

U.S. Army-Baylor University Graduate Program in Health Care Administration

Graduate Management Project

**Statistical Measurement and Analysis of Claimant and  
Demographic Variables Affecting Processing and  
Adjudication Duration in The United States Army  
Physical Disability Evaluation System**

Presented To

Lt Col Bernard J. Kerr, Jr., USAF, MSC, FACHE

In Partial Fulfillment of the Requirements for

a Master in Health Administration

By

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Office of The Army Surgeon General, Washington, DC

6 February 1997

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20000111 127

# REPORT DOCUMENTATION PAGE

*Form Approved*  
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1. AGENCY USE ONLY <i>(Leave blank)</i>	2. REPORT DATE <b>FEBRUARY 1997</b>	3. REPORT TYPE AND DATES COVERED <b>FINAL REPORT (8-96 TO 7-97)</b>
4. TITLE AND SUBTITLE <b>Statistical Measurement and Analysis of Claimant and Demographic Variables Affecting Processing and Adjudication Duration in the United States Army Physical Disability Evaluation System</b>		5. FUNDING NUMBERS
6. AUTHOR(S) <b>CPT M. NICHOLAS COPPOLA, MS</b>		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>OFFICE OF THE ARMY SURGEON GENERAL WASHINGTON, DC</b>		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) <b>US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL BLDG 2841 MCCS-HRA (US ARMY BAYLOR MHA PROGRAM) 3151 SCOTT RD SUITE 1411 FORT SAM HOUSTON TX 78234-6135</b>		10. SPONSORING / MONITORING AGENCY REPORT NUMBER  <b>30-97</b>
11. SUPPLEMENTARY NOTES		
12a. DISTRIBUTION / AVAILABILITY STATEMENT  <b>APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED</b>		12b. DISTRIBUTION CODE
13. ABSTRACT <i>(Maximum 200 words)</i> <b>U.S. Army disability records processed in Fiscal Year 1996 were examined for variables affecting processing and adjudication time. The dependent variable examined was days. Independent variables included age, race, gender, grade, component, length of service, retirement eligibility, request for congressional involvement, request for formal physical evaluation board (PEB), compensation award and regional PEB. The research suggests the Physical Disability Evaluation System (PDES) is remarkably fair and unbiased in terms of the process and process duration. Variations in individual disability awards were not examined. Recommendations for improving the PDES center on a systems oriented approach to disability management as a concept of integrated health care delivery.</b>		
14. SUBJECT TERMS  <b>Army Physical Disability Evaluation System (PDES)</b>		15. NUMBER OF PAGES <b>112</b>
		16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT  <b>N/A</b>	18. SECURITY CLASSIFICATION OF THIS PAGE  <b>N/A</b>	19. SECURITY CLASSIFICATION OF ABSTRACT  <b>N/A</b>
20. LIMITATION OF ABSTRACT  <b>UL</b>		

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## ACKNOWLEDGMENTS

Any effort such as this is the result of the combined efforts of many people. Several individuals contributed to this project through direct mentorship, research assistance, editorial advice or professional development. Their efforts are appreciated and acknowledged here.

This study would not have been possible if not for the support and assistance of the United States Army Physical Disability Agency. Colonel Charles Peck, MD (ret), Charles Weber and Colonel Willie McMillian were instrumental in collecting data and receiving approval through the chain of command to initiate and conduct this study. Their trust and confidence in allowing me access to privileged soldier information was crucial in completing this research. My appreciation is also extended to First Sergeant Terry Cooper and Staff Sergeant Joe Blount from Medical Holding Company, Walter Reed Army Medical Center for assisting with the sampling population collection.

Many thanks to Colonel Michael Smith and Colonel Bob Fechner (ret) for their advice and mentorship while I was stationed at Walter Reed Army Medical Center. If not for their leadership examples, I may never have applied to the US Army-Baylor University Degree Program in Health Care Administration. Additional thanks to Colonel Ronald Hudak for setting the standard for things to come while teaching courses at Central Michigan University in my Executive Masters degree, and advising me on how to prepare for the Army-Baylor Program once accepted. Thanks to Lieutenant Colonel Joel Bales for his editorial assistance and to Lieutenant Colonel Richard Guerin and Harry Conley for their statistical advice. Special thanks to Colonel Dan Blum who provided ample time, opportunity and assistance in completing this project in an efficient manner without having to balance competing priorities. Furthermore, I want to thank the Army-Baylor University Degree Program in Health Care Administration faculty for an extraordinary educational experience, and especially my counselor and reader, Lieutenant Colonel Bernard Kerr, USAF for his friendship, mentorship and advice. Lastly, much appreciation to my study partner, Major Steve Carpenter who kept me motivated throughout the didactic year.

Most of all thanks to my loving wife who has proofread over one-thousand pages of academic text and has endured numerous long evenings and weekends alone while I disappeared to the library or back bedroom to study. Her efforts and sacrifices were greater than my own.

## ABSTRACT

U.S. Army disability records processed in Fiscal Year 1996 were examined for variables affecting processing and adjudication time. The dependent variable examined was days. Independent variables included: Age, Race, Gender, Grade, Component, Length of Service, Retirement Eligibility, Request for Congressional Involvement, Request for Formal Physical Evaluation Board (PEB), Compensation Award and Regional PEB. A finite population,  $N = 8,301$ , was studied with a confidence interval of 95 percent and  $\alpha = 0.05$  specified error. Linear regression was conducted using the Statistical Package for Social Scientists (SPSS<sup>®</sup>), Standard Version 6.1. Analysis of the population yielded a  $\mu = 155$  days,  $\sigma = 114$  days, a median of 131 days and a range of one to 2,052 days. Eighty-nine percent ( $n = 7,383$ ) of the cases met the Medical and Personnel Commands' shared expectations to complete Medical Evaluation Boards (MEBs) within fifty days. Sixty-three percent ( $n = 5,271$ ) of the cases met Department of Defense guidance for total completion within ninety days of the final MEB. The research suggests the Physical Disability Evaluation System (PDES) is remarkably fair and unbiased in terms of the process and process duration. Variations in individual disability awards were not examined. Recommendations for improving the PDES center on a systems oriented approach to disability management as a concept of integrated health care delivery.

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## 1. RESEARCH AND ACADEMIC PURPOSE STATEMENT

The purpose of this health service research is to further the effort in identifying known or existing variables affecting processing and adjudication duration in the United States Army Physical Disability Evaluation System (PDES). Secondly, the academic purpose of this paper is to complete the requirements for the author's Graduate Management Project (GMP), as outlined in the 1996-1997 Residency Manual for Graduation, US Army-Baylor University Graduate Program in Health Care Administration. The author of this paper, hereafter referred to as "the researcher<sup>1</sup>," completed this study while assigned as the Administrative Resident, Office of The Army Surgeon General (OTSG), Falls Church, Virginia. Initial action requesting permission from the Commander, Personnel Command (PERSCOM) to conduct the study, and to promulgate a memorandum over the signature of Colonel Willie McMillian, Deputy Commander, United States Army Physical Disability Agency (USAPDA) and the researcher's preceptor, Colonel Daniel E. Blum, Chief, Resource Management, OTSG, announcing the study, was initiated on 26 August 1996 and completed on 1 October 1996. This letter, along with a copy of the researcher's proposal was forwarded to the academic committee, US Army-Baylor University Graduate Program in Health Care Administration for approval and continuance on 1 November 1996. Permission was received to continue this study on 3 December 1996. A copy of the letter initiating action for the study is enclosed at Annex 1.

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## 2. INTRODUCTION

This retrospective study analyzes relationships of variables to adjudication and processing duration in the Army PDES. Adjudication and processing duration measured in days is the researcher's dependent variable. Independent variables include immutable characteristics such as: Regional Physical Evaluation Boards (PEB), Component, Gender, Race, Age, Rank, Length of Service, and Retirement Eligibility. This study also examines mutable variables such as: Request for Formal Boards, Request for Congressional Involvement and Compensation Award, Table 1.

