

**CHILD ABUSE AND NEGLECT IN MILITARY AND NON-MILITARY FAMILIES:
AN ANALYSIS OF THE NATIONAL CHILD ABUSE AND NEGLECT DATA
SYSTEM, 2000-2003**

Ericka Danielle Rentz

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Epidemiology, School of Public Health.

Chapel Hill
2006

Approved by
Advisor: Stephen W. Marshall, PhD
Reader: Carri Casteel, PhD
Reader: Deborah Gibbs, MSPH
Reader: Dana Loomis, PhD
Reader: Sandra L. Martin, PhD

© 2006
Ericka Danielle Rentz

ABSTRACT

ERICKA DANIELLE RENTZ: Child Abuse and Neglect in Military and Non-Military Families: An Analysis of the National Child Abuse and Neglect Data System, 2000-2003.
(Under the direction of Dr. Stephen W. Marshall)

Context: The impact and stress of war extend beyond the military soldier to include emotional upheaval for his or her family, yet little is known about how war affects the occurrence of child maltreatment in families. This study is the first to use data from a national surveillance system to compare child maltreatment in military and non-military families. Further, it is the only known study to characterize military perpetrators of child maltreatment and to examine the effects of the September 11th, 2001 attacks on the occurrence of child maltreatment.

Objective: The first objective of this study was to determine if being a child in a military family is protective of, or a risk factor for, substantiated child maltreatment. The second objective was to assess the impact the attacks of September 11th, 2001 and the subsequent US military response had on the occurrence of substantiated child maltreatment in military families.

Methods: This study is a secondary analysis of the National Child Abuse and Neglect Data System that incorporates state-level information from the US Census Bureau and the Department of Defense to calculate and compare the rates of occurrence of substantiated maltreatment in children of military and non-military families. All reports of child maltreatment in the state of Texas that received a disposition of substantiation from January 1, 2000 through June 30, 2003 were the focus of these analyses. Texas was

selected because of the completeness and quality of its NCANDS data and its large military population.

Results: The rate of occurrence of substantiated child maltreatment in military families is generally lower than that of non-military families. However, the rate doubled when comparing the period after October 1, 2002 to the period before. The periods with the highest rates of child maltreatment corresponded to intense military operations in Iraq, the highest percentage of departures to operational deployments, and the lowest percentage of returns from operational deployments.

Conclusion: Compared to children of non-military families, children of military families generally experienced lower rates of child maltreatment. However, this protective effect seemed to disappear when military combat increased and military families experienced operation-related deployment.

ACKNOWLEDGEMENTS

This work was supported by the Summer Research Institute at Cornell University and the Smith Research Grant and the Opportunity Fund of the University of North Carolina-Chapel Hill. The analyses presented in this publication were based on data from the National Child Abuse and Neglect Data System (NCANDS) Child File, 2000-2003. These data were provided by the National Data Archive on Child Abuse and Neglect at Cornell University, and have been used with permission. The data were originally collected under auspices of the Children's Bureau. Funding was provided by the Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U.S. Department of Health and Human Services. The collector of the original data, the funder, NDACAN, Cornell University, and the agents or employees of these institutions bear no responsibility for the analyses or interpretations presented here. The information and opinions expressed reflect solely the opinions of the authors.

Portions of this dissertation [Rentz ED, Martin SL, Gibbs DA, Clinton-Sherrod M, Hardison J, & Marshall SW. Trauma, Violence, & Abuse (7,2) pp. 93-108, copyright © 2006] have been reprinted with permission of Sage Publications.

DEDICATION

Words cannot express how grateful I am to my dissertation advisor and mentor, Dr. Stephen W. Marshall, who has helped me evolve as a researcher, a writer, and a person. The lessons I learned while working with him on this dissertation will last me throughout my entire career as an epidemiologist. I can only hope that my future supervisors will be as influential in my career as he has been.

I would also like to thank my dissertation committee – Carri Casteel, Deborah Gibbs, Dana Loomis, Steve Marshall, and Sandy Martin – for their time, feedback, and patience. My research is better because of them. Thank you to my friends and family for providing constant support and for helping me see a light at the end of the tunnel. Finally, the staff at the National Data Archive on Child Abuse and Neglect at Cornell University provided me with insight and training that undoubtedly contributed to the successful completion of this research.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	x
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xii
CHAPTER	
I. Introduction	1
A. Overview.....	1
B. References	5
II. Review of the Literature.....	6
A. Historical Background	6
B. Negative impact of child maltreatment	8
C. Child maltreatment in the military	9
1. Types of maltreatment in the military.....	9
2. Comparison of child maltreatment in military versus non-military populations.....	11
3. Methodological limitations in existing literature.....	14
D. Characteristics of the military family.....	16
1. War and the military family.....	16
2. Military family stressors	17
3. Advantages of the military lifestyle to families.....	18

E. Conclusion.....	20
F. References.....	21
III. Statement of Specific Aims	30
IV. Methods	33
A. Data Sources	33
1. National Child Abuse and Neglect Data System	33
2. U.S. Census Bureau	37
3. Deployment information.....	39
B. Data Analyses.....	40
1. Analyses to address Specific Aim 1.....	41
a. Victim-focused Analysis.....	42
b. Perpetrator-focused Analysis	44
c. Statistical Analyses	46
2. Analyses to address Specific Aim 2.....	47
C. References	52
V. Occurrence of Child Maltreatment in Military and Non-military Families	59
A. Introduction.....	59
B. Methods	60
1. Data Source.....	60
2. Child-focused analysis	61
3. Perpetrator-focused analysis	62
4. Effect Measure: Rate of Occurrence.....	62
5. Statistical Analyses	63

C. Results	64
1. Child-focused analysis	64
2. Perpetrator-focused analysis	66
D. Discussion	67
E. References	72
VI. Effect of Deployment on the Occurrence of Child Maltreatment in Military and Non-military Families	78
A. Introduction	78
B. Methods	79
1. Maltreatment Data	79
2. Deployment Data	80
3. Denominator Data	80
4. Statistical analysis	81
C. Results	82
D. Discussion	85
E. References	89
VII. Conclusions	97
A. Overview	97
B. Strengths	99
C. Limitations	100
D. Future Directions	103
E. Conclusions	104
F. References	105

LIST OF TABLES

Table 2-1.	Types of child maltreatment among military families with reported or substantiated maltreatment.....	24
Table 2-2.	Extent of child maltreatment in military versus non-military populations.....	27
Table 4-1.	Family status of child victims for two years of NCANDS data, 2000-2001	53
Table 4-2.	American Community Survey sample sizes in the state of Texas	54
Table 4-3.	Comparison of general demographic characteristics between ACS and Census 2000 data.....	55
Table 4-4.	Definitions and categorizations for variables used in the analyses for Specific Aim 1	56
Table 4-5.	Definitions and categorizations for variables used in the analyses for Specific Aim 2.....	58
Table 5-1.	Rate of occurrence of substantiated child maltreatment per 1,000 person-years at risk from 2000 to 2002 for children of military and non-military families.....	74
Table 5-2.	Distribution of caretaker characteristics for unique children in military and non-military families, 2000-2002 (n = 125,555).....	75
Table 5-3.	Rate of occurrence of substantiated child maltreatment per 1,000 person-years at risk from 2000 to 2002 for military and non-military perpetrators.	76
Table 5-4.	Distribution of characteristics of military and non-military perpetrators, 2000-2002 (n = 166,079)	77
Table 6-1.	Characteristics of the maltreated study population by family type of child victim.....	91
Table 6-2.	Rate ratios for the occurrence of child maltreatment among children in military and non-military families, comparing the period October 1, 2002-June 30, 2003 to the period January 1, 2000-September 30, 2002.....	92
Table 6-3.	Rate ratios for the occurrence of substantiated child maltreatment among children in military and non-military families based on month of departure to and return from operational deployment.....	93

LIST OF FIGURES

Figure 4-1.	The child level data submission and analysis process	35
Figure 4-2.	Data structure for child characteristics, January 2000 – December 2002.....	44
Figure 4-3.	Data structure for perpetrator characteristics, January 2000 – December 2002.....	46
Figure 4-4.	Plot of log likelihoods from Negative Binomial Regression models (n=20)	49
Figure 6-1.	Rate of occurrence of substantiated child maltreatment by report month for children of military and non-military families, January 2000 – June 2003.....	94
Figure 6-2.	Percentage of Texas-residing soldiers departing for or returning from operational deployments within each month of the study period	95
Figure 6-3.	Distribution of child maltreatment in military families by military and non-military caretakers	96

LIST OF ABBREVIATIONS

ACS	American Community Survey
CI	Confidence Interval
CPS	Child Protective Services
DCDC	Detailed Case Data Component
DHHS	Department of Health and Human Services
DOD	Department of Defense
DTFDV	Defense Task Force on Domestic Violence
FAP	Family Advocacy Program
NCANDS	National Child Abuse and Neglect Data System
PERSTEMPO	Personnel Temp
PICU	Pediatric Intensive Care Unit
PR	Proportion Ratio
PRV	Plant Replacement Value
PUMS	Public Use Microdata Samples
RR	Rate Ratio
TX	Texas
US	United States

I. Introduction

A. Overview

Over a six week period in June and July 2002, five Army soldiers stationed at Fort Bragg in North Carolina killed their spouses. Three of these soldiers had recently returned from deployment in Afghanistan. These incidents brought national attention to the occurrence of domestic violence in military families and resulted in an investigation by government officials into the circumstances surrounding the murders. The Fort Bragg Epidemiological Consultation Report (2002) found that the stress of long deployments significantly contributed a number of marital problems and that many soldiers viewed seeking help for behavioral health problems as potentially career-ending. The report also recommended more counseling and redeployment training for soldiers returning from a combat zone to prevent potential conflicts among newly reunited families.

Although the impact of deployment on the occurrence of child abuse and neglect in military families has not been researched, it is plausible that a relationship exists and that the mechanism by which maltreatment occurs differs from spousal violence. Unlike spouse abuse that can only be perpetrated pre- and post-deployment when the partners are together, child maltreatment can occur before deployment by either parent, during deployment by the parent left behind, or after deployment by either parent. Of course, child maltreatment may also be perpetrated at any time by other family members, friends, acquaintances, etc.

Child maltreatment is a serious public health problem because of its potential to have long lasting negative effects on the victim and to exact a large financial burden on the healthcare system. It is of particular importance in the military, which has one of the largest healthcare systems in the country that cares for almost five million soldiers and their family members. The military healthcare system includes 164 hospitals around the world and more than 500 separate outpatient clinics (Congressional Budget Office, 1992). Over one-third of active duty military personnel are married with children (37.3%) and an additional 6.1% are single parents. There are more than one million children living with active duty military personnel in the United States, with the largest group being younger than 6 years of age (39.6%), followed closely by those 6 to 11 years old (32.3%) (Military Family Resource Center, 2003).

The impact of the occurrence of child maltreatment among children in military families is not limited to the healthcare and support services systems of the military community but extends into the surrounding civilian community because maltreatment investigated by military authorities should also be investigated by civilian authorities. According to the Department of Defense (DOD) Directive 6400.1, when an alleged act of abuse has been reported to the Family Advocacy Program (FAP), the agency responsible for addressing the prevention, identification, and treatment of family violence on military installations, the FAP office is supposed to notify the local child protective services agency. Therefore understanding the patterns and causes of child maltreatment in military families as well as identifying opportunities for primary prevention efforts are important for military and civilian communities, particularly in areas with a large military presence.

Although much research on child maltreatment has been conducted in the non-military community, we have a limited understanding of the problem in the military context. Military families fundamentally differ from non-military families, potentially resulting in varying risk and protective factors. Military families have some benefits that are expected to be protective of child maltreatment. They receive housing funded or provided by the government and have at least one full-time employed parent, who may be discharged upon discovery of a severe mental health, alcohol, and/or drug problem. On the other hand, military families experience stresses uncommon in non-military families, including separations in the form of training and deployment and frequent relocation. Only a small number of published studies have addressed the issue of child maltreatment in military families, and many of those are outdated. In addition, although all four branches of the military (Air Force, Army, Navy, and Marine Corps) collect annual child abuse and neglect statistics, only the Army consistently publishes its findings.

Our understanding of how military rates of child maltreatment compare to non-military rates of child maltreatment is therefore limited. Studies aimed at comparing child abuse and neglect rates in the two populations have found mixed results and suffer from several methodological limitations, including a lack of standardized procedures for reporting, tracking, and substantiating child maltreatment cases. Additionally, the definitions of abuse and neglect differ between populations and referrals for maltreatment come from different sources.

This study addressed many limitations of the current research by analyzing four years (2000-2003) of child-level data from a national child maltreatment surveillance system, the National Child Abuse and Neglect Data System (NCANDS). NCANDS annually collects

data on all maltreatment reported in the state, including the month of report and substantiation, the type of maltreatment (physical abuse, sexual abuse, emotional abuse, other abuse, and neglect), and characteristics of the maltreatment victims. NCANDS data also specify whether a child victim was the legal dependent of an active duty military soldier in the Army, Navy, Air Force, or Marine Corps (Inactive Reserve and National Guard members are not considered active duty), and whether the perpetrator was an active duty military soldier. Because Texas had the most complete information on military family status of child victims, the largest number of children in military families ($n=2,454$ for 2000 and 2001, compared to next highest of $n=137$) and a large military population ($\sim 200,000$ active duty soldiers), our analyses were restricted to all cases of child maltreatment that were reported and substantiated between January 1, 2000 and June 30, 2003 in that state. By combining individual child maltreatment data with state-level population estimates from the US Census Bureau and state-level deployment information from the Defense Manpower Data Center, we were able to answer two main research questions: (1) Is being a child in a military family protective of, or a risk factor for, substantiated child maltreatment? and (2) What impact did the attacks of September 11, 2001 and the subsequent US military response have on the occurrence of substantiated child maltreatment in military families?

This research provides further insight into child maltreatment in the military and can inform future decisions made by the Department of Defense with respect to the allocation of services to its military personnel such as the amount and/or intensity of services offered during stressful periods.

B. References

Congressional Budget Office. (1992, April 7). *Testimony on the Budgetary Outlook for the Military's Health Care System*. Subcommittee on Military Personnel and Compensation, Committee on Armed Services, U.S. House of Representatives.

Military Family Resource Center. *2003 Demographics: Profile of the Military Community*. Available at:
http://www.militaryhomefront.dod.mil/dav/lsn/LSN/BINARY_RESOURCE/BINARY_CONTENT/1869841.swf. Accessed June 9, 2005.

U.S. Department of Defense. (1992). *Family Advocacy Program* (Directive 6400.1). Washington, DC: Author.

U.S. Army Surgeon General. (2002). *Fort Bragg epidemiological consultation report*. Washington, DC: Department of Defense.

II. Review of the Literature

A. Historical Background

Child maltreatment, including child abuse and neglect, is a public health concern in both military and civilian populations. The U.S. government first focused on child maltreatment when Congress passed the Child Abuse Prevention and Treatment Act (P.L. 93-247) in 1974. This Act established a National Center on Child Abuse and Neglect and provided financial assistance for a demonstration program for the prevention, identification and treatment of child abuse and neglect. The bill was amended in 1988, creating a national clearinghouse for child abuse and neglect information and a national data collection and analysis program focused on state child abuse and neglect reports (P.L. 100-294). As a result, the National Child Abuse and Neglect Data System (NCANDS) annually collects and analyzes data voluntarily submitted by the States and the District of Columbia concerning child abuse and neglect known to child protective services (CPS) agencies within each state (US Department of Health and Human Services [DHHS], 2005).

Nationally, child protective services agencies receive an average of 50,000 referrals each week alleging child abuse or neglect, of which approximately two-thirds are screened in as reports because they meet the various States' policies for conducting an investigation or assessment. The NCANDS collects case-level data on all children who received an investigation or assessment by a CPS agency. States that are unable to provide case-level data submit aggregate counts of key indicators. Child Maltreatment 2003, the fourteenth annual publication of data collected via NCANDS, reports that approximately 906,000

children were substantiated victims of child abuse or neglect in the U.S. in 2003, a national victimization rate of 12.4 children per 1,000. Nationally, 63.2% of child victims experienced neglect (including medical neglect), 18.9% were physically abused, 9.9% were sexually abused, 4.9% were emotionally or psychologically maltreated, and an additional 16.9% of child victims experienced “other” types of abuse, such as threats of harm to the child and congenital drug addiction.

The Department of Defense (DOD) has taken a clear stance against family violence. In 1981, Department of Defense Directive 6400.1 required each branch of military service (Army, Navy, Air Force, and Marine Corps) to establish: (1) a Family Advocacy Program (FAP) and (2) a confidential central registry to collect and analyze FAP data (Department of Defense, 1981). Family Advocacy Programs (FAP) are responsible for addressing the prevention, identification, evaluation, treatment, rehabilitation, follow-up, and reporting of family violence on military installations. Suspected incidents of child maltreatment in military families are referred to Family Advocacy Programs where a case review committee, comprised of a multidisciplinary team of designated individuals working at the military installation level, is tasked with the evaluation and determination of abuse and/or neglect, and the development and coordination of treatment and disposition recommendations (Mollerstrom, Patchner, & Milner, 1992). Substantiated child abuse and neglect cases are those with a preponderance of available information indicating that abuse has occurred, while unsubstantiated cases have insufficient information available to support the claim that child abuse and/or neglect did occur (Jellen, McCarroll, & Thayer, 2001).

Though both the U.S. government and the Department of Defense enacted laws to address child abuse and neglect in the civilian and military communities, respectively, the

working relationship between Child Protective Services and Family Advocacy Programs has not been fully delineated. The only review of the level of collaboration between military installations and civilian communities was conducted by the Defense Task Force on Domestic Violence (DTFDV) between 2000 and 2003 as part of a larger initiative to understand the DOD response to child and spousal violence in the military. Specifically, the DTFDV assessed the extent to which military policy encouraged installation commanders to seek to establish formal agreements, or memorandums of understanding, with neighboring civilian communities about child and spousal violence-related information sharing and procedures. In its first-year review, the DTFDV found such agreements were required by the Army, encouraged by the Air Force and Marine Corps, and not addressed by the Navy (Hickman & Davis, 2003). However, even when memorandums of understanding are in place, the language describing the roles and functions of both the installation and the child protective services organization, including reporting responsibilities, referrals, case management, and emergency interventions, can vary (DOD 6400.1-M, 1992).

B. Negative impact of child maltreatment

Based on data drawn from the Department of Health and Human Services, the Department of Justice, the U.S. Census Bureau, and numerous researchers, the total estimated cost of child abuse and neglect in the United States has been conservatively estimated to be \$94 billion per year. This amount includes an estimated \$24 billion per year in direct costs (those costs associated with the immediate needs of abused or neglected children) and \$69 billion per year in indirect costs (those costs associated with the long-term and/or secondary effects of child abuse and neglect) (Fromm, 2001). But beyond the economic impact child maltreatment has on the U.S., the negative effects of abuse and

neglect can be long-lasting for the victimized child. They include adverse psychological, physical, behavioral, academic, sexual, interpersonal, and self-perceptual, as well as subsequent violence victimization and/or perpetration (Latimer, 1998). Further, it has been suggested that the severity of the negative outcomes a child experiences as a result of abuse and neglect are related, in part, to the length and severity of the abuse and the relationship of the abuser to the victim (Latimer, 1998). This underscores the need for early detection and appropriate case management of child maltreatment.

C. Child maltreatment in the military

C.1. Types of maltreatment in the military

Table 2-1 summarizes information from eleven studies that examined the distribution of four types of child maltreatment (physical abuse, sexual abuse, emotional abuse, and neglect) among military families (Rentz, Martin, Gibbs, et al., 2006). All four branches of the military have been studied, including six studies of the Army, three of the Air Force, and one of the Navy and Marine Corps. One study included all military in Hawaii. Five studies examined all child abuse and neglect cases that were reported (both substantiated and unsubstantiated), while the remaining six studies focused only on substantiated cases. The study data are drawn from various sources, including records from military hospitals and Family Advocacy Program central registries.

Physical abuse appears to be the most common type of child maltreatment in military families (Table 2-1), with 31.3% to 70.8% of all child maltreatment cases being this type of abuse. Though the range is wide, once methodological differences are accounted for, the percentages become much more similar between studies. For example, the studies that found a high percentage of physical abuse (more than 50% of all child maltreatment cases) used

reported, rather than substantiated maltreatment cases (Acord, 1977; Myers, 1979; James, James, Furukawa, & Mangelsdorff, 1984). Studies examining only substantiated maltreatment report that 31.3% to 46.4% of cases were substantiated for physical abuse, reflecting the facts that many more cases of child maltreatment are reported than are actually substantiated and that a proportion of the unsubstantiated cases are for reports of physical abuse.

Like child physical abuse, child neglect is also a common form of child maltreatment in military families, accounting for 18.5% to 50.0% of the child maltreatment in the eleven study samples. The smallest percentages (18.5% and 23.0%) were reported by Myers (1979) and Acord (1977), respectively. Both of these authors studied samples that consisted of suspected or alleged child maltreatment cases, rather than substantiated cases. Acord noted that the low proportion of neglect is likely a function of the lack of both the visibility of neglect and a clear neglect definition. While Wichlacz et al. (1975) found a much higher percentage of neglect (50.0%) among all substantiated abuse cases in military families, this result is limited by a small study ($n=36$) that consisted of data collected before the establishment of central registries. Examining only studies with large sample sizes of substantiated cases finds that the range for child neglect among all substantiated child maltreatment cases in military families becomes smaller (35.0% to 48.4%).

Child sexual abuse is one of the least common types of child maltreatment found in military families. Sexual abuse accounted for 6.1% to 17.8% of all the child maltreatment found in military families. The range remains similar when considering only those studies focused on substantiated sexual abuse cases in military families, 6.7% to 17.0%.

Emotional abuse of children in military families was first studied by Dubanoski and McIntosh in 1984, which also marks the beginning of research focused on substantiated cases of child maltreatment, as opposed to reported or alleged maltreatment. For the six studies reporting emotional abuse in military families, the percentage of emotional abuse among all child maltreatment cases ranged from 0.7% to 15.6%. Emotional abuse is the least common form of abuse or neglect found in 5 of the 6 reporting studies, with the only exception being Army Central Registry data from 1999 (McCarroll, Ursano, Fan, & Newby, 2004b) in which emotional abuse accounted for 15.6% of all child maltreatment cases, the highest of any published study.

