Published in final edited form as:

J Trauma Stress. 2013 August ; 26(4): 512–520. doi:10.1002/jts.21835.

Lifetime Prevalence of Posttraumatic Stress Disorder in Two American Indian Reservation Populations

Janette Beals¹, Spero M. Manson¹, Calvin Croy¹, Suzell A. Klein², Nancy Rumbaugh Whitesell¹, Christina M. Mitchell¹, and The AI-SUPERPFP Team¹

¹Centers for American Indian and Alaska Native Health, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Aurora, Colorado, USA

²Latino Research and Policy Center, Colorado School of Public Health, University of Colorado Denver, Denver, Colorado, USA

Abstract

Posttraumatic stress disorder (PTSD) has been found to be more common among American Indian populations than among other Americans. A complex diagnosis, the assessment methods for PTSD have varied across epidemiological studies, especially in terms of the trauma criteria. Here, we examined data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) to estimate the lifetime prevalence of PTSD in two culturally distinct American Indian reservation communities, using two formulas for calculating PTSD prevalence. The AI-SUPERPFP was a cross-sectional probability sample survey conducted between 1997 and 2000. Southwest ($n = 1,446$) and Northern Plains ($n = 1,638$) tribal members living on or near their reservations, aged 15–57 years at time of interview, were randomly sampled from tribal rolls. PTSD estimates were derived based on both the single worst and 3 worst traumas. Prevalence estimates varied by ascertainment method: single worst trauma (lifetime: 5.9% to 14.8%) versus 3 worst traumas (lifetime, 8.9% to 19.5%). Use of the 3-worst-event approach increased prevalence by 28.3% over the single-event method. PTSD was prevalent

Copyright © 2013 International Society for Traumatic Stress Studies.

Correspondence concerning this article should be addressed to Janette Beals, Centers for American Indian and Alaska Native Health, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Nighthorse Campbell Native Health Building, MS F800, 13055 E. 17th Ave., Room 333, Aurora, CO 80045-0508. jan.beals@ucdenver.edu.

In addition to the authors listed above, the AI-SUPERPFP team includes Cecelia K. Big Crow, Dedra Buchwald, Buck Chambers, Michelle L. Christensen, Denise A. Dillard, Karen DuBray, Paula A. Espinoza, Candace M. Fleming, Ann Wilson Frederick, Joseph Gone, Diana Gurley, Lori L. Jervis, Shirlene M. Jim, Carol E. Kaufman, Ellen M. Keane, Denise Lee, Monica C. McNulty, Denise L. Middlebrook, Laurie A. Moore, Tilda D. Nez, Ilena M. Norton, Douglas K. Novins, Theresa O’Neill, Heather D. Orton, Carlette J. Randall, Angela Sam, James H. Shore, Sylvia G. Simpson, Paul Spicer, and Lorette L. Yazzie.

AI-SUPERPFP would not have been possible without the significant contributions of many people. The following interviewers, computer/data management, and administrative staff supplied energy and enthusiasm for an often difficult job: Anna E. Barón, Antonita Begay, Amelia T. Begay, Cathy A. E. Bell, Phyllis Brewer, Nelson Chee, Mary Cook, Helen J. Curley, Mary C. Davenport, Rhonda Wiegman Dick, Marvine D. Douville, Pearl Dull Knife, Geneva Emhoolah, Fay Flame, Roslyn Green, Billie K. Greene, Jack Herman, Tamara Holmes, Shelly Hubing, Cameron R. Joe, Louise F. Joe, Cheryl L. Martin, Jeff Miller, Robert H. Moran Jr., Natalie K. Murphy, Melissa Nixon, Ralph L. Roanhorse, Margo Schwab, Jennifer Settlemire, Donna M. Shangreaux, Matilda J. Shorty, Selena S. S. Simmons, Wileen Smith, Tina Standing Soldier, Jennifer Truel, Lori Trullinger, Arnold Tsinajinnie, Jennifer M. Warren, Intriga Wounded Head, Theresa (Dawn) Wright, Jenny J. Yazzie, and Sheila A. Young. We would also like to acknowledge the contributions of the Methods Advisory Group: Margarita Alegria, Evelyn J. Bromet, Dedra Buchwald, Peter Guarnaccia, Steven G. Heeringa, Ronald Kessler, R. Jay Turner, and William A. Vega. Finally, we thank the tribal members who so generously answered all the questions asked of them.

in these tribal communities. These results also serve to underscore the need to better understand the implications for PTSD prevalence with the current focus on a single worst event.

Posttraumatic stress disorder (PTSD) has gained increasing prominence worldwide as a common, chronic, and debilitating mental illness. The prevalence of PTSD varies considerably internationally, with estimates positively related to national levels of political turmoil and inversely related to economic development (Keane, Marshall, & Taft, 2006). Indigenous populations are often considered to be at greater risk for PTSD than are their compatriots. Yet thus far, we have lacked comparable diagnostic data with sufficient power to understand the prevalence of PTSD and its demographic correlates within well-defined indigenous samples.

