of a Mandate Reintegration Program

Rumi Kato Price, PhD, MPE 1, 2, *

Monica M. Matthieu PhD LCSW 2, 3

Gregory A. Widner, MSW 1

Carissa van den Berk-Clark PhD 1, 2

Sundari Balan PhD 1

Enola Proctor PhD 4

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IN PREPARATION (American Journal of Public Health) – NOT FOR CITATION

ABSTRACT

Objective: We examined short-term self-efficacy improvement and reduction in perception of stigma toward mental health in among National Guard (NG) services members and their supporting family and other members who attended a federally-mandated secondary prevention program called the Yellow Ribbon Reintegration Program (YRRP).

Method: Two samples included NG service members who returned from a Kosovo peace keeping mission and their family members, and NG service members who returned from Iraq and Afghanistan and their family members. Surveys were collected at the beginning and end of two successive YRRPs, each being held as an over-weekend event. We examined change patterns and covariates for the knowledge, ability, help-seeking and stigma perception scales.

Results: The knowledge and ability aspects of self-efficacy regarding reintegration and psychological health improved at the end of each session and over two event exposures. Family members' initial gain was larger than service members. Attitude toward stigma of mental illness did not improve as a result of participating in this program. Results were comparable between Kosovo returnees and Afghan and Iraq returnees despite considerable differences in combat experience.

Conclusions: This large-scale brief secondary prevention program implementation for National Guard and family members is effective in changing perceptions about self-efficacy in a short-term.

KEYWORDS: National Guard, Post-deployment, Secondary public health prevention, Self-efficacy, Stigma

Appendix H1.b

Pages: 17
Words: 3,266
Abstract words: 197 (max 200)
Tables: 1
Figures: 2
References: 30
First author: Jeffrey F. Scherrer, PhD
Guarantor: Rumi Kato Price, PhD, MPE
Email: pricer@psychiatry.wustl.edu

Assessment of a Post-deployment Yellow Ribbon Reintegration Program for National Guard Members and Supporters

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KEYWORDS: War, Military personnel, Family research, Program evaluation, Program effectiveness

Note: A portion of the data for this paper was presented at the Military Operational Medicine Research Program (MOMRP)/Joint Program Committee for Military Operational Medicine (JPC5) In Progress Review (IRP) Meeting in August 2012. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Defense, including the National Guard Bureau and any state National Guard, the Department of Veterans Affairs, or any other U.S. government department.

ABSTRACT

The Yellow Ribbon Reintegration Program (YRRP) was created to meet the needs of National Guard members and their families throughout the deployment cycle. This study examined the perceived utility of the YRRP's delivery of information and assistance during the post-deployment reintegration period by National Guard members and accompanying supporters who were mostly spouses. Over 22 months, from 10 YRRP events, 683 service members and 411 supporters completed questionnaires immediately after the YRRP. We analyzed questions on information and help provision, timeliness and concerns related to education, employment, legal, family, and health. Service members and supporters most often endorsed education needs being met (76.8% and 78.2% respectively) and were least likely to endorse legal needs being met (63.5% and 60% respectively). Significantly more supporters than service members ($p < 0.0001$) reported that the YRRP was the first time they learned of available services across all domains. Service members were significantly more likely than supporters to report concerns about education, employment, and health; while supporters were significantly more likely to report concerns about family. Results suggest the YRRP fills gaps in supporter knowledge and provides needed information and resources to most National Guard families 2-4 months after a deployment.

Appendix H1.c

The impact of hazardous alcohol use on help seeking among military personnel with recent
combat exposure

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Acknowledgement:

This study was in part funded by the Department of Defense research grant W81XWH-11-2-0108 and National Institute of Health research training grant T32DA007313. Funding sources had no further role in study design, collection, analysis and interpretation of data, writing of this manuscript, or in the decision to submit the manuscript for publication. Authors would like to thank members of National Guard for their leadership and insightful ideas throughout the completion of this study. We also acknowledge St. Louis VA Health Care System's oversight

and support. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Defense, including the National Guard Bureau , the State National Guards and the Department of Veterans Affairs.

HAZARDOUS ALCOHOL USE AND HELP SEEKING

Abstract

Prior research suggests that both post-traumatic stress disorder (PTSD) and alcohol abuse affect help seeking (i.e. utilization of mental health services and counselors) among combat-exposed military populations; however, their interactive effect is not well documented. The aim of this paper is to use a behavioral economic approach to examine the marginal effect of hazardous alcohol use on the probability of help seeking while controlling for PTSD and other factors, stratified by combat exposure level. We utilized a sample of National Guard service members who participated in an in-depth survey 2-4 months after returning from Operation Enduring Freedom and Operation Iraqi Freedom overseas deployments (n=467). In the unadjusted logistic model, hazardous alcohol use reduced the probability of help seeking by 92% among combat exposed National Guard service members. An adjusted model, which controlled for socio-demographic (age, gender and race) and barriers to care (knowledge of services, perception services harmful to one's career), showed that hazardous alcohol use further reduced the probability of help seeking by 173%. These findings provide support for the established view that members of the military use alcohol or other substances to self-medicate, rather than engage in help seeking. Although these findings require replication, they emphasize the strength of economic models in predicting help seeking behavior.

Highlights

- Recent military service members and veterans have high rates of mental health problems but low rates of mental health service utilization
- How does combat exposure impact alcohol use, PTSD and help seeking behavior?

- National Guard service members were more likely to engage in help seeking if they had more severe health and mental health issues, except alcohol use.
- Alcohol Use reduced the probability of help seeking in adjusted models by 173%.

Keywords: help seeking; hazardous alcohol use; post-traumatic stress disorder;; behavioral economics; military

Appendix H1.d

**Combat Exposure, Employment, Psychological Strain and Relationship Satisfaction among
National Guard Service Members and their Partners**

**Authors: Carissa van den Berk,¹ Jeffrey Scherrer^{1,2} Greg Widner¹, Manan Shroff¹,
Sundari Balan,¹ Rumi Price¹**

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Keywords: Employment, PTSD, Relationship Satisfaction, National Guard

**Source of funding: Department of Defense Research Grant (W81XWU1120108), National
Institute of Drug Abuse Training Grant (tT32DA007313)**

Unemployment, Psychological Strain and Relationship Satisfaction among National Guard Service Members and their Partners

BRIEF REPORT

Abstract

Operation Enduring Freedom, Operation Iraqi Freedom and Operation New Dawn (OEF/OIF/OND) soldiers and guard members have high levels of unemployment and psychological problems, which may contribute to poor relationship satisfaction and divorce. The primary objective of this study is to examine whether combat exposure effects of unemployment and psychological strain among National Guard Service Members and whether this decreases relationship satisfaction among National Guard Service Members and their partners. One hundred ninety-four guard member/supporter couples were surveyed approximately 2-4 months post-deployment. We used a stepwise actor partner interdependence model to determine if there is an association between relationship satisfaction and self and partner employment before and after controlling for group membership, age, children in household, residential unemployment rate, self and partner income, post-traumatic stress disorder (PTSD), depression, hazardous alcohol use and post-deployment social support. Self-employment status and depression were significantly associated with relationship satisfaction. When post-deployment was added to the model, self-employment status was no longer significant. Couples with a National Guard Service Member who had recent combat exposure (within past deployment) were significantly different than couples without such exposure when it came to income, education, rate of residential unemployment, employment, PTSD and depression. Efforts to improve the family functioning of OEF/OIF/OND veterans should focus

on the constraints and opportunities that post-deployment social support brings to families, especially when guard members have experienced recent combat.

Keywords: Employment, Combat, National Guard, Relationship Satisfaction

Appendix H2

Appendix H2.a

Whose post-traumatic stress affects drinking levels: Couple-dyad modeling of National Guard Service members and their partners

S Balan, C van den Berk-Clark, M Shroff, G Widner, J Scherrer, RK Price

Washington University School of Medicine, St. Louis

Presentation at CPDD Annual meeting 2013

Acknowledgements

Sources of Support:

- NIDA T32DA007313
- W81XWH-11-2-0108 (PI: Price)

Conflict of Interest: None

Overview

- Background
- Study aims
- Method
- Results
- Discussion

Background

- Post deployment period presents a critical transition phase for returning service members and families (e.g., Reddy et al., 2011)
- Drinking levels post deployment are higher in National Guard service members as compared to pre-deployment levels (Gewirtz et al., 2010)
- PTSD and drinking commonly co-occur in individuals

- Ecological context of family is a useful framework to understand family processes (Bronfenbrenner, 1986)
- PTSD symptoms, depressive symptoms and drinking may co-occur in couples
 - Assortative mating (Agrawal et al., 2006)
 - Reciprocal and social influence processes (Bramsen et al., 1995)
- Women and men may be differentially affected (Reddy et al., 2011)

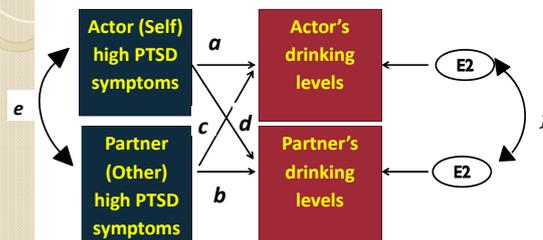
Study aims

- To examine relative associations between high PTSD symptoms in couples and drinking levels (simultaneously accounting for PTSD symptoms in couples)
- To examine any differences by gender

Actor Partner Independence Model

- Actors and partner's effects are reciprocal?
- Presence of non-independence
- Using dyad as the unit of analysis- i.e., sample size is based on the number of pairs
 - Averaging?
 - Treat individuals as nested within dyads
- Both effects need to be accounted in modeling couples
 - Actor effects are her/his own
 - Partner effects are how much one is influenced by a partner

Actor Partner Independence model



Note: a, b = actor/ partner effect ; c, d = gender interaction effect; e= intra class correlation co-efficient; E1= Actor's error variance; E2= Partner's error variance; f= correlated errors (Figure adapted from Cook & Kenny, 2005).

National Guard Study-Participants

- On going study of NG service members and their partners (N=183)
- Only partners who were currently married or living together were included
- Interviewed over phone approximately four months after their return from deployment
- Couples were interviewed separately

Measures

- Dependent measure: Drinking levels (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001)
- PTSD: Symptoms (PCL: National Center for PTSD, 2012)
- Depression: Symptoms (PHQ-9:(Spitzer, Kroenke, & Williams, 1999)
- Pre-deployment negative life Events (DRRI: King, King & Vogt, 2003)
- Demographics: (Employment, Marital Status, Parenthood, race, age)

Analysis strategy

- Multi-level modeling using Actor-Partner Independence Model
- First MLM tested the effects of actor and partner PTSD
- Second MLM tested the interaction effects by role relative to each other.
- Individual level co-variates were accounted in models
- All variables were centered and effect coded

Table 1. Descriptive characteristics

		Men % (N=183)	Women % (N=183)
Age	19-59	36.62 (9.33)	34.92 (9.46)
Deployed	Yes	95.08	4.92
Race	Caucasian	89.07	91.80
Education	Some college	55.74	55.19
Employment	Employed	93.44	78.14
Parenthood	Have at least one child	80.87	79.78
Negative life event	0-4	0.95 (0.99)	0.94 (1.23)

Table 1. Descriptive characteristics

		Men % (N=183)	Women % (N=183)
Drinking levels	3-32	11.24 (6.07)	8.02 (4.57)
Depressive Symptoms	0-23	3.84 (4.22)	4.11 (4.22)
PTSD Symptoms	17-62	26.71 (11.84)	25.06 (8.95)

Table 2. Correlations (couples n=183)

Variable	Couple
Drinking Levels	0.21***
Depressive Symptoms	0.08
Negative Life Events	0.02
PTSD Symptoms	0.21***

*p<.05; **p<.01; ***p<.001.