**Table 1**  
**Independent and Dependent Variables**

<u>Dependent Variable</u>	<u>Independent Variables</u>
Adjudication and Processing Days	Age Compensation Award Component Gender Length of Service Race Rank Regional PEB Retirement Eligibility Request for Congressional Request for Formal Boards

The PDES is closely monitored and controlled by the USAPDA, which is the final reviewing and processing authority for all PEBs within the Army. The USAPDA reviews approximately 8,000 records each year with a mean processing duration time of  $\mu = 159$  days (Peck, 1996). This study surveyed all records which completed the review and adjudicating process successfully in Fiscal Year (FY) 1996 (1 October 1995 through 30 September 1996). This finite population,  $N = 8,301$ , was studied with a confidence interval of 95 percent, a corresponding Z value of 1.96, ( $p < .05$ ) and  $\alpha = 0.05$  specified error. Backward linear regression analysis and correlation was conducted using

the Statistical Package for Social Scientists (SPSS), Standard Version 6.1, June 1994, to determine relationships among the dependent and independent variables. Frequencies generate descriptive statistics on each non-linear independent predictor variable so that the range of values is determined by analysis of the consanguinity between variables. Content and criterion validity is employed to determine the measure of scientific validity. Reliability is also measured through content and criterion measures and through mathematical parallelism between the solved regression equation model and the actual population mean (Conley, 1996; Brown, 1996).

**a. Ethics/Professional Standards:** Ethical conduct and professional standards were exercised throughout the study. The researcher maintains access to privileged soldier information and medical history. The subject's right to privacy is of the utmost importance to the researcher. Provision of social security numbers and personal demographic data remains secure and confidential. No names or references to individuals are included in this study. No material deemed inappropriate by the Chief Medical Member, USAPDA, was removed from resident USAPDA facilities.

**b. Researcher Assumptions:** Selection of a manageable set of predictor variables for use in the null and alternate hypothesis is a common problem in regression analysis. Gunst and Mason discuss the importance of selecting a subset of potential predictor variables from the available list of infinite characteristics in the population. It is necessary for the researcher to make inferences as to what variables will have the greatest impact prior to computing the least squares regression without contributing to researcher bias in the variable selection process (Gunst and Mason, 1980; Cooper and Emory, 1995). The variables selected for this study are the most common mutable and immutable

variables affecting processing duration as found in the research on processing days in disability (Peck, 1996). The following assumptions are made by the researcher based on personal heuristics with disability processing and a thorough review of research regarding predictor variables and their influence on disability processing duration. These assumptions are as follows:

- (1) A shorter processing duration period is better than a protracted processing duration period.
- (2) All of the observations are independent.
- (3) The error variance is constant reference source variables.
- (4) There is negligible variance in personnel and administrative procedures in physical evaluation board processing duration.
- (5) Patient independent variables are the predominant predictor of variance in processing duration.
- (6) Studies conducted identifying independent variables for disability duration in the civilian community will be similar to the independent variables in the researcher's study.
- (7) Soldiers with greater knowledge of disability processing procedures may be able to increase or decrease processing duration through self-activism.
- (8) Waste, fraud and abuse may be leading motivators in the inordinate amount of time patients remain in the physical disability system. Soldiers may be manipulating the system for personal gain.
- (9) No variables are classified as favorable or unfavorable to processing duration.
- (10) For each value of the independent variable, there is a normal distribution of values of the dependent variable.

(11) No external events occurred (e.g., changes in procedures, personnel, workload)

which would suggest the data were not representative.

**c. Study Limitations:**

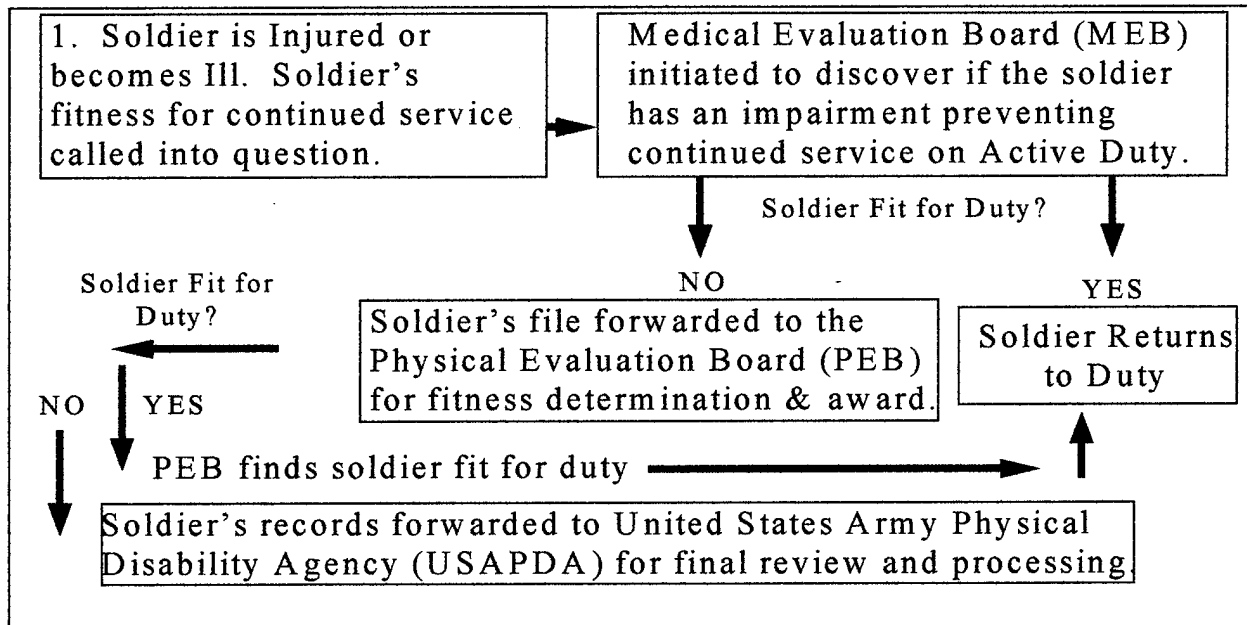
(1) This study is unable to identify soldier activism, waste, fraud and abuse as individual predictor variables.

(2) Information on soldier education level, record of adverse disciplinary actions, military career performance history and individual soldier knowledge of the disability processing system cannot be gathered on the entire population. This information is not contained in the USAPDA database. It is not possible to accurately gather and input this material into the statistical measuring instrument manually.

(3) Other variables may have an impact on processing duration which have not been identified in this study. However, based on an intensive literature review and discussions with the PDES leadership, the researcher is confident that the probability of an unknown variable affecting the dependent variable is slim.

**d. Tenets of the PDES:** The PDES is composed of three separate elements: The Medical Evaluation Board (MEB), the Physical Evaluation Board and the final reviewing and adjudicating authority, the USAPDA (AR 40-3, 1985; AR 40-501, 1995; AR 600-60, 1985; AR 635-40, 1990). The emphasis of this study centers on the time from the initial day the soldier received an exam initiating the MEB and follows through to final action by PERSCOM. However, prior to examining the conditions which have promoted this study, it is first necessary to understand the incremental steps necessary for a soldier's record to be forwarded to the USAPDA for final processing and adjudication review. Table 2 highlights the basic echelons of processing in the PDES.

**Table 2**  
**Echelons of Disability Processing**



The MEB is completed by at least two physicians and an approving authority who have expertise in the medical condition affecting the soldier. The MEB is completed at the local medical treatment facility (MTF). The physicians complete DA Form 3947, (Medical Evaluation Board Proceedings) and a brief but complete clinical history of the patient's medical status referred to as the NARSUM, or Narrative Summary. These forms generally comprise the MEB dictation. In most cases, the soldier's physician will complete the MEB dictation alone, and then discuss the findings with the chief of the clinical department prior to the final preparation of the document. The soldier and the soldier's Physical Evaluation Board Liaison Officer (PEBLO) counselor will then discuss the contents of the MEB. If there are no concerns that need to be addressed in the MEB by the soldier,

the soldier will sign the document. Then, one of four things will happen (AR 40-3, 1985; AR 40-501, 1995; AR 635-40, 1990):

(1) The soldier will return to full duty and retain a "one" profile because the MEB found the soldier has met medical retention standards in accordance with Army Regulation (AR) 40-501, Standards of Medical Fitness, Chapter 3.

(2) The soldier will be returned to duty with limitations based on permanent "two" profile that was assigned.

(3) The soldier will be returned to duty with a permanent "three" profile. The parent organization will be responsible for coordinating a Military Occupation Specialty (MOS) Medical Review Board (MMRB) to determine if the soldier is still capable of performing his or her designated MOS, if applicable.

(4) The soldier does not meet medical retention standards. The MEB dictation is forwarded to the PEB for a medical retention determination.

There are three Regional PEBs in the Army located at:

- (1) Fort Sam Houston, Texas.
- (2) Fort Lewis, Washington.
- (3) Walter Reed Army Medical Center, Washington, DC.

In some cases, the Headquarters, USAPDA may act as a PEB and adjudicate or re-adjudicate cases under various special circumstances. Such special circumstances may involve a case that must be expedited through the PDES (e.g., terminal illness requiring immediate retirement processing), a case receiving Department of the Army scrutiny (e.g., Line of Duty pending), or a complicated medical and/or administrative situation.