C.2. Comparison of child maltreatment in military versus non-military populations

The six studies presented in Table 2-2 compared child maltreatment in the military and civilian communities (Dubanoski & McIntosh, 1984; Gessner & Runyan, 1995; Raiha & Soma, 1997; McCarroll, Ursano, Fan, & Newby, 2004a; McCarroll et al., 2004b; North Carolina Child Advocacy Institute, 2004). Because the aims differed somewhat in each of these studies, the methods used to obtain military and civilian child abuse and neglect data also vary. Dubanoski and McIntosh (1984) examined substantiated cases of child maltreatment in Caucasian military and civilian families that were recorded by the child protective services of Hawaii; Gessner and Runyan (1995) reviewed the medical charts of all infants with a diagnosis of shaken baby syndrome and searched hospital and pediatric intensive care unit databases; Raiha and Soma (1997) took their military study sample from a central registry and compared it to existing national statistics reported by the Department of Health and Human Services; McCarroll and colleagues (2004a, 2004b) compared a sample of substantiated cases from the Army Central Registry to both case level data from Washington

State made available in a national dataset and aggregate data from a national dataset; and finally, the North Carolina Child Advocacy Institute (2004) examined military and civilian child fatalities from the North Carolina Medical Examiner's database.

The six studies found mixed results when comparing child maltreatment in military and non-military samples. Two studies suggested that child abuse and neglect were more common in the military community than in civilians. Gessner and Runyan (1995) found that of the 22 infants admitted to the pediatric intensive care unit (PICU) with a diagnosis of shaken baby syndrome, eight (36%) were military dependents and 14 (64%) were civilian dependents. This high proportion of shaken babies within military families was notable since only 39 (9.5%) of all admissions of infants to the PICU for any reason were from military families. The odds for a shaken infant being a military dependent was three times the odds of other children admitted to the PICU being military dependents (OR = 3.5; 95% CI: 1.4-8.3). Other researchers analyzing North Carolina medical examiner data from 1985 to 2000 found that the two counties with the largest military installations in North Carolina had high child abuse homicide rates for children of military families under the age of ten (approximately 5.0 per 100,000 children), compared to the overall state rate of 2.2 deaths per 100,000 children aged 0-10 (North Carolina Child Advocacy Institute, 2004). However because the medical examiner data were analyzed at the level of the county, the study has potential for ecological bias, meaning that the estimates of effect at the ecological level do not necessarily equate to estimates of effect obtained from individual level analysis (Morgenstern, 1998).

Two studies found a lower rate of child maltreatment in the military study samples compared to the civilian study samples. Raiha and Soma (1997) contrasted child maltreatment victim rates in the U.S. Army and civilian populations and concluded that the

overall rate of child maltreatment appeared to be lower in the Army than the civilian population (7.4 cases vs. 14 cases per 1,000 children). Further, the U.S. Army rate of neglect was less than half of that found in the general population (2.9 cases versus 7.7 cases per 1,000 children in 1992). McCarroll et al. (2004a) analyzed substantiated cases of child abuse and neglect in the Army Central Registry and the National Child Abuse and Neglect Data System. Their findings agreed with Raiha and Soma's conclusion of less abuse and neglect in the military. The overall rates of child maltreatment in the U.S. civilian population (14.7 to 11.8 per 1,000 children) were about double the rates of substantiated maltreatment seen in Army families (7.6 to 6.0 per 1,000 children) from 1995 to 1999. In 1999, the rate of neglect among all substantiated child maltreatment in the Army was half that of the civilian population (3.1 versus 6.9 per 1,000 children). The civilian population also had slightly higher rates than the Army for physical abuse (2.5 versus 2.0 per 1,000 children) and sexual abuse (1.3 versus 0.8 per 1,000 children). Similar rates of emotional abuse were found between the two populations, with a rate of 1.0 per 1,000 children in the Army and 0.9 per 1,000 children in the civilian population.

The remaining two studies (Dubanoski & McIntosh, 1984; McCarroll et al., 2004b) reviewed in Table 2-2 suggest mixed findings. To remove the effect of ethnicity and race from their analyses, Dubanoski and McIntosh (1984) studied substantiated cases of child maltreatment in Caucasian military and civilian families in the state of Hawaii. They found that the prevalence of most types of abuse were similar between military and civilian families. Military families in the study population experienced significantly less psychological abuse, threat of abuse, educational neglect, psychological neglect, and abandonment; however, no significant differences were found for major or minor physical

abuse, sexual abuse, and most forms of neglect. Similarly, McCarroll et al. (2004b) compared the severity of child maltreatment between substantiated cases reported in the Army Central registry and a representative sample of substantiated cases in Washington state, and concluded that the Army reported more emotional and physical abuse cases, but less neglect. The Army Central Registry contained three times more emotional abuse cases than were reported in the National Child Abuse and Neglect Data System from Washington state (9% vs. 3%), and the Army also had more reports of severe physical abuse than Washington state (11% vs. 5%). However, Washington State classified 16% of its neglect cases as severe compared to only 3% of substantiated cases in the Army.

C.3. Methodological limitations in existing literature

There are few studies documenting the extent of violence in military families. Physical abuse and neglect comprise the majority of reported and substantiated cases of child maltreatment in the military, followed by sexual abuse and emotional abuse. However, caution is urged in interpreting these estimates in light of the methodological limitations of these studies. First, recent statistics are not available for all branches of the military. Only one paper was identified that published data on the prevalence of child maltreatment in Navy and Marine Corps families, and this paper was published almost 30 years ago (Acord, 1977). Somewhat similarly, statistics from the Air Force central registry have not been published for child maltreatment and spouse abuse since 1995 (Mollerstrom, Patchner & Milner, 1995). In addition, although the Department of Defense set forth requirements and instructions in Directive 6400.1 and Instruction 6400.2 concerning the criteria for substantiating child maltreatment and spouse abuse, the reporting system, and the source of referrals may differ somewhat for each branch of the military (Chamberlain, Stander, & Merrill, 2003). Because

each branch is responsible for its own data collection and analyses, the amount of family violence information published in peer-reviewed journals varies between the services, with no single publication reflecting an overall picture of family violence in the military.

Therefore it is difficult to compare statistics from each branch of the military. Finally, the statistics presented in recent published studies generally focus on substantiated cases of abuse and neglect entered into central registries and do not include cases that are never reported to the authorities and those that are unsubstantiated. Thus, these estimates based on substantiated child maltreatment will undoubtedly be an underestimate of what is actually occurring in military communities. This caveat also applies to research in civilian communities.

Papers that examined the extent of child maltreatment in military versus non-military populations differed in terms of their findings, with two studies suggesting more abuse and neglect in the military, two studies suggesting a lower overall rate of abuse and neglect in the military, and two studies suggesting more and less severe maltreatment in military compared to non-military populations, depending on the type of maltreatment examined. Again, the methodological issues noted above should be considered when interpreting these results. The methods used to report, track, and substantiate abuse and neglect cases within military and civilian populations are not standardized (McCurdy & Daro, 1994). Depending on the state, the National Child Abuse and Neglect Data System receives either case-level or aggregate data, whereas the central registries record information on the individual level (DHHS, 2005; McCarroll et al., 1999; Mollerstrom et al., 1995). Additionally, definitions of abuse and neglect differ between populations (McCarroll et al., 2004a) and referrals of maltreatment come from different sources (DHHS, 2005; Wardinsky & Kirby, 1981; Mollerstrom et al.,

1995). In summary, it is currently contentious whether the rate of child maltreatment is higher or lower in military, relative to civilian, families.

D. Characteristics of the military family

D.1. War and the military family

In an effort to summarize research on war and the family, Schwab, Ice, Stephenson, et al. (1995) outlined the direct effects that war has had on the family, including: (1) anxiety and grief about the fate of family members in the armed services; (2) disruptions and separations of the family as members go to war, including wives and children beginning to work outside of the home; (3) changing patterns of family life produced by the war, such as a decline in the standard of living; (4) strains on the family unit, including the many marital separations and divorces, adultery, juvenile delinquency, and neglect of children; and (5) change in the social norms governing sexual relations, which may result in extra-marital relationships. In addition to the direct effects of war, strain can also be placed on the family through delayed effects, an example being the difficulty of many servicemen and servicewomen in readjusting to everyday life following return from deployment.

These war-related direct and delayed effects on military families are of particular concern given the current mobilization and deployment of military personnel to active theaters of combat. On September 11th, 2001, more than 3,000 people were killed when terrorists hijacked four U.S. airliners. The planes crashed into both towers of the World Trade Center in New York City, the Pentagon in Washington, DC, and a field in rural Pennsylvania. In the weeks following the attacks, one thousand soldiers from the U.S. Army's 10th Mountain Division were sent to the Central Asian nation of Uzbekistan, which borders Afghanistan, on October 5th, and the U.S. began bombing Afghanistan just two days

later. In his evening address to the nation on October 7th, President George W. Bush stated that the United States military had begun strikes against al Qaeda terrorist training camps and military installations of the Taliban regime in Afghanistan. From that point on, the US military has been engaged in large-scale, active combat in Afghanistan and subsequently, Iraq. According to the Pentagon, over 1 million U.S. troops have fought in these theaters of combat since September 11th, 2001, and approximately one-third of all troops ever sent to Iraq or Afghanistan have been deployed more than once (Bender, 2005). The potential for deployment and uncertainty about the well-being of a deployed soldier are only two of a number of stressors that military families must contend with since the September 11th attacks. The fact that the Pentagon, the nation's leading military institution, was attacked and damaged by terrorists also created a level of mental distress among military families.

In addition to the stress placed on military families by a war environment, these families experience a number of strains on a daily basis that are unique to the military lifestyle. The following is a discussion of both the disadvantages and advantages that the military way of life has on the family unit.

D.2. Military family stressors

Understanding family violence in the military is an important concern because of the unique stresses faced by military families on a daily basis that could place them at greater risk for family dysfunction. Members of the Armed Forces are often required to relocate to another city, state, or even country. While the opportunity to travel is seen favorably by some, others view the frequent moves, with accompanying housing, employment, school and community changes, as a disruption to family life (Segal, 1989). In addition to geographic mobility, service members tend to have long and erratic work schedules that may interfere

with recreational plans, the spouse's employment, and family obligations. In a study of Navy servicemen and their wives, Hertz and Charlton (1989) found that many wives share symptoms of their husbands' work-related stress, in the form of lost sleep, digestive disorders, and irritability because they often assume more household responsibilities in their husbands' absences.

In addition, military members are often separated from their families due to trainings, temporary assignment, etc., that require travel. Depending on the job, a service member may be gone for months with little contact with family members. Separations due to deployment create additional stressors including assumption of new family roles by the partner left behind, disruption of family routines, uncertainty about the service members' safety, and inability to plan for the future (Blount & Curry, 1992; Figley, 1993; Segal, 1989).

The military family may experience stress in the form of different types of separations, but a more innate stress that may be placed on the family is due to the very nature of the military. The military, because of its organizational structure, has been hypothesized to create difficulties for the family through its lack of autonomy, rigid structure, and increased prevalence of the traditional view of spouses and children as second-class citizens (Jensen, Lewis, & Xenakis, 1986). However, Jensen asserts that a more plausible hypothesis is that the structure aids some families and hinders others, which is likely a function of the soldier's rank, duty assignment, individual and family person-environment fit, as well as other factors.

D.3. Advantages of the military lifestyle to families

There are a number of protective factors unique to the military lifestyle that could reduce the occurrence of family violence. The discovery of fairly severe problems, including

criminal conduct, mental health problems, and drug and alcohol abuse, are cause for the punishment or discharge of soldiers from the military (Raiha & Soma, 1997). Military families generally enjoy the benefits of economic and employment security. For families with children, having at least one employed parent who is able to function effectively in a structured environment and is required to pass literacy and aptitude tests may also be viewed as a protective factor for child maltreatment (Raiha & Soma, 1997). The military family also has health care, housing provided or funded by the government, and access to many family support programs (McCarroll et al., 2004b), which may mediate the effects of the previously discussed stressors.

Historically, the military has served as a conduit for educational and economic opportunities. As one of the few racially integrated societal institutions, the military has been able to attract a disproportional number of ethnic minorities. While African-Americans comprise 12% of the total U.S. population, they comprise 31% of the enlisted Army personnel (Richards & Bowen, 1993). Further, these soldiers succeed within the military as suggested by their low rates of injury and attrition during basic combat training (AMSARA, 2003). The military has also provided alternative employment and training opportunities to traditional universities and civilian jobs (Owens, 1992; Teachman, Call, & Segal, 1993).

The military environment also offers a strong social system for families. Not only do families have the support of neighbors and friends, they also have support from the institution. Because domestic problems have implications for the entire unit, Commanders and First Sergeants are invested in the well-being of the family (Segal, 1989). Additionally, Family Advocacy Programs have a number of resources available that are designed to help

military families cope with family problems, such as marital and group therapy, stress and anger management, and alcohol counseling (McNelis & Awalt, 1986; Brewster, 1996).

E. Conclusion

In general, studies examining child maltreatment in the military have been limited in their attempts to implement standard epidemiological methods. Many are purely descriptive in nature because the authors have been unable to ascertain a denominator for the calculation of the rate of child maltreatment. A major limitation of the current literature comparing the extent of military and civilian abuse is that most authors compared data from two separate sources (a military database and a civilian database) that most likely differed in the way the data were collected and the definitions of abuse and neglect that were employed. Finally, a problem that faces all research focused on reported abuse and neglect is the potential for underreporting and unfortunately, at this time, there is limited data available that quantify the extent of underreporting and how this might differ between military and civilian communities.

With respect to military families, war places strain on the family through direct and indirect, as well as immediate and delayed, effects. On a daily basis, families face disadvantages of the military lifestyle that could place them at greater risk for family dysfunction. Although long work hours, dangerous assignments, frequent moves, and family separation can create stressors, the military also offers many opportunities and resources that act as buffers against family problems. Overall, early detection and prevention will reduce the expenditures associated with child abuse and neglect and improve the overall readiness of military soldiers.

F. References

- Acord LD. (1977). Child abuse and neglect in the Navy. *Military Medicine*, 141, 862-4.
- AMSARA (Accession Medical Standards Analysis and Research Activity, Walter Reed Army Institute of Research). (2003). *AMSARA 2002 Annual Report*. Silver Spring, MD: Author.
- Bender B. (2005, November 11). Concern voiced on multiple tours of duty: Strains on troops in Iraq feared. *The Boston Globe*. Available at: http://www.boston.com/news/world/middleeast/articles/2005/11/11/concern_voiced_on_multiple_tours_of_duty/. Accessed February 17, 2006.
- Blount BW, Curry A, & Lubin G. (1992). Family separations in the military. *Military Medicine*, 157(2), 76-80.
- Brewster AL. (1996). USAF Family Advocacy Program. In C.M. West, *Partner Violence in Military Families*. Available on internet: http://www.agnr.umd.edu/nnfr/research/pv/pv_ch6.html.
- Chamberlain H, Stander V, & Merrill LL. (2003). Research on child abuse in the US armed forces. *Military Medicine*, 168, 257-260.
- Dubanoksi RA & McIntosh SR. (1984). Child abuse and neglect in military and civilian families. *Child Abuse & Neglect*, 8, 55-67.
- Figley CR. (1993). Coping with stressors on the home front. *Journal of Social Issues*, 49, 51-71.
- Fromm S. (2001). *Total estimated cost of child abuse and neglect in the United States—statistical evidence*. Chicago (IL): Prevent Child Abuse America (PCAA). Available at: http://www.preventchildabuse.org/learn_more/research_docs/cost_analysis.pdf. Accessed April 1, 2005.
- Gessner RR & Runyan DK. (1995). The shaken infant: A military connection? *Archives of Pediatrics & Adolescent Medicine*, 149, 467-9.
- Hertz R & Charlton J. (1989). Making family under a shiftwork schedule: Air Force security guards and their wives. *Social Problems*, 36, 491-507.
- Hickman L J & Davis LM. (2003). *Formalizing Collaboration—Establishing Domestic Violence Memorandums of Understanding Between Military Installations and Civilian Communities*. Santa Monica, CA: RAND Corporation.
- James JJ, James NS, Furukawa TP, & Mangelsdorff AD. (1984). Child abuse and neglect reports in the United States Army central registry. *Military Medicine*, 149, 205-6.

- Jellen LK, McCarroll JE, & Thayer LE. (2001). Child emotional maltreatment: A 2-year study of US Army cases. *Child Abuse & Neglect*, 25, 623-639.
- Jensen PS, Lewis RL, & Xenakis, SN. (1986). The military family in review: Context, risk, and prevention. *Journal of the American Academy of Child Psychiatry*, 25, 225-234.
- Latimer J. (1998). *The Consequences of Child Maltreatment: A Reference Guide for Health Practitioners*. Ottawa: Health Canada. Available at: <http://www.hc-sc.gc.ca/hppb/familyviolence/html/98p057eO.html>. Accessed May 6, 2005.
- McCarroll JE, Newby JH, & Thayer LE. (1999). Trends in child maltreatment in the U.S. Army, 1975-1997. *Child Abuse & Neglect*, 23, 855-61.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004a). Classification of the severity of the US Army and civilian reports of child maltreatment. *Military Medicine*, 169, 461-4.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004b). Comparison of U.S. Army and civilian substantiated reports of child maltreatment. *Child Maltreatment*, 9, 103-110.
- McNelis PJ & Awalt, SJ. (1986). Project SAFE: An armed forces cooperative initiative for the prevention and treatment of family violence. *Evaluation and Program Planning*, 9, 233-241.
- McCurdy K & Daro D. (1994). Child maltreatment: a national survey of reports and fatalities. *Journal of Interpersonal Violence*, 9, 75-94.
- Mollerstrom WW, Patchner MA, & Milner JS. (1992). Family violence in the Air Force: A look at offenders and the role of the Family Advocacy Program. *Military Medicine*, 157, 371-374.
- Mollerstrom WW, Patchner MA, & Milner JS. (1995). Child maltreatment: the United States Air Force's response. *Child Abuse & Neglect*, 19, 325-34.
- Myer SS. (1979). Child abuse and the military community. *Military Medicine*, 144, 23-5.
- North Carolina Child Advocacy Institute. (2004, September). *Reducing collateral damage on the home front: Child abuse homicides within military families and communities in North Carolina: Facts and recommendations*. Raleigh, NC: Author.
- Owens, T J. (1992). Where do we go from here?: Post-high school choices of American men. *Youth & Society*, 23, 452-477.
- Raiha NK & Soma DJ. (1997). Victims of child abuse and neglect in the US Army. *Child Abuse & Neglect*, 21, 759-768.

- Rentz ED, Martin SL, Gibbs DA, Clinton-Sherrod M, Hardison J, & Marshall SW. (2006). Family violence in military families: A review of the literature. *Trauma, Violence, & Abuse*, 7, 93-108.
- Richards KB & Bowen GL. (1993). Military downsizing and its potential implications for Hispanic, Black, and White soldiers. *The Journal of Primary Prevention*, 14, 73-92.
- Schwab JJ, Ice JF, Stephenson JJ, et al. (1995). War and the Family. *Stress Medicine*, 2, 131-137.
- Segal MW. (1989). The nature of work and family linkages: A theoretical perspective. In C.M. West, *Partner Violence in Military Families*. Available on internet: http://www.agnr.umd.edu/nnfr/research/pv/pv_ch6.html. Accessed June 2, 2005.
- Teachman JD, Call, VR, & Segal MW. (1993). Family, work, and school influences on the decision to enter the military. *Journal of Family Issues*, 14, 291-313.
- U.S. Department of Defense. (1987). *Child and spouse abuse report* (Instruction 6400.2). Washington, DC: Author.
- U.S. Department of Defense. (1986). *Family Advocacy Program* (Directive 6400.1). Washington, DC: Author.
- U.S. Department of Defense. (1992). *Family Advocacy Program* (Directive 6400.1). Washington, DC: Author.
- U.S. Department of Defense Task Force on Domestic Violence. (2002). *Defense Task Force on Domestic Violence second annual report*. Washington, DC: U.S. Department of Defense.
- U.S. Department of Health and Human Services (DHHS), Administration on Children, Youth and Families. (2005). *Child Maltreatment 2003: Reports from the States to the National Child Abuse and Neglect Data System*. Washington, DC: U.S. Government Printing Office.
- U.S. Senate. (1974). *Child Abuse Prevention and Treatment Act* (Public Law #93-247). Washington, DC: Author.
- U.S. Senate (1988). *Child Abuse Prevention, Adoption, and Family Services Act of 1988*. (Public Law #100-294). Washington: Author.
- Wardinsky TD & Kirby W. (1981). A review of child maltreatment at a USAF medical center. *Military Medicine*, 146, 328-331.
- Wichlacz CR, Randall DH, Nelson JH, & Kempe CH. (1975). The characteristics and management of child abuse in the US Army-Europe. *Clinical Pediatrics*, 14, 545-8.

Table 2-1. Types of child maltreatment among military families with reported or substantiated maltreatment.