Table 3. Multilevel regression models on drinking levels (couples n=183)

Variable	Estimate
Gender	1.61***
Actor Effect-PTSD	0.05*
Partner Effect-PTSD	-0.001
Gender Actor Interaction effect	0.01
Gender Partner Interaction effect	0.003

*p<.05; **p<.01; ***p<.001.

Predictors and covariates explained 31% of the shared effect

Table 3. Multilevel regression models on depressive symptoms (couples n=183)

	Estimate
Gender	-0.37*
Actor Effect-PTSD	5.16***
Partner Effect-PTSD	0.17
Gender Actor Interaction effect	-0.23
Gender Partner Interaction effect	1.40**

*p<.05; **p<.01; ***p<.001.

Predictors and covariates explained 30% of the shared effect

Discussion

- Overall, men's drinking levels were higher
- Actor PTSD effects were observed for drinking levels
- No partner effects were observed
- For both men and women, their own PTSD affected drinking levels

Implications & Limitations

- Replicate the links between PTSD and drinking levels using couple level data
- Additional longitudinal analysis is necessary
- Future studies need to test potential additional models of family processes
- Cross-sectional design with self-selected sample

Thank You

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Appendix H2.b



Washington UNIVERSITY IN ST. LOUIS

MISSOURI HISTORY MUSEUM
Under 6 Duffelwood in Forest Park
1116 FINE ARTS Bldg. - 535-1100

Missouri History Museum

When Soldiers Come Home

The Science of War Injuries from Vietnam to Afghanistan

Rumi Kato Price PhD MPE
Washington University School of Medicine
VA St. Louis Health Care System
August, 2013

BETWEEN TWO WORLDS
Veterans Journey Home

Academy of Science
Perspectives on Science and History Lecture Series

CONNECTING SCIENCE & THE COMMUNITY SINCE 1856

Washington UNIVERSITY IN ST. LOUIS

Acknowledgments

- National Institute of Mental Health
- National Institute on Drug Abuse
- Department of Defense
- VA Health Services Research & Development
- Institute of Clinical and Translational Sciences (ICTS)
- Center for Mental Health Services Research (CMHSR)
- Brown Center for Violence and Injury Prevention (BCVIP)
 - No financial conflicts
 - No consulting relationships other than study sections and other committees
 - No stock equity over \$10,000
 - No payment from a Speaker's Bureau

The Battle of Issus (333 BC)
Albrecht Altdorfer (1529)

Washington UNIVERSITY IN ST. LOUIS

MISSOURI HISTORY MUSEUM
Under 6 Duffelwood in Forest Park
1116 FINE ARTS Bldg. - 535-1100

Missouri History Museum

Every major war in modern history spurs technology and science development.

The Vietnam War signifies a beginning shift in science capital investment emphasizing psychological injuries of deployment.

BETWEEN TWO WORLDS
Veterans Journey Home

Academy of Science
Perspectives on Science and History Lecture Series

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Washington UNIVERSITY IN ST. LOUIS

Talk Points

- Mortality
- Suicide
- Physical injuries
- Trauma spectrum disorder
- Neuro-psychological injuries
- Treatment and prevention
- Reintegration

Washington
WASHINGTON UNIVERSITY IN ST. LOUIS

Disclaimer

- Omission of Gulf War I (Operation Dessert Storm, 1990-1991) for the most part
- Not a full range of “invisible wounds” covered today
- Technological advances only introductory
- Treatment modalities only introductory



The Death of General Wolf (1770)
Benjamin West

Mortality: Vietnam War (1955-1975)*

Number of Death	
US Armed Force	
Killed in action (KIA)	58,286
Missing in action (MIA)	1,645
Prisoner of War (POW)	65-116
Vietnamese Military	
South	171,311-220,375
North/Viet Cong	444,000-1,100,000
Vietnamese Civilians	
South	195,000- 430,000
North	50,000-65,000

* Various sources.

Mortality: OIF/OND/OEF (2001-Present)*

Number of Deaths			
US Armed Force	OIF (2003-10)	OND (2010-11)	OEF (2001-present)
Killed in action (KIA)	3,481	38	1,774
Non-hostile	929	28	481
TOTAL	4,410	66	2,255
DoD Civilian			
Killed in action (KIA)	13	0	1
Non-hostile	9	0	2
TOTAL	22	0	3

* US Casualty Status Sheet, August, 2013.

Post-deployment Mortality*

Table 5: Temporal changes in injury-related mortality rate ratios (95%CI) in various studies

Conflict	Study	Follow-up Period (years)	All External Causes ²	Motor Vehicle Events ³	Suicide (950-99) ⁴	Homicide (180-96) ⁵
Vietnam	Boyle et al. 1987 & Buchner et al. 2004 [7,29]	< 5	ND	1.93 (1.16-3.22)	1.72 (0.76-3.88)	1.52 (0.59-3.91)
		6-14	ND	1.16 (0.72-1.87)	0.64 (0.27-1.30)	0.78 (0.39-1.53)
		6-30	ND	1.02 (0.73-1.43)	0.93 (0.64-1.34)	0.80 (0.50-1.20)
Gulf	Kang & Bullman 2001 [37]	< 1.7	ND	1.31 (1.13-1.53)	ND	ND
		1.8-3.3	ND	1.21 (1.01-1.45)	ND	ND
		3.4-5.0	ND	1.17 (0.98-1.40)	ND	ND
		5.1-6.7	ND	1.00 (0.82-1.23)	ND	ND
Iraq/Afghanistan	MacFarlane et al. 2005 [39]	< 6	1.13 (1.06-1.20)	ND	ND	ND
		7-13	1.05 (0.82-1.33)	ND	ND	ND

* Knapik et al., BMC Public Health, 2009.

Post-deployment Mortality*

- ❑ Vietnam - Compared to non war-zone veterans, war-zone veterans were:
 - twice more likely to die from motor vehicle events during the first 5 years
 - But only 16% more likely during 6-14 years
 - 50% more likely to die from homicide during the first 5 years
- ❑ Gulf - Compared to non war-zone veterans, war-zone veterans were:
 - 30% more likely to die from motor vehicle events during the first 1.7 years
- ❑ OIF/OND/OEF – Too early for any systematic data

* Knapik et al., BMC Public Health, 2009.

1996

Suicide Facts: US Population*

- More than 31,000 suicides in US (2005).
- Suicide is the second leading cause of death for white males 20-29 years old.
- Firearm is the most commonly used method (51%), followed by suffocation (34%), and poisoning (8%).
- Rate varies by gender, racial and ethnic groups.
- Risk factors: previous attempt(s), depression, other psychiatric illnesses, alcohol and/or drug abuse, physical illness, lack of social support (e.g., living alone).

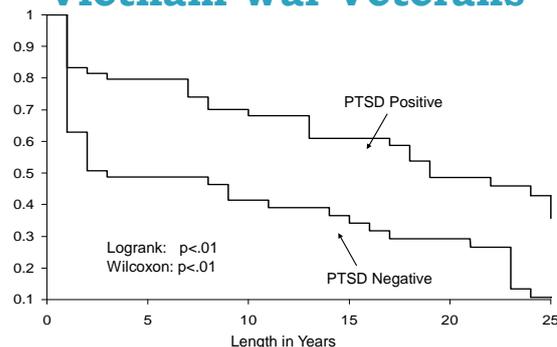
* Kang & Bullman, Suicide Prevention Conference, 2010.

Suicide: Vietnam and Gulf Wars*

- The risk of suicide among Vietnam War veterans and Gulf War veterans, as a whole, is not significantly higher than non-deployed veterans or the comparable U.S. general population.
- Posttraumatic stress disorder (PTSD) and being wounded in action were associated with the risk of suicide among Vietnam veterans.
- A VA treatment seeking population experienced a significantly higher risk compared to the U.S. general population.

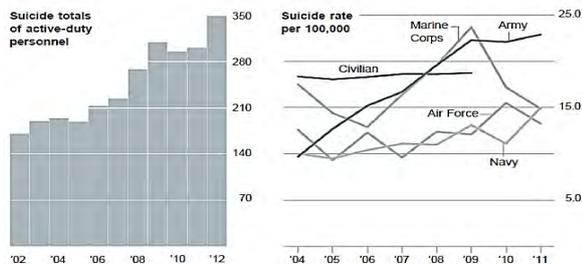
* Various sources; Kang & Bullman, Suicide Prevention Conference, 2010.

Non-fatal Suicidality: Vietnam War Veterans*



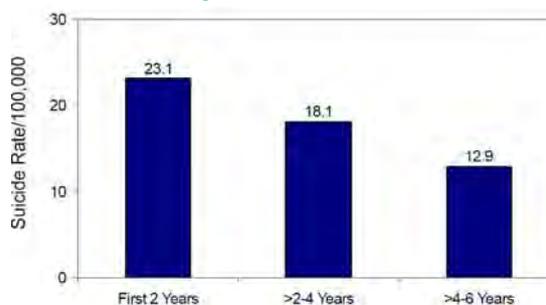
* Price et al., Drug Alc Dep, 2004; among those who experienced severe suicidal ideation.

Suicide: OIF/OND/OEF Active Duty and Veterans*



* NY Times, 3-15-2013

Suicide after Separation from Active Duty: OIF/OEF Veterans*



* Kang & Bullman, Suicide Prevention Conference, 2010.

Suicide: OIF/OND/OEF Active Duty and Veterans*

- The risk of suicide among OEF/OIF veterans is significantly higher than the comparable U.S. general population (23 vs. 18 per 100,000).
- The risk appears to be inversely related to the time elapsed since separation from active military duty or deployment.
- But half of suicides were not deployed to conflict regions; half at least partially involved intimate relationship failures.

* Various sources; Kang & Bullman, 2010; DoSER Suicide Event Report, 2012.

Suicide Prevention: Ideally... *



* US Army Center for Health Promotion and Preventive Medicine

Suicide Prevention for Service Members and Veterans*

- Improved screening for mental health (depression, PTSD)
- Suicide hotline (VA, military)
- Patient Aligned Care Team (PACT, VA)
- Substance abuse prevention
- Family support programs
- Gate-keeper model (Air Force)
- Holistic comprehensive soldier fitness
- Means restriction – fire arms hygiene

* Various sources



"Ten or 20 years ago, this would have been an automatic death sentence" – ABC News 1-30-2006

Wounded War Fighters

- ❑ Death rates among the wounded:
 - 30% in WW II
 - 24% Vietnam
 - 9% in OIF
- ❑ Improved body armor
- ❑ Mine-resistant ambush protected armored vehicles (MRAP)



Quadguard IV



Interceptor body armor



Physical Injuries: Vietnam vs. OIF*



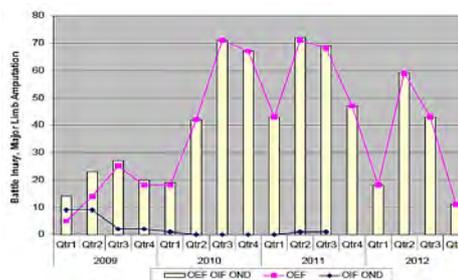
* Goldberg, Military Medicine, 2010.

Wounded-to-Fatality Vietnam vs. OIF/OIF*

	Vietnam (1964-75)	OIF (2003-07)	OIF + OEF (2001-07)
Wounded-to-fatality ratios			
Wounded/death	5.2	7.6	7.1
Wounded/hostile death	6.4	9.4	9.2
Wounded not returned to duty/hostile death	---	4.2	4.2
Survival rates (%)			
All wounded	86.5	90.4	90.2
Hospitalized/not returned to duty	76.4	80.8	80.6

* Goldberg, Military Medicine, 2010.