Within the United States, the lifetime prevalence of PTSD is estimated to be 7%–8% (Kessler, Berglund, Demler, Jin, & Walters, 2005). Women are more likely than men to qualify for PTSD in community-based epidemiological studies (Breslau et al., 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). A key investigation, using the baseline National Comorbidity Survey (NCS) data, failed to find racial/ethnic differences in PTSD prevalence after controlling for other demographic factors (Kessler et al., 1995). Here, using psychiatric epidemiology assessment methods comparable to those of the NCS, we investigated PTSD within two tribally defined American Indian reservation populations.

The PTSD diagnosis involves unique measurement issues. Key is the dependence for diagnosis on exposure to a traumatic event (Criterion A) and the requirement that subsequent criteria refer to this trauma. Initial approaches—in the Diagnostic Interview Schedule, for example—asked participants to nominate their worst trauma (Helzer, Robins, & McEvoy, 1987); these events then were coded by the interviewer to determine whether or not each met Criterion A. Typically diagnostic interviews have focused on the single worst event identified by the participant; however, some versions of the Diagnostic Interview Schedule allowed for consideration of up to three events.

The baseline NCS set a new standard by providing a list of probable traumas, asking participants to endorse all that applied and then to select their worst trauma; this event then became the focus of subsequent questions about the remaining PTSD criteria (Kessler et al., 1995). Breslau, Kessler, and colleagues have demonstrated that variations in the methods used to measure Criterion A influence our estimates of PTSD prevalence with attention paid to the broader definitions of trauma as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994; Breslau, 2002). Yet, to our knowledge, no one has returned to the question of whether, using lists of probable traumas, the estimates based on a single worst event are comparable to those based on two or more worst events.

Here we report on a key population-based assessment of the prevalence of *DSM-IV* PTSD among American Indian tribal members living on or near large reservations in the United States. The American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) was the largest and most comprehensive study of American Indian populations in the United States and, to date, of indigenous peoples

worldwide. Here we report on analyses addressing two goals: to describe the prevalence of *DSM-IV* PTSD in these two American Indian communities, calculated using two different methods—one based on single worst and the other based on the three worst traumas; and to examine the demographic correlates of these estimates. The results address a major gap in our methods for estimating PTSD prevalence within these particular indigenous populations.

Method

Participants and Sampling

The primary objective of AI-SUPERPFP was to estimate the prevalence of psychiatric disorders and associated service utilization in two American Indian reservation populations. The populations of inference were defined as 15- to 54-year-old enrolled members of two closely related Northern Plains tribes and a Southwestern tribe living on or within 20 miles of their reservations at the time of sampling (1997). To protect the confidentiality of the tribal communities involved in this research (Norton & Manson, 1996), we refer to the tribes using Northern Plains and Southwest as general descriptors rather than specific tribal names. The two participating tribal groups characterize both the diversity and common experiences of American Indian populations in the United States. They represent different linguistic families, have different histories of migration, subscribe to different principles for reckoning kinship and residence, and have historically pursued different forms of subsistence. Nevertheless, they share similar histories of colonization, including dramatic military resistance and externally imposed forms of governance. Unemployment and poverty are widespread.

AI-SUPERPFP was designed to address a critical gap in our knowledge of the mental health of American Indian populations. Tribal rolls were used to form the sampling universe; these records list all individuals meeting minimal requirements for recognition as tribal members. A critical point for AI-SUPERPFP was the fact that tribal enrollment coincided with eligibility for Indian Health Service services—the major service provider in the rural communities involved and a major focus of the AI-SUPERPFP services research.

Stratified random sampling procedures were used with tribe, age (15–24, 25–34, 35–44, and 45–54 years), and gender as strata. Records were selected randomly for inclusion into replicates, which were then released as needed to reach the goal of approximately 1,500 interviews per tribe. The addresses listed on these rolls were often out-of-date; as a consequence, substantial effort was required to locate potential participants. With the relative paucity of telephones, interviewers drove many miles and used extensive tribal social networks to find those selected. Supervisors verified at least 10% of the locations made (Beals, Manson, Mitchell, Spicer, & the AI-SUPERPFP Team, 2003). Altogether 46.6% and 39.2% of those listed in the Southwest and Northern Plains tribal rolls were found to be living on or near their reservations. Of those located and found eligible, 73.7% in the Southwest ($n = 1,446$) and 76.8% in the Northern Plains ($n = 1,638$) agreed to participate. Sample weights, used in all analyses presented here, accounted for differential selection probabilities across all strata and for nonresponse biases. The AI-SUPERPFP methods are described in greater detail elsewhere (Beals et al., 2003).

Measures

The trauma section used to diagnose PTSD was designed to include the most common traumas reported in these and other populations and built upon the NCS (Kessler et al., 1995), among other sources. Participants were asked about 16 types of traumas. Ten of these dealt with events the participant might have experienced directly, such as being in a natural disaster, a life-threatening accident, or being physically abused. Two concerned witnessing an event such as a serious accident. Three queried about events that had happened to someone close, such as a family member being raped or committing suicide, and one provided the participant an opportunity to report any traumatic experience not mentioned previously in the list of the other 15.