Author (Year)	Study Sample	Methods	Results			
			Percentage of Physical Abuse	Percentage of Neglect	Percentage of Sexual Abuse	Percentage of Emotional Abuse
Wichlacz, Randall, Nelson, and Kempe (1975) ^{*,†}	56 <i>suspected</i> cases brought to the Child Abuse and Neglect Board at a US Army General Hospital in Germany between 7/1/71 and 6/30/72 representing 36 maltreatments	Divided number of substantiated cases of each type of child maltreatment by total number of maltreatments (denominator=36)	38.9	50.0	11.1	--
Acord (1977) [†]	430 <i>suspected</i> reports of child maltreatment involving Navy and Marine Corps personnel submitted by naval medical facilities for the years 1974 and 1975 representing 408 maltreatments	Divided number of suspected incidents of each type of child maltreatment by total number of maltreatments (denominator=408)	70.8	23.0	6.1	--
Myers (1979) ^{†,§}	1,328 <i>suspected</i> child maltreatment cases in the Air Force Office of Special Investigations database from 1975-1977 representing 1,288 maltreatments	Divided sum of suspected incidents of each type of child maltreatment across all years by overall total number of maltreatments (denominator=1,288)	63.7	18.5	17.8	--
Wardinsky and Kirby (1981)	158 <i>reported</i> cases brought to the Air Force Child Advocacy Committee from April 1, 1975 through September 1977 representing 158 maltreatments	Divided number of reported cases of each type of child maltreatment by total number of maltreatments (denominator=158)	58.9	34.2	7.0	--

James, James, Furukawa, and Mangelsdorff (1984) ^{*,†,‡}	Representative sample of 1,126 <i>alleged</i> cases of child maltreatment from 10/1/78 - 12/31/80 in the Army Central Registry (ACR) representing 1,077 maltreatments	Divided number of alleged cases of each type of child maltreatment by total number of alleged cases (denominator=1,077)	50.6	46.7	10.8	--
Dubanoski and McIntosh (1984) [*]	403 substantiated cases of child maltreatment in Caucasian families during the period of 1/1978 to 2/1981 involving military personnel in Hawaii, representing 403 types of maltreatment	Divided number of confirmed cases of each type of child maltreatment by the total number of maltreatments (denominator=403)	46.4	46.2	6.7	0.7
Mollerstrom, Patchner, and Milner (1995) ^{*,†,§,#}	19,587 substantiated child maltreatment cases in the US Air Force central registry for fiscal years 1987 through 1992 representing 19,269 total maltreatments	Divided sum of substantiated incidents of each type of child maltreatment across all years by overall total number of maltreatments (denominator=19,269)	40.6	35.0	14.9	9.4
Raiha and Soma (1997) ^{*,†,‡}	8,442 substantiated child maltreatment cases involving active duty Army families that were reported to the Army Central Registry in 1992 and 1993 representing 9,040 total maltreatments	Divided sum of substantiated incidents of each type of child maltreatment across all years by overall total number of maltreatments (denominator=8,422)	41.6	39.3	17.0	9.5
McCarroll, Newby, and Thayer (1999) ^{‡,§}	62,641 cases of initial substantiated child maltreatment in the Army Central Registry from 1975-1997 representing 66,288 total maltreatments	Divided sum of substantiated incidents of each type of child maltreatment across all years by overall total number of maltreatments (denominator=62,641)	41.4	44.4	11.7	8.3

McCarroll, Ursano, Fan, and Newby (2004a)	3,422 substantiated cases of child maltreatment from US Army Family Advocacy Program (FAP) data over 1 year period from 1994 to 1995 representing 3,422 total maltreatments	Divided number of substantiated cases of each type of child maltreatment by total number of maltreatments (denominator=3,422)	37.7	39.4	14.3	8.6
McCarroll, Ursano, Fan, and Newby (2004b) [‡]	All substantiated Army child maltreatment cases in 1999	Divided number of substantiated cases of each type of child maltreatment by total number of substantiated cases	31.3	48.4	11.7	15.6

* Overall percentages of types of maltreatment calculated by author (EDR) from original paper.

† Death, other, and unknown abuse type categories not included in total number of maltreatments.

‡ Percentages total to more than 100% due to cases involving more than one type of maltreatment.

§ Overall percentage reported for studies that calculated statistics by year for each fiscal year of the study period.

Number of substantiated cases includes those with multiple types of maltreatment. However, multiple types are not included in the denominator because not enough information was available to differentiate between the types of maltreatment experienced.

Table 2-2. Extent of child maltreatment in military versus non-military populations.

Author (Year)	Purpose	Study Sample	Methods	Results
Dubanoski and McIntosh (1984)	To compare military and civilian families who abused and neglected their children	All confirmed cases of child maltreatment in military and civilian Caucasian families from the Hawaii child protective services database during the period of January 1978 to February 1981	Cases were compared based on sources of referral, types of maltreatment, characteristics of the victim and perpetrator, and stress factors.	Military families reported significantly less psychological abuse, threat of abuse, educational neglect, psychological neglect, and abandonment than civilian families. No significant differences were found between military and civilian families for physical abuse or sexual abuse.
Gessner and Runyan (1995)	To investigate whether military dependents were over-represented among children hospitalized with shaken baby syndrome and if their pattern of injury or outcomes differed from those of children in the civilian population	All 22 infants with diagnosis of shaken baby syndrome between 1/1/89 and 2/28/93 at UNC Hospitals, Chapel Hill and 480 children younger than two years of age admitted to the pediatric intensive care unit for any cause identified in the hospital and PICU databases	Charts were reviewed by physicians to corroborate diagnosis. Odds ratios (OR) were calculated comparing military dependents to non-military dependents admitted to pediatric intensive care unit (PICU).	Military dependents under the age of 1 were 3.45 times more likely than non-military dependents to be PICU admissions; and 6.7 times more likely for children under age of 2.
Raiha and Soma (1997)	To estimate child maltreatment victim rates in the US Army and to contrast them with existing child maltreatment victim rates in the civilian population	All 8,442 substantiated child maltreatment cases involving active duty Army families which were reported to the Army Family Advocacy Central Registry in 1992 and 1993	Rates of abuse were estimated from the Army Central Registry data for each type of child maltreatment. Comparison information about child abuse and neglect in the US population was obtained from the National Center on Child Abuse and Neglect's summary reports from the states for years 1992 and 1993.	The overall 1992/1993 abuse/neglect rate in the Army population was 7.4 annual cases per 1,000 children, which is substantially lower than the general US population rate of 14 cases per 1,000 children in 1992/3. (Note: The difference between Army and general population rates is primarily due to a neglect rate less than half that found in the general population for 1992, e.g. 2.9 cases versus 7.7 cases per 1,000 children.)

McCarroll, Ursano, Fan, and Newby (2004a)	To compare reports of the severity of child maltreatment for the US Army and the civilian jurisdiction of Washington state	All 3,422 substantiated child maltreatment cases from US Army Central Registry and a representative sample of 4,019 substantiated child maltreatment cases from Washington state over a 1 year period (1994 to 1995)	Severity of maltreatment was recorded in the Army Central Registry for each substantiated case of maltreatment. However, because severity of maltreatment was not recorded for child maltreatment cases in Washington state database, assessments of the level of severity of maltreatment in Washington state cases were made based on guidelines in Washington state department of Social and Health Services, Division of Children and Family Services Risk Factor Matrix Guide. These guidelines were similar to those of the Army.	Statistically significant differences exist in the severity of each of the types of maltreatment for the Army and for Washington state ($p < 0.001$). More cases of physical abuse are classified as severe by the Army (11%) compared with Washington state (5%). However, 16% of Washington state neglect cases were classified severe compared with 3% of Army cases.
McCarroll, Ursano, Fan, and Newby (2004b)	To compare US Army and civilian substantiated reports of child maltreatment	All substantiated Army and US child abuse cases from 1995 to 1999 as reported in the Army Central Registry and the National Child Abuse and Neglect Data System, respectively.	The overall rates of child maltreatment were compared for the Army and US civilian populations from 1995 to 1999. For 1999 only, the most recent data available at the time of the analyses, the type of maltreatment by age and sex, the victim rates by race/ethnicity, and the relationship of perpetrator to victim were compared for the Army and US civilian populations.	The overall rates of child maltreatment in the US civilian population (14.7 to 11.8 per 1,000 children) were about double the Army rates (7.6 to 6.0 per 1,000 children) from 1995 to 1999. In 1999, the rate of neglect in the Army was half of that in the civilian population (3.1 versus 6.9 per 1,000 children); while similar rates between the Army and civilian populations were found for physical abuse (2.0 versus 2.5 per 1,000 children), sexual abuse (0.8 versus 1.3 per 1,000 children), and emotional abuse (1.0 versus 0.9 per 1,000 children).

North Carolina
Child
Advocacy Institute
(2004)

To calculate and compare
rates of child abuse
homicides North Carolina
military and non-military
families

All 378 cases of child abuse
homicide in children 0 to 10
years of age found in NC
Medical Examiner database
from 1985 to 2000

Homicide cases from the
Medical examiner database were
used to calculate the overall state
child abuse homicide rate per
year as well as county-specific
rates.

In the period 1985-2000 in NC, the
annual child abuse homicide rate was
2.2 deaths per 100,000 children ages
0-10. In Cumberland and Onslow
Counties, home to three of the state's
largest military installations, the
annual child abuse homicide rate for
children of military families over the
same 16-year period was 5.0 per
100,000 and 4.9 per 100,000 children
ages 0-10, respectively.

III. Statement of Specific Aims

This research was guided by two research questions: (1) Is being a child in a military family protective of, or a risk factor for, substantiated child maltreatment? and (2) What impact did the attacks of September 11, 2001 and the subsequent US military response have on the occurrence of substantiated child maltreatment in military families? Specifically, this study aimed:

Aim 1

To compare the occurrence of child maltreatment in military and non-military families by analyzing data from a national surveillance system that collects standardized information on both military and non-military populations.

- a) Determine the rate of the occurrence of substantiated physical abuse, sexual abuse, emotional abuse, neglect, and multiple types of maltreatment per 1,000 person-years for children, ages 17 and under, in military and non-military families.
- b) Compare rates of each type of child maltreatment and the distribution of child, caretaker, and perpetrator characteristics between children in military families and non-military families.

Hypothesis

Aim 1a is purely descriptive in nature and is, therefore, not hypothesis driven. The hypothesis for Aim 1b is that children in military families will experience lower rates of occurrence of substantiated child maltreatment compared to children in non-military families. Further, sociodemographic characteristics will be similar between children of military and

non-military families, but will differ for military and non-military caretaker and perpetrator characteristics.

Rationale

Risk factors associated with child maltreatment in the non-military population, such as low socioeconomic status, are not as prevalent in military families. Military families also have a number of available support services and receive housing and healthcare funded by the government, which may result in lower maltreatment rates. Child victims of maltreatment in military and non-military families will be similar with respect to their sociodemographic characteristics and types of maltreatment experienced because certain individual characteristics have been found to increase the risk of being maltreated (e.g. young children are at particular risk for neglect and physical abuse).

Caretaker characteristics are hypothesized to be different between children in military and non-military families because presumably a larger percentage of military families will have at least one family member who is employed full time, leading to fewer military families with financial problems and/or the need for public assistance. Further, drug and alcohol problems will not be as present among caretakers in military families because of the low tolerance the military has for these problems and the availability of support programs. Perpetrator characteristics are also hypothesized to be different because the distribution of sociodemographic characteristics of military personnel tends to be different from that of the general public. For example, the distribution of Hispanics is likely different between the military and non-military population in Texas.

Aim 2

To examine the temporal trends in the occurrence of substantiated child maltreatment in military and non-military families and the impact of recent increases in deployment on the occurrence of substantiated child maltreatment in military families.

Hypothesis

An increase in departures to operational deployment and an increase in returns from operational deployment will act independently to increase the rate of occurrence of substantiated child maltreatment in military families.

Rationale

Family stress occurs in military families with anticipation of deployment, separation during deployment, and re-integration into the family post deployment. Unlike spouse abuse that can only be perpetrated pre- and post-deployment, child maltreatment can occur before deployment by either parent, during deployment by the parent left behind or an abusing family member who assumes the role of caretaker, or after deployment by either parent. Therefore, if families are under increased stress when the US troops mobilize and deploy to active theaters of combat, it is plausible that family dysfunction can increase and lead to higher rates of child maltreatment within military families.

IV. METHODS

This study is a secondary analysis of the National Child Abuse and Neglect Data System that incorporates state-level information from the US Census Bureau and the Department of Defense to calculate and compare the rates of occurrence of substantiated maltreatment in children of military and non-military families.

A. Data Sources

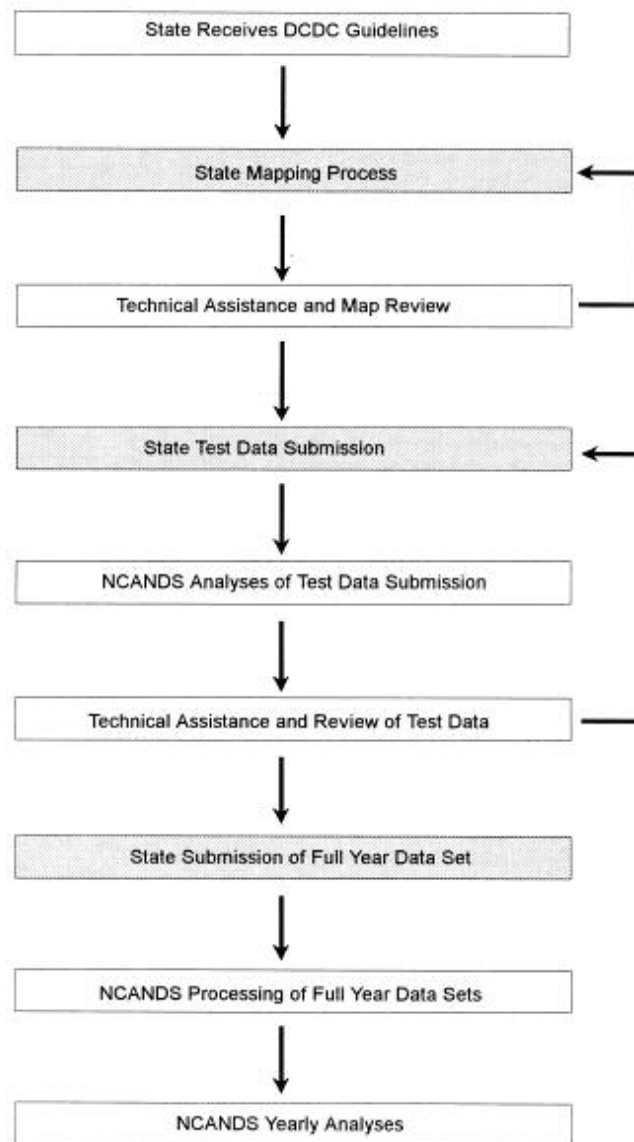
A1. National Child Abuse and Neglect Data System

The primary data source for information on child maltreatment was the 2000 to 2003 Child Files for the state of Texas from the National Child Abuse and Neglect Data System (NCANDS). NCANDS is the primary source of national information on maltreated children reported to State child protective services (CPS) agencies. Data is maintained by the National Data Archive on Child Abuse and Neglect (Cornell University, Ithaca, NY) and is submitted by states in three formats. The Child File consists of the most detailed information at the level of the child, including report characteristics (including report date, investigation start date, report source, etc.), demographic characteristics of children and their perpetrators, types of maltreatment (physical abuse, sexual abuse, emotional abuse, neglect, other abuse), results from investigation or assessment, caretaker risk factors (including alcohol and drug use, public assistance, inadequate housing, financial problem, domestic violence) and services provided as a result of the investigation or assessment (including family support, family preservation, and foster care). The Agency File includes aggregated, state-level data on items that are not able to be collected at the case level, such as information on the number

of child protective services workers, preventive services, and additional data on child fatalities. Finally, in the Summary Data Component, states that are unable to submit any case-level data complete a survey reporting aggregate statistics for key items in the Child File and the Agency File, such as data on reports, investigations, victims, and services. This study used only data recorded in the Child File.

All data included in NCANDS have been reviewed and validated by the NCANDS Technical Team. Each state that submits data to NCANDS must follow the detailed case data collection (DCDC) guidelines that are outlined by the Technical Team. Submission procedures consist of each state mapping the requested data elements into the standardized Child file record layout, extracting the State data into the Child file record layout, and submitting the case level data to NCANDS. As illustrated in Figure 4-1, there is a system in place to review and correct all submissions to NCANDS. Once a state maps its data elements to the Child File record layout, the NCANDS Technical Team reviews the results and provides feedback to the state. The state then addresses any identified problems and makes necessary adjustments to the mapping forms. The state next develops the computer programs necessary to extract the Child File data from its child welfare information system and submits a test Child file. The test file is checked to confirm the accuracy of the submission. Once the Technical Team validates the test file, the results are shared with the state, and the state then submits a revised file containing all cases for the data collection year. Finally, the Technical Team confirms that the final submission has been corrected of all systematic errors and/or logical inconsistencies that were identified in the test file. The process of submission, review, and assistance may take several iterations before the Technical Team approves the State to submit a final version of the data.

Figure 4-1. The child level data submission and analysis process.



Entries within each Child File are referred to as report-child pairs, meaning that each child on a given report appears in the dataset as a separate entry (see discussion in Sections B.1.a. and B.1.b. below). Through 2002, data was submitted to NCANDS annually based on the calendar year in which each child maltreatment investigation reached a conclusion. Beginning in 2003, data submission was based on the Fiscal Year. That is, data submitted

for year 2003 included all reports of child maltreatment that reached a disposition between October 1, 2002 and September 31, 2003.

Although 20 states archived their child-level data in 2000 and 22 states and the District of Columbia in 2001, 2002 and 2003, the state of Texas was selected as the focus of these analyses because it has the most complete information on military family status of child victims (e.g. no missing data in 2000-2001 NCANDS Child Files; Table 4-1), a large number of child victims in military families (e.g. approximately 2,500 for 2000-2001 NCANDS Child Files; Table 4-1), as well as a large military population. According to the Department of Defense (DOD) Base Structure Report (2003), Texas has a total of 253 military installations of varying sizes that represent all four branches of the military. These include 181 from the Army, 17 from the Navy, 54 from the Air Force, and 1 from the Marine Corps. The DOD categorizes installations into large, medium, and small, based on predetermined value criteria referred to as a Plant Replacement Value (PRV). In Texas, there are five large installations (total PRV greater than or equal to \$1.5 billion), six medium installations (total PRV between \$800 million and \$1.5 billion), and 242 small installations (total PRV greater than \$10 million) as well as approximately 200,000 active duty soldiers.

There were 188,516 report-child pairs that were substantiated for some form of child maltreatment in Texas between January 1, 2000 and September 30, 2003. Because of the change from calendar year to fiscal year submissions in 2003, there were duplicate entries of report-child pairs that were substantiated between October 1, 2002 and December 31, 2002 (i.e. these entries were included in the 2002 Child File and the 2003 Child File). These duplicate entries were deleted ($n = 11,705$) as well as all other duplicate entries found when the four years of data were combined into one master file ($n = 431$). Based on technical

advice from NCANDS data analysts, multiple reports of maltreatment for a single child that occurred within 2 days of each other likely captured the same occurrence of child maltreatment. To prevent counting the same maltreatment multiple times, the report-child pair with the least amount of information was deleted from the final dataset (n = 778). The final dataset for these analyses included 175,602 unduplicated report-child pairs that were substantiated in Texas between January 1, 2000 and September 30, 2003. Substantiated cases are those in which the allegation of maltreatment or risk of maltreatment was supported or founded by the State law or State policy.

A.2. U.S. Census Bureau

Denominator data for the calculation of rates per 1,000 person-years at risk were obtained from the Public Use Microdata Sample (PUMS) files of the US Census Bureau for the state of Texas. PUMS files have state-level data from the US Census 2000 that contain individual records of the characteristics for a 1- and 5-percent sample of people and housing units. The 1-percent files were used in these analyses because they have the maximum amount of social, economic, and housing information available. At our request, the Texas State Data Center (a state branch of the US Census Bureau) tabulated the number of children ages 17 and under residing in households with at least one family member on active duty in the military as well as the number of individuals ages 18 and older who identified themselves as being an active duty member of the Armed Forces, categorized by age, gender, race, and ethnicity. The same population statistics were tabulated for children living in households without an active duty military family member and for individuals who did not identify themselves as being an active duty member of the military. These data were used to calculate the rate of occurrence of substantiated child maltreatment per 1000 person-years at

risk for children ages 17 and under in military and non-military families and for military and non-military perpetrators ages 18 and older. The denominators for all rate calculations were estimated by multiplying the appropriate population statistics by the number of years of follow-up under the assumption that the population at risk did not change over the study period.

Because denominator data for rate calculations were obtained from the 2000 Census, it was important to determine whether the change in the rate over time was due to the occurrence of child maltreatment (i.e. changes in the numerator) or the child population in Texas (i.e. changes in the denominator). We verified that the population of military and non-military children residing in Texas did not increase markedly over time by examining yearly population estimates from the US Census Bureau American Community Survey (ACS). The ACS is a new nationwide survey based on a sample of US households and is designed to eliminate the need for the long form in the 2010 Census. Its goal is to collect information from US households similar to what was collected on the Census 2000 long form, such as income, veteran status, and living conditions. Table 4-2 outlines the sample sizes from Texas for those households approached and interviewed in each of the study years. For each study year, approximately 60% of the initial addresses selected subsequently completed final interviews.

The decennial census and the ACS are very different in methodology, scope, timing, and visibility. The main emphasis of the decennial census is to enumerate the US population; the collection of long form data is secondary. The ACS, in contrast, is designed to collect long form data only but on an annual basis. In 2001, the Census Bureau initiated the ACS Research and Evaluation Program to answer questions about the usability and reliability of

the ACS estimates. The comparisons in Table 4-3 show that there were very few statistically significant differences between the ACS data and Census 2000 data.

To verify that the population of children in military and non-military families in the state of Texas did not markedly increase over the study period, the Texas State Data Center provided population estimates from years 2000 – 2003 of the American Community Survey on the number of children ages 17 and under residing in households with at least one family member on active duty in the military as well as the number of individuals ages 18 and older who identified themselves as being an active duty member of the Armed Forces. This data was stratified by age, gender, and race/ethnicity. ACS data were used only to confirm that the size of the military population stationed in Texas was relatively constant over the study period. It was not directly used to compute denominator data for rate calculations because it was still in the pilot phase for the initial portion of the study period.

A.3. Deployment information

Because the impact of deployment on the occurrence of child maltreatment was explored, it was important to have this information for military troops stationed in Texas. NCANDS does not include individual-level deployment information on military perpetrators of child maltreatment, so determining the deployment history for particular individuals was impossible. Instead, state-level deployment information was obtained from the Department of Defense's Personnel Temp (PERSTEMPO) dataset, which is maintained by the Defense Manpower Data Center. The PERSTEMPO dataset includes information dating back to October 2000 and is comprised of a record for each time a service member, pursuant to orders, is performing active service by participating in a training exercise or operation at a location that makes it infeasible for the member to spend off-duty time in the housing in

which the member resides (US Code: Title 10, Chapter 50). The Defense Manpower Data Center was able to provide monthly data on the total number of military active duty service members permanently residing in Texas, as well as the number of individuals in each month who departed to or returned from PERSTEMPO deployment. These data were stratified based on whether the soldier was listed as having at least one child. PERSTEMPO data included in the analyses were restricted to departures to and returns from operation-related deployments. That is, soldiers who left home for training, funeral honors duty, disciplinary action, hospitalization, etc. were excluded. The operational deployment data was used to calculate the monthly percentages of (1) total active duty military personnel and (2) active duty military personnel with at least one child who departed to/returned from operation-related deployment. Because the number of soldiers residing in Texas was likely to change over the study period (i.e. the denominator), percentages were used in the analyses rather than the actual number of soldiers who departed to or returned from operational deployment.