Amputation Injuries: OIF/OND/OEF*



* Fischer, Congressional Research Service, 2013.

Improved Mobility and Well-being for the Wounded



Tibiotarsal amputation, c. 1862

Work NC computer-aided knee prosthesis



Talk Points

- Mortality
- Suicide
- Physical injuries
- Trauma spectrum disorder
- Neuro-psychological injuries
- Treatment and prevention
- Reintegration

Invisible Wounds: Trauma Spectrum Disorder*



* Modified from Jonas et al., Military Medicine, 2010; Price et al., under review.

**Sleeping with Buster,
was like sleeping with a
Vietnam vet,
who suffered from
PTSD...**



New Yorker, 1-5-04

Posttraumatic Stress Disorder (PTSD)

- **Before Vietnam**
 - Railway spine; Da Costa's Syndrome; soldier "exhaustion" – 19th century
 - Shell shock – WWI
 - Battle fatigue, combat fatigue, combat neurosis, traumatic war neurosis – WWII
- **Vietnam**
 - Gross stress reaction (DSM-II*), Vietnam Syndrome
- **Contemporary terminologies**
 - Posttraumatic stress disorder (PTSD) – born in the DSM-III* as a "true" psychiatric disorder.
 - PTSD must meet explicit criteria.
 - Acute stress disorder – less than a month; within normal acute stress reactions.

* Diagnostic and Statistical Manual of Mental Disorders, Second Edition, 1968; Third Revision, 1980.

DSM-5 PTSD Diagnostic Criteria*

- **Stressor (Criterion A)**
 - Death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, as follows: (1 required).
 - Subjective impact (e.g., horrifying) not needed.
- **4 Symptom clusters (Criteria B-E)**
 - Intrusion (B, 1)
 - Avoidance (C, 1)
 - Negative alterations in cognitions and mood (D, 2).
 - Alterations in arousal and reactivity (E, 2).
- **Duration: >=1 month (Criterion F)**
- **Functional impairment (Criterion G)**
- **Exclusion: not due to medication, substance use or other illnesses**

* Diagnostic and Statistical Manual of Mental Disorders, Fifth Revision, 2013.

PTSD: Vietnam*

	Current	Lifetime	Current	Lifetime
Male	15.2	30.9	11.1	22.5
Female	8.5	26.9	7.8	21.2

	Most-Prevalent Current Disorders	Most-Prevalent Lifetime Disorders
Male	Alcohol Abuse Alcohol Dependence Generalized Anxiety Disorder	Alcohol Abuse Alcohol Dependence Generalized Anxiety Disorder Antisocial Personality Disorder
Female	Depression Generalized Anxiety Disorder	Generalized Anxiety Disorder Depression Alcohol Abuse Alcohol Dependence

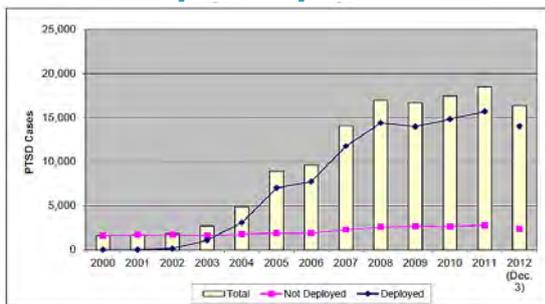
* National Vietnam Veterans Readjustment Study, 1988; National Center for PTSD.

PTSD: Vietnam*

	Risk Factors for PTSD Development	Risk Factors for PTSD Maintenance
Premilitary Factors	Hispanic ethnicity Family instability Severe punishment during childhood Childhood antisocial behavior Depression	Severe punishment during childhood
Military Factors	War-zone exposure Peritraumatic dissociation* Depression	Serious injury during Vietnam War-zone exposure Peritraumatic dissociation*
Postmilitary Factors	Recent stressful life events Post-Vietnam trauma Depression	Recent stressful life events
	Protective Factors for PTSD Development	Protective Factors for PTSD Maintenance
Premilitary Factors	Japanese-American ethnicity High school degree or college education Older age at entry to war Higher socioeconomic status More positive paternal relationship	Native Hawaiian or Japanese-American ethnicity College education
Military Factors	None	None
Postmilitary Factors	Social support at homecoming Current social support	Current social support

* National Vietnam Veterans Readjustment Study, 1988; National Center for PTSD.

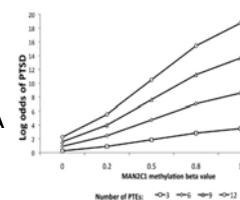
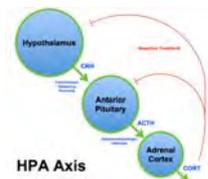
PTSD New Cases: OIF/OND/OEF*



* Fischer, Congressional Research Service, 2013.

Neurobiology of Stress Reaction*

- **Hypothalamic-pituitary-adrenal (HPA) axis**
 - Neuroendocrine system that controls reactions to stress and regulates body processes (e.g., immune system, digestion, mood and emotion).
 - Repeated exposure to a threat inhibit or turn off the HPA-axis's stress-response cascade by negative feedback loops.
- **Gene expression and methylation associated with PTSD***
 - DNA methylation (addition of methyl group to the cytosine or adenine DNA nucleotides) alter the expression of genes in cells.
 - Potentially inheritable without changing genotypic variations.

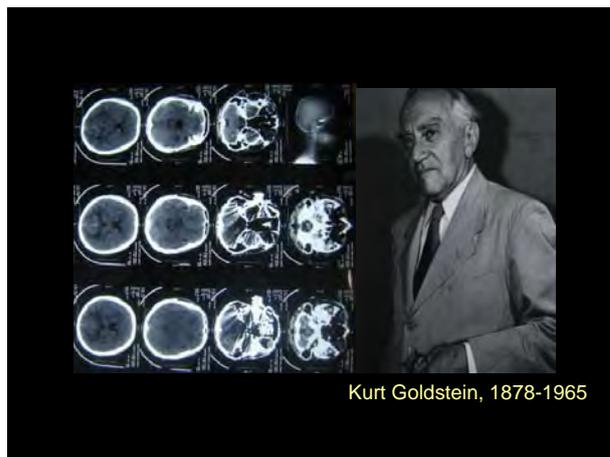


* Uddin et al., Dis Markers, 2011

Treatment of PTSD*

- Cognitive behavioral therapy (CBT)
 - Cognitive processing therapy (CPT) - Challenge thoughts about trauma and allow cognitive restructuring.
 - Prolonged exposure therapy (PE) – Allow controlling and overcoming fears associated with trauma through repeated exposures.
- Eye Movement Desensitization and Reprocessing (EMDR)
 - Rapid eye movements make it easier for brain to work through the traumatic memories.
- Pharmacologic (medications)
 - Selective Serotonin Reuptake Inhibitors (SSRIs) – sertraline (Zoloft) and paroxetine (Paxil) approved by FDA for PTSD treatment.
 - Raise the level of serotonin in brain
 - Side effects: nausea, decreased interest in sex, drowsy, tired.
- No magic bullets

* National Center for PTSD, US Department of Veterans Affairs, 2011.

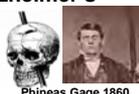


Kurt Goldstein, 1878-1965

Traumatic Brain Injury (TBI)*

- Before Vietnam
 - “Shell shock” initially meant nervous system damage from concussive blast exposure (1916)
 - “Physioneurosis” termed by Abram Kardiner (1940)
 - “Aftereffects of Brain Injuries in War” published by Kurt Goldstein, a neurologist, 1942
- Vietnam
 - The Vietnam Head Injury Study (VHIS)– registry of Vietnam veterans with a head injury, 1967-1970
 - Comparison with other era cohorts and civilians difficult: VHIS participants are with mostly penetrating brain injuries
 - Long term effects of PTSD and TBI on Alzheimer’s disease (AD) as Vietnam veterans age

* Defense Centers of Excellence, 2011; Dana Foundation 2013; Bhattacharjee, Science, 2008.



Phineas Gage 1860

Traumatic Brain Injury (TBI) Definition*

- External forces
 - Head struck by an object
 - A foreign body penetrating the brain
 - Brain undergoing an acceleration/ deceleration movement without direct external trauma to the head
 - Forces generated from events (blast, explosion)
- Open vs. closed TBI
- TBI sequelae
 - Physical (headache, nausea, vomiting, dizziness, blurred vision, sleep disturbance, weakness, paresis/plegia, sensory loss, spasticity, aphasia, dysphagia, apraxia, balance disorders, disorders of coordination, and seizure)
 - Cognitive (impairments in attention, concentration, new learning, memory, speed of mental processing, planning, reasoning, judgment, executive control, self-awareness, language, and abstract thinking)
 - Emotional/behavioral (depression, anxiety, agitation, irritability, impulsivity, aggression)

* Veterans Health Initiative, 2010

Traumatic Brain Injury (TBI)*

“New” Signature Injury of OIF/OND/OEF

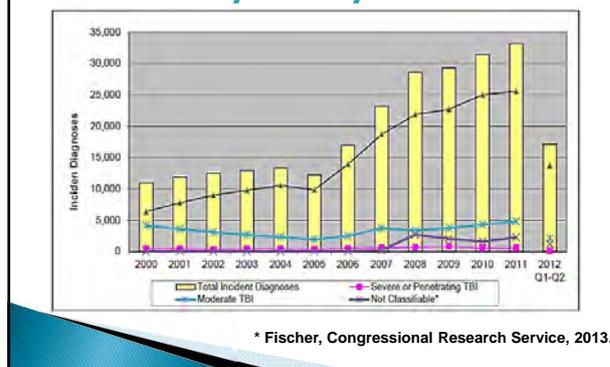
Mild	Moderate	Severe
Normal structural imaging	Normal or abnormal structural imaging	Normal or abnormal structural imaging
LOC = 0-30 min	LOC >30 min and < 24 hours	LOC > 24 hrs
AOC = a moment up to 24 hrs	AOC >24 hours. Severity based on other criteria	
PTA = 0-1 day	PTA >1 and <7 days	PTA >7 days
GCS=13-15	GCS=9-12	GCS=3-8

LOC- loss of consciousness
 AOC – alteration of consciousness/ mental state
 PTA – posttraumatic amnesia
 GCS – Glasgow coma scale

Severe or Penetrating TBI: 6,476 (2%)
 Moderate TBI: 42,093 (17%)
 Mild TBI: 184,561 (77%)
 Not Classifiable*: 10,210 (4%)

* Department of Defense and Department of Veterans Affairs, Traumatic Brain Injury Task Force, 2008; Fischer, Congressional Research Service, 2013.