Unlike the MEB which is prepared by one physician and concurred with by a more senior physician, the PEB is composed of designated board members who adjudicate cases equally, irrespective of rank. The composition of this board is arranged in accordance with AR 40-501 and AR 635-40. Evaluation is by a three-member board composed of a (Colonel) President, a personnel management officer (PMO) and a physician who may be civilian or military of any rank (experienced field grade officer preferred). The President and PMO may be any branch except medical. The PMO is usually a Reserve Component (Information, 1996). In some cases, enlisted soldiers in the grade of E-7 or above may be seated as board members at the soldier's request. The board must always have an odd number of voting members to prevent ties in the adjudication process. Additionally, the PEB reviews MEBs in two fashions, informally and formally. Finally, the board has the authority to make fitness determinations and compensation awards. After review by the PEB, the board result is forwarded to the USAPDA. The USAPDA has the authority to modify the PEBs findings, if applicable (AR 40-3, 1985; AR 40-501, 1995; AR 635-40, 1990).

At the Informal PEB, only the soldier's MEB records appear before the board. Once the MEB has been received by the PEB, the PEB determines if the soldier meets retention standards or is medically unqualified for continued service. If medically unqualified, the soldier's physical limitations are rated based on the Department of Veterans Affairs Schedule for Rating Disabilities (VASRD), (AR 600-60, 1985). Basically, the VASRD is a "flow chart" that the board members follow in order to objectively rate the soldier's condition. For example, if the soldier experienced an amputation, was it an arm or a leg? If arm, turn to page "X." Was it the soldier's dominant arm? Was the amputation above or below the elbow? Once all the questions have been answered, the VASRD guides the board members toward a disability rating.

Once the board completes adjudication, the soldier has the opportunity to concur or nonconcur with the board's finding. If the soldier does not concur with the finding of the Informal PEB, the soldier can request a Formal PEB. This is scheduled by the President of the PEB (AR 40-3, 1985; AR 40-501, 1995; AR 635-40, 1990).

In most cases during the Formal PEB, the soldier's MEB record, the soldier and the soldier's legal advisor appear before the board to address concerns over the board's original finding. The legal advisor may be one that is appointed or one that the soldier retains independently at no expense to the government. The legal advisor is not part of the board and is present to assist the soldier in the appeal. The soldier may also appear alone before the board or may have someone appear on his or her behalf. Lastly, the soldier may simply make a written appeal to the board instead of a personal appearance. After a second look at the soldier's record, the board members may change the fitness recommendation or compensation award (AR 40-3, 1985; AR 40-501, 1995; AR 635-40, 1990). Under Governing Statutes, after final review by one of the three Regional PEBs, the soldier's record is forwarded to the centralized USAPDA for final medical/administrative review.

Chapter 61, Title 10, US Code provides the Secretaries of the Military with the authority to retire or discharge a member if he or she finds the member unfit to perform duties due to a disability.

The USAPDA, under the operational control of the Commander, PERSCOM, is responsible for operating the PDES and executes Secretary of the Army decision-making authority as directed by Congress in Chapter 61, Title 10 US Code, and in accordance with Department of Defense (DoD) Directive 1332.18 and Army Regulation 635-40 (Topic, 1996). There is no single organizational structure for the reviewers of PEBs in the USAPDA (Weber, 1996). Historically, the reviewers in the USAPDA generally consist of at least three personnel. One is a physician, one is a lawyer and

one is a field grade officer of any branch. All reviewers in the USAPDA will examine soldier records forwarded to them from the Regional PEBs first in isolation. If questions or concerns occur while circulating the record between reviewers, the members will meet to discuss the case and reach consensus on a resolution (Weber, 1996). Upon satisfactory review of the soldier's record and affirmation of the Regional PEBs adjudication, the USAPDA makes the final fitness determination and forwards its results to the Commander, PERSCOM. The soldier's status is then changed from a patient undergoing disability review to an Active Duty Soldier or separated classification (AR 40-3, 1985; AR 40-501, 1995; AR 635-40, 1990). If issues are identified by the reviewers which preclude satisfactory examination of the soldier's record, the USAPDA may return the record to the Regional PEB or local MTF with instructions for re-submission. Soldiers who feel they were separated wrongfully have the right to appeal their case to the Board of Correction of Military Records after discharge (Tomes, 1987).

According to a 1993 Process Action Team (PAT) collecting data on the disability system, it took an average of 220 days to satisfactorily complete all requirements for soldier disposition from MEB dictation to final PDES completion (IPR, 1993). Recent efforts in Total Quality Management (TQM) and Continuous Quality Improvement (CQI) have reduced this number to 159 days as of the end of FY 95 (Topic, 1996). Table 3 profiles the echelons of control in the PDES.

**Table 3**  
**Hierarchy of Control in Disability Processing**

ACTION	WHO	CONTROL
MEB Dictation	Physician at the local MTF	Clinical Dept of MTF
MEB Processing	Physical Evaluation Board Liaison Office (PEBLO) at MTF	PEBLO of MTF
PEB: Both Formal & Informal	One of Three Regional PEBs	President, Regional PEB
Review	USAPDA Adjudication Board	Deputy Commander, PERSCOM

**e. Conditions Which Prompted the Study:** Three factors have influenced the conditions which have prompted this study:

(1) Variables affecting processing and adjudication duration are not known. They have never been studied in the Army Physical Disability System, according to Dr. Charles Peck, Chief Medical Member, USAPDA. It is not statistically known at this point what (if any) variables impact adversely on this system. Do white, male, field grade officers have any advantage over black, enlisted females in reference to processing duration? Once variables are identified, can efforts be initiated to reduce or improve equality in physical disability processing duration? The answers to these questions are not known due to the absence of any information regarding variables affecting processing duration in the PDES.

(2) The Military Health Service System (MHSS) has continued to implement Business Process Reengineering efforts in the managed care arena (Blum, 1996), while the

organization of the physical disability processing system has remained relatively unchanged. Does the system need to reorganize or does the MHSS need to emphasize greater allocation of resources toward decreasing duration days in the disability system? Is the PDES meeting a joint MEDCOM and PERSCOM expectation for completing the MEB within fifty days (Peck, 1996)? Is the PDES meeting its DoD directed goal of completing all cases with ninety days of a completed MEB (Peck, 1996)?

(3) Soldiers being processed through the PDES are a liability for unit deployment and adversely affect the overall readiness of the Army because of the length of time of the process and the inability of a unit to requisition a deployable replacement (LaNoue, 1996; LaNoue 2, 1996). Furthermore, this liability for unit deployment presents an opportunity cost for the Army in both the human resource pool and the managerial accounting of military pay (Blum, 1996). Opportunity cost is defined as a benefit given up that is not directly or typically shown on management documents; while managerial accounting is used to provide information on the efficiency and effectiveness of economic resources (ACHE, 1995; Blum, 1996).

During the 1996 Turning Point Conference at the White House sponsored by the American Medical Group Association (AMGA) from 9-10 September, Congressman William Thomas (R-CA) stated that for every patient that needlessly remains on the hospital register due to some administrative criteria not directly influenced by a health care provider, the entire managed care system suffers. He stated that the managed care system, its administrators and physicians, must do a better job getting patients out of the hospital (management) system when they no longer need to be there (Thomas, 1996). Developing criteria or benchmarks for lengths of stay often become entitlements and no-later-than-quotas rather than medical practice (Thomas, 1996). As

the Army Medical Department (AMEDD) begins to compete for beneficiaries in the managed care market through the DoD TRICARE initiative, its leaders and administrators should adopt this business focused approach [to disability review] to maintain readiness and competitiveness (LaNoue, 1996).

According to Patrick E. Kapsner, Past President of the AMGA, it is imperative for the managed care system to completely follow patients not only through the continuum of care, but also successfully through the compensation system when disability benefits may be awarded (Kapsner, 1996). This is a consideration not incorporated into TRICARE. The most recent TRICARE conference in Vienna, Virginia, 15-17 July, 1996, did not mention incorporating disability evaluation in its readiness, contract or improvement initiatives (TRICARE, 1996).