B. Data Analyses

The terms incidence and prevalence are commonly used to describe the occurrence of diseases in populations, however they are limited in their applicability to child abuse and neglect. The term “prevalence” does not adequately describe the data in the NCANDS Child File. The data included in these analyses count only child maltreatment that is known to and substantiated by child protective services in Texas. Further, maltreatment may continue for many years before being detected or may never be detected. Therefore, substantiated reports of child abuse and neglect indicate an undercount of the true extent of the problem and do not represent the prevalence of maltreatment in the population. Likewise, the term “incidence” is inappropriate because children may experience multiple incidents of substantiated

maltreatment or children may appear in the Child File only once although their maltreatment is ongoing. Therefore the term “rate of occurrence of substantiated maltreatment” is used in these analyses to describe child maltreatment reported and substantiated within the study period.

B.1. Analyses to address Specific Aim 1 – To compare the occurrence of child maltreatment in military and non-military families by analyzing data from a single data source that collects standardized information on both military and non-military populations.

Two approaches compared the rate of occurrence of substantiated child maltreatment in military and non-military families: one focused on substantiated child victims of maltreatment and one focused on perpetrators of substantiated child maltreatment. The first strategy identified a child victim as living in a military family if she/he was the legal dependent of an individual on active duty in the Armed Services of the United States, which includes active duty in the Army, Navy, Air Force, or Marine Corps (members of Inactive Reserve or National Guard, or retired military members were not considered active duty). A child victim in a non-military family was a person who was not identified as the legal dependent of an individual on active duty in the Armed Services. In the second approach, military perpetrators were defined in the dataset as those persons on active duty in the Armed Services of the United States; and non-military perpetrators were persons not on active duty in the Armed Services. Variables of interest for these analyses are defined in Table 4-4.

From a prevention standpoint the two strategies are complementary. A victim-focused analysis can elucidate characteristics of children at risk for experiencing substantiated child maltreatment and allow service providers to increase prevention, intervention, and surveillance activities among these individuals. Similarly, a perpetrator-

focused analysis enables service providers to tailor primary and secondary measures to those individuals most at risk of perpetrating child maltreatment.

B.1.a. Victim-focused Analysis

The NCANDS Child Files consist of records containing data for each child listed on a report of child maltreatment, referred to as report-child pairs. Because there may be multiple victims of substantiated child maltreatment per report, multiple reports of substantiated child maltreatment per victim, and/or multiple types of substantiated child maltreatment per child, the study size changes based on the analysis conducted (Figure 4-2). Figure 4-2 outlines the data structure used for the examination of report and child characteristics as well as calculating the rate of occurrence of substantiated maltreatment and the number of substantiated incidents of maltreatment.

There were 90,175 substantiated reports of abuse and neglect between January 1, 2000 and December 31, 2002. These reports were used to compare the report source between the military and non-military groups as well as post-investigation services for children of military and non-military families. Post-investigation services are provided or arranged for the child or family (i.e. at the level of the child or the level of the report) as a result of needs discovered during an investigation of alleged maltreatment. These services include family preservation, family support, foster care, and other services.

There were 125,255 unique children who had ever experienced substantiated maltreatment between January 1, 2000 and December 31, 2002. The first chronological record of each maltreated child (regardless of how many times the child was reported and substantiated) was used for assessing (1) the association of caretaker characteristics (including domestic violence, financial assistance, inadequate housing, and public assistance)

and (2) the rate of occurrence of substantiated maltreatment per 1,000 person-years at risk for particular child characteristics (including age, gender, and race/ethnicity). The last chronological record of each maltreated child was used to determine whether the child was a prior victim.

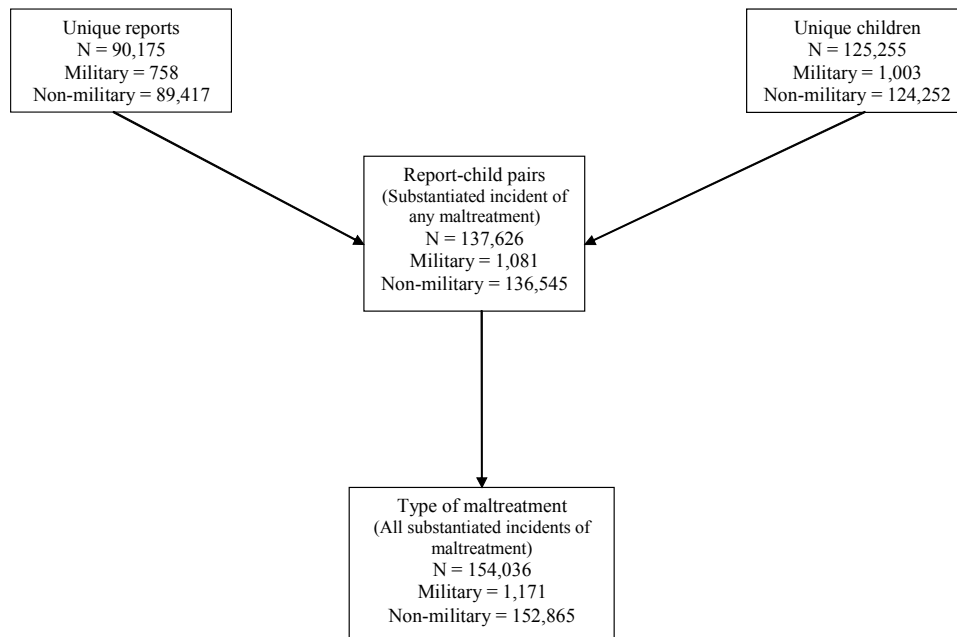
As seen in Figure 4-2, report-child pairs represent the combination of unique reports and unique children. The number of observation increases to 137,626 in this data structure because multiple children may be on one report and/or one child may appear on multiple reports over the study period. For example, if three children appeared on one report, there would be three separate entries (the report identification number paired with each child identification number) in this data structure or if one child experienced three separate incidents of maltreatment, the child identification number would be paired with three different report identification numbers. Thus, this file may contain both duplicated reports and duplicated children.

Report-child pairs were used for examining the distribution of receiving post-investigation services among children of military and children of non-military families as well as the rate of occurrence of substantiated maltreatment per 1,000 person-years at risk for each type of maltreatment in each year of the study period. Types of maltreatment include the following mutually-exclusive groups: physical abuse only, sexual abuse only, emotional/other abuse only (collapsed because of small numbers), neglect only, and more than one type of maltreatment.

Because up to four types of maltreatment may be reported for each child, the final count of 154,036 in Figure 4-2 represents the actual number of substantiated incidents of abuse or neglect. Types of substantiated incidents of maltreatment include the following

non-mutually exclusive groups: physical abuse, sexual abuse, emotional/other abuse and/or neglect.

Figure 4-2. Data structure for child characteristics, January 2000 – December 2002.



B.1.b. Perpetrator-focused Analysis

As with child-level analyses, there were multiple data structures employed in the analysis of perpetrators, since there may be multiple perpetrators per maltreated child, and vice versa. Figure 4-3 depicts the data structure used to examine perpetrator characteristics in the NCANDS Child File. There were 103,731 unique perpetrators during the study period. The first chronological record of each perpetrator was used for calculating the distribution of perpetrator characteristics, including age, gender, and race/ethnicity. The last chronological record of each perpetrator was used to determine whether the person was a prior perpetrator of substantiated maltreatment against a child. Unique perpetrators were identified based on their role as caretaker of the child victim. Risk factors of child maltreatment were compared for those military and non-military perpetrators identified as caretakers.

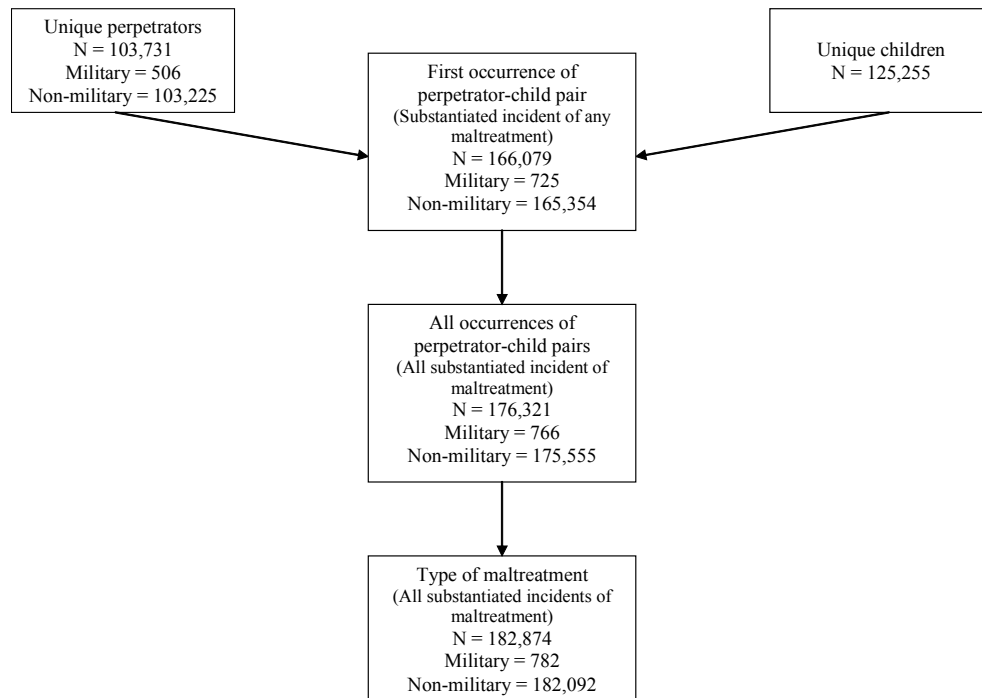
Unique perpetrators and unique children were combined to create perpetrator-child pairs because one child may have up to three perpetrators recorded in the Child File and/or one perpetrator may maltreat multiple children. For example, if two individuals perpetrate violence against one child, two entries would be found in the perpetrator-child pair file, each perpetrator identification number paired with the child identification number. Likewise, if one child was maltreated three times by the same perpetrator, there would be three entries in the perpetrator-child file in which the perpetrator identification number is paired with the child identification number.

The first chronological record of a unique perpetrator-child pair ($n = 166,079$) was used to calculate the association of relationship types (e.g. biological parent, other relative, etc.) between perpetrators and their child victims as well as the distribution of military and non-military perpetrators within military and non-military families. Because perpetrator-child pairs could appear more than once over the study period, all occurrences of perpetrator-child pairs ($n = 176,321$) were considered when calculating the type of substantiated maltreatment at the perpetrator level. Types of substantiated maltreatment include the following mutually exclusive groups: physical abuse only, neglect only, sexual abuse only, emotional/other abuse only, and more than one type of maltreatment. Finally, 182,874 incidents of substantiated maltreatment were perpetrated by individuals. The categorization consists of non-mutually exclusive groups, i.e. physical abuse, neglect, sexual abuse, and emotional/other abuse.

There are more types of substantiated maltreatment when examined at the level of the perpetrator ($n = 176,321$) rather than the level of the child ($n = 137,626$). This is due to the fact that although a child may be substantiated for physical abuse only, for example, that

abuse could be perpetrated by two individuals, resulting in one observation in the report-child file and two observations in the perpetrator-child file.

Figure 4-3. Data structure for perpetrator characteristics, January 2000 – December 2002.



B.1.c. Statistical Analyses

Overall rates of occurrence of each type of substantiated child maltreatment, including an additional category representing those children who experienced more than one type of maltreatment, were calculated for children of military families and non-military families. The numerator represented the sum of substantiated cases during the study period of January 1, 2000 to December 31, 2002. The denominator estimated the person-time at risk based on the sum of the PUMS data multiplied by the number of years of follow-up (3). That is, each person in the PUMS dataset contributed three years of person-time at risk, representing one year at risk for each study year (2000-2002). In addition to calculating overall rates of occurrence of substantiated child maltreatment, rates of occurrence of substantiated child maltreatment were also calculated for each year of the study period, and

for child and perpetrator demographic characteristics for which denominator data was available (age, gender, and race/ethnicity). When denominator data was unavailable, univariate distributions, Chi-square tests, and proportion ratios were calculated to compare report, child, caretaker, and perpetrator characteristics between the proportion of children in military families and the proportion of children without a military family member.

Relative effect measures of the rates of occurrence of each type of substantiated child abuse and neglect, along with the associated 95% confidence intervals, were calculated to compare children of military families to children of non-military families and military to non-military perpetrators. Children of non-military families and non-military perpetrators were the referent groups for these rate ratio calculations. A rate ratio greater than 1.0 indicates that children of military families/military perpetrators have a greater rate of occurrence of substantiated child maltreatment compared to children of non-military families/non-military perpetrators.

B.2. Analyses to address Specific Aim 2 - To examine the temporal trends in the occurrence of substantiated child maltreatment in military and non-military families and the impact of recent increases in deployment on the occurrence of substantiated child maltreatment in military families.

These analyses focused on the period from January 2000 through June 2003. Although child maltreatment data was available through September 30, 2003, we chose to exclude reports of child maltreatment that occurred after June 30, 2003 due to the average length of time to substantiation (approximately 42 days). The rate of occurrence of substantiated child maltreatment was calculated for (1) each category of age, race/ethnicity, and gender and (2) each reporting month of the study period. These rates were stratified by whether the child had a military family member. Negative binomial regression was also used to calculate the rate of occurrence of substantiated maltreatment, adjusting for potential

confounding by child age, gender, and race/ethnicity (McCullagh & Nelder, 1989; Gardner, Mulvey, & Shaw, 1995). Because overdispersion (variation greater than predicted under Poisson assumptions) was present when using Poisson regression to estimate the rates, negative binomial regression was used to account for the violation of the Poisson assumptions. Extra poisson variation was likely present in the models due to the lack of data on the distribution of person-time at risk by risk factors that are associated with the incidence of maltreatment, i.e. there was substantial under-stratification in the models. The negative binomial models provided an adequate fit to the data, with an over-dispersion parameter (Pearson's deviance divided by degrees of freedom) below 1.5 in all models. Confidence limit ratios (CLR) were calculated for all rate ratios (Poole, 2001) because precision varied between the military and non-military group (due to the larger size of the non-military group). Variables of interest in these analyses are outlined in Table 4-5.

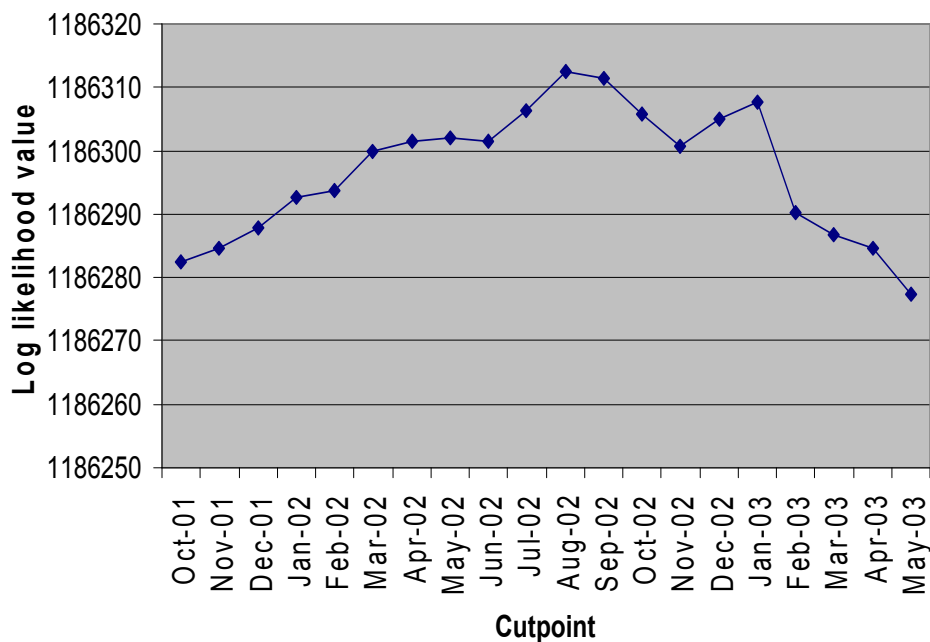
Four modeling strategies were implemented to estimate the rate of occurrence of substantiated child maltreatment among children in military and non-military families during the study period. In the first strategy, we assessed whether rates in children of military and non-military families differed in time (January 2000 through September 2002 vs. October 2002 through June 2003) by adding an interaction term with binary time to the regression models. To account for the potential confounding effects of child characteristics, age (<4; 4-11; 12-17), race/ethnicity (White, non-Hispanic; Other), and gender (Male; Female) were included in the models:

$$\text{Model (1.1) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{time} + \beta_3 \times \text{military} \times \text{time}$$

$$\text{Model (1.2) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{time} + \beta_3 \times \text{military} \times \text{time} + \beta_4 \times \text{age} + \beta_5 \times \text{race/ethn} + \beta_6 \times \text{gender}$$

To select the cutpoint for the binary time parameter, we fit all possible models that parameterized time in a binary function (a total of 20 models representing a potential cutpoint at each month from October 2001 to May 2003) and plotted the log likelihoods from these models, under the assumption that the model with the greatest predictive ability would maximize the log likelihood and be the most suitable cutpoint. A plot of the results (Figure 4-4) indicated a general, but non-specific, plateau between August 2002 and January 2003. We selected October 2002 as the cutpoint because it was central to the general “plateau” region and represented the one year anniversary of the mobilization of US troops post-September 11th.

Figure 4-4. Plot of log likelihoods from Negative Binomial Regression models (n=20).



The second strategy included a variable in the regression models that represented the monthly percentage of soldiers who entered into a PERSTEMPO deployment, where month was the unit of analysis. The child maltreatment data were restricted to October 1, 2000 through June 30, 2003 to account for the available months of PERSTEMPO data. Separate

models were run for the percentage of soldiers with dependents and the total percentage of all soldiers, and monthly percentages of departures were entered as a continuous variable and a dichotomous variable. For the continuous categorization (Models 2.1 through 2.4), interaction terms were included in the models to assess the change in the rate for each one percent increase in departures to operational-deployment for children in military and non-military families. Child's age, race/ethnicity, and gender were included as confounding variables:

$$\text{Model (2.1) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{total_departures} + \beta_3 \times \text{military} * \text{total_departures}$$

$$\text{Model (2.2) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{total_departures} + \beta_3 \times \text{military} * \text{total_departures} + \beta_4 \times \text{age} + \beta_5 \times \text{race/ethn} + \beta_6 \times \text{gender}$$

$$\text{Model (2.3) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{dependent_departures} + \beta_3 \times \text{military} * \text{dependent_departures}$$

$$\text{Model (2.4) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{dependent_departures} + \beta_3 \times \text{military} * \text{dependent_departures} + \beta_4 \times \text{age} + \beta_5 \times \text{race/ethn} + \beta_6 \times \text{gender}$$

To capture the impact of large percentages of monthly departures to operational deployment on the rate of occurrence of substantiated child maltreatment, a separate set of models was run with a dichotomous variable replacing the continuous categorization of departures. This dichotomous variable was categorized into months with at least three percent of the total strength departed to operational deployment and months in which less than three percent of the total strength departed to operational deployment.

The third strategy was identical to the second with the monthly percentage of soldiers returning from PERSTEMPO deployment replacing the monthly percentage of soldiers entering into PERSTEMPO deployment:

$$\text{Model (3.1) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{total_returns} + \beta_3 \times \text{military} * \text{total_returns}$$

$$\text{Model (3.2) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{total_returns} + \beta_3 \times \text{military} * \text{total_returns} + \beta_4 \times \text{age} + \beta_5 \times \text{race/ethn} + \beta_6 \times \text{gender}$$

$$\text{Model (3.3) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{dependent_returns} + \beta_3 \times \text{military} * \text{dependent_returns}$$

$$\text{Model (3.4) } \ln(\text{rate}) = \beta_0 + \beta_1 \times \text{military} + \beta_2 \times \text{dependent_returns} + \beta_3 \times \text{military} * \text{dependent_returns} + \beta_4 \times \text{age} + \beta_5 \times \text{race/ethn} + \beta_6 \times \text{gender}$$

To explore who was responsible for perpetrating child maltreatment in each reporting month, we limited our analysis to military families and calculated the proportion of military and non-military perpetrators who were identified as caretakers within these families for each reporting month of the study period. A Chi-square statistic was calculated to determine whether significant differences appeared over time.

C. References

- Gardner W, Mulvey EP, & Shaw EC. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin*, 118, 392-404.
- McCullagh P & Nelder JA. (1989). *Generalized Linear Models*. New York, NY: Chapman & Hall; 198-199.
- Poole C. (2001). Low P-Values or Narrow Confidence Intervals: Which Are More Durable? *Epidemiology*, 2, 291-294.
- U.S. Census Bureau (2005). *American Community Survey 1999-2001 and Census 2000 Comparison Study*. Available at: http://www.census.gov/acs/www/AdvMeth/acs_census/index.htm. Accessed November 13, 2005.
- U.S. Census Bureau (2005). *Using the Data: Quality Measures*. Available at: <http://www.census.gov/acs/www/UseData/sse/sam/tx.htm>. Accessed November 13, 2005.
- U.S. Code. Title 10: Chapter 50. (2004). *Miscellaneous Command Responsibilities*.
- U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau (2005). *National Child Abuse and Neglect Data System (NCANDS) Child File*. Available from the National Data Archive on Child Abuse and Neglect Website, <http://www.ndacan.cornell.edu>.

Table 4-1. Family status of child victims for two years of NCANDS data, 2000-2001.