TBI New Cases: OIF/OND/OEF*

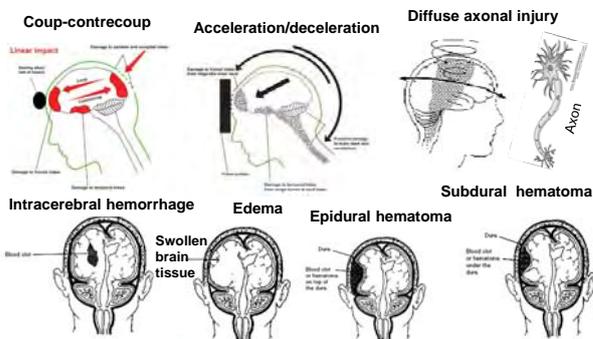


TBI: What Happens to the Brain?*

- **PRIMARY**
The Injury is more or less complete at the time of impact
- Skull fracture
- Contusion/bruising of the brain
- Hematoma/blood clot on the brain
- Diffuse axonal injury
- **SECONDARY**
The injury evolves over a period of hours to days after the initial impact
- Brain swelling/edema
- Increased intracranial pressure
- Intracranial infection
- Epilepsy
- Hypoxemia (low blood oxygen)
- High or low blood pressure
- Anoxia/hypoxia (lack of oxygen to the brain)

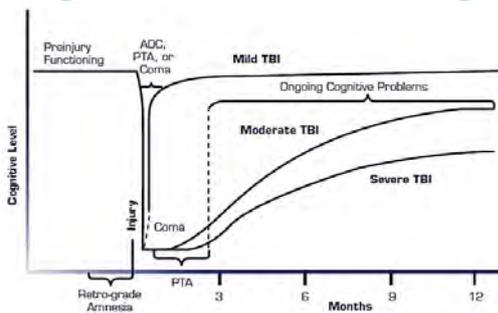
* Brain Resource Information Network; Defense Centers of Excellence.

TBI: What Happens to the Brain?*



* Brain Resource Information Network; Defense Centers of Excellence; various.

TBI Expected Course: Cognitive Functioning*

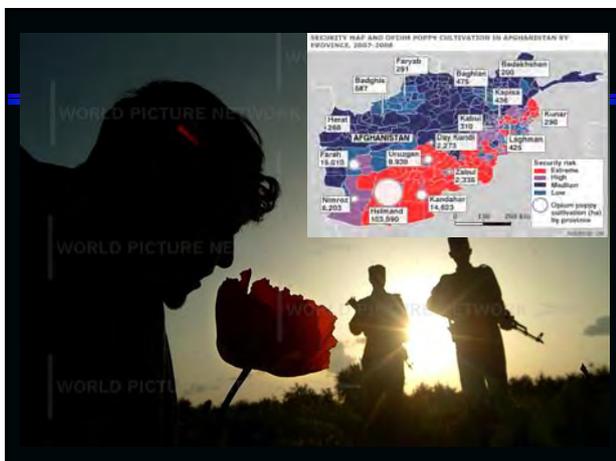


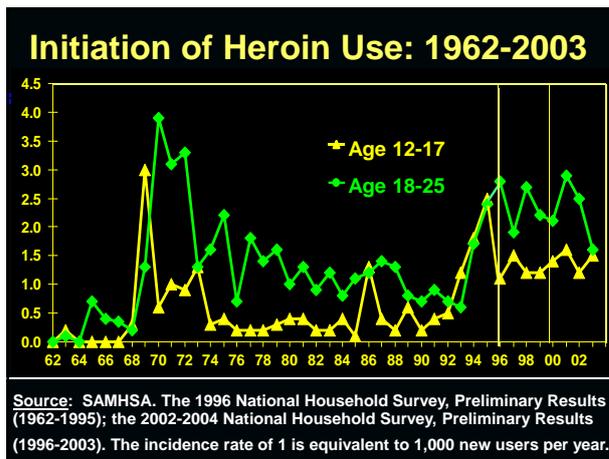
* Veterans Health Initiative, 2010.

Where Advances Are Most Visible

- **Identification and mapping of closed form TBIs**
 - Better identification of brain injury areas and types of injuries.
 - Diffusion tensor imaging (DTI) to detect axonal injury.
- **Treatment**
 - Rapid aeromedical evacuation (medevac).
 - Comprehensive assessment of TBI symptoms and sequelae (long-term rehabilitation still rather variant).
- **Public health**
 - Greater awareness in military and veteran's health providers.
 - Research in civilian TBIs (football, vehicle accidents).
 - Information is readily available for service members, veterans and civilians.

*Various sources; MacDonald et al., NEJM 2011.





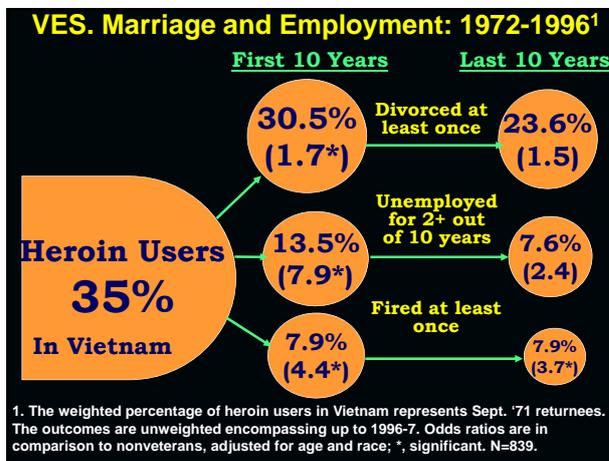
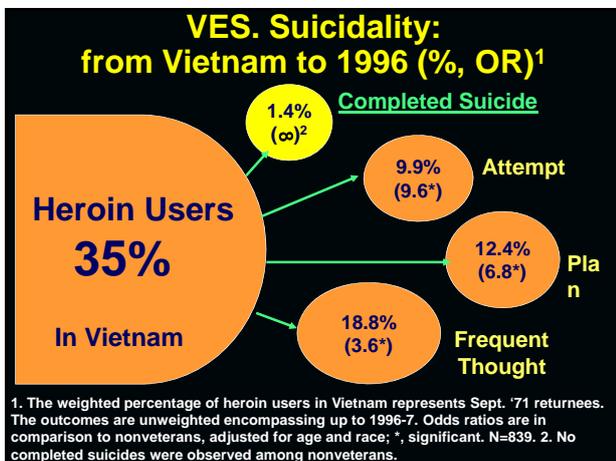
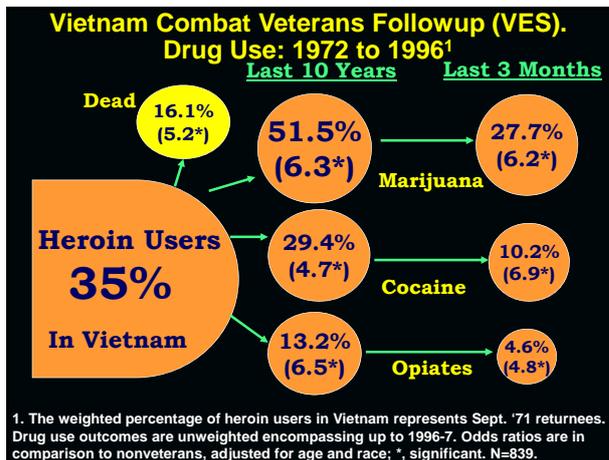
Opiate Addiction before, in and after Vietnam¹

Table 1.—Drug Use Before, In, and After Vietnam*

	Before Vietnam, %	In Vietnam, %	Since Vietnam, %
Marijuana, any	41	69†	45
Any drug; narcotics, amphetamines, barbiturates	30	45	23
Narcotics	11	43	10
Addiction to narcotics			
By self-report	0.2	20	0.7
By symptoms of dependence	0.4	21	1
Amphetamines	24	25	19
Barbiturates	14	23	12
Combinations of drug types			
All 3: narcotics, amphetamines, barbiturates	4	18	6
Amphetamines & barbiturates	5	0	3
Narcotics & amphetamines	3	6	2
Narcotics & barbiturates	2	5	1
Narcotics only	2	15	1
Amphetamines only	11	2	9
Barbiturates only	2	...	2

* Data from the interviewed general sample (N = 451).
 † Estimate based on assumption that those who used marijuana before continued in Vietnam.
 ‡ Criteria given on p 857.
 § Less than 0.5%.

1. Robins LN, Helzer JE, Davis DH, Arch. Gen. Psychiatry, 1975

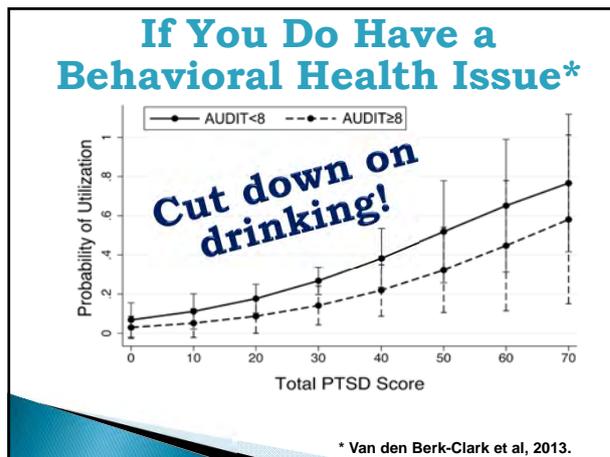


Strengthening Our Warriors



Physical	Emotional	Social	Family	Spiritual
Educating For Optimal Nutrition, Rest, & Exercise	Tools to Make Positive Choices: Reframing Optimism Character Self-Control Stamina	Developing & Maintaining Trusted, Valued, Fulfilling Relationships	Environment which is: Safe Supportive Loving Healthy Secure	Core Beliefs Principles & Values which Sustain

Comprehensive Warrior Fitness ~ Holistic Fitness ~ Resiliency
Source: Missouri National Guard



Many Thanks to...

~1227 Vietnam veterans
~2275 Missouri National Guard service members and their supporters





Many Thanks to...

WUSM Lee Robins, Edward Spitznagel, Keith Murray, Nathan Risk, Gregory Widner

St. Louis VA Seth Eisen, Katherine Virgo, William True, Monica Matthieu, Gary Collins

Consultants Bruce Goldberger, Kurt Kroenke, Lee Judy, Gery Ryan

COL Glenn Hagler, MAJ Scott Zimmerman, LTC Regina Kilmer, COL Gary Gilmore, SFC Lora Finn, Dr. K. Llewellyn McGhee and Yellow Ribbon Operational Team








Contact:
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Collage movie made by:
Manan V. Shroff



Acknowledgments:
Ang Lee, Ride with the Devil
Ken Burns, The Civil War

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Appendix H2.c

Profile classifications of deployment experience among National Guard members utilizing behavioral health services

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2. Veterans Administration St. Louis Health Care System Research Services



Introduction

Introduction: Many studies have documented that National Guard members routinely describe a wide range of stressors during deployment which could substantially increase their need for behavioral health services. These stressors include combat exposure which has been linked to a variety of different negative mental health consequences such as post traumatic stress disorder (PTSD), depression and substance use. They also include other features of deployment experience such as family disruption, additional life stressors, health conditions and social support. Due to their 'citizen-soldier' status, National Guard members have access to a variety of different sources of behavioral healthcare which include military and non-military providers. However, little is known about how combat and deployment experiences together affect their utilization and preference toward military or veteran providers.

Objectives: The objective of this poster is to better understand utilization patterns of National Guard members by: (1) doing a profile analysis of National Guard members which examines deployment-related stressors and protective factors (2) to determine whether profile class membership affects utilization and utilization preference.

Methods

Participants

Participants were National Guard Service members ("Guard members") who completed telephone surveys following deployment to Afghanistan or other conflict regions and who reported at least one symptom of PTSD, depression or hazardous alcohol use (N=288). Guard members who attended their assigned post-deployment reintegration weekend were recruited to participate in the FAMPAC study, an on-going project designed to examine the health care and psychosocial needs of Guard members and their families during their reintegration period. The FAMPAC sample is representative of the deployed Army National Guard members in a Midwestern state because of project access to reintegration registration master lists.

Measures

Outcome Measure:
Behavioral Health Care Utilization Preference: was based on respondents self-reports of behavioral health care utilization during or after deployment. Three categories were defined as 1) no utilization, 2) use of civilian providers, 3) use of either military or veteran providers.