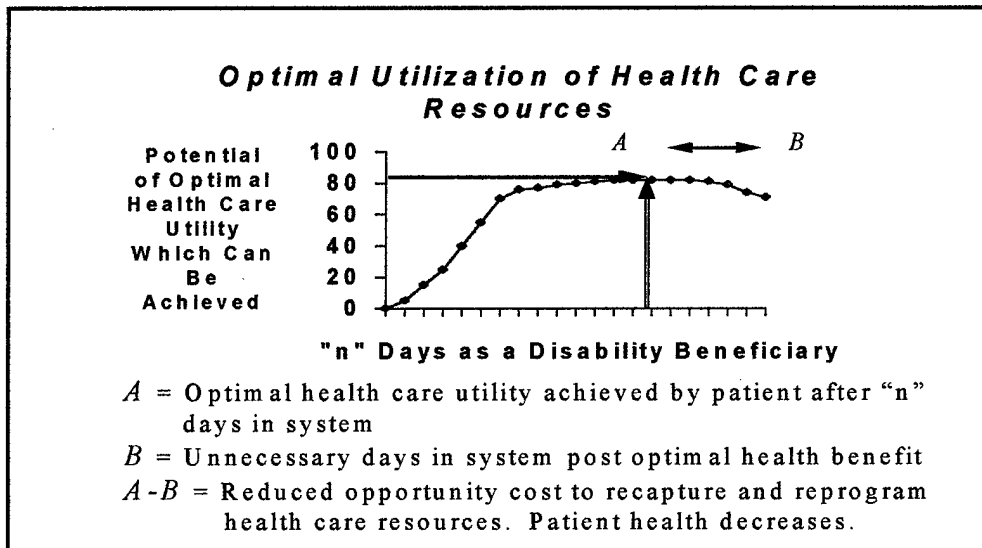
Kapsner stated that patients whose claims are not filed (reviewed and adjudicated) correctly by one employer, and who then switch jobs, may be able to find compensation benefits from both (or neither) employers. This adversely affects the integration, cost effectiveness, delivery and continuum of managed care in the medical facility providing treatment (Fyffe, 1996; Kapsner, 1996) and provides a disservice to the patient.

Some soldiers undergoing adjudication and processing through the disability system are still maintained as inpatients in the MTF (AR 40-3, 1985; AR 40-501, 1989; AR 635-40, 1990). During PDES review, the soldier remains a non-bed occupied inpatient assigned to a Medical Holding Company (MHC) of the MTF or a non-deployable soldier assigned to a unit of origin (AR 40-3, 1985; AR 40-501, 1989; AR 635-40, 1990). Maintaining these soldiers on protracted active duty adversely affects the MTF in its allocation and use of its scarce health care resources. These resources include physical lodging, nutrition care and an increased access to specialty, dental and

medical care. This increased access to specialty care deviates from the principle of gatekeeper approval in managed care theory (Kongstvedt, 1995).

Furthermore, it has been demonstrated that people undergoing disability evaluation use two to three times as much health care utility as persons without disabilities entering the health care system. Additionally, this increase in health care utility continues to increase the longer the individual is allowed to remain in a treatment state (Weiner, Clauser and Kennell, 1995; Gustafson, 1993). The resulting increase in use of health care utility by the patient remaining on protracted disability processing results in moral hazard; however, the patient receives no greater advantage in health benefit through the increased use and access to medical care (Weiner, Clauser and Kennell, 1995; Williams and Torrens, 1993). The optimal utilization of resources for a patient undergoing disability review is to determine the minimum period of time that is required for satisfactory delivery of all health care and intersect this with the highest possible health benefit that is achievable by the patient (Eckholm, 1993; Feldstein, 1993, Shalala, 1996), Graph 1. Unfortunately, duration of medical treatment is often perceived as a metric for determining quality (Shalala, 1996; Carroll, 1994). Lastly, the Health Insurance Association of America (HIAA) states that disability patients who are maintained needlessly on the rolls of a providing institution also disrupt normal patient turnover flow and adversely affect the delicate physician to patient ratio (Fyffe, 1996).

**Graph 1**  
**Optimal Utilization of Health Care Resources**



Maintaining soldiers on protracted active duty for disability evaluation affects readiness (LaNoue, 1996; LaNoue 2, 1996; LaNoue 3, 1996). According to former Army Surgeon General, LTG Alcide LaNoue, "In some respects, many of the initiatives undertaken by the AMEDD to enhance readiness within the total managed care force relate to the application of improved business practices." Readiness is an issue unique to the uniformed services and not generally a consideration in civilian managed care organizations (LaNoue, 1996).

When a soldier's record is being processed and adjudicated, the soldier remains a liability for unit deployment and adversely affects the unit's "C-Rating" on the Unit Status Report (USR). This is because the personnel being processed through the physical disability system generally do not work in their primary MOS and are considered a loss to the unit. In addition to the opportunity cost to utilize the soldier in his or her designated MOS, the unit cannot request a replacement for its soldier undergoing disability review because the soldier is still considered a part of the organization

despite PDES proceedings (Blum, 1996; Coppola 3, 1994). The smaller, more elite Army of the 21st century cannot afford to have soldiers remaining on protracted active duty affecting unit end strength, soldier readiness and impacting on the already scarce health care resources of the local MTF (LaNoue, 1996; LaNoue 2, 1996). Additionally, if the soldier undergoing disability review is an Army Major with fourteen years time-in-grade and living in the Washington metro area, the soldier will continue to receive over \$5,000/month while disability proceedings continue. This represents a loss in the efficiency and effectiveness of military pay as an economic resource, if the soldier is not performing the duties he or she was trained to do (Blum, 1996). This opportunity cost for the Army, while difficult to gauge accurately, has an adverse impact on the potential to recapture and reprogram this resource in another manner (Blum, 1996). Since 1990, the Army has processed and adjudicated over 70,000 soldier medical cases with a mean processing time over 180 days (Peck, 1996). Furthermore, the last audit of the USAPDA in 1989 by the US Army Audit Agency (USAAA) found that delays in processing and adjudication cost the Army over \$11 million annually. Costs for such delays can potentially be much higher (Blum, 1996). Additionally, the USAAA calculated that the combined population of disability claimants received over \$475,000/day in military pay and benefits alone during PDES processing (Peck, 1996).

Finally, the Army is in a state of turmoil from continued downsizing, outsourcing and reengineering efforts which constantly affect increasingly scarce resources (LaNoue 2, 1996). Since 1990, the Army has shrunk from 780,000 troops and eighteen combat divisions to 495,000 soldiers in ten combat divisions. Likewise the AMEDD is downsizing too. Analysts cite the loss of 1,000 physicians and 31 percent of the total medical personnel force. During Operation Desert Storm, the AMEDD had more than 150 deployable medical units. This number could be reduced to twenty-six

deployable medical units (LaNoue 2, 1996). Maximum readiness is keeping the smaller force and soldiers deployable at all times (LaNoue 3, 1996). Any event which removes a soldier from world wide deployability but maintains the soldier on active duty in a non-deployable condition adversely affects the overall readiness of the Army and the delicate TRICARE infrastructure (LaNoue, 1996; LaNoue 2, 1996; LaNoue 3, 1996). Additionally, the Army will have fewer facilities and resources available in the future to expeditiously process disability claims.

**f. Statement of Problem or Question:** What variables affect processing duration in the physical disability system? Do immutable variables such as Gender, Length of Service and Grade affect the likelihood of impact on adjudication and processing duration as opposed to mutable variables such as Request for Congressional Involvement? What other variables relate? How do we know individuals are not manipulating the disability system for personal or secondary gain; or are themselves victims of a poorly initiated medical review? While this study will not seek to answer directly these last hypothetical questions, Kerlinger (1986) addresses the importance of research to offer possible direction for future examination opportunity.

**g. Literature Review:** A thorough review of literature at the Library of Congress, the Congressional Research Service and the National Library of Medicine revealed no refereed research concerning variables affecting adjudication and processing duration in the Army Physical Disability Process. The physical and medical evaluation board process is a fairly recent one in the military community health care setting. Although primitive agencies existed as early as 1788 in the fledgling Continental Army for disability compensation, programs within the military health care setting remained largely unstructured through 1950 (Staff, 1984). In the last 200 years, Congress has commissioned several quantitative and analytical studies to determine presumptions of fitness, the

amount of retired pay, medical separation compensation, severance pay and eligibility for fifteen-year retirement awarded to soldiers upon satisfactory completion of the PDES. Furthermore, the USAAA has profiled various measures of central tendency associated with core processing time involved in disability cases. Additionally, Zimmerman conducted extensive research on literature reviews involving biomedicine and disability; however, no studies have yet identified variables affecting processing and adjudication duration in the Army PDES.