NCANDS Reporting State									
	Arkansas n (%)	Kansas n (%)	Kentucky n (%)	Maine n (%)	Nebraska n (%)	Rhode Island n (%)	Texas n (%)	Utah n (%)	Wyoming n (%)
<i>NCANDS 2000</i>									
Military	--	107 (0.4)	28 (<0.1)	24 (0.3)	29 (0.3)	9 (0.1)	1,268 (0.7)	1 (<0.1)	3 (0.1)
Non-military	--	30,513 (99.6)	25,186 (39.4)	9,661 (99.8)	9,963 (99.7)	2,374 (21.0)	192,512 (99.4)	255 (1.0)	3,860 (99.9)
Unknown	--	0 (--)	38,731 (60.6)	0 (--)	2 (<0.1)	8,905 (78.9)	0 (--)	24,834 (99.9)	0 (--)
Total	--	30,620	63,945	9,685	9,994	11,288	193,780	25,090	3,863
<i>NCANDS 2001</i>									
Military	1 (< 0.1)	30 (0.4)	29 (<0.1)	12 (0.1)	26 (0.2)	16 (0.1)	1,186 (0.6)	--	2 (0.1)
Non-military	0 (--)	7,777 (99.6)	24,781 (43.9)	9,151 (99.9)	10,676 (97.3)	1,962 (17.7)	196,438 (99.4)	--	4,181 (99.9)
Unknown	25,632 (100)	0 (--)	31,637 (56.1)	0 (--)	3 (<0.1)	9,083 (82.1)	0 (--)	--	0 (--)
Total	25,633	7,807	56,447	9,163	10,705	11,061	197,624	--	4,183
<i>Total</i>									
Military	1(< 0.1)	137 (0.4)	57 (<0.1)	36 (0.2)	55 (0.3)	25 (0.1)	2,454 (0.6)	1 (<0.1)	5 (0.1)
Non-military	0 (--)	38,290 (99.6)	49,967 (41.5)	18,812 (99.8)	20,639 (99.7)	4,336 (19.4)	388,950 (99.4)	255 (1.0)	8,041 (99.9)
Unknown	25,632 (100)	0 (--)	70,368 (58.5)	0 (--)	5 (<0.1)	17,988 (80.5)	0 (--)	24,834 (99.9)	0 (--)
Total	25,633	38,427	120,392	18,848	20,699	22,349	391,404	25,090	8,046

Table 4-2. American Community Survey sample sizes in the state of Texas.

Year	Initial Addresses Selected	Final Interviews	Percent Complete
2003	51,586	32,795	63.6
2002	46,221	28,982	62.7
2001	49,581	32,343	65.2
2000	52,444	32,369	61.7

Source: Using the Data: Quality Measures; US Census Bureau, 2005

Table 4.3 Comparison of general demographic characteristics between ACS and Census 2000 data.

	1999-2001 ACS Estimate	1999-2001 ACS Percentage	Census 2000 Sample Estimate	Census 2000 Sample Percentage	ACS - Census Difference	Margin of Error of Difference	Statistically Significant
Total population	12,241	(NA)	12,160	(NA)	81	*****	- -
<i>SEX AND AGE</i>							
Male	1,671,419	49.7%	1,665,350	49.6%	0.1%	+/-0.1%	no
Female	1,694,477	50.3%	1,693,080	50.4%	-0.1%	+/-0.1%	no
Under 5 years	285,346	8.5%	278,250	8.3%	0.2%	+/-0.1%	yes
5 to 9 years	280,387	8.3%	281,370	8.4%	-0.1%	+/-0.2%	no
10 to 14 years	269,983	8.0%	268,710	8.0%	0.0%	+/-0.2%	no
15 to 19 years	248,806	7.4%	246,480	7.3%	0.1%	+/-0.1%	no
20 to 24 years	247,847	7.4%	246,730	7.3%	0.1%	+/-0.1%	no
25 to 34 years	564,846	16.8%	560,180	16.7%	0.1%	+/-0.1%	yes
35 to 44 years	552,534	16.4%	572,020	17.0%	-0.6%	+/-0.1%	yes
45 to 54 years	434,615	12.9%	431,980	12.9%	0.0%	+/-0.1%	no
55 to 59 years	139,938	4.2%	135,600	4.0%	0.2%	+/-0.1%	yes
60 to 64 years	99,131	2.9%	97,610	2.9%	0.0%	+/-0.1%	no
65 to 74 years	144,356	4.3%	142,920	4.3%	0.0%	+/-0.1%	no
75 to 84 years	77,462	2.3%	76,640	2.3%	0.0%	+/-0.1%	no
85 years and over	20,646	0.6%	20,130	0.6%	0.0%	+/-0.1%	no

Source: Comparison study for Harris County, TX; US Census Bureau, 2005

Table 4-4. Definitions and categorizations for variables used in the analyses for Specific Aim 1.

Variable	Definition	Categorization
<i>Report Characteristics</i>		
Report source	The category or role of the person who makes a report of alleged maltreatment	Social Services Personnel Medical Personnel Mental Health Personnel Legal, Law Enforcement, Criminal Justice Education Personnel Child Day Care Provider Substitute Care Provider Alleged Victim Parent Other Relative Friends/Neighbor Alleged Perpetrator Anonymous Reporter Unknown or other
<i>Child Characteristics</i>		
Military family member	A person who is the legal dependent of an individual on active duty in the Armed Services of the United States. Excluded are members of the Inactive Reserves, National Guard or retired military members.	Yes No
Age at report	Age, calculated in years, as of the date of the report of alleged child maltreatment	Under 1 1 to 3 4 to 7 8 to 11 12 to 15 16 to 17
Gender	Child's gender	Male Female
Race/Ethnicity	A combination of the Child's race and Hispanic or Latino origin	White, non-Hispanic Black, non-Hispanic Other, non-Hispanic Hispanic
Prior victim	The existence of previous substantiated or indicated incidents of maltreatment of the child victim	Yes No
Maltreatment type	Form of child maltreatment in a report that is determined by investigation to be substantiated or indicated under State law	Physical abuse only Neglect or deprivation of necessities only Sexual abuse only Emotional/Other maltreatment only More than one type of abuse
<i>Caretaker Characteristics</i>		
Domestic violence	Incidents of inter-spousal physical or emotional abuse perpetrated by one of the spouses or parent figures upon the other spouse or parent figure in the child victim's home environment	Yes No
Inadequate housing	A risk factor related to substandard, overcrowded, unsafe, or otherwise inadequate housing conditions, including homelessness	Yes No
Financial problem	A risk factor related to the family's inability to provide sufficient financial resources to meet minimum needs	Yes No

Public assistance	Any one or more combination of the following welfare or social services programs: AFDC, General Assistance, Medicaid, SSI, Food stamps, etc.	Yes No
<i>Perpetrator Characteristics</i>		
Military member	A person on active duty in the Armed Services of the United States. This term includes active duty in the Army, Navy, Air Force, or Marine Corps. Excluded are members of the Inactive Reserves, National Guard or retired military members.	Yes No
Relationship	Refers to the primary role of the perpetrator with the child victim of maltreatment	Parent Other relative Foster parent Residential facility staff Child day care provider Unmarried partner of parent Legal guardian Unknown or other
Age at report	Perpetrator's age, calculated in years, as of the date of the report of alleged child maltreatment	19 or younger 20 to 19 30 to 39 40 to 49 50 or older
Gender	Perpetrator's gender	Male Female
Race	A combination of the Perpetrator's race and Hispanic or Latino origin	White, non-Hispanic Black, non-Hispanic Other, non-Hispanic Hispanic
As a caretaker	The person who has been determined to have caused or knowingly allowed the maltreatment of the child was also responsible for the care and supervision of the child at the time of the maltreatment	Yes No
Relationship	Refers to the primary role of the perpetrator with the child victim of maltreatment	Biological parent Other parent Unmarried partner of parent Other relationship
Family of child victim	Describes whether the child victim was a member of a military or non-military family	Military Non-military
Prior abuser	The recording in the State information system of previous substantiated or indicate incidents of child maltreatment by the perpetrator	Yes No
Alcohol abuse-Caretaker	The principal caretaker(s)' compulsive use of alcohol that is not of a temporary nature	Yes No
Drug abuse-Caretaker	The principal caretaker(s)' compulsive use of drugs that is not of a temporary nature	
Maltreatment type	The perpetrator was involved in the corresponding maltreatment type on the record for a specific child, and this maltreatment was determined by investigation to be substantiated or indicated under State law	Physical abuse only Neglect or deprivation of necessities only Sexual abuse only Emotional/Other maltreatment only More than one type of abuse

Table 4-5. Definitions and categorizations for variables used in the analyses for Specific Aim 2.

Variable	Definition	Categorization
Military family member	A person who is the legal dependent of an individual on active duty in the Armed Services of the United States	Yes No
Age at report	Age, calculated in years, as of the date of the report of alleged child maltreatment	Under 4 4 to 11 12 to 17
Gender	Child's gender	Male Female
Race/Ethnicity	A combination of the Child's race and Hispanic or Latino origin	White, non-Hispanic Other
Time	Binary time used for models examining rate of maltreatment in entire study period, January 2000 to June 2003	October 1, 2002 to June 20, 2003 January 1, 2000 to September 30, 2002
Departures	Monthly percentage of total strength who departed to operation-related deployment during the study period, October 2000 to June 2003	Continuous
Returns	Monthly percentage of total strength who returned from operation-related deployment during the study period, October 2000 to June 2003	Continuous
Binary departures	Monthly percentage of total strength who departed to operation-related deployment during the study period, October 2000 to June 2003	$\geq 3\%$ of total strength < 3% of total strength
Binary returns	Monthly percentage of total strength who returned from operation-related deployment during the study period, October 2000 to June 2003	$\geq 3\%$ of total strength < 3% of total strength
Offset	The denominator for the calculation of the incidence rate is derived from the US Census 2000 for the state of Texas.	Log of the population estimate

V. Occurrence of Child Maltreatment in Military and Non-military Families

A. Introduction

In 2003, approximately 906,000 children were victims of maltreatment in the United States, a prevalence rate of 12.4 per 1,000 children (US Department of Health and Human Services [DHHS], 2005). The negative effects of abuse and neglect can be long-lasting for the victimized child and may include adverse psychological, physical, behavioral, academic, sexual, interpersonal, and self-perceptual consequences as well as subsequent violence experiences and perpetration (Latimer, 1998). Child maltreatment is estimated to cost \$94 billion each year (Fromm, 2001).

Child maltreatment has been addressed separately in the military and civilian populations, with each establishing surveillance systems and conducting research in its respective community (PL 93-247, PL 100-294, DHHS, 2005). As a result, it is unclear how military rates of child maltreatment compare to civilian rates of child maltreatment. Two studies have suggested higher child maltreatment rates in military populations (Gessner & Runyan, 1995; North Carolina Child Advocacy Institute, 2004), two have suggested lower rates in military populations (Raiha & Soma, 1997; McCarroll, Ursano, Fan, & Newby, 2004a), and two found mixed results (Dubanoski & McIntosh, 1984; McCarroll, Ursano, Fan, & Newby, 2004b). These contradictory results are likely due to differences in methodologies. Some studies compared cases of military and non-military child maltreatment from different sources (two studies compared central registry data to a national dataset and one study compared central registry data to national statistics), while others

focused on only very severe maltreatment (child fatalities and shaken baby syndrome). Furthermore, the methods used to report, track, and substantiate child maltreatment cases are not standardized between military and civilian populations (McCurdy & Daro, 1994); the definitions of abuse and neglect vary between the two populations (McCarroll et al., 2004a); and referrals of maltreatment come from different sources (DHHS, 2005; Wardinsky & Kirby, 1981; Mollerstrom, Patchner & Milner).

An analysis of data on child maltreatment within military and non-military populations that come from a single data source can identify characteristics within each population that protect against the occurrence of child maltreatment and inform future prevention and intervention efforts. Therefore the purpose of this study was to compare the occurrence of child maltreatment and the characteristics of child victims and their perpetrators between military and non-military populations by analyzing data from a national surveillance system.

B. Methods

B.1. Data Source

Data for these analyses come from the Child File of the National Child Abuse and Neglect Data System (NCANDS), a reporting system based on voluntary state participation. NCANDS is the primary source of national information on maltreated children reported to state child protective services (CPS) agencies and is maintained by the National Data Archive on Child Abuse and Neglect (Cornell University, Ithaca, NY). The Child File consists of the most detailed information at the level of the child, including data on child, caretaker, and perpetrator demographics, investigations, types of maltreatment, and services.

All data included in NCANDS have been reviewed and validated by the NCANDS Technical Team.

All reports of child maltreatment in the state of Texas that received a disposition of substantiation from January 1, 2000 through December 31, 2002 were the focus of these analyses. Substantiated cases are those in which the allegation of maltreatment or risk of maltreatment was supported or founded by State law or State policy. Texas was selected because of the completeness and quality of its NCANDS data and its large military population. Two approaches were used to analyze the data. First, the child-focused analysis compared children in military and non-military families based on their maltreatment experiences and characteristics. Children in military families were defined in NCANDS as being the legal dependent of an individual on active duty in the Armed Services of the United States, which includes active duty in the Army, Navy, Air Force, or Marine Corps (members of Inactive Reserve or National Guard, or retired military members are excluded). Second, the perpetrator-focused analysis compared the characteristics of military and non-military perpetrators of substantiated child maltreatment. Military perpetrators were defined as those persons identified in NCANDS as being on active duty in the Armed Services of the United States.

B.2. Child-focused analysis

The NCANDS Child Files consist of records containing data for each child listed on a report of child maltreatment, referred to as report-child pairs. Because there may be multiple victims of substantiated child maltreatment per report, multiple reports of substantiated child maltreatment per victim, and/or multiple types of substantiated child maltreatment per child, the study sample size changes based on the analysis conducted (see Figure 4-2 in Methods).

There were 90,175 reports of substantiated child maltreatment and 125,255 unique children who had ever experienced substantiated maltreatment over the three year study period. Report-child pairs represent the combination of unique reports and unique children. There were 137,626 report-child pairs because multiple children may be on one report and/or one child may appear on multiple reports over the three year study period.

B.3. Perpetrator-focused analysis

As with the child-focused analysis, multiple approaches were employed in the analysis of perpetrators since there may be multiple perpetrators per maltreated child, and vice versa (see Figure 4-3 in Methods). There were 103,731 unique perpetrators in the three year study period. Unique perpetrators and unique children were combined to create perpetrator-child pairs because one child may have up to three perpetrators recorded in the Child File and/or one perpetrator may maltreat multiple children. Both the first chronological record of a unique perpetrator-child pair ($n = 166,079$) and all occurrences of perpetrator-child pairs ($n = 176,321$) were used in these analyses.

There are more types of substantiated maltreatment when examined at the level of the perpetrator ($n = 176,321$) rather than at the level of the child ($n = 137,626$). This is due to the fact that although a child may be substantiated for physical abuse only, for example, that abuse could be perpetrated by two individuals, resulting in one observation in the report-child file and two observations in the perpetrator-child file.

B.4. Effect Measure: Rate of Occurrence

Although incidence and prevalence are commonly used to describe the occurrence of diseases in populations, they are limited in their applicability to child maltreatment. Because maltreatment may continue for many years before being detected or may never be detected,

substantiated reports of child abuse and neglect presumably indicate an undercount of the true extent of the problem. Therefore, the term “prevalence” does not adequately describe the data in the NCANDS Child File. Likewise, the term “incidence” is inappropriate because children may experience multiple incidents of substantiated maltreatment or children may appear in the Child File only once although their maltreatment is ongoing. To describe the data represented in the NCANDS Child File, we use the term “rate of occurrence of substantiated maltreatment” in this study.

B.5. Statistical Analyses

The rate of occurrence of substantiated maltreatment per 1,000 person-years at risk was calculated for each study year, as well as child and perpetrator characteristics for which denominator data were available (i.e. age, gender, race/ethnicity). Rate ratios of the occurrence of each type of substantiated maltreatment, along with 95% confidence intervals, were calculated to compare children of military families to children of non-military families. Denominator data for the calculation of the rates per 1,000 person-years of substantiated child maltreatment was taken from the US Census Bureau Public Use Microdata Sample (PUMS) files for the state of Texas. The Texas State Data Center tabulated the number of children ages 17 and under with and without at least one family member on active duty in the military as well as the number of adults (ages 18 and over) who were and were not active duty military personnel, categorized by age, sex, race, and ethnicity. When denominator data was unavailable, the distributions of report, child, caretaker, and perpetrator characteristics were calculated and compared using Chi-square tests. Proportion ratios and 95% confidence intervals were calculated to compare proportions between children in military and non-military families and military and non-military perpetrators.

This study received approval from the UNC Public Health Institutional Review Board.

C. Results

The overall rate of occurrence of substantiated maltreatment from 2000 to 2002 was lower for children in military families (5.05 per 1,000 person-years, 95% confidence interval [CI]: 4.76-5.36) compared to children in non-military families (7.89 per 1,000 person-years, 95% CI: 7.85-7.93). Thus the maltreatment occurrence ratio comparing military to non-military families was 0.64 (95% CI: 0.60-0.68).

C.1. Child-focused analysis

Table 5-1 presents the rates of occurrence of substantiated maltreatment for children in military and non-military families. Relative to children in non-military families, the rate of substantiated maltreatment for children in military families was 23% lower for physical abuse only (95% CI = 0.78, 0.97), 36% lower for neglect only (95% CI = 0.58, 0.69), 55% lower for sexual abuse only (95% CI = 0.37, 0.55), and 60% lower for emotional/other abuse only (95% CI = 0.23, 0.69). The rate of more than one type of substantiated maltreatment in children of military families was 54% lower than that of children in non-military families (95% CI = 0.37, 0.57).

Except for children of military families aged 16 and 17, children of non-military families experienced more substantiated maltreatment for all age, gender, and race/ethnicity groups (Table 5-1). Children under the age of one experienced the highest rate of occurrence of substantiated child maltreatment in both military (Rate = 6.65; 95% CI = 5.51, 7.96) and non-military (Rate = 16.21; 95% CI = 15.96, 16.46) families, compared to all other age groups. Relative to children in non-military families, the rate for children in military families

was significantly lower for all age groups except 16 and 17 year olds. In this age group, children in military families were almost equally as likely as those in non-military families to experience substantiated maltreatment (Rate Ratio [RR] = 1.11; 95% CI = 0.78, 1.57). The rate of occurrence of substantiated maltreatment decreased in both children of military and children of non-military families as age increased.

Within military families, females were equally as likely as males to experience substantiated maltreatment (Proportion Ratio [PR] = 1.05; 95% CI = 0.93, 1.19), whereas the rate of occurrence of substantiated maltreatment in non-military families was 19% greater for females compared to males (PR = 1.19; 95% CI = 1.18, 1.21). Relative to children in non-military families, the rate of occurrence of substantiated maltreatment was 30% lower for males (RR = 0.70; 95% CI = 0.64, 0.76) and 38% lower for females (RR = 0.62; 95% CI = 0.56, 0.67) in military families.

African-Americans of non-Hispanic ethnicity experienced the highest rates of occurrence of substantiated maltreatment among children in military and non-military families (Rate = 7.27; 95% CI = 6.48, 8.14 and Rate = 11.46; 95% CI = 11.31, 11.60, respectively) (Table 5-1). Relative to children in non-military families, the rate of occurrence of substantiated maltreatment was 37% lower for Non-Hispanic White and Non-Hispanic African-American children (RR = 0.63; 95% CI = 0.58, 0.69 and RR = 0.63; 95% CI = 0.57, 0.71, respectively) and 44% lower for Hispanic children (RR = 0.55; 95% CI = 0.47, 0.64) in military families. No statistically significant differences were found between military and non-military children of all other races of non-Hispanic ethnicity (RR = 0.88; 95% CI = 0.69, 1.11).

Children in military families were less likely to be a prior victim of substantiated maltreatment (PR = 0.71; 95% CI = 0.61, 0.83) and post-investigation services were provided equally to children of military and children of non-military families (38.5% and 39.5%, respectively). A major difference found in the child-focused analysis was that a significantly smaller proportion of caretakers of children in military families compared to non-military families reportedly had financial problems (PR = 0.28; 95% CI = 0.21, 0.36) and received public assistance (PR = 0.32; 95% CI = 0.26, 0.38) (Table 5-2). A greater proportion of caretakers in military families reportedly resided in inadequate housing (PR = 1.72; 95% CI = 1.17, 2.52), but the sample size was small for this calculation.

C.2. Perpetrator-focused analysis

For military and non-military perpetrators, the highest rate of occurrence of substantiated maltreatment was for neglect only (Rate = 1.29; 95% CI = 1.17, 1.42 for military and Rate = 2.31; 95% CI = 2.30, 2.33 for non-military), but the proportion of physical abuse only was much higher among military perpetrators than non-military perpetrators (PR = 1.64; 95% CI = 1.48, 1.82). The highest rate was seen in military perpetrators ages 30 to 39 years old (Rate = 2.05; 95% CI = 1.76, 2.36), followed closely by 20 to 29 year olds (Rate = 1.90; 95% CI = 1.69, 2.13) (Table 5-3). For non-military perpetrators, age was inversely associated with the rate of occurrence of substantiated child maltreatment. The highest rate of maltreatment was seen in perpetrators aged 18 to 20 years old (Rate = 5.76; 95% CI = 5.66, 5.87) and the lowest rate was found in the 50 and older age group (Rate = 0.43; 95% CI = 0.42, 0.45).

Although there were four times as many male as female military perpetrators, the rate of occurrence of substantiated child maltreatment was not significantly different between the

groups (PR = 0.83; 95% CI = 0.67, 1.03). Non-military perpetrators were more evenly distributed with respect to gender (45.5% for males and 55.5% for females) and the rate of occurrence of substantiated child maltreatment was 16% lower for females compared to male non-military perpetrators (PR = 0.84; 95% CI = 0.83, 0.86). Relative to non-military perpetrators, the rate among military perpetrators was approximately 20% lower for males and females (RR = 0.77; 95% CI = 0.70, 0.85 for males and RR= 0.78; 95% CI = 0.65, 0.95 for females).