Socioeconomic Measures:
Demographic: age, gender, and job status are included in the analyses.

Mental Health Measures:

Mental Health: We used DSM IV guidelines to determine PTSD diagnosis (through PCL-Military scale) and Depression diagnosis (through PHQ-9 scale). A total score for both PTSD and depression was computed as well as a dichotomous indicator of mental diagnosis 1=a diagnosis of either PTSD or Depression, 0=no diagnosis.

Hazardous Alcohol Use: Ten items from the Alcohol Use Disorders Identification Test (AUDIT) were used to examine alcohol use. A 6-point scale ranging from 1 (low risk) to 7 (high risk) was used; a total score was computed.

Deployment Experience Measures

Stressors: We used 8 items from the Post Deployment stressor scale from the Department of Defense's Post Deployment Health Reassessment (PDHRA) at three time points (pre-deployment, during deployment and post deployment). The scale ranged from 1=strongly disagree to 5=strongly agree; a total score was computed and standardized.

Physical Health: We used nine items adapted from PDHRA which asked about asthma, hypertension, diabetes and other health conditions at three time points (pre-deployment, during deployment and post deployment). Each item was dichotomous (0=no, 1=yes); a total score was computed and standardized.

Combat Experiences: We used a combat trauma scale consisting of 20 items used initially by the Office of Command Surgeon USFOR-A. Each item was dichotomous (0=no, 1=yes); a total score was computed and standardized.

Family disruption: We used 14 items from the Concerns about Life and Family Disruption Scale from PDHRA. The scale ranged from 0=not at all, to 4=a great deal; a total score was computed and standardized.

Post Deployment Social Support: We used 10 items from the Post-Deployment Social Support Scale from PDHRA. The scale ranged from 0=strongly disagree to 4=strongly agree; a total score was computed and standardized for each scale.

Other Measures:

Unit Social Support: We used 12 items from the Deployment Social Support Scale from PDHRA. The scale ranged from 0=strongly disagree to 4=strongly agree; a total score was computed and standardized for each scale.

Distance to Services: We used the number of miles from individual residence to veteran and military providers using Veteran Administration and Department of Defense websites.

Analyses

• Determined that less than 3% of the data was missing at random and used listwise deletion.

• After preliminary bivariate analysis and repeated measures analysis was conducted to compare utilization patterns as well as deployment experience measures and other measures described above in measures section, factor analysis and K-means clustering were carried out to assess the best variables to use for latent class profile (LCP) analysis and as a measure of utilization patterns (data not shown). Variables chosen for profile analysis included a total of 7 measures: pre-deployment, during-deployment and post-deployment health, combat experiences, post-deployment stress, family disruption and post-deployment social support.

• Determined best fitting model based on LCP analysis using Mplus 5.0. Multiple indicators for LCP model fit were considered including Bayesian information criterion (BIC), adjusted BIC, entropy and class size (See [TABLE 1](#)). In addition, we also considered mean-based comparison through ANOVA using Stata 12.1 (See [TABLE 2](#)).

• The relationship between class membership and utilization preference was assessed by using class as a main predictor. We performed a multinomial logistic regression and also included gender, age, job status, distance to services, mental health, alcohol use, unit social support and the interaction between unit social support and mental health using Stata 12.1 ([TABLE 3](#)). The following variables were not included in the final model because of low significance: distance to military providers, distance to veteran outpatient providers and number of civilian providers within 25 miles.

Results

TABLE 1. Model fit indices and minimum class sizes: 1-4 class solutions for clinical and social profile differences using Latent Class Profile (LCP) analysis

Model	BIC	Adjusted BIC	Entropy	Minimum Class Size
1 class	5822.9	5778.5	-	-
2 class	5569.3	5499.6	0.980	17
3 class	5475.1	5380.0	0.934	17
4 class	5362.7	5242.2	0.959	7

Notes: Based on LCP analysis separately run for 1 to 4 class solutions. The input measures to LCP were standardized scores of family disruption, combat experience, health at pre-deployment, during deployment and post-deployment time points, post-deployment stress and post-deployment social support. BIC: Bayesian information criteria

TABLE 2. Means based on 3 class solution

(a) Behavioral health issues (n=288)

Profile	N	PTSD	Depression	Alcohol
1 (low risk)	229	23.98	4.04	5.11
2 (medium risk)	17	32.18	6.97	5.79
3 (high risk)	42	35.50	5.18	5.17
F(2,285)		26.17***	13.24***	0.18

(b) Health issues (n=287)

Profile	N	Pre-Depl. Health	In-Depl. Health	Post-Depl. Health
1 (low risk)	228	0.26	0.42	0.17
2 (medium risk)	17	1.88	2.71	2.24
3 (high risk)	42	0.21	0.76	0.55
F(2,285)		67.90***	87.90***	135.38***

(c) Other issues (family, combat, stress, support) (n=288)

Profile	N	Family Disruption	Combat	Post-Depl. Stress	Post-Depl. Social Support
1 (low risk)	229	26.14	1.14	8.92	40.89
2 (medium risk)	17	26.77	3.12	10.24	40
3 (high risk)	42	28.19	8.78	9.52	39.38
F(2, 285)		1.42	287.77***	9.24***	1.34

Notes: * <.05, ** <.01, *** <.001. For description of behavioral health, relationship, family, stigma and social support related measures, see methods section of poster. All measures are based on sums of screening questions. Mean comparisons were computed using ANOVA and were included to examine specific group differences.

TABLE 3. Multinomial logistic regression results assessing utilization and utilization preference based on class membership (n=284)

Variable	Description	RRR	CI
(a) Base outcome (no utilization) (n=223)			
(b) Utilize civilian services (n=22) a			
Class ^c	1 (base outcome)		
	2	-0.02	0.00-0.00
	3	0.18	0.31-4.11
Gender	Male	-0.51	0.21-2.49
Age	Age 20-59	-0.14	0.94-1.05
Job Status	Employed	-1.05	0.21-1.60
Availability of Services	Miles to VA Hospital	-0.77	0.97-1.01
Mental Health	Diagnosis		
	PTSD/Depression	0.73	0.08-230.5
Alcohol Use	AUDIT 0-30	-2.48	0.69-0.96
Unit Social Support	PDHRA 13-60	-1.22	0.92-1.02
Unit Social Support x Mental Health	Interaction	0.16	0.89-1.15
(c) Utilize military or veteran providers only (n=43) ^b			
Class ^c	1 (base outcome)		
	2	2.08	1.09-19.58
	3	0.32	0.40-3.53
Gender	Male	-0.93	0.20-1.78
Age	Age 20-59	0.83	0.97-1.07
Job Status	Employed	-0.22	0.35-2.29
Availability of Services	Miles to VA Hospital	1.65	1.00-1.03
Mental Health	Diagnosis		
	PTSD/Depression	-1.78	0.00-1.35
Alcohol Use	AUDIT 0-30	-1.80	0.84-1.01
Unit Social Support	PDHRA 13-60	-3.51	0.88-0.97
Unit Social Support x Mental Health	Interaction	3.47	1.07-1.27

Notes: The score test for proportional odds assumption indicated original level class structure. Chi-Square=101.67, df=20, p<.0001. Pseudo R²=.26 In bold: p<.05.
 a. The RRR refers to the odds of Guard member utilizing civilian services (1) vs. those who do not utilize services at all (0).
 b. The second set of results show the odds of Guard member who only utilize military or veteran services (2) vs. those who do not utilize services at all (0).
 c. Class 1 (low risk) is the base outcome. Class 2 is medium risk and class 3 is high risk. For more description of classes, see Tables 1 and 2.

Conclusion

Results suggest that there are deployment experiences among Guard members. Those with higher health problems were much more likely to utilize behavior health care services than other groups and an increasing focus on integrated care by both military and veteran providers likely facilitates access to behavioral health services among those with high levels of physical health problems. Such findings point to a need for regular healthcare assessments of Guard members which also assess psychological health and alcohol use. Results also suggest that those utilizing behavioral health services who had lower levels of unit social support may have been experiencing higher levels of stigma. However, among other respondents increased unit support may have helped facilitate utilization of behavioral healthcare. How these differences take place during deployment should be accessed further using qualitative methods. Profile class results should be interpreted with caution because such results only represent deployment experience profiles of one group of Guard members who live mostly in Missouri, Kansas and Illinois. Further study is needed to establish generalizable patterns of risk, resilience and behavioral health utilization among differing National Guard populations.

Acknowledgements

Financial and in-kind supports were obtained from Institute of Clinical and Translational Sciences (ICTS); Center for Mental Health Services Research (CMHSR); Brown Center for Violence and Injury Prevention (BCVIP); St. Louis VA Health Services Research & Development (HSR&D). FAMPAC is supported by a research grant from the Department of Defense, Defense Medical Research and Development Program (DMRDP) to the last author. The preparation of this poster is supported by a NIDA Training Program (T32DA007313).

Results and Discussion

- Initial bivariate analysis revealed that 26% of respondents utilized military providers at some point, 26% utilized veteran providers and 34% utilized civilian providers. The majority of those utilizing military services did so during deployment (56%). The majority of those utilizing veteran services also utilized military services (65%) (data not shown).
- As shown in Table 1, adjusted BIC and entropy suggests that a 3 class solution is sufficient.
- Profile class membership was distributed as follows: low risk (n=229)(class 1), medium risk (high physical health problems, medium combat exposure, high stress) (n=17) (class 2), high risk (medium physical health problems, high combat exposure, high stress)(class 3) (n=42). Both groups 2 and 3 have high levels of PTSD and depression.
- Using no service utilization as a base outcome, multinomial regression indicated that class 2 was more likely to utilize military or veteran services, especially if they had low levels of military unit social support. There was, however, an interaction between military unit social support and a PTSD or Depression diagnosis: Those with higher levels of military social support were also more likely to utilize services when they had a diagnosis of PTSD or depression
- Respondents were much less likely to utilize civilian services when they had higher levels of alcohol use.

Appendix H2.d

Coming home: Role of family disruption in behavioral health problems in National Guard families

Sundari Balan, PhD

Presentation at Department of Psychiatry Research Seminar, December 4, 2013.

Disclosures

Name & Presentation Date: Sundari Balan, 12-4-2013

- Sources of Research Support
 - 1. NIDA T32 DA007313
 - 2. W81XWH-11-2-0108 (PI: Price)
- Consulting Relationships
 - None
- Stock Equity (> \$10,000)
 - 1. None
- Speaker's Bureau(s)
 - 1. None

Overview

- Background
- Aims: Individual and family level approach
- Results
- Discussion

Post traumatic stress symptoms (PTSS) and drinking in military personnel

Balan, S., Widner, G., Shroff, M., van den Berk, C., Scherrer, J., & Price, R. K. (2013). Drug use disorders and post-traumatic stress disorder over 25 adult years: Role of substance abuse and psychiatric problems in non-familial and familial networks. *Drug and Alcohol Dependence*, 133, 228-234.

National Guard: Who are they?

- United States military consists of Active component and Reserve components.
- Army (ARNG) and Air (ARG) guards are part of the reserve component.
- 54 ARNG units in the United States
- NG goals include state, national, and international missions during war and peace.
- **Citizen soldiers who straddle military and civilian lives**

"Deployment does change a person just by the mere fact that you go. There's a baseline of issues that touches every home, every family, every soldier, every extended family."