**(1) History of Disability Processing:** The modern American military disability system traces its roots to the Military Pension Act, enacted in Britain by its Parliament in 1593 (Staff, 1984). This bill recognized the need to properly provide for regular Naval officers through a pension plan. The Continental Congress of 1799 recognized a similar need after the Revolutionary War. However, due to the absence of statutes and governing bodies, the pensions granted were largely invalid pensions (Staff, 1984). Invalid pensions were called such due to their subjectiveness and often questionability in their being awarded at all. The range of subjectiveness which governed the invalid pensions did not always compensate individuals truly deserving to receive compensation for wounds, illness and faithful service. However, as speculative as these pensions may have been, they existed as an informal part of the military system for over half a century (Staff, 1992).

The debate over military pensions was a heated one in Congress for several years prior to 1861. During the War of 1812, there was a reemphasis on maintaining readiness and a fit fighting force. A regular problem in the military then was the aged officer population. Officers were staying on protracted active duty well past the period of time that they could actually perform their duties. The issue was again debated in Congress during 1838 and 1847. In 1847, Congress debated a bill that would, for the first time, allow officers to retire. Until this time, the only method of departing

the service was through resignation, cashier or death (Staff, 1992). The term retire was used liberally. It included those soldiers who had received wounds incurred during service and could no longer function to the full extent of their profession. Unfortunately, Congress adjourned before the legislation could be passed and the issue was not debated again until 1855 (Staff, 1984).

In 1855, the Navy took the lead in what would eventually become a successive series of mandates shaping the modern physical disability system. That year the House of Military Affairs established "An Act to Promote Efficiency in the Navy." This mandate required that officers no longer capable of performing their duties under field/sea conditions be expeditiously retired. These officers were then allowed to take advantage of the "invalid pensions" that existed at the time. The intent of the mandate was (obviously) to promote efficiency in the Navy. However, the mandate met with considerable resistance from within several circles. Ultimately, in 1857, the law was amended to allow officers the opportunity to appeal the compulsory retirement decision (Staff, 1984).

In 1861, Congress passed "An Act for the Better Organization of the Military Establishment." This law provided for the separation/retirement of officers with forty plus years of service and for the medical separation of soldiers who had incurred injuries while in the line of duty (LOD). The separation pay was equal to 100 percent of annual pay for the highest rank held and could never be taken away. Additionally, for the first time, there is a formal organization of a board of officers whose duty it was to oversee this process. This board consisted of five to nine officers, two-fifths of whom had to be medical officers. The mission of the board was to "decide whether, in its judgment, the said incapacity in the line of duty, from sickness or exposure therein, or from any other incident of service precluded continued service or warranted compensation and separation"

(Staff, 1984). The current structure and function of the modern USAPDA varies little in mission and design from the original founding board of officers.

The disability review boards went through several reorganizations before finally reaching some stability in 1949, through the "Career Compensation Act of Disability Retired Pay." Today, this law has changed very little and is referred to under Title 10, US Code. Title 10 consolidated disability provisions for all the military services, recognized no difference in officer or enlisted, regular or reserve, combat or non-combat related injuries (except for tax purposes) and varying lengths of service. An incremental analysis of pertinent milestones and legislation in the formulation of the modern PDES is outlined in Annex 2.

Authors studying Army disability evaluation since 1949 have concentrated more on ensuring that retirement and separation allowances have maintained pace with consumer price indexes rather than analyzing adjudication duration (CRS, 1995). This is unfortunate for soldiers, because unfamiliarity with the disability system often results in a disservice to separating soldiers. Readiness issues and personnel strength have plagued commanders throughout our nation's history. The official history of World War II regarding commanders use of the disability system reflects the following (Goforth, 1996):

An organization commander is primarily interested in a unit which has as few substandard men as possible. From a commander's point of view, the simplest way of disposing of substandard men during World War II was often through medical channels. In many instances the proper disposition was an administrative separation rather than one for disability, but, because of command pressure, the latter channel was utilized (Heaton, 1967).

Conversely, some soldiers who participated in Operation Desert Shield and Desert Storm have faced the exact opposite of this trend. Soldiers afflicted with conditions which may be related

to chemical exposure during the Gulf War have been administratively rather than medically separated in the last several years (Chung, 1996; Hawkins, 1996). Due to inadequacies with the current PDES and VASRD codes with respect to evaluating soldiers who are being processed for conditions relating to Gulf War Illness, President Clinton signed into law the "Veterans Administration Benefits Improvement Act." This act makes it possible for veterans to be compensated for undiagnosed illnesses or injuries which may be related to service in the Persian Gulf Region (Chung, 1996; Hawkins, 1996). As a result of these modifications to the disability system, 562 of the original 11,000 soldiers who filed claims for service connected disability for undiagnosed illnesses or injuries have been compensated as of 30 December 1996 (Hawkins, 1996).

As the military and AMEDD continue to downsize, increased attention will be given those soldiers not capable of performing missions within designated MOSs. Soldiers who have records being reviewed through the PDES will come under increased scrutiny. Commanders, apprehensive of inordinate adjudication duration times in the PDES, may seek alternative avenues to removing the soldier from organic unit assignment (Coppola 3, 1994).

This is unfortunate, because commanders have a responsibility to take care of soldiers assigned to their unit when these soldiers become unable to perform designated duties due to injury or illness (AFIS, 1988; Coppola 3, 1994). Soldiers being processed through the PDES remain in a state of apprehension until the process is complete. Soldiers are neither able to return to full duty nor able to begin new employment in the civilian sector until after they are medically retired or separated. Normally, soldiers undergoing disability review will perform branch and rank non-specific jobs for the duration of disability processing (Coppola 4, 1994). These jobs may be in the vicinity of the MTF the soldier is receiving treatment in, or in proximity to the soldier's unit of

assignment. The soldier may also take advantage of counseling and programs designed to decrease the stress of transition to civilian employment (Budahn, 1994). These assistance programs include the Army Career Alumni Program (ACAP) and the Transition Assistance Program (TAP). Both these programs can assist the soldier in either translating military experience into civilian terminology for a resume, or assist the soldier in developing new skills for civilian employment, if required. Lastly, it may be possible for the soldier to begin to investigate educational opportunities offered under the Veterans Education Assistance Program (VEAP) or the GI Bill. These programs can provide tuition assistance for various educational, vocational and degree programs once the soldier has been discharged or retired from military service (Budahn, 1994).

**(2) Related Models:** Several authors have examined disability evaluation in respect to processing duration and entrance into the claimant and beneficiary system supporting the objectives of this study. Among these authors, eight whose insights and methodology are applicable to the tenets of this research are outlined here. One author offers insights into the military model of disability processing and evaluation.

McWhinnie measured the amount of disability days incurred by patients as his independent variable against such dependent variables as differing levels of functional performance. McWhinnie found that disability had to be broken down into two distinct categories. One category was time based and the latter was function based. Time based disability refers to a temporary state of incapacitation where an individual's normal activities of daily living are impaired for a short duration, usually days. Eventually the individual returns to society and is able to perform activities commensurate with his or her pre-disability condition. Function based disability refers to an individual who cannot function in a manner consistent with others occupying a similar place in

society. These disabilities are the result of long-term consequences of significant health problems. Because an individual's behavior model of disability differs from the medical model of disability, McWhinnie utilized objective physical measures such as running, walking, carrying and bending to determine the level of impairment of his subjects. McWhinnie also focused on some of the activities of daily living like cutting food, getting out of bed unassisted and dressing. By focusing on these objective measures, McWhinnie was able to eliminate some of the semantic differences associated with individual perception of impairment.

Additionally, McWhinnie found subjects who have an increase in access to health care were more likely to be identified as having either time or function based disabilities. He also found that exogenous liberal social policies had a positive correlation with certain time based disabilities. McWhinnie recognized different behavior patterns between subjects who would receive pay during their time off from work and those who received no pay. Those who received pay while off from work had longer absences than those who did not receive pay.

Emanuel et al. studied similar conditions affecting disability in the Dutch Disability Social Program in the Netherlands. They discovered there is a gap between the medical model of disability and the behavioral model of disability. In studying the behavioral model of disability, the dependent variable was the total number of sick days measured against independent variables of working under various management and supervisory conditions. They broke their independent variables down into the following classifications: One's Own Work, Other Suitable Work, Uncertain Prospects and Unfavorable Prospects. The measurement of these independent variables is outlined in Table 4.