Non-Hispanic African-Americans had the highest rate of occurrence of substantiated maltreatment among military and non-military perpetrators. However, relative to non-military perpetrators, the rates among military perpetrators were 26% lower for non-Hispanics Whites, 33% lower for non-Hispanic African-Americans, and 44% lower for Hispanics of any race (Table 5-3). The rate was similar for military and non-military perpetrators of all other races of non-Hispanic descent (PR = 1.04; 95% CI = 0.52, 2.10).

Military perpetrators were more often caretakers of their child victims relative to non-military perpetrators (PR = 1.14; 95% CI = 1.13, 1.16) and were almost always the parent of the victim (94.5%) (Table 5-4). The proportion of military perpetrators who were prior child abusers was 33% lower than that of non-military perpetrators (PR = 0.67; 95% CI = 0.53, 0.85). Alcohol and drug abuse were present among military and non-military perpetrators identified as caretakers, although the proportions of both characteristics were much greater in non-military families (3.1% vs. 14.6% for alcohol abuse and 2.1% vs. 21.0% for drug abuse).

D. Discussion

For each type of maltreatment, children of military families had a lower rate of occurrence of substantiated maltreatment than children of non-military families. The

characteristics most associated with the highest rate of occurrence of substantiated maltreatment among children of military and non-military families were being under the age of one; being female; and being a non-Hispanic African-American. Additionally, non-military families more often experienced financial problems and the need for public assistance compared to military families. However, this is almost undoubtedly due to the fact that each military family has at least one employed parent.

There are a number of fundamental differences between the military and general U.S. population that may lead to lower child maltreatment rates in military families. In the general population, certain family characteristics are risk factors for child maltreatment, including poverty and unemployment (Sedlak & Broadhurst, 1996; Black, 2000; Lee & George, 1999), a lacking social network (Bishop & Leadbeater, 1999), and the presence of substance abuse (Ammerman, Kolko, Kirisci, Blackson, & Dawes, 1999; Besinger, Garland, Litrownik, & Landsverk, 1999; DHHS, 2005). Given the inherent structure of the military lifestyle, these risk factors are not as present in most military families. At least one member of a military family has full-time employment. Military families also have access to health care and support programs, as well as housing provided or funded by the government (McCarroll et al., 2004a). Additionally, military personnel may be discharged from the military upon discovery of severe mental health, alcohol, or drug use problems (Raiha and Soma, 1997). The military also attracts a disproportionate number of ethnic minorities compared to other professions and provides training and educational opportunities (Owens, 1992; Teachman, Call, & Segal, 1993). In the military as a whole, only 0.9% of enlisted military personnel have no high school diploma or GED (Military Family Resource Center, 2003), which is a large contrast to the 24.4% of the Texas adult population (ages 18 and

older) with no high school diploma or GED (US Census Bureau, 2000). Additionally, 12% of Texas families live below the poverty level. The fact that differences in the rate of occurrence of substantiated maltreatment exist between military and non-military families suggests that family stressors such as low income and public assistance, which are both proxies for poverty, may play a role in increasing the incidence of child maltreatment. The rate of occurrence of substantiated maltreatment may be more comparable between military and non-military families with similar family characteristics.

Although there are a number of protective factors in military families, the military lifestyle creates stresses that could increase family dysfunction. For example, soldiers experience geographic mobility in the form of training, temporary assignment, relocation, or deployment, and tend to have long work schedules. These factors may cause disruption to family life, increase stress, and may precipitate maltreatment.

Military perpetrators with the highest rate of substantiated maltreatment were aged 30 to 39; female; and non-Hispanic African-American. However the greatest proportions of military perpetrators were aged 20 to 29; male; and non-Hispanic White. Because Caucasians comprise 64.2% of the US active duty military population, 65.5% are 30 years old and younger, and 85% are males (Military Family Resource Center, 2003), it is not surprising that the majority of the military perpetrators have the same characteristics. Once population estimates for the number of adults who were and were not active duty military personnel, categorized by age, sex, race, and ethnicity, were included in the calculations, military perpetrators rates differed from proportions.

Physical abuse was the only type of child maltreatment that was more often substantiated and had a higher rate of occurrence among military and non-military

perpetrators. This may be a function of the distribution of gender between the perpetrators in that more men comprise the military and men in the military have been found to perpetrate more physical violence than women (Mollerstrom et al., 1995). Military perpetrators were overwhelmingly male and were more often than non-military perpetrators to be caretakers of the child victims. In military families, both military and non-military perpetrators were responsible for the occurrence of substantiated child maltreatment, suggesting that detection and prevention programs in the military should be focused on the entire family, with specific consideration given to the male military personnel.

In general, studies examining child maltreatment in the military have been limited in their attempts to implement standard epidemiological methods. Many are purely descriptive in nature because the authors have been unable to ascertain a denominator for the calculation of the rate of child maltreatment. The main limitation of the current literature comparing the extent of military and non-military maltreatment is that most authors compared data from two separate sources (a military database and a non-military database) that most likely differed in the way the data were collected and the definitions of abuse and neglect that were employed. Finally, a problem that faces all research focused on reported abuse and neglect is the potential for underreporting. Unfortunately, at this time, there is limited data available in both the military and non-military communities that quantify the extent of underreporting for the types of child maltreatment and how this might differ between military and non-military populations.

This study has many strengths. It is the first study that analyzed child abuse and neglect within military and non-military populations that used data from a single source representing data from a national surveillance system. And, because the analyses focus on

one state, concern over methodological differences in reporting, tracking, and substantiating abuse and neglect were reduced. Procedures for collecting, recording, and submitting child maltreatment information are generally established at the state-level, so each county/region within the state is encouraged to use the same definitions and criteria for maltreatment.

Although the current study advances the current literature on child abuse and neglect in the military, there are limitations. Validating military status in NCANDS and the U.S. Census population statistics against records for each branch of the military in Texas was not possible in this study. Therefore, it is plausible that misclassification of military status occurred for child, perpetrator, and population data, which could introduce bias into the study. Also, the number of substantiated maltreatment cases among children with a military family member in NCANDS is likely an underestimate due to the fact that not all military child maltreatment cases substantiated by military personnel will necessarily be reported to child protective services agencies (McCarroll et al, 2004a) and/or child protective services agencies may not correctly identify a child as a member of a military family.

Future studies would benefit from validating the military affiliation of perpetrators and their children, exploring additional sources of denominator data for rate calculations, and comparing military and non-military families with similar family characteristics. Though the rates of occurrence of child maltreatment were found to be lower in military families, the military is encouraged to continue its detection and prevention programs that focus on the entire family. By focusing interventions to at-risk children and at-risk perpetrators, the long term costs to society associated with child abuse and neglect will likely be reduced.

E. References

- Ammerman R, Kolko D, Kirisci L, Blackson T, & Dawes M. (1999). Child abuse potential in parents with histories of substance abuse disorder. *Child Abuse & Neglect*, 23, 1225-1238.
- Besinger B, Garland A, Litrownik A, & Landsverk J. (1999). Caregiver substance abuse among maltreated children placed in out-of-home care. *Child Welfare*, 78, 221-239.
- Bishop S & Leadbeater B. (1999). Maternal social support patterns and child maltreatment: Comparison of maltreating and nonmaltreating mothers. *American Journal of Orthopsychiatry*, 69, 172-181.
- Black M. (2000). The roots of child neglect. In R.M. Reece (Ed.), *Treatment of child abuse: Common mental health, medical, and legal practitioners*. Baltimore, MD: Johns Hopkins University Press.
- Dubanoksi RA & McIntosh SR. (1984). Child abuse and neglect in military and civilian families. *Child Abuse & Neglect*, 8, 55-67.
- Fromm S. (2001). *Total estimated cost of child abuse and neglect in the United States—statistical evidence*. Chicago (IL): Prevent Child Abuse America (PCAA). Available at: http://www.preventchildabuse.org/learn_more/research_docs/cost_analysis.pdf. Accessed April 1, 2005.
- Gessner RR & Runyan DK. (1995). The shaken infant: A military connection? *Archives of Pediatrics & Adolescent Medicine*, 149, 467-9.
- Latimer J. (1998). *The Consequences of Child Maltreatment: A Reference Guide for Health Practitioners*. Ottawa: Health Canada. Available at: <http://www.hc-sc.gc.ca/hppb/familyviolence/html/98p057eO.html>. Accessed May 6, 2005.
- Lee B & George R. (1999). Poverty, early childbearing, and child maltreatment: A multinomial analysis. *Child and Youth Services Review*, 21, 755-780.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004a). Classification of the severity of the US Army and civilian reports of child maltreatment. *Military Medicine*, 169, 461-4.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004b). Comparison of U.S. Army and civilian substantiated reports of child maltreatment. *Child Maltreatment*, 9, 103-110.
- McCurdy K & Daro D. (1994). Child maltreatment: a national survey of reports and fatalities. *Journal of Interpersonal Violence*, 9, 75-94.

- Military Family Resource Center. (2003). *2003 Demographics: Profile of the Military Community*. [Accessed 2005 October 3]. Available at: <http://www.militaryhomefront.dod.mil>. Accessed June 9, 2005.
- Mollerstrom WW, Patchner MA, & Milner JS. (1995). Child maltreatment: the United States Air Force's response. *Child Abuse & Neglect*, 19, 325-34.
- North Carolina Child Advocacy Institute. (2004, September). *Reducing collateral damage on the home front: Child abuse homicides within military families and communities in North Carolina: Facts and recommendations*. Raleigh, NC: Author.
- Owens TJ. (1992). Where do we go from here?: Post-high school choices of American men. *Youth & Society*, 23, 452-477.
- Raiha NK & Soma DJ. (1997). Victims of child abuse and neglect in the US Army. *Child Abuse & Neglect*, 21, 759-768.
- Sedlak A & Broadhurst D. (1996). *The Third National Incidence Study of Child Abuse and Neglect: NIS 3*. U.S. Department of Health and Human Services.
- Teachman JD, Call, VR, & Segal MW. (1993). Family, work, and school influences on the decision to enter the military. *Journal of Family Issues*, 14, 291-313.
- U.S. Census Bureau (2000). Census 2000, Summary File 3. American Fact Finder. Available at: <http://factfinder.census.gov>. Accessed October 3, 2005.
- U.S. Department of Defense. (1992). *Family Advocacy Program* (Directive 6400.1). Washington, DC: Author.
- U.S. Department of Health and Human Services (DHHS), Administration on Children, Youth and Families. (2005). *Child Maltreatment 2003: Reports from the States to the National Child Abuse and Neglect Data System*. Washington, DC: U.S. Government Printing Office.
- U.S. Senate. (1974). *Child Abuse Prevention and Treatment Act* (Public Law #93-247). Washington, DC: Author.
- U.S. Senate (1988). *Child Abuse Prevention, Adoption, and Family Services Act of 1988*. (Public Law #100-294). Washington: Author.
- Wardinsky TD & Kirby W. (1981). A review of child maltreatment at a USAF medical center. *Military Medicine*, 146, 328-331.

Table 5-1. Rate of occurrence of substantiated child maltreatment per 1,000 person-years at risk from 2000 to 2002 for children of military and non-military families.

	Children in Military Families*		Children in Non-Military Families†		
	Number of cases (%)	Rate (95% CI) ‡	Number of cases (%)	Rate (95% CI) ‡	Rate Ratio (95% CI)§
<i>Substantiated incident of any maltreatment (n = 137,626)</i>					
Physical Abuse only	317 (29.3)	1.48 (1.32, 1.65)	29,393 (21.5)	1.70 (1.68, 1.72)	0.87 (0.78, 0.97)
Neglect only	575 (53.2)	2.69 (2.47, 2.91)	73,232 (53.6)	4.23 (4.20, 4.26)	0.64 (0.58, 0.69)
Sexual abuse only	92 (8.5)	0.43 (0.35, 0.52)	16,484 (12.1)	0.95 (0.94, 0.97)	0.45 (0.37, 0.55)
Emotional/Other abuse only	13 (1.2)	0.06 (0.03, 0.10)	2,630 (1.9)	0.15 (0.15, 0.16)	0.40 (0.23, 0.69)
More than one type of maltreatment	84 (7.8)	0.39 (0.32, 0.48)	14,806 (10.8)	0.86 (0.84, 0.87)	0.46 (0.37, 0.57)
<i>Unique child characteristics (n=125,255)#</i>					
Age at Report					
Under 1	113 (11.8)	6.65 (5.51, 7.96)	15,652 (13.1)	16.21 (15.96, 16.46)	0.41 (0.34, 0.49)
1 to 3	267 (27.8)	5.55 (4.92, 6.25)	24,734 (20.7)	8.78 (8.67, 8.89)	0.63 (0.56, 0.71)
4 to 7	283 (29.4)	5.09 (4.52, 5.70)	30,481 (25.5)	7.91 (7.82, 8.00)	0.64 (0.57, 0.72)
8 to 11	161 (16.7)	3.34 (2.85, 3.89)	24,682 (20.7)	6.25 (6.17, 6.33)	0.53 (0.46, 0.62)
12 to 15	107 (11.1)	3.24 (2.67, 3.90)	19,476 (16.3)	5.06 (4.99, 5.14)	0.64 (0.53, 0.77)
16 to 17	31 (3.2)	2.56 (1.77, 3.58)	4,354 (3.7)	2.31 (2.24, 2.38)	1.11 (0.78, 1.57)
Gender					
Male	514 (51.5)	4.55 (4.17, 4.96)	57,922 (46.8)	6.53 (6.48, 6.59)	0.70 (0.64, 0.76)
Female	485 (48.6)	4.80 (4.38, 5.24)	65,819 (53.2)	7.79 (7.73, 7.85)	0.62 (0.56, 0.67)
Race/Ethnicity					
White, Non-Hispanic	447 (45.5)	3.99 (3.63, 4.37)	46,424 (38.0)	6.31 (6.25, 6.36)	0.63 (0.58, 0.69)
African-American, Non-Hispanic	294 (29.9)	7.27 (6.48, 8.14)	24,286 (19.9)	11.46 (11.31, 11.60)	0.63 (0.57, 0.71)
Other, Non-Hispanic	69 (7.0)	3.90 (3.06, 4.91)	3,483 (2.9)	4.44 (4.30, 4.59)	0.88 (0.69, 1.11)
Hispanic	172 (17.5)	3.92 (3.37, 4.54)	48,035 (39.3)	6.82 (6.76, 6.88)	0.56 (0.50, 0.67)

* A person who is the legal dependent of an individual on active duty in the Armed Services of the United States.

† A person who is not the legal dependent of an individual on active duty in the Armed Services of the United States.

‡ Calculated rate is measured per 1,000 person-years at risk for children ages 17 and under. CI=confidence interval.

§ Children in non-military families used as referent group. CI=confidence interval.

Calculation based on first appearance of child, i.e. each child appears only once.

Table 5-2. Distribution of caretaker characteristics for unique children in military and non-military families, 2000-2002 (n = 125,555).

		Children in Military Families*	Children in Non-Military Families†	Proportion Ratio (95% CI)‡
		Number of cases (%)	Number of cases (%)	
Domestic Violence§				
	Yes	25 (2.5)	2,261 (1.9)	1.36 (0.92, 2.01)
	No	966 (97.5)	119,520 (98.1)	0.99 (0.98, 1.00)
	<i>P-value</i>		p = 0.12	
Inadequate Housing§				
	Yes	26 (2.6)	1,862 (1.5)	1.72 (1.17, 2.52)
	No	966 (97.4)	120,178 (98.5)	0.99 (0.98, 1.00)
	<i>P-value</i>		p < 0.01	
Financial Problem§				
	Yes	52 (5.2)	23,035 (18.7)	0.28 (0.21, 0.36)
	No	949 (94.8)	100,179 (81.3)	1.17 (1.15, 1.18)
	<i>P-value</i>		p < 0.001	
Public Assistance§				
	Yes	89 (8.9)	34,755 (28.2)	0.32 (0.26, 0.38)
	No	912 (91.1)	88,459 (71.8)	1.27 (1.24, 1.29)
	<i>P-value</i>		p < 0.001	

* A person who is the legal dependent of an individual on active duty in the Armed Services of the United States.

† A person who is not the legal dependent of an individual on active duty in the Armed Services of the United States.

‡ Children in non-military families used as referent group. CI=confidence interval.

§ Calculation based on first appearance of child, i.e. each child appears only once. Caretaker characteristics were determined for each child victim by child protective services.

Table 5-3. Rate of occurrence of substantiated child maltreatment per 1,000 person-years at risk from 2000 to 2002 for military and non-military perpetrators.

	Military Perpetrators*		Non-military Perpetrators†		Rate Ratio (95% CI)§
	Number of cases (%)	Rate (95% CI) ‡	Number of cases (%)	Rate (95% CI) ‡	
All occurrences of perpetrator-child pair (n=176,321)#					
Physical abuse only	251 (32.8)	0.83 (0.73, 0.94)	35,026 (20.0)	0.78 (0.78, 0.79)	1.06 (0.94, 1.20)
Neglect only	389 (50.8)	1.29 (1.17, 1.42)	103,268 (58.8)	2.31 (2.30, 2.33)	0.56 (0.51, 0.62)
Sexual abuse only	73 (9.5)	0.24 (0.19, 0.30)	20,927 (11.9)	0.47 (0.46, 0.48)	0.52 (0.41, 0.65)
Emotional/Other abuse only	6 (0.8)	0.02 (0.01, 0.04)	3,621 (2.1)	0.08 (0.08, 0.09)	0.25 (0.11, 0.55)
More than one type of maltreatment	47 (6.1)	0.16 (0.11, 0.21)	12,713 (7.2)	0.28 (0.28, 0.29)	0.55 (0.41, 0.73)
Unique perpetrator characteristics (n=103,731)*					
Age at Report					
Age 19 or Younger	7 (1.4)	0.22 (0.10, 0.44)	11,165 (10.8)	5.76 (5.66, 5.87)	0.04 (0.02, 0.08)
Age 20-29	284 (56.1)	1.90 (1.69, 2.13)	36,315 (35.2)	3.95 (3.91, 3.99)	0.48 (0.43, 0.54)
Age 30-39	178 (35.2)	2.05 (1.76, 2.36)	34,356 (33.3)	3.53 (3.49, 3.56)	0.58 (0.50, 0.67)
Age 40-49	34 (6.7)	1.16 (0.81, 1.59)	15,031 (14.6)	1.62 (1.59, 1.64)	0.71 (0.51, 1.00)
Age 50 or older	3 (0.6)	0.70 (0.19, 1.87)	6,299 (6.1)	0.43 (0.42, 0.45)	1.61 (0.52, 5.00)
Gender					
Male	405 (80.0)	1.62 (1.47, 1.79)	45,737 (44.5)	2.10 (2.09, 2.12)	0.77 (0.70, 0.85)
Female	101 (20.0)	1.95 (1.60, 2.36)	57,073 (55.5)	2.49 (2.47, 2.51)	0.78 (0.65, 0.95)
Race/Ethnicity					
White, Non-Hispanic	232 (49.2)	1.29 (1.13, 1.46)	43,749 (44.3)	1.74 (1.73, 1.76)	0.74 (0.65, 0.84)
African-American, Non-Hispanic	167 (35.4)	2.57 (2.20, 2.98)	18,479 (18.7)	3.83 (3.78, 3.89)	0.67 (0.58, 0.78)
Other, Non-Hispanic	8 (1.7)	0.56 (0.26, 1.05)	1,030 (1.0)	0.53 (0.50, 0.57)	1.04 (0.52, 2.10)
Hispanic	65 (13.8)	1.55 (1.21, 1.97)	35,616 (36.0)	2.78 (2.75, 2.81)	0.56 (0.44, 0.71)

* A person on active duty in the Armed Services of the United States. Excluded are members of the Inactive Reserves, National Guard, or retired military members.

† A person not on active duty in the Armed Services of the United States. Excluded are members of the Inactive Reserves, National Guard, or retired military members.

‡ Calculated rate is measured per 1,000 person-years at risk for adults ages 18 and older. CI=confidence interval.

§ Non-military perpetrators used as referent group.

¶ Calculation based on each appearance of a perpetrator and child combination, i.e. a perpetrator-child combination may appear more than once if substantiated maltreatment occurred on more than one occasion in the three year study period.

‡ Calculation based on first appearance of perpetrator, i.e. each perpetrator appears only once.

Table 5-4. Distribution of characteristics of military and non-military perpetrators, 2000-2002 (n=166,079).

	Military Perpetrators*	Non-military Perpetrators†	Proportion Ratio (95% CI)‡
	Number of cases (%)	Number of cases (%)	
<i>First occurrence of perpetrator-child pair (n=166,079)§</i>			
Caretaker of child victim			
Yes	696 (96.0)	138,992 (84.1)	1.14 (1.13, 1.16)
No	20 (4.0)	26,362 (15.9)	0.25 (0.18, 0.36)
<i>P-value</i>		p < 0.001	
Relationship of perpetrator to child			
Biological parent	557 (76.8)	119,941 (72.8)	1.06 (1.01, 1.10)
Other parent	128 (17.7)	8,747 (5.3)	3.32 (2.83, 3.89)
Unmarried partner of parent	24 (3.3)	9,145 (5.6)	0.60 (0.40, 0.88)
Other relationship	16 (2.2)	26,967 (16.3)	0.13 (0.08, 0.22)
<i>P-value</i>		p < 0.001	

* A person on active duty in the Armed Services of the United States. This term includes active duty in the Army, Navy, Air Force, or Marine Corps. Excluded are members of the Inactive Reserves, National Guard, or retired military members.

† A person not on active duty in the Armed Services of the United States. This term includes active duty in the Army, Navy, Air Force, or Marine Corps. Excluded are members of the Inactive Reserves, National Guard, or retired military members.

‡ Children in non-military families used as referent group. CI=confidence interval.

§ Calculation based on unique combinations of perpetrator and child, i.e. each perpetrator-child combination appears only once.

VI. Effect of Deployment on the Occurrence of Child Maltreatment in Military and Non-military Families

A. Introduction

War has a profound emotional impact on servicemen and servicewomen. The impact and stress of war may occur before, during, and after deployment, and extend beyond the military soldier to include stress and emotional upheaval for his or her family. Anticipation of deployment can lead to feelings of anger, resentment, and hurt within the family (Ursano & Norwood, 1996). Separation during deployment may create the assumption of new family roles by the partner left behind, disruption of family routines, uncertainty about the service members' safety, and the inability to plan for the future (Blount, Curry, & Lubin, 1992; Figley, 1993; Segal, 1989). And, reintegration into the family post-deployment can be stressful as relationships are renegotiated and roles are redefined (Ursano & Norwood, 1996).