Source:
 Colonel Gary Gilmore, State chaplain of the Missouri National Guard.
<http://news.stlpublicradio.org/post/returning-war-science-wars-invisible-wounds>

Study measures

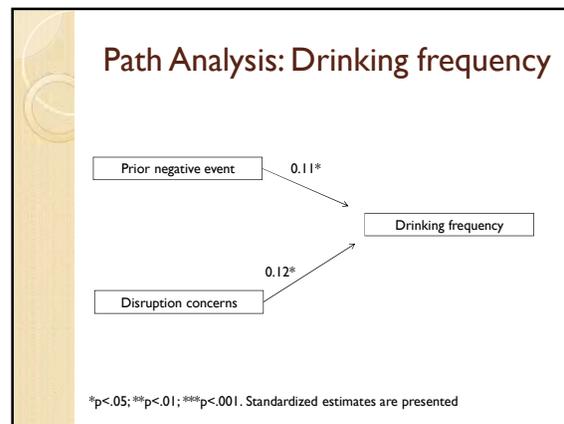
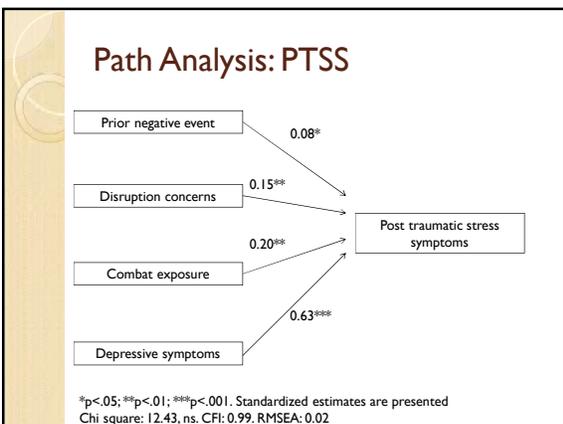
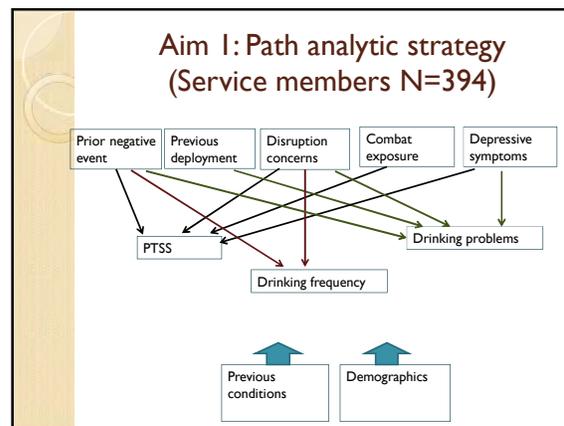
- Demographics
- Prior negative life events: 4 yes/no items
- Prior smoking problem: 1 item
- Prior deployment: 3 item yes/no
- Disruption concerns:** 14 item Family disruption concerns scale
E.g., Before you mobilized ...how concerned were you missing out on a promotion at your job back home
E.g., Before you mobilized ...how concerned were you about your inability to directly manage or control family affairs
- Combat exposure** during recent deployment: 18 yes/no items
- Depressive symptoms:** 9 item PHQ
E.g., Little interest or pleasure in doing things
- Post traumatic stress symptoms:** 17 item PCL checklist
E.g., Repeated disturbing memories, thoughts, or images of a stressful military experience
- Drinking levels:** 10 item AUDIT
Drinking frequency
Drinking problems

Service member sample characteristics

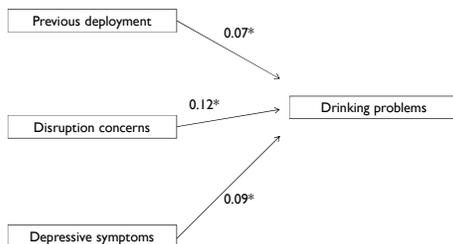
- 16% women
- 37% were married
- 59% had some college education
- 91% were employed
- 66% had one or more children
- 52% were officers and E5 and above
- 49% had been previously deployed (Active duty/ NG/ Reserves)
- Depressive symptoms (10% DSM IV Criteria)
- PTSS (10% DSM IV Criteria)
- Drinking levels (12% Hazardous drinking)

Correlations between major variables

	1	2	3	4	5	6	7
1 Prior negative life events	1						
2 Previous deployment	0.04	1					
3 Disruption concerns	0.15**	0.06	1				
4 Combat Exposure	0.13**	-0.05	0.13***	1			
5 Depressive Symptoms	0.18***	0.04	0.25***	0.24***	1		
6 PTSS	0.23***	0.07	0.33***	0.38***	0.72***	1	
7 Drinking frequency	0.11*	0.08	0.13**	0.05	0.07	0.14**	1
8 Drinking problems	0.09*	0.14**	0.13**	0.07	0.15**	0.24***	0.77***



Path Analysis: Drinking problems

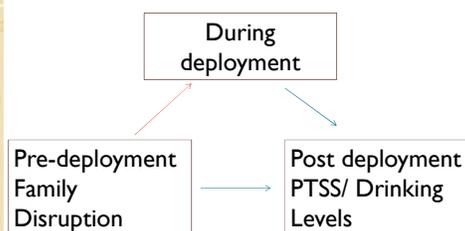


*p<.05; **p<.01; ***p<.001. Standardized estimates are presented
Chi square: 12.43, ns. CFI: 0.99, RMSEA: 0.02

Discussion

- Disruption concerns are related to increased post traumatic stress symptoms, increased drinking frequency and problem drinking
- Effect is independent of prior negative events, previous deployment, combat experiences, and depressive symptoms
- Cross sectional data based on retrospective reports; Possibility of several alternative models including time dimensional model.

Alternative model



Aim II

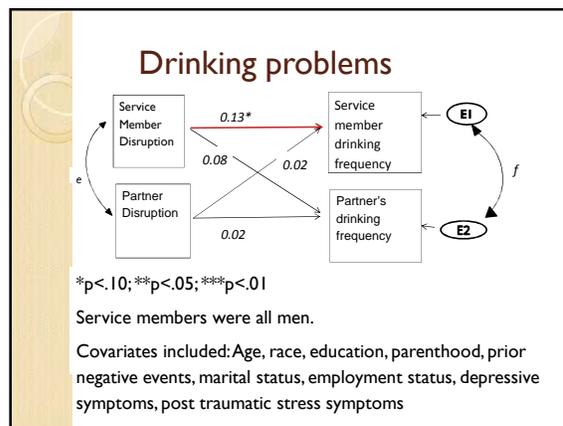
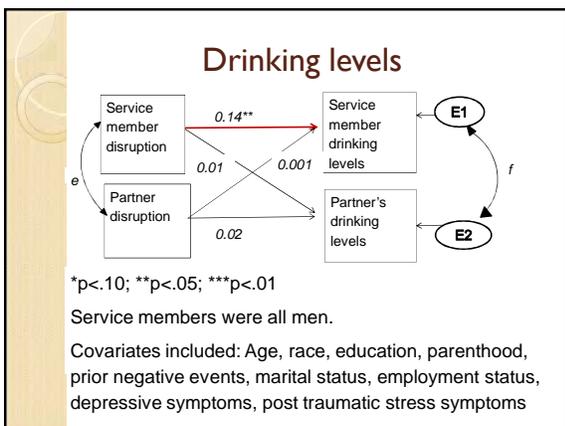
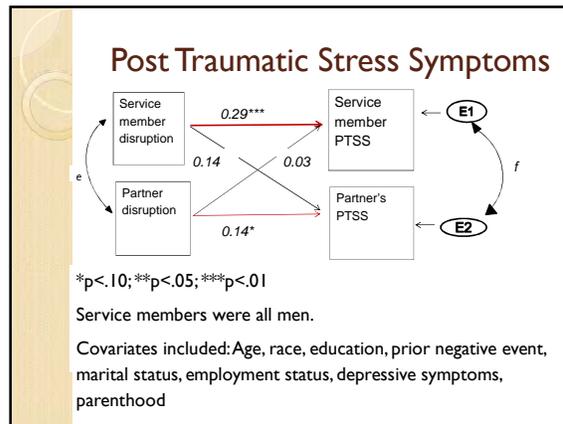
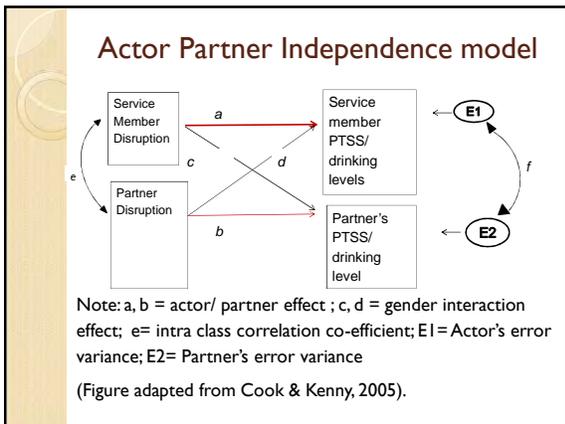
To examine the effects of disruption on families?

Couple characteristics

- 171 heterosexual couples
- All couples were married or living together
- Couples were separately interviewed
- Similar measures were used for couple members
- Partners were asked with reference to their service member's recent deployment
- Couple correlations
 - Prior negative events: 0.03, ns
 - Disruption concerns: -0.61***
 - Depressive Symptoms: -0.08, ns
 - PTSS: -0.32***
 - Drinking levels: 0.19***

Actor Partner Independence Model

- Actor effects are her/his own
- Partner effects are how much one is influenced by a partner
- Both effects need to be accounted in modeling couples
- Actors and partner's effects are reciprocal
- Presence of non-independence
- Using dyad as the unit of analysis- i.e., sample size is based on the number of pairs
 - Treat individuals as nested within dyads



Discussion

- Disruption is related to PTSS and drinking levels. Replicates the results of path analysis.
- Only self effect was seen. No effect of partner perceptions for PTSS/ drinking levels
- Partners were all women. Not generalizable to male partners
- Utilized retrospective cohort design

Acknowledgements

- Rumi Kato Price, PhD, MPE
- Missouri National Guard collaborators
- Greg Widner, MSW
- Manan Shroff, MBBS, MPH
- Carissa van den Berk-Clark, PhD
- Jeffrey Scherrer, PhD
- Study Field Staff

Results

	PTSD	Drinking Frequency	Drinking Problem
Perceived disruption-self	0.21***	0.08*	0.07
Perceived disruption-partner	0.08	0.01	0.04
Perceived disruption-Actor differences	0.07	0.05	0.06
Perceived disruption-Partner differences	-0.05	-0.00	-0.03

* $p < .05$, ** $p < .01$

Multilevel dyadic model framework includes service members and their partners. Estimates are adjusted for role, PTSS, Prior negative events, Depressive symptoms, marital status, age, employment status, parenthood, college education and race.

Analysis strategy

- Multi-level modeling (MLM) using Actor-Partner Independence Model
- First MLM tested the relative main effects of actor and partner PTSD on drinking levels
- Second MLM tested the interaction effects by role relative to each other.
- Individual level co-variates were accounted in models
- All variables were centered and effect coded to aid interpretation

Appendix H2.e




Rumi Kato Price, PhD, MPE
Sundari Balan, PhD
Monica M. Matthieu, PhD, LCSW

Trauma and Post-traumatic Stress disorder (PTSD) in Women

Prepared for Grand Rounds Program
Saint Louis University
Department of Obstetrics, Gynecology & Women's Health




Acknowledgments

- National Institute of Mental Health
- National Institute on Drug Abuse
- Department of Defense
- VA Health Services Research & Development
- VA Mental Health QUERI

- No financial conflicts
- No consulting relationships other than study sections and other committees
- No stock equity over \$10,000
- No payment from a Speaker's Bureau

Many Contributed to 20 years of Work with Military and Veterans

WUSM Lee Robins, Edward Spitznagel, Keith Murray, Nathan Risk, Gregory Widner, Carissa van den Berk-Clark, Sundari Balan, Manan Shroff

St. Louis VA Seth Eisen, Katherine Virgo, William True, Monica Matthieu, Gary Collins

Consultants Bruce Goldberger, Kurt Kroenke, Lee Judy, Gery Ryan

MONG: COL Glenn Hagler, MAJ Scott Zimmerman, LTC Regina Kilmer, COL Gary Gilmore, SFC Lora Finn, LTC K. Llewellyn McGhee and Yellow Ribbon Operational Team



Every major war in modern history spurs technology and science development.