PTSD was diagnosed using a culturally modified version of the Composite International Diagnostic Interview (World Health Organization, 1990) based on *DSM-IV* criteria. For each endorsed trauma type, additional questions assessed whether the event met *DSM-IV* conditions for PTSD's Criterion A. Specifically, participants were asked whether the trauma caused either real or perceived harm to self or others (Criterion A1) and, whether at the time of the event or upon learning of the event, the participant experienced intense fear, helplessness, or horror (Criterion A2). These conditions had to be met for the event to be a qualifying trauma.

Follow-up questions based on *DSM-IV* Criteria B–F were asked to determine whether a PTSD diagnosis could be made. Briefly, these criteria concern persistent reexperiencing of the trauma (B), persistent avoidance of trauma-related stimuli or numbing of responsiveness (C), persistent increased arousal (D), symptom duration of more than 1 month (E), and significant distress or impairment (F). In most studies, participants are asked to identify the most traumatic event and the Criteria B–F items are asked only in reference to this one event. To assess whether a focus on a single worst event was sufficient, AI-SUPERPFP participants were asked to select the three worst traumas they had experienced in their lifetimes and the symptoms questions were asked separately about each of the three events.

In our experience, an event identified by a participant as the most traumatic might not reach the Criterion A threshold, whereas other events in the participant's past may have done so. Specifically, a trauma nominated as worst—perhaps, in part, because it happened most recently—may fail Criterion A. The participant was not restricted to just one event per trauma category: When two events fell within the same category (e.g., having been raped more than once), the necessary questions were asked about the second event to determine whether this event, too, qualified under Criterion A. The AI-SUPERPFP PTSD module was purposefully organized so that we could both replicate the measurement strategies of other studies (that is, focus only on the single worst trauma) and examine the impact of allowing assessment of the full PTSD criteria for up to three worst events.

Data Collection

Tribal and Colorado Multiple Institutional Review Board approvals were obtained prior to data collection. All adult participants provided informed consent; parental/guardian consent was obtained before requesting adolescent assent. Interviews were computer-assisted and

administered by tribal members intensively trained in research and interviewing methods. Extensive quality-control procedures verified that location, recruitment, and interview procedures were conducted in a standardized, reliable manner.

Data Analysis

In terms of demographic correlates, all analyses were conducted separately for the two tribal populations. Within each tribe we examined the relationship of PTSD to gender (women as reference group), age at interview (25–34, 35–44, or 45+ years compared to 15–24 years of age), formal educational attainment (high school/general equivalency diploma or some post-secondary education compared to less than high school), employment status (student or unemployed compared to working), and marital status (separated/widowed/divorced or never married compared to married/cohabitating).

Variable construction was completed using SAS 9.2. All inferential analyses were conducted in Stata Version 11 (StataCorp, 2009) using sample and nonresponse weights (Kish, 1965). In Tables 1–3, we present estimates, by tribe, separately for men and women. Because of multiple comparisons, 99% confidence intervals (CIs) for each estimate are provided; thus, our discussion focuses on the subgroup comparisons significant at $p < .01$. Tables 4 and 5 present multivariate logistic regressions of the demographic correlates of lifetime PTSD, first based on PTSD derived from the single worst event (Table 4) and then based on the three worst events (Table 5). These models are presented separately by tribe. Tables 4 and 5 also present a separate analysis where, among those with at least one qualifying trauma, the relationship of number of qualifying traumas to PTSD diagnosis is shown. We report 95% CIs for these logistic regressions.

Results

Typically over half of the participants reported having experienced at least one trauma that qualified for Criterion A of *DSM-IV*. Of those identifying at least one qualifying trauma as their worst, 60% or more listed two or three qualifying events. Table 1 presents lifetime qualifying trauma exposure by tribe and gender.

PTSD Prevalence: Single Worst Event and Three Worst Events

Table 2 presents the lifetime prevalence estimates of PTSD. First, for single worst trauma, the lifetime estimates were 14.8% and 13.2% for Southwest and Northern Plains women respectively, with analogous estimates of 8.4% and 5.9% for men. Overall, Southwest and Northern Plains women were more likely than Northern Plains men to be diagnosed with lifetime PTSD. The lower section of Table 2 presents the lifetime prevalence estimates of PTSD based on up to three worst qualifying traumas. Overall, use of the three-worst-event approach increased prevalence by 28.3% over the single-worst-event method. Under this scenario, a marked gender difference was found, with women more likely to qualify for PTSD than were men.

In AI-SUPERPPF, verification of Criterion A status for specific events was determined algorithmically during variable construction rather than by the interviewer at the time of survey administration. Thus, we had the opportunity to compare the resultant prevalence

estimates in several ways. The prevalence estimates in the upper part of Table 2 restricted the estimation of lifetime PTSD prevalence to participants' nominations of their single worst event—some of which did not qualify for Criterion A. The results in lower section of Table 2, on the other hand, show that by inquiring about up to three worst events, the lifetime prevalence estimates were substantially higher.