**Table 4**  
**Conditional Probabilities of Work Capacity Categories**

<b>Type of Work or Supervision</b>	<b>Sample Size</b>	<b>Number Entering Disability System</b>	<b>Probability</b>
<b>One's Own Work</b>	<b>837</b>	<b>298</b>	<b>36%</b>
<b>Other Suitable Work</b>	<b>817</b>	<b>514</b>	<b>63%</b>
<b>Uncertain Prospects</b>	<b>617</b>	<b>433</b>	<b>70%</b>
<b>Unfavorable Prospect</b>	<b>537</b>	<b>435</b>	<b>*81%</b>
<b>Total</b>	<b>2,808</b>	<b>1,680</b>	<b>60%</b>

\* Positive correlation between type of work and probability of becoming a beneficiary

Emanuel et al. found there is a correlation between the type of work one is doing and the probability of entering into a compensatory arrangement with an employer if the type of work is unfavorable. They found that they could produce entrance into the disability system within a sample if the worker's fixed-preferences for desired work were not met (Emanuel et al., 1987).

“Workers on sick leave will have different perceptions of the extent to which their work capacity is limited. I assume that, apart from medical factors, work-leisure preferences, denoted as inclination factors, are of influence” (Emanuel et al., 1987).

Additionally, Emanuel et al. found that pay was an explicit factor in determining and encouraging entry into the disability program. This factor proved to be significantly relevant for workers in the disability system for periods of five months or more. Lastly, there was a correlation between a worker receiving decreased income due to working decreased hours a week and the probability of becoming a disability beneficiary. Emanuel et al. found that when the decreased work

wage equaled or became smaller than the benefit from becoming a disability beneficiary, the worker became a full-time claimant under the provisions of The Netherlands compensation system.

Helen Lippman, Editor of Business & Health magazine, profiled independent variables associated with an American worker's likelihood to enter into a disability compensation program. She found the leading indicators and predictors for individual workers gravitating toward compensation programs involved workers who are under forty, who may not be receiving social security benefits, and who may be out on disability leave longer than standard means of patients with similar medical conditions. Furthermore, another leading indicator is unemployment. She found an increased trend with patient disabilities when plant shutdowns or massive unemployment layoffs are imminent (Lippman, 1995).

The National Council on Compensation Insurance (NCCI) in cooperation with the National Insurance Crime Bureau (NICB), the American Re-Insurance Company, the Louisiana Workers' Compensation Corporation and several other agencies, compiled and identified leading indicators and predictors for disability evaluation duration for persons perpetuating disability review for personal or secondary gain. These independent variables and indicators were developed through retrospective review of worker compensation case studies (Delehanty, 1996).

While no single independent variable or set of variables can indicate definitively whether persons are manipulating the system for personal or secondary gain, certain behavior patterns can act as flags for further inspection (Delehanty, 1996). Some of these predictors include:

- Employee experiencing labor problems.
- Rumors in the workplace that the claimant is malingering.
- Altered medical or personnel documents.
- History of adverse disciplinary or personnel actions.
- Employee has history of poor attendance record.
- Employee resists physician suggestions to do light work.
- Employee is resistant to outside review of medical history/second opinion.
- Substantial treatment with no diagnosis.
- Degree of disability not consistent with lost work time.
- Frequency of doctor visits abnormally high.
- Injured employee is experiencing financial difficulty/financial future is uncertain.
- Injured employee is disgruntled, soon-to-retire or facing imminent firing or layoff.

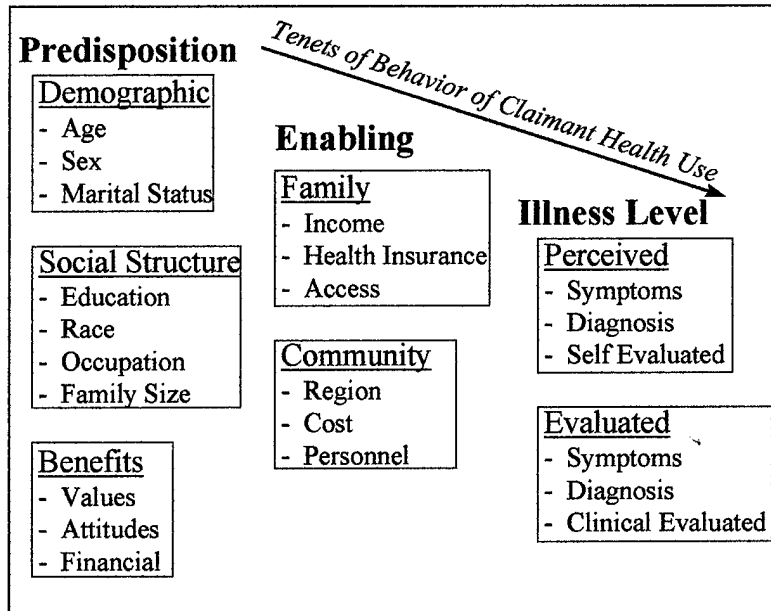
Fenn and Harris measured variables affecting the incidence of disability in England and Wales. Their study first sought to identify interruptions with normal working week activities which lasted for more than two weeks in a twelve month period. Independent variables included such factors as age, sex, marital status and socio-economic group. The study found that men are significantly less likely than women to suffer incapacity; married people are least likely to suffer incapacity, and widowed, divorced and separated individuals are most likely to suffer some sort of incapacity greater than two weeks within a one-year period. Additionally, younger individuals and white collared workers were less susceptible to injuries than older employees or manual laborers. Men of any socio-economic status who were approaching retirement were also likely to enter into periods of incapacity for two weeks or more in a calendar year (Emanuel et al., 1987).

A study conducted in Lithuania and America examined the Lottery Mentality held by many American victims of automobile accidents regarding lawsuits and compensation. Lithuania law does not allow victims of automobile accidents to sue other drivers. As a result, this study examined the concept of "whiplash" and compensation behavior. The study

hypothesis centered on the premise that whiplash does not exist and pursuance of whiplash injuries in America is solely motivated by financial gain. The study matched 202 Lithuania drivers and passengers involved in significant rear-end collisions over a three year period. An equal number of persons who were age and gender matched and never involved in an automobile accident were used as controls. The research found that the percentage of victims reporting transient or chronic back and neck pain did not differ significantly from those percentages of control personnel reporting these symptoms. The study also found those participants involved in automobile accidents who complained of problems had such ailments pre-existing to the accident itself (Schneider, 1996). The identical study was completed with American victims of automobile accidents and the study findings proved to be significant for those drivers and passengers involved in collisions, leading the researchers to believe that financial incentives were a predictor of whiplash injuries (DuVall, 1996).

One of the best known comprehensive models of individual behavior concerning medical use in America is the Andersen behavioral model (Sorkin, 1992). Andersen's model outlines three decision and behavior node sequences an individual flows through when deciding to use health services. These independent variables include predisposition, enabling and illness level as outlined in Table 5 (Sorkin, 1992).

**Table 5**  
**Claimant Behavior Model**



The predisposition component includes demographic variables, social structures and perceived benefits; the enabling component includes family and community influences and the illness component includes clinical and self evaluations (Sorkin, 1992). Andersen found conditions surrounding the enabling and illness mode were the primary predictors of health service and disability utilization. Individuals with similar demographic characteristics behaved differently. Individual behavior characteristics resulted in patients receiving different forms of health care based on unique circumstances (Sorkin, 1992). Individuals whose financial futures were uncertain, who self evaluated and had access into the health care delivery system used as much health care utility as patients with clinical diagnosis (Sorkin, 1992; Weiner, Clauser and Kennell, 1995; DuVall, 1996).

Finally, Coppola examined criteria and perceptions relating to average length of stay (ALOS) of soldiers undergoing disability review at WRAMC from 1993 through 1994. Questionnaires were distributed to thirty-seven interns entering WRAMC out of medical school and seventeen physician-residents for a total of fifty-seven survey respondents during WRAMC's semi-annual in-processing. Since a preponderance of interns and residents are responsible for completing the NARSUM, their perceptions associated with disability processing were studied. The questionnaire requested the physicians write down the three major assumptions they make when evaluating a patient. Utilizing the Delphi Technique and semantic differential for the collected physician responses, the three leading tentative assumptions made by this physician sample are categorized in Table 6 (Coppola 1, 1994).

**Table 6**  
**Collected Physician Responses for**  
**Assumptions Made When Evaluating a Patient at WRAMC**

- (1) The Soldier is Sick.
- (2) The Soldier Wants to Get Better.
- (3) The Soldier Wants to Return to Work When Healthy.

\* 54 Physicians surveyed over a twelve month period, 1993-1994, WRAMC, Washington, DC

\*\* Delphi Team consisted of eight medical and administrative personnel

The finding showed physicians believe the patient will fully communicate all information associated with his or her individual health. This finding reaffirmed the philosophical and educational training of physicians perpetuated in America since 1920. In the early part of the 1920s, Dr. Kovner (a physician) created what he called the Sick Roll for patients. The Sick Roll stipulated a patient has a responsibility to disclose (truthfully) all information relating to the

injury/illness, follow physician directives, and make an effort to get better. Kovner's Sick Roll presupposes that patients being presented to a physician for evaluation are actually sick and telling the truth about their health. Such was not the case with one patient at WRAMC in 1993 (Cooper, 1996; Coppola 2, 1996; Peck, 1996).