Since the attacks of September 11th, 2001, large numbers of U.S. troops have been mobilized and deployed to active theatres of conflict in Afghanistan and Iraq, potentially increasing stress in military families. Yet little is known about how this stress impacts family dysfunction and the occurrence of child maltreatment in military families. In fact, no studies have been published that examine the role of the threat of war and deployment on the occurrence of child maltreatment. However, research is needed on this topic so that service providers will be able to better address the needs of military families in times of stress. This study examines the occurrence of child maltreatment in military and non-military families before and during intense military operations in the Middle East. We hypothesized that

increases in departures to and returns from operation-related deployment would increase the occurrence of child maltreatment in military families.

B. Methods

This study used monthly individual-level child maltreatment data and state-level population estimates to calculate rates of substantiated maltreatment in military and non-military families. State-level military data on departures and returns from operational deployments were used to examine the relationship between deployment and the occurrence of child maltreatment for each month of the study period.

B.1. Maltreatment Data

The primary data source for information on child maltreatment was the 2000 to 2003 Child Files for the state of Texas from the National Child Abuse and Neglect Data System (NCANDS). The data are voluntarily submitted by state child protective services agencies and are maintained by the National Data Archive on Child Abuse and Neglect (Cornell University, Ithaca, NY). NCANDS provides data on all maltreatment reported in the state, including the month of report and substantiation, the type of maltreatment (physical abuse, sexual abuse, emotional abuse, other abuse, and neglect), and characteristics of the maltreatment victims. NCANDS data also specify whether a child victim was the legal dependent of an active duty military soldier in the Army, Navy, Air Force, or Marine Corps (Inactive Reserve and National Guard members were excluded). Because Texas had the most complete information on military family status of child victims and a large military population, our analyses were restricted to all substantiated cases of child maltreatment that were reported between January 1, 2000 and June 30, 2003 in that state. More than one child may be listed on each report of child maltreatment and one child may appear on multiple

reports (i.e. re-abuse of the same child may occur). The first appearance of each child in the dataset was used to calculate descriptive statistics of the child victim (n=147,982 total children; 1,399 military children and 146,583 non-military children) and each unique combination of a report and a child, referred to as a report-child pair, was the focus for the calculation of rates (n=164,239; 1,539 military and 162,700 non-military).

B.2. Deployment Data

State-level deployment information for active duty military personnel residing in Texas came from the Department of Defense's Personnel Temp (PERSTEMPO) dataset, which is maintained by the Defense Manpower Data Center. PERSTEMPO is comprised of a record for each time a service member, pursuant to orders, is performing active service by participating in a training exercise or operation at a location that makes it infeasible for the member to spend off-duty time in the housing in which the member resides (US Code: Title 10, Chapter 50). Because the period when a parent is away on operational deployment and the period when the parent returns from deployment are stressful for military families, we obtained monthly data on the total number of individuals on active duty service who returned from or departed to operation-related PERSTEMPO deployment. These data were restricted to those who permanently resided in the state of Texas and were stratified by whether or not the soldier had at least one child. Since the total number of active duty military personnel varied over the study period, we calculated the monthly percentage of (1) total active duty military personnel and (2) active duty military personnel with at least one child who returned from or departed to operation-related deployment between October 2000 and June 2003.

B.3. Denominator Data

Data on the number of children aged 17 and younger residing in Texas were obtained from the US Census Bureau's Public Use Microdata Sample (PUMS) files for year 2000. These data were categorized based the child's age, race/ethnicity, and gender and whether or not the child resided in a household with at least one active duty military family member. Because the population statistics represent the year 2000, we multiplied the population estimates by 3.5, representing the number of years of follow-up time in the entire study period (January 2000 to June 2003), and 2.75, representing the number of years of follow-up time in the restricted study period (October 2000 to June 2003). These calculations are based on the assumption that the population of children in military and non-military families does not change over time.

B.4. Statistical analysis

The data represented in NCANDS Child Files do not strictly represent incidence or prevalence because child maltreatment may be ongoing (i.e. it is not "new" maltreatment that occurred during the study period) and/or not reported (i.e. it is not the total fraction of the population that experienced maltreatment during the study period). Therefore we use the term "rate of occurrence of substantiated maltreatment" in this study to describe child maltreatment reported and substantiated within the study period. This can be considered a proxy of the incidence of child maltreatment in the population.

The unit of observation for this study is time measured in months. Rates of occurrence of substantiated child maltreatment were calculated within categories of age, gender, and race/ethnicity of the study sample and for each reporting month of the study period. These rates were stratified by whether the child had a military family member. Negative binomial regression was used to calculate the rate of occurrence of substantiated

maltreatment, adjusting for potential confounding by child age, gender, and race/ethnicity (McCullagh & Nelder 1989; Gardner, Mulvey, & Shaw 1995). The negative binomial models provided an adequate fit to the data, with over-dispersion parameters less than 1.5 in all models. Confidence limit ratios (CLR) were calculated for all rate ratios (Poole, 2001).

This study was approved by the UNC Public Health Institutional Review Board.

C. Results

Military and non-military victims of child maltreatment were similar with respect to the distribution of gender (Table 6-1). The rate of occurrence of substantiated maltreatment was slightly higher for females in military families and males in non-military families. Maltreated children in military families were more likely to be non-Hispanic Whites and under the age of four than children in non-military families. In both groups, non-Hispanic Whites had lower rates compared to all other race and ethnic categories. The rate of occurrence of child maltreatment dropped with increasing age in both military and non-military families, with those younger than 4 years of age having the highest rate of maltreatment in both populations. The rate ratio for the youngest age group versus the oldest age group was 2.60 (95% CI: 2.57, 2.64) in non-military families versus 2.10 (95% CI: 1.78, 2.47) in military families, indicating a slightly greater age differential between younger and older children in non-military families.

Figure 6-1 shows that the rate of occurrence of substantiated child maltreatment was relatively stable for non-military families over the study period. The rate for military families, however, began to increase during the last 6 months of 2002, and rose dramatically in January 2003 (Figure 6-1). Children in military families generally had a lower rate of substantiated child maltreatment than children in non-military families before January 2003.

However, after this date, the rate for military families was consistently higher than the rate for non-military families. This coincides with intensive operational military activities in the Middle East (Figure 6-1), resulting in a higher percentage of Texas service personnel assigned to operational deployments (Figure 6-2).

After inspection of the data, we decided to compare the rate of occurrence of substantiated child maltreatment before October 1, 2002 to the rate on and after October 1, 2002. The date of October 1, 2002 was suggested by the observation that the rate in military families appeared to be rising during this period and also by the fact that it was approximately 12 months following the terrorist attacks of September 11, 2001, and therefore captures the experience of the U.S. military response to those attacks approximately one year later. The rate of substantiated child maltreatment in military families after October 2002 was approximately double the rate before October 2002 (Rate Ratio [RR] =2.15, 95% CI: 1.85, 2.50; see Table 6-2). This rate ratio reduced to 1.98 (95% CI: 1.76, 2.22) when controlling for child characteristics. Rate ratios in children of non-military families were not significantly elevated when comparing the time period after October 2002 to before. The unadjusted rate ratio was 1.05 (95% CI: 0.95, 1.17), which increased slightly when controlling for child characteristics.

In order to more fully characterize the effect of the post-September 11th era on the rate of child maltreatment, we included the percentage of active duty personnel departing to and returning from operation-related deployments in each month as predictor variables in two sets of negative binomial regression models. For these analyses, child maltreatment data were restricted to those substantiated cases that were reported between October 2000 and June 2003 in order to correspond to the available deployment data. The percentage of total

personnel departing to operational deployment ranged from 0.52% to 5.76% and the percentage of total personnel returning from operational deployment ranged from 0.44% to 4.92% (Figure 6-2). Among children in military families, for each 1% increase in the percentage of active duty personnel with at least one child who departed to or returned from operational deployments, the rate of occurrence of child maltreatment increased by 28% (95% CI: 1.20, 1.37) and 31% (95% CI: 1.16, 1.48), respectively. These patterns were consistent whether examining all soldiers or only for soldiers with at least one child and changed little when controlling for child characteristics (Table 6-3). Small increases in the rate of maltreatment in non-military families were also associated with increases in the percentage of operation-related deployments. To capture the large increases in the monthly percentage of departures to and returns from operational deployment at the end of the study period, we dichotomized the percentages 3% or more versus less than 3%. When the monthly percentage of departures to or returns from operational deployments was 3% or more, compared to less than 3%, the rate of occurrence of substantiated maltreatment approximately doubled in children of military families and remained the same in children of non-military families (Table 6-3). These rate ratios decreased slightly when adjusted for child's age, gender, and race/ethnicity.

The proportion of child maltreatment in military families perpetrated by military and non-military caregivers varied across the study period (Figure 6-3). Non-military caretakers perpetrated the majority of substantiated child maltreatment, ranging from 25 to 75% of maltreatment in a given month. The proportion of maltreatment perpetrated by non-military caretakers in military families was significantly higher towards the end of the study period (6 month average for January 1, 2003 to June 30, 2003 = 65.1%) than at the start (6 month

average for January 1, 2000 to June 30, 2000 = 49.6%) ($p < 0.05$), which corresponds to the highest percentage of departures to and returns from operational deployments (Figure 6-2).

D. Discussion

This time series analysis examined the impact of operational deployments on the occurrence of child maltreatment in military and non-military families. The rate of occurrence of substantiated maltreatment in children of military families doubled in the period after October 2002 (the one-year anniversary of the response to the September 11th terror attacks) compared to the period prior to that date. The rate in children of military families increased approximately 30% with each one-percentage point increase in the proportion of soldiers with at least one child who departed to or returned from operational deployments. The rate of occurrence of substantiated child maltreatment also doubled in children of military families when operational deployments were dichotomized as 3% or more and less than 3%. Further, the rate in non-military families did not change for these analyses. This indicates that irrespective of whether the exposure is treated as a continuous or categorical variable, both departures to and returns from operational deployment impose stresses on military families and likely predict child maltreatment. However, because we do not have family-level deployment data, the increases in child maltreatment may also extend to families at risk of being deployed.

After controlling for child characteristics, all rate ratios presented in these analyses decreased for children in military families and stayed approximately the same for children of non-military families. Upon further inspection of the data, we found that the differences between the unadjusted and adjusted models were most likely due to missing data rather than confounding by child's age, gender, and race/ethnicity. Overall there was a slightly greater

proportion of missing data for children of military families than children of non-military families (5% versus 4%), but the distribution of the missing data changed disproportionately over the study period between the two populations. For example, prior to October 1, 2002, there was 5.5% missing data for children in military families and 4.7% for children in non-military families. However, for the period after October 1, 2002, children in military families had 3.9% missing data compared to only 1.7% for children in non-military families. In other words, children in military families were missing approximately the same proportion of data as children in non-military families prior to October 1, 2002 but more than twice as much after October 1, 2002. Therefore, we concluded that the greater magnitude of change in rate ratios for children of military families is likely due to the differences in the differential distribution of missing data.

Non-military caretakers perpetrated the largest proportion of substantiated maltreatment in military families. Particularly, non-military caretakers in military families were responsible for the majority of the maltreatment reported from December 2002 to April 2003, which coincides with an increase in the rate of maltreatment, the greatest percentage of soldier departures, and the lowest percentage of soldier returns. This finding further suggests that the stress of war extends beyond the soldier to the family left behind.

These time series analyses combine individual child maltreatment data with state-level population estimates and military deployment information. A limitation of these multi-level data is the potential for ecologic bias, which is the failure of effect estimates at the ecological level to equate to estimates at the individual level (Morgenstern, 1998). This bias can arise from unmeasured confounding by other ecologic factors, such as improved reporting of child maltreatment by military authorities to child protective services over the

study period. The use of state-level deployment data with individual child maltreatment data leads to some temporal ambiguity. For individual soldiers, we are unable to determine whether child maltreatment occurred before, during, or after deployment. Despite these limitations, the time series study design does allow us to control for confounding by factors that do not change with time, even if we are unable to measure them.

We verified that the population of military and non-military children residing in Texas did not increase markedly over time by examining yearly population estimates from the US Census Bureau American Community Survey (ACS), which uses a sample of the population to estimate yearly statistics. Data for Texas show that from 2000 to 2003 there was a 43% decrease (from 38,442 to 21,909) in the number of children residing in active duty military households and 5.1% increase (from 5,919,507 to 6,220,548) in the number of children residing in non-military households. Although these estimates are based on samples (not a complete enumeration), they suggest that the study results do not appear to be biased by an increase over time in the number of children of military families residing in Texas. We did not incorporate ACS data into our analysis because this survey was still in the pilot phase during the first part of our study period.

There is no consensus in the literature on how military rates of child maltreatment compare to non-military rates (Dubanoski & McIntosh, 1984; Gessner & Runyan, 1995; McCarroll, Ursano, Fan, & Newby, 2004a; McCarroll, Ursano, Fan, & Newby, 2004b; North Carolina Child Advocacy Institute, 2004; Raiha & Soma, 1997). However, this study suggests that the rate of occurrence of substantiated child maltreatment is generally lower in military families, but may increase as military families are threatened by war. These findings are important given the ongoing deployment and mobilization of troops to the Middle East

and the fact that over one-third of active duty military personnel are married with children, and an additional 6% are single parents (Military Family Resource Center, 2003).

In general, risk factors for child maltreatment are not as prevalent in military families as non-military families. Military families receive health care and housing at least partially funded by the government, and all are financially supported by at least one employed family member. Soldiers are also required to pass aptitude tests and may be discharged if severe drug or alcohol use is discovered. Military families also have resources aimed at mitigating negative aspects of the military lifestyle. Family support services are available in each branch of military service to assist troops and their families in preparing for and coping with family separations. However, it appears that families either do not utilize resources available to them during periods of high stress (such as the departure of a family member to an operation-related deployment) or that the services alone cannot adequately respond to the needs of the families. Possible interventions could include providing additional support and education programs for family members remaining behind during separations as well as increased monitoring of family function during stressful periods.

Future studies are needed to address child maltreatment in inactive duty military families, such as the National Guard, where not as many social support services may be available (Ursano & Norwood, 1996). Studies should also be replicated in different states with large military populations and include family-level deployment data and characteristics of the deployment to determine if there are differences based on location, length, or frequency of deployment. Intervention programs should be evaluated to determine which are most effective in mitigating family dysfunction in times of stress.

E. References

- Blount BW, Curry A, & Lubin G. (1992). Family separations in the military. *Military Medicine*, 157(2), 76-80.
- Dubanoksi RA & McIntosh SR. (1984). Child abuse and neglect in military and civilian families. *Child Abuse & Neglect*, 8, 55-67.
- Figley CR. (1993). Coping with stressors on the home front. *Journal of Social Issues*, 49, 51-71.
- Gardner W, Mulvey EP, & Shaw EC. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin*, 118, 392-404.
- Gessner RR & Runyan DK. (1995). The shaken infant: A military connection? *Archives of Pediatrics & Adolescent Medicine*, 149, 467-9.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004a). Classification of the severity of the US Army and civilian reports of child maltreatment. *Military Medicine*, 169, 461-4.
- McCarroll JE, Ursano RJ, Fan Z, & Newby JH. (2004b). Comparison of U.S. Army and civilian substantiated reports of child maltreatment. *Child Maltreatment*, 9, 103-110.
- McCullagh P & Nelder JA. (1989). *Generalized Linear Models*. New York, NY: Chapman & Hall; 198-199.
- Military Family Resource Center. (2003). *2003 Demographics: Profile of the Military Community*. [Accessed 2005 October 3]. Available at: <http://www.militaryhomefront.dod.mil>. Accessed June 9, 2005.
- Morgenstern H. (1998). Ecological studies. In: Rothman K, Greenland S, eds. *Modern epidemiology*. Philadelphia, PA: Lippincott-Raven.
- North Carolina Child Advocacy Institute. (2004, September). *Reducing collateral damage on the home front: Child abuse homicides within military families and communities in North Carolina: Facts and recommendations*. Raleigh, NC: Author.
- Poole, C. (2001). Low P-Values or Narrow Confidence Intervals: Which Are More Durable? *Epidemiology*, 2, 291-294.
- Raiha NK & Soma DJ. (1997). Victims of child abuse and neglect in the US Army. *Child Abuse & Neglect*, 21, 759-768.

- Segal MW. (1989). The nature of work and family linkages: A theoretical perspective. In C.M. West, *Partner Violence in Military Families*. Available on internet: http://www.agnr.umd.edu/nnfr/research/pv/pv_ch6.html. Accessed June 2, 2005.
- Stevenson, M. & McClure, R. (2005) Use of ecological study designs for injury prevention. *Injury Prevention*, 11, 2-4.
- Ursano, N., and A. E. Norwood. (1996). *Emotional Aftermath of the Persian Gulf War: Veterans, Families, Communities, and Nations*. Washington, D.C.: American Psychiatric Press, Inc.
- U.S. Code. Title 10: Chapter 50. (2004). *Miscellaneous Command Responsibilities*.
- U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau (2005). *National Child Abuse and Neglect Data System (NCANDS) Child File*. Available from the National Data Archive on Child Abuse and Neglect Website, <http://www.ndacan.cornell.edu>.

Table 6-1. Characteristics of the maltreated study population by family type of child victim.

		Children in Military Families [*]		Children in Non-Military Families [†]	
		n (%)	Rate (95% CI) [‡]	n (%)	Rate (95% CI) [‡]
<i>Gender</i>					
	Male	684 (49.1)	6.61 (6.13, 7.12)	77,635 (53.2)	9.55 (9.49, 9.62)
	Female	708 (50.9)	7.64 (7.09, 8.21)	68,325 (46.9)	8.82 (8.76, 8.89)
<i>Race/Ethnicity</i>					
	White, Non-Hispanic	647 (47.2)	4.95 (4.58, 5.34)	54,232 (37.6)	6.31 (6.26, 6.37)
	Other	723 (52.8)	6.08 (5.65, 6.53)	90,064 (62.4)	7.76 (7.71, 7.81)
<i>Age at Report</i>					
	Under 4	565 (41.3)	7.44 (6.85, 8.08)	48,981 (34.3)	11.10 (11.00, 11.20)
	4 to 11	615 (45.0)	5.08 (4.69, 5.49)	65,474 (45.8)	7.19 (7.14, 7.25)
	12 to 17	187 (13.7)	3.55 (3.07, 4.08)	28,505 (19.9)	4.26 (4.21, 4.31)

* A person who is the legal dependent of an individual on active duty in the Armed Services of the United States.

† A person who is not the legal dependent of an individual on active duty in the Armed Services of the United States.

‡ Calculated rate is measured per 1,000 person-years at risk for children ages 17 and under. CI=confidence interval.

Table 6-2. Rate ratios for the occurrence of child maltreatment among children in military and non-military families, comparing the period October 1, 2002-June 30, 2003 to the period January 1, 2000-September 30, 2002.

	Maltreatment in Military Families		Maltreatment in Non-military Families	
	Rate Ratio (95% CI)*	CLR†	Rate Ratio (95% CI)*	CLR†
Unadjusted	2.15 (1.85, 2.50)	1.35	1.05 (0.95, 1.17)	1.23
Adjusted‡	1.98 (1.76, 2.22)	1.12	1.08 (1.03, 1.13)	1.10

* CI=confidence interval.

† CLR=confidence limit ratio.

‡ Adjusted for child's age (<4, 4-11, 12-17), child's race/ethnicity (non-Hispanic White, Other), and child's gender (Male, Female).

Table 6-3. Rate ratios for the occurrence of substantiated child maltreatment among children in military and non-military families based on month of departure to and return from operational deployment.

Based on Month of Departure					Based on Month of Return				
With dependents			Total		With dependents			Total	
Rate Ratio (95% CI)*	CLR†		Rate Ratio (95% CI)*	CLR†	Rate Ratio (95% CI)*	CLR†		Rate Ratio (95% CI)*	CLR†
Each 1% increase in operational deployment									
<i>Maltreatment in military families</i>									
Unadjusted	1.28 (1.20, 1.37)	1.14	1.24 (1.18, 1.32)	1.12	1.31 (1.16, 1.48)	1.28		1.28 (1.15, 1.42)	1.23
Adjusted‡	1.25 (1.19, 1.30)	1.09	1.21 (1.17, 1.26)	1.08	1.24 (1.17, 1.33)	1.14		1.22 (1.15, 1.29)	1.12
<i>Maltreatment in non-military families</i>									
Unadjusted	1.04 (0.99, 1.11)	1.12	1.04 (0.99, 1.08)	1.09	1.02 (0.92, 1.14)	1.24		1.02 (0.93, 1.12)	1.20
Adjusted‡	1.04 (1.03, 1.06)	1.03	1.04 (1.02, 1.05)	1.03	1.02 (1.00, 1.05)	1.05		1.02 (1.00, 1.05)	1.05
≥ 3% increase in operational deployment vs. <3%									
<i>Maltreatment in military families</i>									
Unadjusted	2.22 (1.72, 2.87)	1.67	2.22 (1.72, 2.87)	1.67	1.88 (1.22, 2.89)	2.37		1.88 (1.22, 2.89)	2.37
Adjusted‡	2.05 (1.76, 2.38)	1.35	2.05 (1.76, 2.38)	1.35	1.73 (1.41, 2.13)	1.51		1.73 (1.41, 2.13)	1.51
<i>Maltreatment in non-military families</i>									
Unadjusted	1.10 (0.88, 1.38)	1.57	1.10 (0.88, 1.38)	1.57	0.98 (0.66, 1.46)	2.21		0.98 (0.66, 1.46)	2.21
Adjusted‡	1.10 (1.04, 1.18)	1.13	1.10 (1.04, 1.18)	1.13	0.98 (0.89, 1.07)	1.20		0.98 (0.89, 1.07)	1.20

* CI=confidence interval.

† CLR=confidence limit ratio.

‡ Adjusted for child's age (<4, 4-11, 12-17), child's race/ethnicity (non-Hispanic White, Other), and child's gender (Male, Female).