PTSD Prevalence by Number of Qualifying Events

Table 3 provides another view of the differential prevalence by number of qualifying traumas. Restricted to those with at least one qualifying event, PTSD estimates are reported separately for those with one, two, or three worst qualifying traumas. For those who had only one qualifying trauma, lifetime PTSD prevalence ranged from 8.9% to 19.6% lifetime (most of which, but not all, were the single worst event nominated). However, for those who identified two or three qualifying worst events, the prevalence of PTSD was considerably higher: typically about twice as large among those experiencing two worst qualifying traumas and over three times as large for those reporting on three worst qualifying events. Most striking, for both groups of women, those with three worst qualifying traumas had dramatically higher lifetime PTSD estimates compared to those who had only one qualifying trauma.

Demographic and Trauma-Exposure Correlates of PTSD

Table 4 presents the demographic correlates for a PTSD diagnosis based on single worst trauma; in parallel, Table 5 examines these same correlates when the PTSD diagnosis was based on the three worst events. After controlling for other factors, men were less likely than women to qualify for a lifetime diagnosis of PTSD based on the worst trauma. Age, education, and employment status were differentially related to lifetime PTSD by tribe. In the Northern Plains, those in the oldest cohort were more likely to qualify for PTSD; in the Southwest, those with at least a high school degree or not working for pay were more likely to experience lifetime PTSD.

The section of Table 4 labeled Qualifying Traumas shows the odds that reporting two or more worst events, among those with at least one event, increased the risk for a PTSD diagnosis, while controlling for other demographic correlates. Based on the single-worst-event calculus, having listed three qualifying worst events yielded over 4 times the risk compared to experiencing only one event, in both tribal populations.

In Table 5, similar and typically stronger patterns appeared when the PTSD diagnosis incorporated reports of up to three worst events. Once again, men had lower estimates of lifetime PTSD than did women. Among Northern Plains tribal members, those in the youngest cohort were less likely than those in the older cohorts to qualify for lifetime PTSD. Having completed some college was associated with higher estimates of lifetime PTSD in the Southwest. Among those with at least one qualifying trauma, participants reporting three qualifying traumas were at markedly increased risk for lifetime PTSD across both tribes.

Discussion

These results present the strongest PTSD prevalence data available to date concerning a well-defined indigenous population, using methods comparable to the current state of the art (Breslau et al., 1998; Kessler et al., 1995, 2005). They also add to the continuing debate about how best to assess this complex diagnosis.

A previous article (Manson, Beals, Klein, Croy, & and the AI-SUPERPFP Team, 2005) documented that nearly two thirds of AI-SUPERPFP participants reported experiencing a traumatic event during their lifetimes (62.4%–69.8%). These estimates fell at the upper limits observed in the baseline NCS, the study to which these data are most comparable. The present study focused on a subset of these overall trauma reports, fully applying Criterion A of the *DSM-IV* PTSD diagnosis; for a trauma to be included here, the participant reported actual or potential harm deriving from that trauma and a subjective response of intense fear, helplessness, or horror. The prevalence estimates of at least one qualifying traumatic event among AI-SUPERPFP participants ranged from a high of 61.8% (Northern Plains women) to a low of 49.7% (Southwest men). More than half of individuals who reported one qualifying event named at least two such events when asked to enumerate up to three worst events.

Previous joint analyses of AI-SUPERPFP and the baseline NCS data, using *DSM-III-R* (APA, 1987) criteria, indicated that men and women in tribal samples were at increased risk for PTSD compared to their NCS counterparts (Beals et al., 2005). Here, using *DSM-IV* criteria and calculated on the basis of the single worst qualifying trauma, the estimates of PTSD ranged between 5.9% and 14.8% across tribe and gender groups; overall, the estimates were 9.6% and 12.0% for the Northern Plains and Southwest tribes, respectively. This contrasts with an overall estimate of PTSD of 6.8% reported in the NCS-Replication study, also using *DSM-IV* criteria and single worst event (Kessler et al., 2005). These data further support the conclusion that these American Indian populations are at increased risk for PTSD compared to other Americans.

Estimates of lifetime prevalence of PTSD tended to increase with age among AI-SUPERPFP participants; however, the pattern reached statistical significance only in the Northern Plains sample. In the Southwest, having completed some college was associated with higher estimates of PTSD. This stands in contrast to other PTSD prevalence studies (Brewin, Andrews, & Valentine, 2000) where those with less formal education tended to be at higher risk. Interestingly, formal education was also positively related in these samples to historical consciousness of significant battles, massacres, deprivations, etc. (Jervis et al., 2006). Among other demographic correlates considered (e.g., poverty, employment, and marital status), few consistent patterns were found—a finding not unusual in this literature (Breslau, 2002; Brewin et al., 2000).

Previous studies demonstrate unequivocally that the risk of PTSD increases significantly with greater exposure to traumatic events (Breslau, 2002; Bromet, Sonnega, & Kessler, 1998). This increase was robust in the AI-SUPERPFP results. As shown in Table 4,

reporting two or three qualifying traumatic events among the worst increased the lifetime estimates of PTSD twofold or nearly four-fold, respectively, compared to a single event.