A soldier who had been in the Persian Gulf Region presented herself to a physician claiming post traumatic stress disorder (PTSD) for having operated a plow which was responsible for digging and filling graves of women and babies killed during Operation Desert Storm. The soldier was granted a consult to the Psychiatric Ward at WRAMC and a MEB was initiated shortly thereafter for PTSD. Several weeks passed and the soldier's MEB (which was complete with a recommendation for PTSD from the Department of Psychiatry) was ready to be forwarded to the PEB. It was then discovered that the soldier had been deployed to the Persian Gulf; however, long after all hostilities and combat action had concluded. The soldier and her unit were never exposed to anything remotely resembling her claims regarding open mass graves and violent death of women and babies. The soldier was returned to her unit for disciplinary and administrative action (Cooper, 1996; Coppola 2, 1996; Peck, 1996).

Unfortunately there may be variables outside the scope of this study which have an impact on processing duration which cannot be explained by this study. Some soldiers can manipulate processing duration in the PDES if granted access to it through a recognized portal of entry.

Although no refereed studies have addressed the Army model of disability processing and adjudication review, the aforementioned authors have conducted peripheral research in this area which is helpful in identifying factors affecting processing duration. Some of the variables

identified by these authors cannot be measured directly. It is the intent of this study to further the effort in identifying known or existing variables affecting processing duration to continue the research in this endeavor.

**h. Purpose (Variables/Working Hypothesis):** The objective of this study is to determine variables affecting processing and adjudication duration in the United States Army Physical Disability System and to recommend avenues to decrease processing and adjudication duration, if applicable. The working null hypothesis follows the traditional no-difference hypothesis in a multiple regression which stipulates the slope associated with a change in any given independent variable are all simultaneously equal to zero. The alternate hypothesis is the slope associated with a change in at least one given independent variable is not equal to zero. The Null and Alternate Hypothesis are listed in Table 7.

**Table 7**  
**Null and Alternate Hypothesis**

**Null Hypothesis (H1<sub>0</sub>):** There is no difference in variables affecting processing and adjudication duration.

$$H1_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \dots \beta_n = 0$$

**Alternative Hypothesis (H1<sub>a</sub>):** There is a difference in variables affecting processing and adjudication duration.

$$H1_a: \beta_i \neq 0 \text{ for some } i, 1 \leq i \leq n$$

\* Where  $\beta$  = the product of the partial regression coefficients and the independent predictor variables

### 3. METHODS & PROCEDURES

**a. Population and Subjects:** The subjects of investigation are Active Duty Army Soldiers or Other Than Active Duty Army Soldiers whose continued service has been called into question through inadequate duty performance or medical impairment. Individual Soldier MEBs and PEBs must have already been processed, adjudicated, reviewed and completed. This study surveys all records processed and adjudicated successfully in FY 96. This year was chosen because it is the most recent. This finite population,  $N = 8,301$  is studied with a confidence interval of 95 percent, a corresponding  $Z$  value of 1.96, ( $p < .05$ ) and  $\alpha = 0.05$  specified error.

**b. Data:** Data was collected through the USAPDA database located at the Headquarters, USAPDA, Bethesda, Maryland. This data is maintained in an application program called the Physical Disability Case Processing System (PDCAPS) which utilizes dBase IV and a software program called Clipper as its root program. PDCAPS replaced the paper record the physical disability system utilized through FY 90. Since 1990 (and as of 14 October 1996), PDCAPS administrators have electronically processed 70, 414 soldier records (Weber, 1996). Data reference Request for Congressional Involvement is maintained in a separate, non-electronic file which the researcher extracted manually. The remaining data is extracted from PDCAPS, converted into a root database file (\*.dbf) and converted/transferred into SPSS for manipulation. Data variables from the dBase IV program are coded in both numeric codes (0,1,2...n) and alphabetic string variables (M, F...\$, etc.). The data did not require excessive data cleaning. All variables are converted to numeric codes for manipulation in SPSS. The dependent variable is calculated by determining the difference between the day the soldier received his or her initial

physical exam at the MTF for the MEB and the effective date of disposition orders concluding PDES processing. A list of SPSS variable codes for the dependent and independent variables is listed in Table 8.

**Table 8**  
**Data Fields**

<u>Independent Variable &amp; SPSS Variable Code</u>	<u>Description</u>	<u>SPSS Data Codes</u>
<b>Dependent Variable: Processing &amp; Adjudication Days (DV_DAYS)</b>	<b>Soldier Physical Exam Date - Effective Date of Ultimate Disposition Orders Issued by PERSCOM</b>	<b>1....2,052 days for N = 8,301 soldiers</b>
Regional PEB (REGONPEB)	One of Three Regional PEBs and sometimes the HQ, USAPDA	1 = WRAMC, Washington, DC 2 = Fort Sam Houston, TX 3 = Fort Lewis, Washington 4 = PEB Re-adjudicated by USAPDA
Gender (GENDER)	Subjects Gender	1 = Male 2 = Female
Race (RACE)	Caucasian, Black, Yellow, Red, Other	1 = Caucasian, 2 = Black, 3 = Yellow, 4 = Red, 5 = Other
Age (AGE)	Age in Years by Category	1 = n < 20, 2 = 21-25, 3 = 26-30, 4 = 31-35, 5 = 36-40, 6 = 41-45, 7 = 46-50, 8 = n > 50
Eligibility to Retire (ERETIRE)	Soldier Has 20 Years or More Service	1 = Yes 2 = No
Length of Service (LOSVC)	Total Years of Service in Greatest Years	1 = 1-5, 2 = 6-10, 3 = 11-15, 4 = 16-19, 5 = 20-25, 6 = 26-30, 7 = n > 30
Grade Category (GRADE)	Military Designation of Enlisted Soldier, Non-Commissioned, Warrant Officer or Commissioned Officer Authority	1 = E1-E4, 2 = E5-E6, 3 = E7-E9 4 = 01-03, 5 = 04-05, 6 = 06-010 7 = W01-W05
Request for Formal Board (FORMPEB)	Soldier Requests Additional Review	1 = Yes 2 = No
Component (COMPONEN)	Active Duty (AD) or Other Than Active Duty (OTAD). {OTAD includes Active Guard/Reserve, Inactive Regular Army Reserve, ARNG Troop Unit Active Drilling Member, Temporary Tour of Active Duty}	1 = Active Duty 2 = Other Than Active Duty
Request for Congressional Involvement (CONGRESS)	Soldier Has Requested and Received Acknowledgment of Presidential, House of Representatives or Senate Involvement	1 = Yes 2 = No
Compensation Award (COMPAWD)	Ultimate Compensation Award in Percent of Soldiers Pay	* 1 = 0%, Separate Without Benefits or Return to Duty 2 = 10%-20% 3 = 30%-40% 4 = 50%-70% 5 = 80%-100%
Injury and/or Illness --NA--	10 Most Prevalent VASRD Codes	** 1 = VASRD Code #1....#10

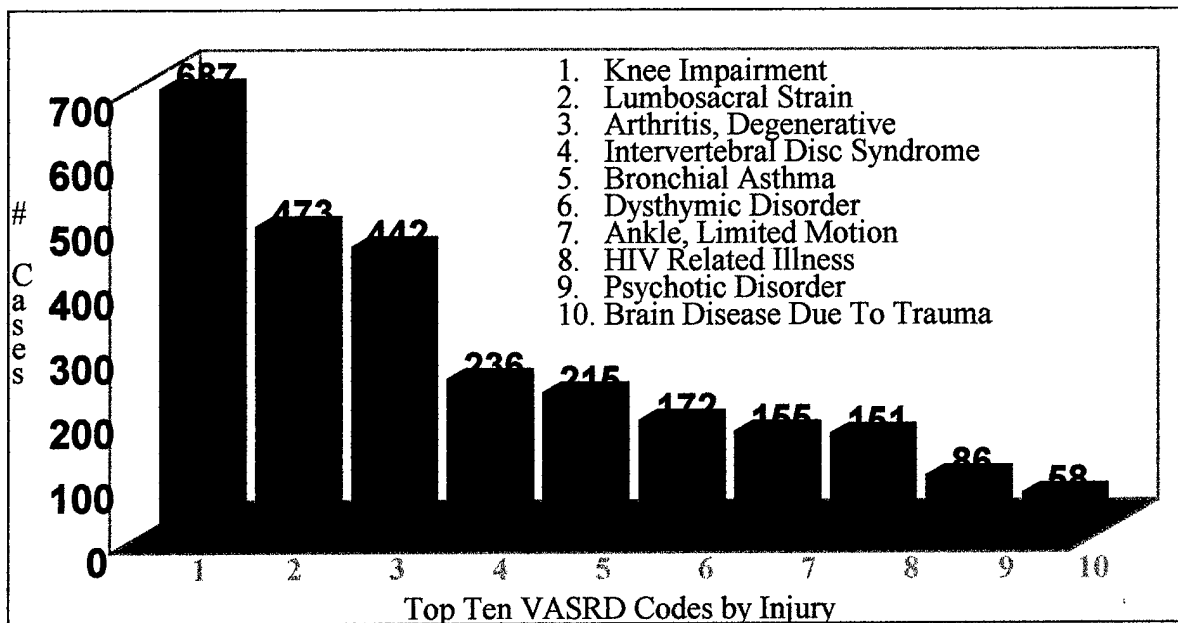
\* 0%-20% = Severance pay and eligibility for Veterans Benefits, n ≥ 30% = permanent disability compensation.