The Vietnam War signifies a beginning shift in science capital investment emphasizing psychological injuries of deployment. Post-traumatic stress disorder (PTSD) was "born" only in 1980.





OUTLINE

- PTSD 101
- Psychological trauma 101
- Treatment of PTSD
- Why sex differences in PTSD?
- Military and veteran populations
 - PTSD – Vietnam to Afghanistan
 - National Guard
 - Military sexual assault and harassment
- Trauma and reproductive health
- Provider's perspective (open forum)




Disclaimer

- Trauma and PTSD introductory
- PTSD treatment introductory
- Just a few examples of research on relationships to reproductive health

POSTTRAUMATIC STRESS DISORDER (PTSD)
 Once known only as "shell shock," a vague condition affecting war veterans, PTSD is now recognized as an anxiety disorder brought on by a traumatic event.

CURRENTLY, PTSD AFFECTS AN ESTIMATED:
 2.2% of the population (7.7 million people)

11-20% of veterans of the Iraq and Afghanistan wars (300,000 people)

10% of the population with PTSD in the US
5% of the population with PTSD in the UK
7-8% of the population with exposure to PTSD in other countries

55-70% of the population will experience a traumatic event in their lifetime

THE CAUSES OF PTSD BEGIN WITH A TRAUMATIC EVENT SUCH AS:
 AN ATTACK OR ASSAULT, A SERIOUS ACCIDENT, A NATURAL DISASTER, A TERRORIST ATTACK, COMBAT, THE DEATH OF A LOVED ONE

<http://www.MilitaryMenatHealth.org>

Posttraumatic Stress Disorder (PTSD)

- Before Vietnam
 - Railway spine; Da Costa's Syndrome; soldier "exhaustion" – 19th century
 - Shell shock – WWI
 - Battle fatigue, combat fatigue, combat neurosis, traumatic war neurosis – WWII
- Vietnam
 - Gross stress reaction (DSM-II*), Vietnam Syndrome
- Contemporary terminologies
 - Posttraumatic stress disorder (PTSD) – born in the DSM-III* as a "true" psychiatric disorder.
 - PTSD must meet explicit criteria.
 - Acute stress disorder – less than a month; within normal acute stress reactions.

* Diagnostic and Statistical Manual of Mental Disorders, Second Edition, 1968; Third Revision, 1980.

DSM-5 PTSD Diagnostic Criteria*

- Stressor (Criterion A)
 - Death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, as follows: (1 required).
 - Subjective impact (e.g., horrifying) not needed.
- 4 Symptom clusters (Criteria B-E)
 - Intrusion (B, 1)
 - Avoidance (C, 1)
 - Negative alterations in cognitions and mood (D, 2).
 - Alterations in arousal and reactivity (E, 2).
- Duration: >=1 month (Criterion F)
- Functional impairment (Criterion G)
- Exclusion: not due to medication, substance use or other illnesses

* Diagnostic and Statistical Manual of Mental Disorders, Fifth Revision, 2013.

Psychological Trauma Experience in the General Population*

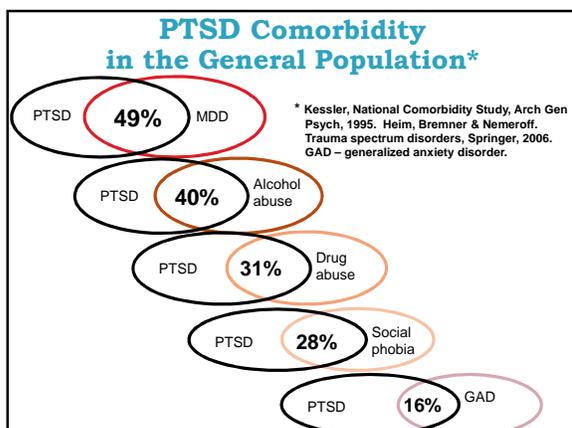
Trauma	Men (n=2812)			Women (n=3065)		
	%	(SE)	No.	%	(SE)	No.
Rape	0.7†	(0.2)	19	9.2	(0.8)	281
Molestation	2.8†	(0.5)	78	12.3	(1.0)	376
Physical Attack	11.1†	(1.0)	313	6.9	(0.9)	210
Combat	3.4*	(1.5)	174	0.0	---	0
Shock	11.4	(1.1)	320	12.4	(1.1)	381
Threat with weapon	19.0†	(1.3)	535	6.8	(0.6)	208
Accident	25.0†	(1.2)	703	13.8	(1.1)	422
Natural disasters with fire	18.9†	(1.4)	532	15.2	(1.2)	467
Witness	35.6†	(2.0)	1002	14.5	(0.7)	445
Neglect	2.1†	(0.4)	58	3.4	(0.5)	105
Physical abuse	3.2†	(0.4)	91	4.8	(0.6)	146
Other qualifying trauma	2.2	(0.5)	61	2.7	(0.4)	83
Any trauma	8.1†	(1.1)	231†	11.1†	(1.1)	341†
No. of traumas 1	26.5	(1.5)	745	26.3	(1.7)	806
2	14.5	(0.9)	407	13.5	(0.9)	415
3	9.5†	(0.9)	268	5.0	(0.6)	154
4	10.2†	(0.8)	287	6.4	(0.6)	195

* Kessler, National Comorbidity Study, Arch Gen Psych, 1995. † sex differences significant, p <.05.

How Likely Specific Trauma Leads to PTSD? General Population *

Trauma	Men		Women	
	P2 (SE)	n _i	P2 (SE)	n _i
Rape	65.0 (15.6)	12	45.9 (5.9)	209
Molestation	12.2† (5.3)	21	26.5 (4.0)	231
Physical attack	1.8† (0.9)	112	21.3 (7.3)	88
Combat	38.8† (9.9)	103	...	0
Shock	4.4† (1.4)	144	10.4 (2.0)	211
Threat with weapon	1.9† (0.8)	176	32.6 (7.8)	76
Accident	6.3 (1.8)	314	8.8 (4.3)	188
Natural disaster with fire	3.7 (1.8)	191	5.4 (3.8)	207
Witness	6.4 (1.2)	524	7.5 (1.7)	209
Neglect	23.9 (10.3)	16	19.7 (7.7)	30
Physical abuse	22.3† (5.2)	46	48.5 (9.5)	54
Other qualifying trauma	12.7† (4.8)	48	33.4 (8.0)	67
Any trauma	8.1 (1.0)	1707	20.4 (1.5)	1570

* Kessler, National Comorbidity Study, Arch Gen Psych, 1995. P2= the probability that a particular trauma (if chosen for the basis of PTSD) actually is associated with PTSD (penetrance rate).



Gender differences in PTSD Comorbidity*

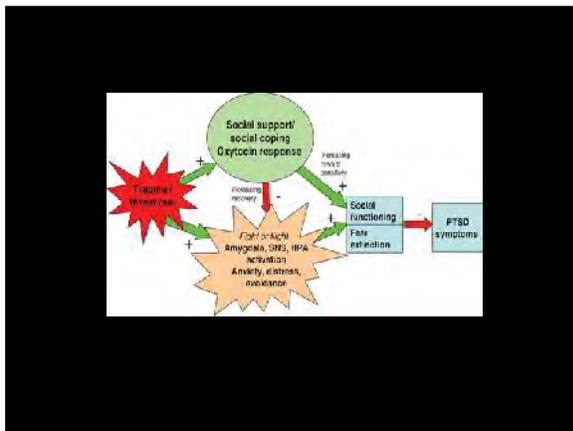
	MEN			WOMEN		
	PTSD (%)	No PTSD (%)	OR	PTSD (%)	No PTSD (%)	OR
Major depression	47.9	11.7	6.90	48.5	18.8	4.07
Alcohol abuse/dep.	51.9	34.4	2.06	27.9	13.5	2.48
Drug abuse/dep.	34.5	15.1	2.97	26.9	7.6	4.46
Social phobia	27.6	11.3	2.99	28.4	14.4	2.42
GAD	16.8	3.3	5.89	15.5	5.9	2.81
3+ diagnoses	59.0	15.7	14.51	43.6	14.1	7.91

* Kessler, National Comorbidity Study, Arch Gen Psych, 1995. OR=odds ratio; all significant at p<0.05, two-tail test

Treatment of PTSD*

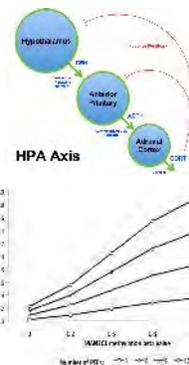
- Cognitive behavioral therapy (CBT)
 - Cognitive processing therapy (CPT) - Challenge thoughts about trauma and allow cognitive restructuring.
 - Prolonged exposure therapy (PE) – Allow controlling and overcoming fears associated with trauma through repeated exposures.
- Eye Movement Desensitization and Reprocessing (EMDR)
 - Rapid eye movements make it easier for brain to work through the traumatic memories.
- Pharmacologic (medications)
 - Selective Serotonin Reuptake Inhibitors (SSRIs) – sertraline (Zoloft) and paroxetine (Paxil) approved by FDA for PTSD treatment.
 - Raise the level of serotonin in brain
 - Side effects: nausea, decreased interest in sex, drowsy, tired.
- No magic bullets

* National Center for PTSD, US Department of Veterans Affairs, 2011.



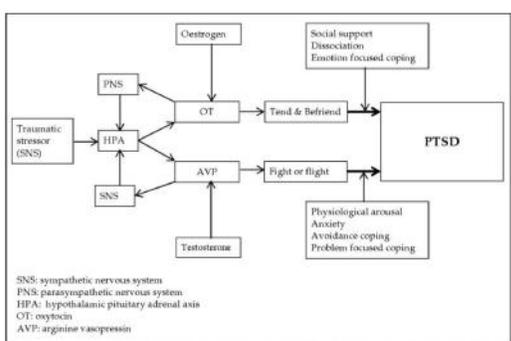
Neurobiology of Stress Reaction*

- Hypothalamic-pituitary-adrenal (HPA) axis
 - Neuroendocrine system that controls reactions to stress and regulates body processes (e.g., immune system, digestion, mood and emotion).
 - Repeated exposure to a threat inhibit or turn off the HPA-axis's stress-response cascade by negative feedback loops.
- Gene expression and methylation associated with PTSD*
 - DNA methylation (addition of methyl group to the cytosine or adenine DNA nucleotides) alter the expression of genes in cells.
 - Potentially inheritable without changing genotypic variations.



* Uddin et al., Dis Markers, 2011

Sex Differences in Stress Reaction*



SNS: sympathetic nervous system
 PNS: parasympathetic nervous system
 HPA: hypothalamic pituitary adrenal axis
 OT: oxytocin
 AVP: arginine vasopressin

* Christiansen and Elklit, <http://www.intechopen.com>



Vietnam Women's Memorial, Washington DC, National Mall

PTSD: Vietnam

	Original estimate*		Re-estimate**	
	Current	Lifetime	Current	Lifetime
Male	15.2	30.9	9.1	18.7
Female	8.5	26.9	?	?