AI-SUPERPPF data also allowed for the calculation of PTSD estimates based on up to three worst qualifying traumas. Using this method, Southwest and Northern Plains women (19.5% and 19.2%, respectively) were significantly more likely than their male counterparts (SM 11.7%; NM 8.9%) to be diagnosed with lifetime *DSM-IV* PTSD. An even stronger age-related effect emerged on risk among members of the Northern Plains tribe. Controlling for demographics, reporting two or three worst events also increased two-fold to more than six-fold, respectively, the lifetime prevalence of PTSD when calculated in this fashion.

Perhaps of greatest methodological interest are the differences in population prevalence estimates when PTSD symptoms on more than a single worst event were considered. Indeed, 28.3% of those qualifying for PTSD under the three-worst-trauma method would not have been diagnosed using the single-worst-trauma approach. This finding adds to a growing literature on the importance—and uniqueness—of the stressor criterion in the diagnosis of PTSD (Breslau, Chase, & Anthony, 2002). To date, much of the concern has centered on the potential biases introduced by focusing on the worst event (Kessler et al., 1995). Breslau and colleagues compared the prevalence figures derived from two methods of selecting the focal trauma: worst event and a randomly selected trauma from those endorsed by the participant (Breslau, Peterson, Poisson, Schultz, & Lucia, 2004). They found that the worst-event method was valid in assessing PTSD prevalence. However, trauma-specific prevalence of PTSD—the conditional PTSD estimates due to rape, for instance—are somewhat inflated when relying on the worst-event strategy. Additional examinations by this group later concluded the worst event was a reasonable alternative to asking about all qualifying traumas. In their earlier work, they reported that a focus on the worst trauma identified 84% of the PTSD cases. However, that study used the Diagnostic Interview Schedule and relied on participants' nominations of traumas rather than the current technique of querying about specific events (Breslau, Davis, Peterson, & Schultz, 1997). What has not been formally considered, using current methods, is the utility of increasing, in a modest fashion, the number of qualifying traumas for which PTSD symptoms are solicited. Not only might this provide a clearer assessment of the degree to which posttraumatic symptoms exist, but it may also offer a more complete picture of the implications of exposure to multiple traumas.

The results presented here are dated, based on data collected between 1997 and 2000. However, AI-SUPERPPF was a landmark study unlikely to be replicated in the near future. Further, little reason exists to expect that these community-based estimates of PTSD have changed significantly in the intervening period. The comparisons made to other studies used similar methods and time periods. Finally, the methodological contributions are unlikely to be bounded by time.

In working with American Indians, the definition of the population(s) is of paramount importance. Developing a national sample of American Indians is difficult and well beyond available resources for a number of reasons. For example, Natives comprise a relatively small proportion of the total U.S. population (1.7% in Census 2010; U.S. Department of Commerce & U.S. Census Bureau, 2011). Strong inferences from American Indian data

obtained from samples in large national studies are likely biased because urban/suburban American Indians typically are oversampled; these American Indians tend to be better educated and have higher incomes; they are also more likely to have decided to identify themselves as being American Indian relatively recently when compared to their rural counterparts (Passel, 1996). Given these circumstances and our interest in the possible variation of trauma and PTSD by tribe, we conducted this epidemiological work with tribally defined populations. Furthermore, the samples were restricted to those living on or near their home reservations. Thus, the AI-SUPERPFP populations of inference are clear, albeit circumscribed.

Our findings support and extend the current literature as well as suggest further important lines of research. In these two American Indian communities, the estimates of lifetime PTSD fell at the upper end of the range previously reported for other U.S. populations. Females were more likely to qualify for lifetime PTSD than males. Other demographic correlates of risk for PTSD were less consistent.

These results form a cornerstone of a line of research that addresses the existence and ramifications of this prevalent disorder in American Indian and other indigenous communities. By understanding the prevalence and correlates of PTSD among American Indians, we are beginning to better anticipate prevention opportunities. Among the population as a whole, our knowledge of the physical health concomitants of PTSD is evolving (Buchwald et al., 2005; Sprague et al., 2010). As these lines of inquiry progress, more remains to be discovered with respect to estimating PTSD in American Indian and other indigenous communities. This study was rural and reservation-based; how might PTSD prevalence vary by residence and geography? As we move beyond the boundaries of the U.S. to consider trauma among other indigenous peoples—e.g., the First Nations of Canada, the Aboriginal population of Australia, the Maori of New Zealand—where does the American Indian experience reside in the broader international indigenous community? The importance of both prevention and treatment in American Indian communities is underscored by the higher estimates found of this chronic and debilitating mental illness. This study represents a small but important step along this journey of discovery.

Acknowledgments

Design, conduct of study, data collection, and original data management and analyses were supported by National Institute of Mental Health grants R01 MH48174 (S. M. Manson and J. Beals, principal investigators [PIs]) and P01 MH42473 (S. M. Manson, PI). Data analyses and interpretation specific to this manuscript as well as preparation, review, and approval were supported by R01 MH073965 (J. Beals, PI) and R01 MH075831 (C. Kaufman, PI).