Figure 6-1. Rate of occurrence of substantiated child maltreatment by report month for children of military and non-military families, January 2000 - June 2003

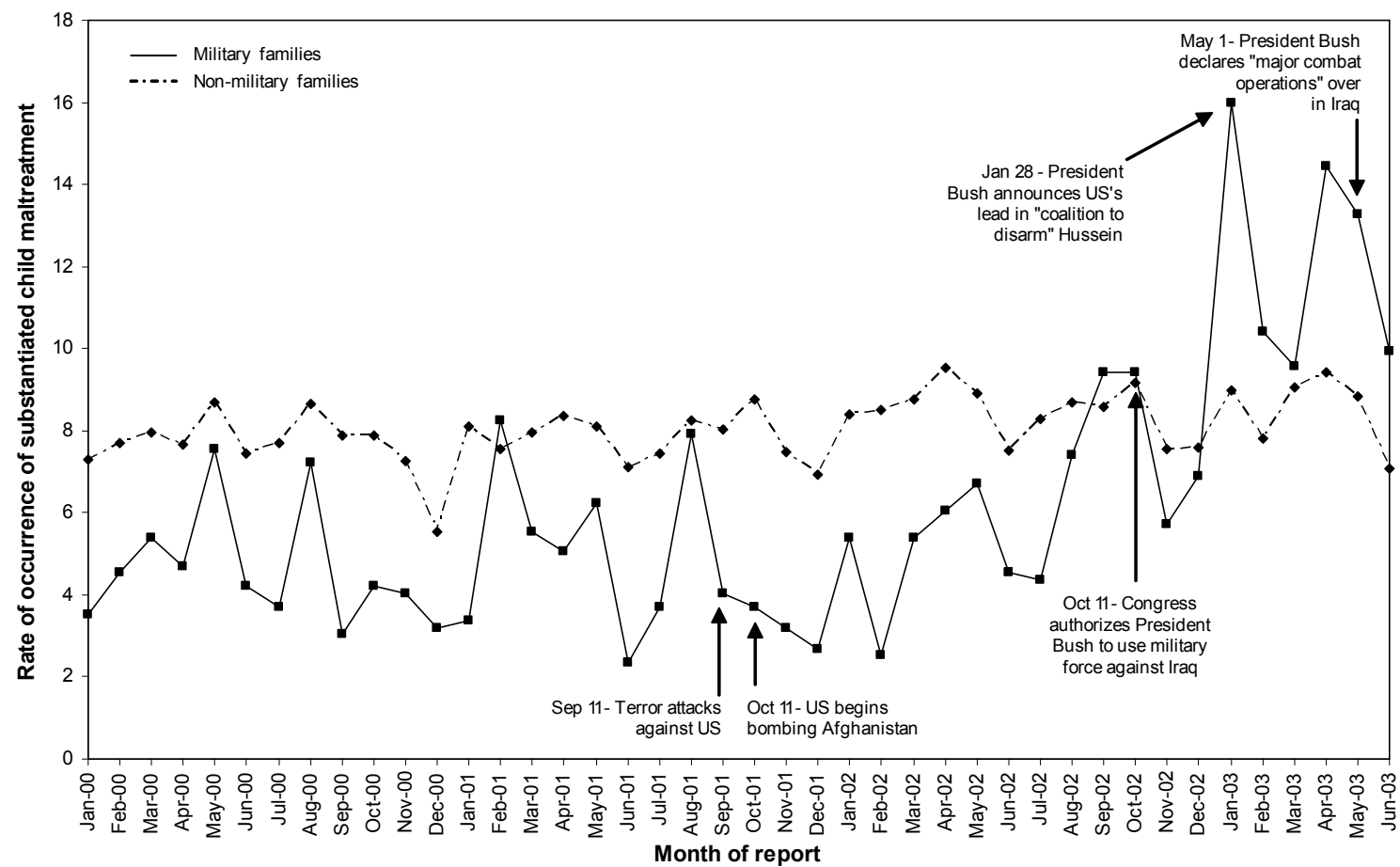


Figure 6-2. Percentage of Texas-residing soldiers departing for or returning from operational deployments within each month of the study period.

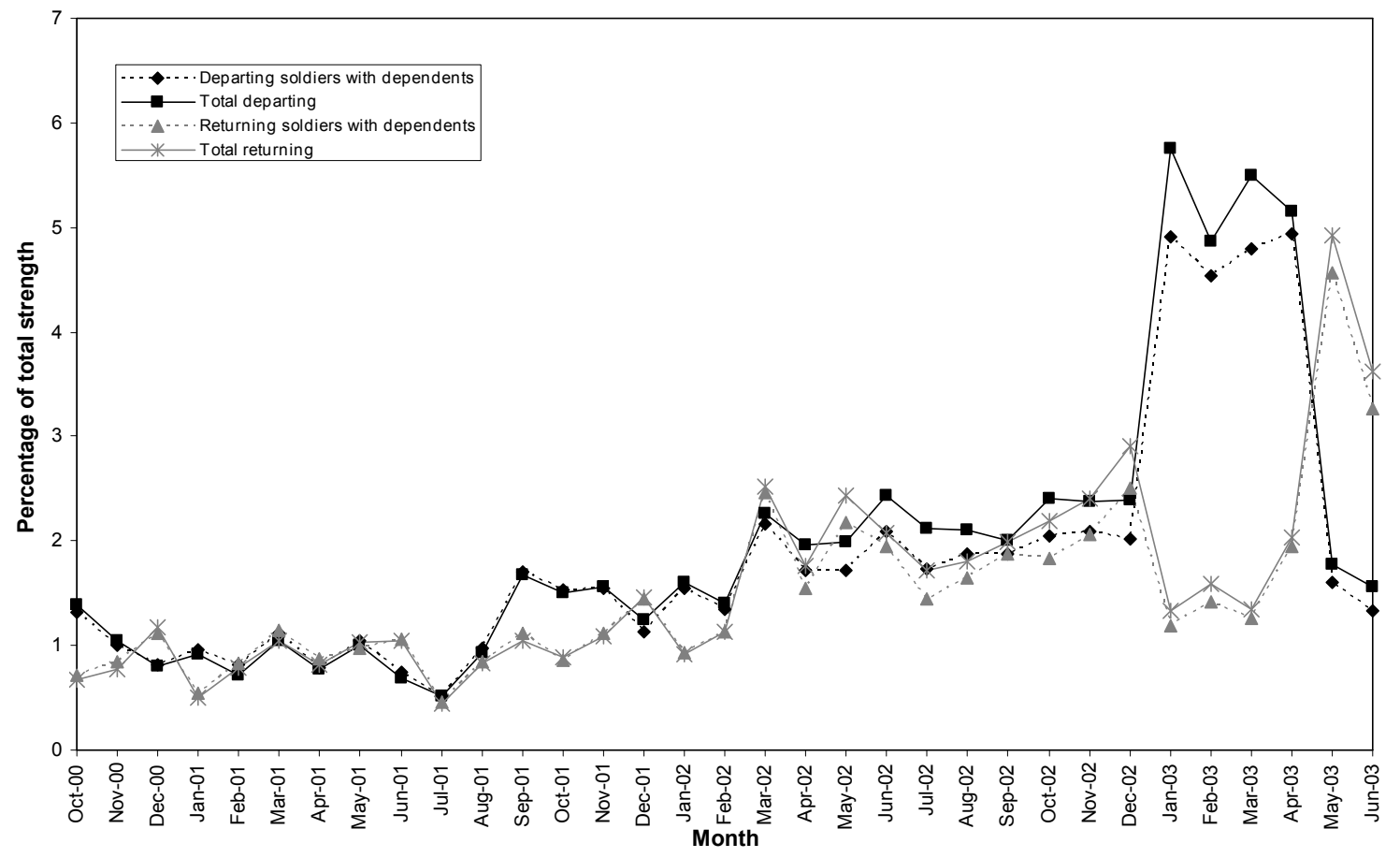
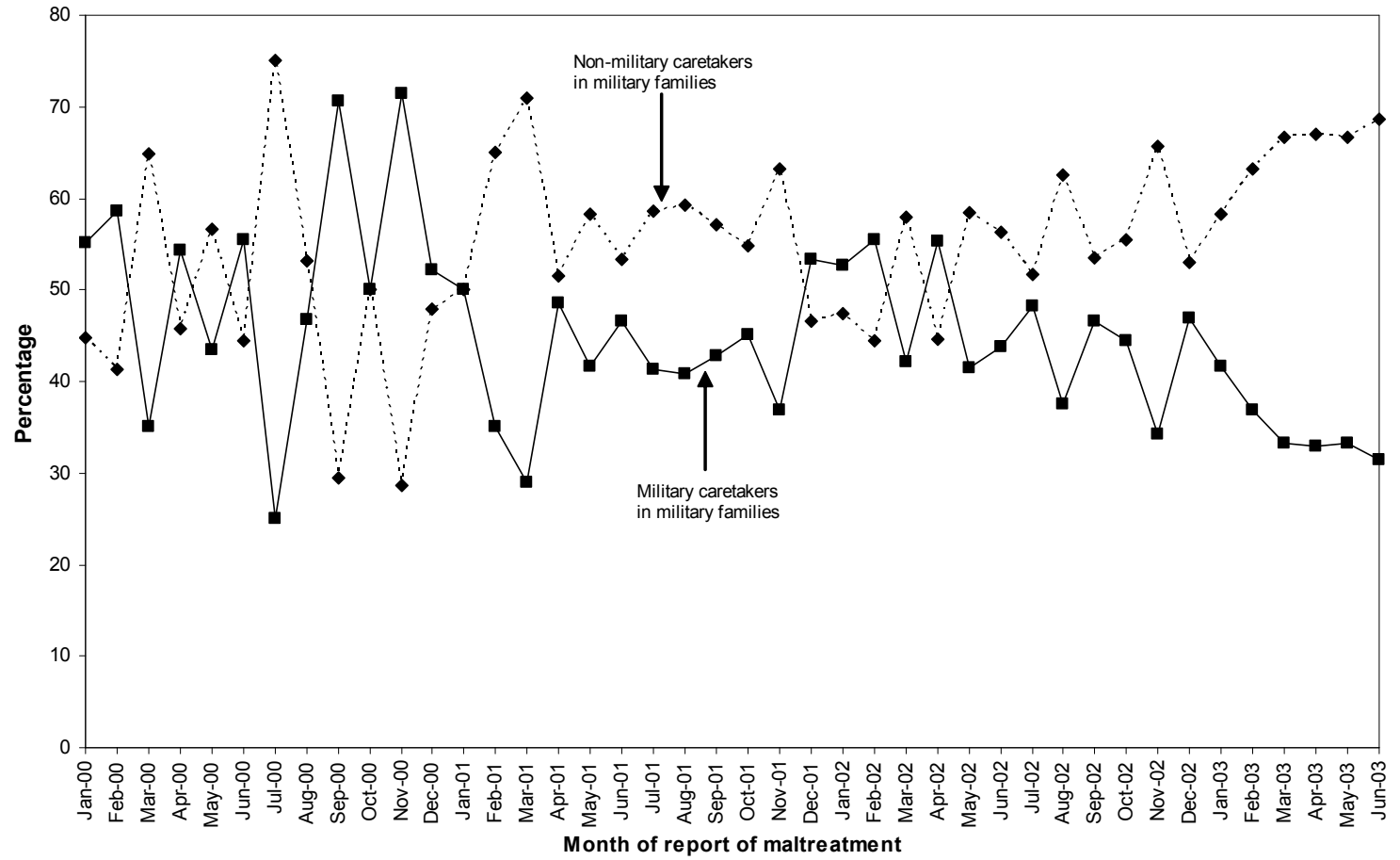


Figure 6-3. Distribution of child maltreatment in military families by military and non-military caretakers.



VII. Conclusions

A. Overview

The objectives of this research were to answer two main research questions: (1) Is being a child in a military family protective of, or a risk factor for, substantiated child maltreatment? and (2) What impact did the attacks of September 11, 2001 and the subsequent US military response have on the occurrence of substantiated child maltreatment in military families? Compared to children of non-military families, children of military families generally experienced lower rates of child maltreatment. However, this protective effect seemed to disappear when military combat increased and military families experienced operation-related deployment. The rate of occurrence of substantiated child maltreatment in military families doubled when comparing the period October 1, 2002 - June 30, 2003 to the period January 1, 2000 - September 30, 2002. The periods with highest rates of child maltreatment corresponded to intense military operations in Iraq, the highest percentage of departures to operational deployments, and the lowest percentage of returns from operational deployments.

The Department of Defense estimated that the cost of military operations in Iraq and Afghanistan is approximately \$5 billion per month, which includes military operations, reconstruction, foreign aid and enhanced security for the military bases. This estimate, added to the \$70 billion said to be requested by the White House, brings the total costs to nearly half a trillion dollars since September 11th (Mazzetti & Havemann, 2006). However, human costs of war, which include lives lost, injuries suffered, and, as supported by this research,

the negative impact on military families, are not included in these estimates. Thus, the real cost to US society is much greater than half a trillion dollars.

The information gleaned from this study can inform preventive efforts in military communities. This research suggests that the younger the child, the higher the risk for experiencing child maltreatment, which is true of child maltreatment in general. Further, males and females were equally likely to be victims of maltreatment, and non-Hispanic African-Americans were at increased risk compared to all other races and ethnicities. With respect to military perpetrators, the highest rate of occurrence of substantiated child maltreatment was found among non-Hispanic African-Americans. The distribution of military perpetrators was overwhelmingly male, but the rate of maltreatment was higher among female perpetrators. These findings can help military service providers tailor preventive efforts to the groups most at risk for experiencing and perpetrating child maltreatment, such as the non-Hispanic African-American population and female service members, who comprise only 19% and 15% of active duty military personnel, respectively (Military Family Resource Center, 2003). Further, because children in military and non-military families most often experienced neglect only, service providers are encouraged to look beyond physical signs of maltreatment.

Military families are unique in that they possess a number of characteristics that likely are inherently protective against certain risk factors for child maltreatment. At least one member of a military family is employed full-time and must pass aptitude tests. Further, military personnel may be discharged upon discovery of severe mental health, drug, and/or alcohol problems. Military families also have housing and healthcare provided or funded by the government and support services are readily available. However, as identified in Chapter

VI, special risk factors do exist within military families that may contribute to the occurrence of child maltreatment. For example, soldiers and their families must contend with the threat of operational deployment to war zones, long separations in the form of trainings and temporary assignments, and relocations, all of which can cause a disruption to family life, increase stress, and may precipitate maltreatment. Military families would benefit from increased monitoring of family function and interventions targeting specific stressful time periods, such as mobilizations and departures to and returns from operational deployment.

B. Strengths

This research has several advantages over previous studies comparing child maltreatment in military and non-military populations. It was the first to analyze child maltreatment data in both populations from a single national surveillance system. The use of multiple data sets with varying data collection methods has been a major limitation in the existing body of literature comparing child maltreatment in military and non-military populations. By focusing our analyses on the state of Texas, we were able to minimize concern over methodological differences in reporting, tracking, and substantiating child maltreatment. Procedures for collecting, recording, and submitting child maltreatment information are established at the state-level, so each region within the state is encouraged to use the same definitions and criteria for maltreatment.

In general, studies examining child maltreatment in the military have been limited in their attempts to implement standard epidemiological methods. Many are purely descriptive in nature because the authors have been unable to ascertain a denominator for the calculation of the rate of child maltreatment. This research, however, combined child maltreatment data for military and non-military families with population statistics from the U.S. Census Bureau

and state-level operational deployment information from the Department of Defense, which allowed us to calculate rates and undertake more sophisticated analyses, such as modeling and adjustment for potential confounding variables. This type of ecologic approach is valuable to injury research because it allows researchers to directly assess the role of environmental factors (namely, the September 11th attacks and US response) on the occurrence of child maltreatment and to develop strategies for injury prevention that can be implemented at the population level (Stevenson & McClure, 2005). By conducting a time series analysis we were also able to control for potential confounding by unmeasured factors that do not change over time.

The results from this research contribute to the literature on child maltreatment in the military. As stated earlier, the Army is the only branch of the military that frequently publishes its findings from the Army Central Registry. Because Texas has military installations representing the Army, Air Force, and Navy, the results from these analyses increase our understanding of maltreatment in the military, as a whole. This study also described military perpetrators and compared their characteristics to non-military perpetrators, neither of which has been fully addressed in the literature. Further, no study to date has examined the effects of the September 11th attacks and the subsequent US response on the rate of child maltreatment in military and civilian communities.

C. Limitations

A problem that faces all research focused on child maltreatment is the potential for underreporting. Since underreporting is an issue of concern in child maltreatment research, to assume that all children who are not substantiated in NCANDS are outcome-negative would be a misrepresentation of what is actually occurring in the population. Unfortunately,

at this time, there is no known data available in military and non-military communities that quantify the extent of underreporting and how it might differ between military and non-military populations. Specific to this research project is the potential for underascertainment of maltreatment among children in military families in that not all military child maltreatment cases substantiated by military personnel will necessarily be reported to child protective services agencies. Because memorandums of understanding are not required in every branch of the military, it is plausible that some child maltreatment reported on military installations is not subsequently reported to non-military child protective services agencies. Because of this, the rates of occurrence of maltreatment for children in military families calculated using NCANDS data likely underestimate the rate that would be found in an analysis of central registry data. And, both of these rates would actually underestimate the true occurrence of maltreatment in military families due to underreporting, in general.

Underascertainment may also be due to child protective services agencies not correctly identifying a child or perpetrator as being affiliated with the military. This could occur when a report of child maltreatment comes from a non-military source (such as a school teacher) and child protective services personnel conducting the investigation fails to ask about military status. Further, a caretaker could lie about the family's military affiliation to protect a military perpetrator from disciplinary action, or an investigation could fail to identify a military perpetrator of maltreatment in a non-military family. These scenarios would lead to an underestimate of the rate of occurrence of child maltreatment in military families in the child-focused analysis and/or perpetrator-focused analysis.

Another important limitation is the inability to validate military status in NCANDS and the U.S. Census population statistics, which could introduce bias into the study. The

definition of a child in a military family used in NCANDS (i.e. a person who is the legal dependent of an individual on active duty in the Armed Services) is identical to the way it was defined for the US Census population estimates. Therefore, if military cases were incorrectly classified as non-military in NCANDS, the estimated rate of occurrence of substantiated child maltreatment in children of military families would be an underestimate of the true value. Conversely, if children of military families were incorrectly identified in the Census as non-military, the estimate of the number of military children would be too low, resulting in an overestimate of the rate of child maltreatment in military families.

The use of state-level population estimates and operational deployment data limit the interpretation of these analyses. Because we were unable to obtain exact monthly estimates of the number of children in military families who resided in Texas during the study period, our estimated rate could either be an overestimate or an underestimate of the true rate of child maltreatment in the population. Additionally, the use of state-level deployment data causes temporal ambiguity. That is, we were unable to determine whether child maltreatment occurred before, during, or after deployment. Finally, these ecological analyses have the potential for ecologic bias, which is the failure of effect estimates at the ecological level to equate to estimates of the effect at the individual level (Morgenstern, 1998). This bias can arise from unmeasured confounding by other ecologic factors. For example, if there were improvements in the reporting of maltreatment by military service providers to non-military service agencies, it would appear as though the rates in military families were increasing. However, the higher rate would actually be due to better procedures rather than more maltreatment and thus would be spurious. Another example would be a state-wide initiative to increase awareness of the occurrence of child maltreatment, which could lead to more

reports of maltreatment and subsequently higher rates of maltreatment. A particular source of ecologic bias in Chapter VI is the potential for an increase in the number of military families stationed in Texas over the study period. This would introduce temporal bias in the military rates since the estimate of the population at risk is from Census 2000 and therefore time-independent. However, estimates from ACS indicate that the military population in Texas was reasonably steady over the study period, so it is unlikely that the Chapter VI analyses suffer from ecological bias due to changes in the number of military families in Texas. An additional limitation of the Chapter VI analyses was the presence of differentially distributed data that led to the models that were inadequately adjusted for child's age, race/ethnicity, and gender.

D. Future Directions

Because there are few investigations that compare military and non-military child maltreatment and none that examine the impact of war on the occurrence of child maltreatment in military families, many opportunities exist for future research. Validation studies need to be conducted to determine if perpetrators and victims are being classified correctly in NCANDS with respect to their military affiliation. Qualitative interviews paired with a sensitivity analysis can inform how well military and non-military authorities share child maltreatment data and enable estimations of the amount of underreporting that occurs in these populations.

This research focused on the entire state of Texas, but additional studies should be replicated in various states with large military populations and be restricted to military and non-military families with similar family characteristics (e.g. include only families with at least one employed caretaker). These studies would benefit from exploring additional

sources of denominator data for rate calculations and obtaining family-level deployment information that includes the location, length, and frequency of operational deployments. Further, studies should explore maltreatment in various branches of the military and include data on inactive duty military families, such as the National Guard, where not as many social support services exist.

E. Conclusions

This research provides further insight into child maltreatment in the military and can inform future decisions made by the Department of Defense with respect to the allocation of services to its military personnel. Descriptive analyses of maltreated children in military families allowed us to identify characteristics common to victims of maltreatment, enabling providers to improve the effectiveness of prevention, detection, and treatment. By analyzing characteristics of perpetrators, we were able to identify risk factors that will help with the early identification of those servicemen and women at risk for perpetrating violence against children, and offer service providers the opportunity to intervene before maltreatment occurs. Our analysis of the changes in the occurrence of child maltreatment in military and non-military families over time will inform military leaders as to how the threat of war and deployment or relocation impacts the military family and enable them to increase the amount and/or intensity of services offered during stressful periods.

F. References

- Mazzetti M & Havemann J. (2006, February 3). Iraq war is costing \$100,000 per minute. *Los Angeles Times*. Available at:
http://seattletimes.nwsources.com/html/politics/2002780385_spending03.html.
Accessed February 17, 2006.
- Military Family Resource Center. (2003). *2003 Demographics: Profile of the Military Community*. [Accessed 2005 October 3]. Available at:
<http://www.militaryhomefront.dod.mil>. Accessed June 9, 2005.
- Morgenstern H. (1998). Ecological studies. In: Rothman K, Greenland S, eds. *Modern epidemiology*. Philadelphia, PA: Lippincott-Raven.
- Stevenson M & McClure R. (2005). Use of ecological study designs for injury prevention. *Injury Prevention*, 11, 2-4.