	Most-prevalent current disorders*	Most-prevalent lifetime disorders*
Male	Alcohol abuse Alcohol dependence GAD	Alcohol abuse Alcohol dependence GAD Antisocial personality disorder
Female	Depression GAD	GAD Depression Alcohol abuse Alcohol dependence

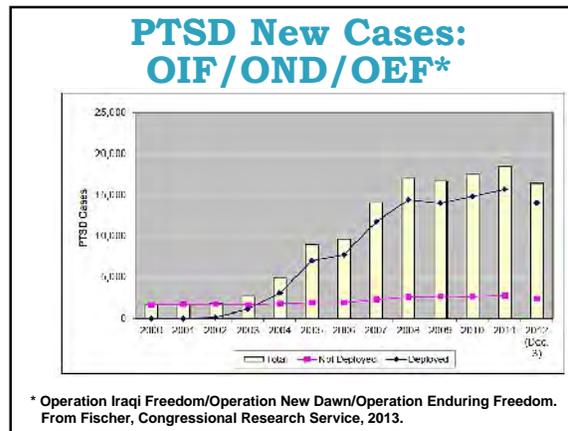
* National Vietnam Veterans Readjustment Study, 1988. **Dohrenwend et al., Science, 2006. GAD – generalized anxiety disorder

PTSD: Vietnam*

	Risk Factors for PTSD Development	Risk Factors for PTSD Maintenance
Premilitary Factors	Hispanic ethnicity Family instability Severe punishment during childhood Childhood antisocial behavior Depression	Severe punishment during childhood
Military Factors	War-zone exposure Posttraumatic dissociation* Depression	Serious injury during Vietnam War-zone exposure Posttraumatic dissociation*
Postmilitary Factors	Recent stressful life events Post-Vietnam trauma Depression	Recent stressful life events

	Protective Factors for PTSD Development	Protective Factors for PTSD Maintenance
Premilitary Factors	Japanese-American ethnicity High school degree or college education Older age at entry to war Higher socioeconomic status More positive paternal relationship	Native Hawaiian or Japanese-American ethnicity College education
Military Factors	None	None
Postmilitary Factors	Social support at homecoming Current social support	Current social support

* National Vietnam Veterans Readjustment Study, 1988; National Center for PTSD.

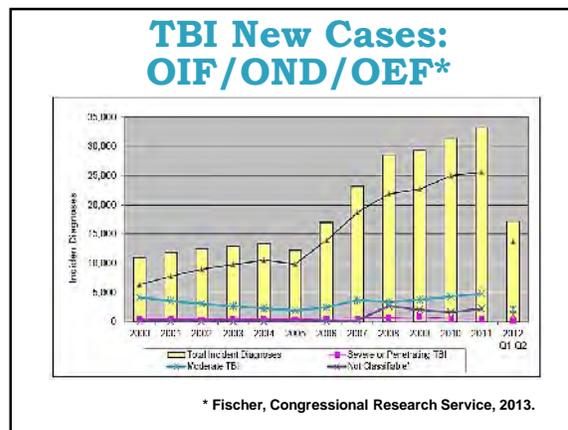


Traumatic Brain Injury (TBI)* “New” Signature Injury of OIF/OND/OEF

Mild	Moderate	Severe
Normal structural imaging	Visible structural structural imaging	Normal or abnormal structural imaging
LOC < 30 min	LOC > 30 min and < 24 hrs	LOC > 24 hrs
AOC = a moment or less	AOC > 24 hours. Severely based on other criteria	
PTA = 0-1 days	PTA = 1 and < 7 days	PTA > 7 days
GCS = 13-15	GCS = 9-12	GCS < 9

LOC – loss of consciousness
AOC – alteration of consciousness/mental state
PTA – posttraumatic amnesia
GCS – Glasgow coma scale

* Department of Defense and Department of Veterans Affairs, Traumatic Brain Injury Task Force, 2009; Fischer, Congressional Research Service, 2013.



Gender differences in Psychiatric Diagnoses: OEF/OIF Veterans in the VA*

Psychiatric diagnosis	MEN (n=288,348)		WOMEN (n=40,701)	
	%	(Number)	%	Number
Major depression*	17%	(47,876)	23	(9,175)
PTSD*	22	(62,916)	17	(6,969)
Substance use disorder*	3	(9,043)	2	(610)
Adjustment disorder	11	(30,613)	11	(4,516)
Anxiety*	10	(28,249)	12	(4,791)
Alcohol use disorder*	8	(21,763)	3	(1,356)
Eating disorder*	0.1	(276)	0.6	(261)
3+ diagnoses*	10	(29,492)	9	(3,622)

* Maguen et al., Am J of Public Health, 2010. Samples were VA users from 2003 to 2008. Diagnoses are based on DSM-IV and ICD-9-CM codes.* p<0.001. All but adjustment disorders were statistically different between men and women (shown red).



FAMPAC (Family as a Total Package) STUDY

- Recruited ~2800 Missouri National Guard service members and their supporters over 3 years.
- Data collection at the Yellow Ribbon Reintegration Programs (YRRP) – went all over Missouri!

AIMS

- Demonstrate the efficacy of the YRRP as a military family-centered reintegration training program.
- Identify the psychological health, family, and other reintegration needs, and service use, and barriers to care among service members and families.

National Guard service members: Demographics *

		Men (n=328)	Women (n=64)
		Mean or %	Mean or %
Age	20-59	34.97 (SD 9.5)	32.4 (SD 9.8)
Race	Caucasian	89.0	65.6
Education	Some college	58.5	64.1
Marital Status	Single	31.1	65.6
Children	Yes	69.2	46.9
Employment	Yes	89.9	93.8
Deployment	Iraq or Afghanistan	44.2	42.2
Previous deployment	Yes	52.7	28.1
National Guard Unit	Air	14.9	7.8
Pay grade	E5 and above	68.9	57.8

* From FAMPAC, unpublished. Data collected between 2011-2013.

Childhood Maltreatment*

	Men (n=328)	Women (n=64)
	%	%
Have a parent who had problems with drugs or alcohol	22.0	29.7
Did you experience being physically injured by another person (for example hit, kicked or beaten up)	51.7	29.7
Did you experience being emotionally mistreated (for example, shamed, embarrassed, ignored or repeatedly told you were no good)	23.8	31.3
Did you experience unwanted sexual activity as a result of force, threat or harm, or manipulation	4.0	18.8

* From FAMPAC, unpublished. Before age 18. Retrospective assessment. Red items were significantly different between men and women, p <0.05.

Pre-deployment Concerns for Going to War (FAMPAC)

	Men (n=328) %	Women (n=64) %
Missing out on a promotion at job	21.3%	14.1%
Missing out on opportunities to start a career	29.3	37.5
Damaging your career by going overseas	28.7	26.6
Losing touch with your co-workers/supervisors	34.5	32.8
Unable to financially support family while away	10.7	7.8
Harming relationship with spouse/significant other	58.5	46.9
Being left by your spouse/ significant other	32.3	34.4
Missing out on your children's development*	93.9	100.0
Losing touch with your friends	57.9	60.9
Missing important events at home	87.8	89.1
Well-being of your family and friends	84.2	87.5
Inability to help when having a problem	86.3	78.1
Inability to directly manage or control family affairs	72.6	65.6
Care your children were receiving while away*	33.48	60.0

* From FAMPAC, unpublished. Retrospective assessment. * based upon only those service members with children. Red items were significantly different between men and women, p <0.05.

In-deployment Trauma Experience (FAMPAC)

Trauma type	Men (%)	Women (%)
Clearing or searching homes or buildings	8.2%	9.4%
Saved the life of a soldier or civilian	9.5	10.9
Being attacked or ambushed	29.3	28.1
Receiving incoming artillery, rocket or mortar fire	40.3	39.1
Being shot at or receiving small arms fire	29.0	25.0
Shooting or directing fire at the enemy	12.8	4.7
Seeing dead bodies or human remains	30.2	20.3
Handling or uncovering human remains	7.6	4.7
Seeing dead or seriously injured Americans	22.3	17.2
Knowing someone seriously injured or killed	32.3	42.2
Participating in demining operations	5.5	1.6
Seeing injured or ill women/children unable to help	18.0	14.1
Being wounded or injured	8.8	9.4
shot or hit, but protective gear saved	8.2	3.1
Had a buddy near shot or hit	10.1	6.3
Sexual assault	1.5	12.5

* FAMPAC, unpublished. Retrospective assessment. Red items were significantly different between men and women, p <0.05.

Post-deployment Outcomes (FAMPAC)

	Men (n=328) %	Women (n=64) %
PTSD - DSM-IV criteria	8.2%	14.1%
PTSD - severe	5.8	6.3
Depression (PHQ-9 criteria)	9.8	10.9
Drinking problem (AUDIT score > 8)	13.4	9.4
Mild TBI (at least one symptom)	15.9	12.5
Medication for a psychological problem	14.0	15.7
Seeing a professional for a psychological problem	13.0	18.0

* From FAMPAC, unpublished. PHQ - Patient Health Questionnaire. AUDIT - alcohol use disorders identification test. TBI - traumatic brain injury. No significant difference between men and women.



Military Sexual Harassment (MSH) and Sexual Assault (MSA)*

	MEN (%)	WOMEN (%)
Military Sexual Harassment (MSH)		
Sexual coercion	2%	8%
Unwanted sexual attention	5	23
Crude or offensive behavior	20	41
Identify as victim of MSH	4	23
Military Sexual Assault (MSA)		
Past year	1%	6%
Ever in military	4	23

* DoD Workplace and Gender Relations Survey, 2012. Courtesy - Cynthia Thomsen PhD. Self-reported results. MSH - unwelcome sexual advances, request for sexual favors or other verbal or physical sexual conduct.

Gender differences in Psychiatric Diagnoses: OEF/OIF Veterans in the VA*

Outcome	Differences in Rate of Screen Positives			Female vs. Male	
	Men (%)	Women (%)	p-value	Adjusted OR	p-value
MST	1%	14%	<0.001	25.49	<0.001
PTSD	33	21	0.002	0.53	0.002
Depression	39	48	0.012	1.57	0.01
BMI > 30	21	13	0.008	0.58	0.02
Any pain (score > 0)	45	38	<0.0001	0.72	0.05

* Haskell et al., J Women's Health, 2010. Among VA patients in Primary Care or Women's Health Clinic. MST - military sexual trauma; BMI-body mass index; Pain - any pain (score > 0). OR - odds ratio, adjusted for age, race, service-connected disability, and marital status.

SUMMARY (1)

- Women are more likely to meet PTSD clinical criteria after experiencing a qualifying trauma.
- Differences in comorbid psychiatric disorders are in part attributable to differences in prevalence of comorbid disorder.
- Sex differences in stress reaction (e.g., hormones) contribute increased risk of PTSD among women.
- PTSD is higher among military personnel and veterans with combat experience. Patterns of comorbidity is similar between Vietnam and OEF/OIF era.
- Female service members are more likely to have experienced childhood maltreatment and sexual assault during deployment.

SUMMARY (2)

- Sexual assault in general and military sexual trauma among service members results in a range of psychopathology – both psychiatric and physical.
- Stress and PTSD have a role in preterm delivery and low birth weight.
- A combined effect of military sexual trauma and recent PTSD appear to have a significant negative effect on preterm delivery.
- Screening of trauma experience is advisable for expectant mothers – both civilian and military population.
- Training of screening and referral procedures may be useful for primary care and OBGYN physicians, as well as nurse practitioners in women's health clinics.