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3. Washington, DC: Author; 1987. rev
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. Washington, DC: Author; 1994.
- Beals J, Manson SM, Mitchell CM, Spicer P. the AI-SUPERPFP Team. Cultural specificity and comparison in psychiatric epidemiology: Walking the tightrope in American Indian research. *Culture, Medicine and Psychiatry*. 2003; 27:259–289.10.1023/A:1025347130953

- Beals J, Novins DK, Whitesell NR, Spicer P, Mitchell CM, Manson SM. the AI-SUPERPFP Team. Prevalence of mental disorders and utilization of mental health services in two American Indian reservation populations: Mental health disparities in a national context. *American Journal of Psychiatry*. 2005; 162:1723–1732.10.1176/appi.ajp.162.9.1723 [PubMed: 16135633]
- Breslau N. Epidemiologic studies of trauma, posttraumatic stress disorder, and other psychiatric disorders. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*. 2002; 47:923–929. <http://publications.cpa-apc.org/>. [PubMed: 12553127]
- Breslau N, Chase GA, Anthony JC. The uniqueness of the DSM definition of post-traumatic stress disorder: Implications for research. *Psychological Medicine*. 2002; 32:573–576.10.1017/S0033291701004998 [PubMed: 12102371]
- Breslau N, Davis GC, Peterson EL, Schultz L. Psychiatric sequelae of posttraumatic stress disorder in women. *Archives of General Psychiatry*. 1997; 54:81–87.10.1001/archpsyc.1997.01830130087016 [PubMed: 9006404]
- Breslau N, Kessler RC, Chilcoat HD, Schultz LR, Davis GC, Andreski P. Trauma and posttraumatic stress disorder in the community: The 1996 Detroit Area Survey of Trauma. *Archives of General Psychiatry*. 1998; 55:626–632.10.1001/archpsyc.55.7.626 [PubMed: 9672053]
- Breslau N, Peterson EL, Poisson LM, Schultz LR, Lucia VC. Estimating post-traumatic stress disorder in the community: Lifetime perspective and the impact of typical events. *Psychological Medicine*. 2004; 34:889–898.10.1017/S0033291703001612 [PubMed: 15500309]
- Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*. 2000; 68:748–766.10.1037/0022-006X.68.5.748 [PubMed: 11068961]
- Bromet E, Sonnega A, Kessler RC. Risk factors for DSM-III-R posttraumatic stress disorder: Findings from the National Comorbidity Survey. *American Journal of Epidemiology*. 1998; 147:353–361. [PubMed: 9508102]
- Buchwald D, Goldberg J, Noonan C, Beals J, Manson SM. the AI-SUPERPFP Team. Relationship between posttraumatic stress disorder and pain in two American Indian tribes. *Pain Medicine*. 2005; 6:72–79.10.1111/j.1526-4637.2005.05005.x [PubMed: 15669952]
- Helzer JE, Robins LN, McEvoy L. Posttraumatic stress disorder in the general population. Findings of the Epidemiologic Catchment Area survey. *New England Journal of Medicine*. 1987; 317:1630–1634.10.1056/NEJM198712243172604 [PubMed: 3683502]
- Jervis LL, Beals J, Croy CD, Klein SA, Manson SM. the AI-SUPERPFP Team. Historical consciousness among two American Indian tribes. *American Behavioral Scientist*. 2006; 50:526–549.10.1177/0002764206294053
- Keane TM, Marshall AD, Taft CT. Posttraumatic stress disorder: Etiology, epidemiology, and treatment outcome. *Annual Review of Clinical Psychology*. 2006; 2:161–197.10.1146/annurev.clinpsy.2.022305.095305
- Kessler RC, Berglund P, Demler O, Jin R, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey-Replication. *Archives of General Psychiatry*. 2005; 62:593–602.10.1001/archpsyc.62.6.593 [PubMed: 15939837]
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*. 1995; 52:1048–1060.10.1001/archpsyc.1995.03950240066012 [PubMed: 7492257]
- Kish, L. Survey sampling. New York, NY: Wiley; 1965.
- Manson SM, Beals J, Klein S, Croy CD. the AI-SUPERPFP Team. The social epidemiology of trauma in two American Indian reservation populations. *American Journal of Public Health*. 2005; 95:851–859.10.2105/AJPH.2004.054171 [PubMed: 15855465]
- Norton IM, Manson SM. Research in American Indian and Alaska Native communities: Navigating the cultural universe of values and process. *Journal of Consulting and Clinical Psychology*. 1996; 64:856–860.10.1037/0022-006X.64.5.856 [PubMed: 8916611]
- Passel, JS. The growing American Indian population, 1960–1990: Beyond demography. In: Sandefur, GD.; Rindfuss, RR.; Cohen, B., editors. *Changing numbers, changing needs: American Indian demography and public health*. Washington, DC: National Academies Press; 1996. p. 79-102.

- Sprague D, Bogart A, Manson SM, Buchwald D, Goldberg J. the AI-SUPERPPF Team. The relationship between post-traumatic stress disorder, depression, and lung disorders in Northern Plains and Southwest American Indians. *Ethnicity and Health*. 2010; 15:569–579.10.1080/13557858.2010.500017 [PubMed: 20721780]
- StataCorp. Stata Statistical Software (Version 11) [Computer software]. College Station, TX: Author; 2009.
- U.S. Department of Commerce, & U. S. Census Bureau. Overview of race and Hispanic origin: 2010. Washington, DC: Author; 2011.
- World Health Organization. Composite International Diagnostic Interview (CIDI), Version 1.0. Geneva, Switzerland: Author; 1990.

Table 1
Lifetime Exposure to Traumas Qualifying Criterion A of *DSM-IV* PTSD Diagnosis

	Southwest				Northern Plains			
	Men		Women		Men		Women	
	<i>n</i> = 617 ^a		<i>n</i> = 829		<i>n</i> = 790		<i>n</i> = 848	
Number of traumas	%	99% CI	%	99% CI	%	99% CI	%	99% CI
No qualifying traumas	50.3	[44.9, 55.8]	42.7	[38.2, 47.5]	44.0	[39.2, 49.0]	38.2	[33.8, 42.9]
1 Qualifying trauma	20.0	[16.0, 24.8]	22.4	[18.7, 26.6]	19.1	[15.5, 23.2]	18.6	[15.2, 22.6]
2 Qualifying traumas	11.1	[8.0, 15.0]	14.3	[11.3, 18.0]	12.3	[9.34, 16.0]	13.8	[10.8, 17.5]
3 Or more qualifying traumas	18.6	[14.7, 23.2]	20.6	[17.0, 24.7]	24.6	[20.6, 29.2]	29.4	[25.3, 33.9]

Note. PTSD = posttraumatic stress disorder; CI = confidence interval; SM = Southwest men; NF = Northern Plains women.

^a Unweighted *ns*.

^b Post hoc significant pairwise differences ($p < .01$).

Table 2
Prevalence of *DSM-IV* Lifetime PTSD based on Single Worst and Three Worst Traumas

Southwest			Northern Plains		
Men <i>n</i> = 573 ^a	Women <i>n</i> = 770		Men <i>n</i> = 755	Women <i>n</i> = 822	
%	99% CI	%	99% CI	%	99% CI
Single worst trauma					
8.4	[5.8, 12.0]	14.8	[11.7, 18.6]	5.9	[4.0, 8.5]
				13.2	[10.3, 16.7]
Three worst traumas					
11.7	[8.6, 15.6]	19.5	[15.9, 23.6]	8.9	[6.5, 12.0]
				19.2	[15.8, 23.3]

Note. PTSD = posttraumatic stress disorder; CI = confidence interval; SF = Southwest women; NF = Northern Plains women; NM = Northern Plains men; SM = Southwest men.

^a 94.6% of the AI-SUPERPPF sample provided valid data for the PTSD diagnoses using single worst event; this was 94.1% for the three-worst-event estimates. Most attrition derived from the placement of the Trauma module near the end of the interview.

^b Post hoc significant pairwise differences ($p < .01$).

Table 3
Prevalence of *DSM-IV* Lifetime PTSD based on Three Worst Traumas by Number of Qualifying Traumas

# of qualifying traumas	Southwest				Northern Plains			
	Men		Women		Men		Women	
	%	99% CI	%	99% CI	%	99% CI	%	99% CI
1 ^b	14.2	[7.8, 24.5]	19.6	[12.8, 28.8]	8.9	[4.5, 17.0]	10.8	[6.0, 18.7]
2	27.2	[16.6, 41.2]	38.4	[28.1, 49.8]	16.2	[9.4, 26.5]	32.4	[23.0, 43.4]
3	39.0	[24.7, 55.5]	61.4	[47.9, 73.3]	27.7	[17.7, 40.5]	55.6	[44.5, 66.1]

Note. PTSD = posttraumatic stress disorder; CI = confidence interval; SF = Southwest women; NM = Northern Plains men; NF = Northern Plains women.

^a 99% Confidence intervals.

^b These figures differ from those in Table 2 where the population-based prevalence estimates were based on the participants' identified worst trauma, some of which may not have qualified for Criterion A. Here, the figures were based on the number of qualifying traumas with those in the "1 trauma" row having only one qualifying trauma. Furthermore, as a consequence, the *ns* vary by both columns and row.

Table 4

Demographic Correlates of Lifetime PTSD Based on Single Worst Event

	Southwest <i>n</i> = 1,253 ^a		Northern Plains <i>n</i> = 1,395 ^b	
	<i>OR</i>	95% CI	<i>OR</i>	95% CI
Sex				
Female	1.00	—	1.00	—
Male	0.57**	[0.39, 0.83]	0.48***	[0.32, 0.72]
Age				
15–24	1.00	—	1.00	—
25–34	1.46	[0.80, 2.64]	1.97*	[1.01, 3.82]
35–44	1.56	[0.87, 2.83]	1.95	[0.96, 3.98]
45+ ^c	1.41	[0.77, 2.58]	2.46**	[1.24, 4.86]
Education				
Less than 12 years	1.00	—	1.00	—
High school grad or GED	1.62*	[1.01, 2.60]	0.63	[0.39, 1.04]
Some college	1.77*	[1.08, 2.91]	1.67	[0.97, 2.88]
Poverty status ^d				
Nonpoor	1.00	—	1.00	—
Poor	1.30	[0.90, 1.88]	1.29	[0.83, 2.00]
Employment				
Working for pay	1.00	—	1.00	—
Student	0.81	[0.37, 1.78]	1.32	[0.64, 2.69]
Not working for pay ^e	1.48*	[1.00, 2.20]	1.31	[0.86, 2.00]
Marital status				
Married ^f	1.00	—	1.00	—
Separated, widowed, divorced	1.07	[0.63, 1.82]	1.19	[0.76, 1.87]
Never married	0.73	[0.45, 1.19]	0.89	[0.54, 1.47]
Qualifying traumas ^g				
	<i>n</i> = 690 ^h		<i>n</i> = 836 ⁱ	
1 Qualifying	1.00	—	1.00	—
2 Qualifying	1.53	[0.87, 2.68]	1.86	[0.92, 3.74]
3 Or more qualifying	4.51***	[2.77, 7.33]	4.20***	[2.37, 7.43]

Note. PTSD = posttraumatic stress disorder; *OR* = odds ratio; CI = confidence interval; GED = general equivalency diploma.

^a $F(11, 1227) = 2.77, p = .002$.

^b $F(11, 1369) = 5.25, p < .001$.

^cAlthough at the time of the sample selection (1997), the maximum age was 54, some persons were older at time of interview (1997–1999).

^dIndeterminate included in nonpoor.

^eIncludes homemaker, looking for work, unemployed, retired, permanently disabled, and other.

^fIncludes living together as if married.

^gEstimates obtained from model including demographic correlates as well as number of qualifying trauma variables, includes only respondents with at least one qualifying trauma.

^h $F(13, 1225) = 4.96, p < .001.$

ⁱ $F(13, 1367) = 4.65, p < .001.$

*
 $p < .05.$

**
 $p < .01.$

 $p < .001.$

Table 5

Demographic Correlates of Lifetime PTSD based on Three Worst Events

	Southwest <i>n</i> = 1,242 ^a		Northern Plains <i>n</i> = 1,389 ^b	
	<i>OR</i>	95% CI	<i>OR</i>	95% CI
Sex				
Women	1.00	—	1.00	—
Men	0.60**	[0.43, 0.84]	0.49***	[0.35, 0.69]
Age				
15–24	1.00	—	1.00	—
25–34	1.20	[0.72, 2.00]	1.97*	[1.14, 3.42]
35–44	1.21	[0.73, 2.03]	2.39**	[1.33, 4.27]
45+ ^c	1.36	[0.82, 2.28]	2.58***	[1.44, 4.60]
Education				
Less than 12 years	1.00	—	1.00	—
High School grad or GED	1.35	[0.88, 2.06]	0.66	[0.43, 1.03]
Some college	2.05***	[1.33, 3.18]	1.51	[0.92, 2.48]
Poverty status ^d				
Non-poor	1.00	—	1.00	—
Poor	1.19	[0.86, 1.65]	1.31	[0.90, 1.91]
Employment				
Working for pay	1.00	—	1.00	—
Student	0.86	[0.45, 1.65]	1.47	[0.83, 2.61]
Not working for pay ^e	1.37	[0.96, 1.97]	1.25	[0.86, 1.82]
Marital Status				
Married ^g	1.00	—	1.00	—
Separated, widowed, divorced	1.33	[0.83, 2.14]	1.07	[0.72, 1.59]
Never married	0.96	[0.64, 1.43]	0.82	[0.53, 1.26]
Lifetime traumas ^g				
	<i>n</i> = 679 ^h		<i>n</i> = 830 ⁱ	
1 Qualifying	1.00	—	1.00	—
2 Qualifying	2.17**	[1.30, 3.61]	2.26*	[1.20, 4.23]
3 Or more qualifying	6.02***	[3.81, 9.53]	6.80***	[4.01, 11.53]

Note. PTSD = posttraumatic stress disorder; *OR* = odds ratio; CI = confidence interval; GED = general equivalency diploma.

^a $F(11, 1216) = 3.00, p < .001$.

^b $F(11, 1363) = 5.99, p < .001$.

^c Although at time of sample selection (1997) the maximum age was 54, some persons were older at time of interview (1997–1999).

^d Indeterminate included in the nonpoor.

^e Includes homemaker, looking for work, unemployed, retired, permanently disabled, other.

^fIncludes living together as if married.

^gEstimates obtained from model including demographic correlates as well as number of qualifying trauma variables, includes only respondents with at least one qualifying trauma.

^h $F(13, 1,214) = 6.25, p < .001.$

ⁱ $F(13, 1,361) = 7.40, p < .001.$

*
 $p < .05.$

**
 $p < .01.$

 $p < .001.$