\*\* The ten most common VASRD codes after examination of finite PDES population N = 8,301, dropped from model.



process. A list of the ten most common VASRD codes in the Army in FY 96 and their related disability is profiled in Graph 3.

**Graph 3**  
**10 Most Common VASRD Codes by Area of Concern**



c. **Measurement Instrument/Design:** Using SPSS, hypothesis testing is conducted through descriptive statistics, frequencies, comparison of means, calculation of F-Distribution and T-Significance (Sig T). A Multiple Regression analysis focusing on the overall regression of the F-Test is created to determine the correlation coefficient between the dependent variable, adjudication and processing days, and the independent predictor variables (Norusis, 1996). Backward elimination is utilized with an entry level significance of 0.05 and a removal level of 0.10 to determine impact on  $R^2$  and Multiple R. The full model multiple linear determinant regression equation to be used in the data analysis is represented in Table 9 (Neter, Wasserman and Kutner, 1990).

**Table 9**  
**Full Regression Model**

$$Y = a_0u + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4\dots + b_nX_n$$

- Y is the dependent variable and represents the number of days in the PDES.
- $a_0u$  is the regression constant, or the Y intercept.
- $X_n$  represents the predictor variables.
- $b_n$  is the least squares regression weight, partial regression coefficient or the slope associated with  $X_n$

**d. Psychometrics:** Criterion and content validity and reliability are used to determine the accuracy of the study. The key to criterion validity is the reliability and validity of the independent variables, the standard against which the instrument is being compared (Isaac and Michael, 1985; Cooper and Emory, 1995). Content validity is measured by the degree to which the content of the items adequately represents the universe of all relevant items under study (Isaac and Michael, 1985; Cooper and Emory, 1995). Reliability is described by Kerlinger as the degree to which the variables are dependable, stable, consistent and accurate.

All criterion variables extracted from PDCAPS are checked against existing documentation from the Composite Health Care System (CHCS) and the Military Personnel Record Jacket (MPRJ) prior to transfer into PDCAPS. These criterion variables have been verified as dependable, stable, consistent and accurate by the individual soldier being evaluated and the various echelons of administrative and medical review who process the PDES case (Weber, 1996; Peck, 1996). Additionally, since the entire finite population (N = 8301) is studied, there are no subjects outside the known universe in this population representing FY 96. Evidence for study validity and the reliability of the regression model is strong in cases where these criterion have been met (Rawlings, 1988).

Type I errors (rejecting the null hypothesis when it is true or a false positive) have been forecasted in advance by the researcher with  $\alpha = 0.05$ . This correlates to a 5 percent chance that the null hypothesis will be rejected when it is true. Type II errors (accepting the null hypothesis when it is false or a false negative) are harder to predict and require estimating the distribution of the alternative hypothesis (Voelker and Orton, 1993). Table 10 profiles the types of statistical errors and application of an incorrect hypothesis.

**Table 10**  
**Analysis of Statistical Errors**

<b>H<sub>10</sub> is Actually:⇒</b>		<b><u>TRUE</u></b>	<b><u>FALSE</u></b>
<b>Test</b>	<b>Reject H<sub>10</sub></b>	<b>Type I error <math>\alpha</math></b>	<b>Correct</b>
<b>Decision</b>	<b>Accept H<sub>10</sub></b>	<b>Correct</b>	<b>Type II error <math>\beta</math></b>

Type I and Type II errors are inversely related; as one error increases, the other will decrease. Type II errors are classified as  $\beta$  errors and their incidence of probability depends on the true value of the specified parameter, the previously selected  $\alpha$  level, the type of test being used, the sample standard deviation and the size of the sample (Cooper and Emory, 1995). Type II errors can be reduced with an increase in criterion reliability and validity and the manipulation of the informatics in the measuring tool (Isaac and Michael, 1985; Cooper and Emory, 1995).

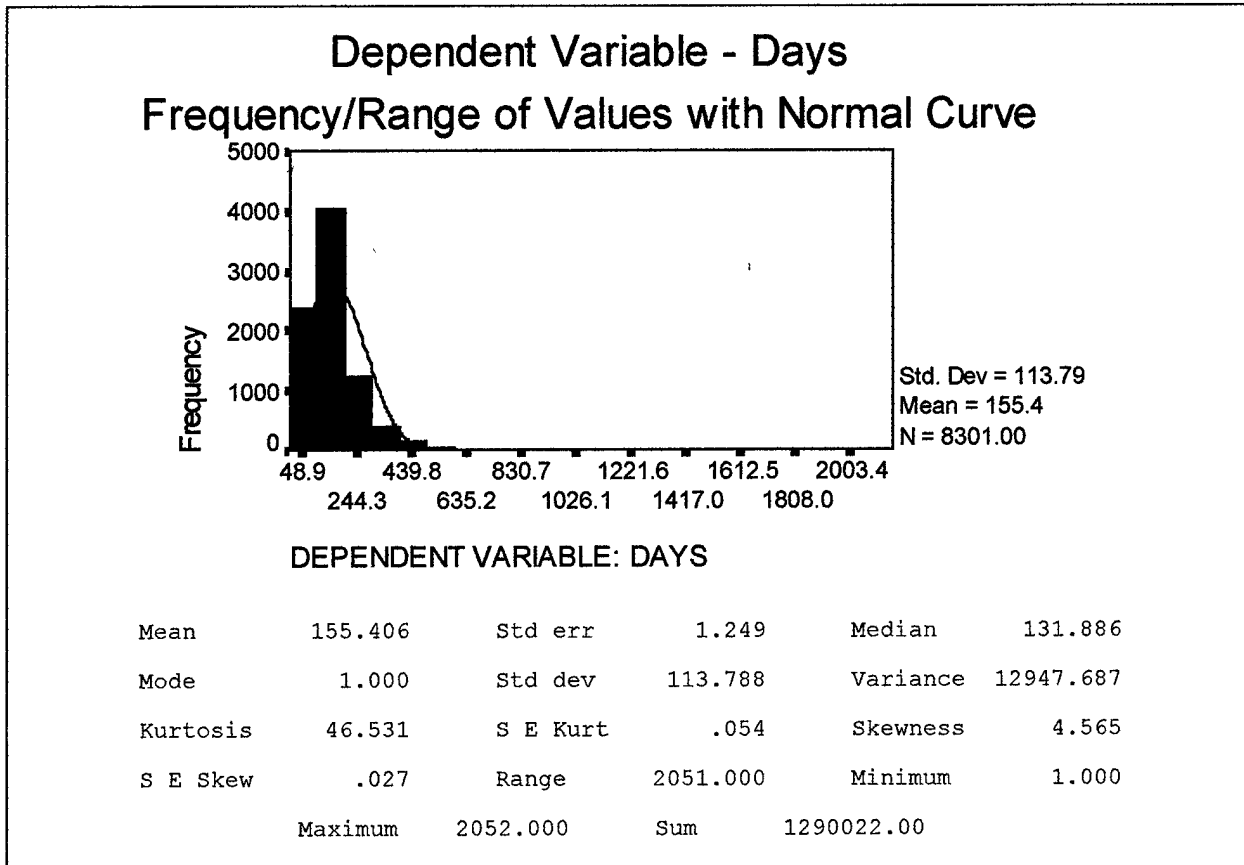
Independent predictor variables included for this study are: Regional PEB, Component, Gender, Race, Age, Rank, Length of Service, Retirement Eligibility, Request for Formal Boards, Request for Congressional Involvement and Compensation Award. All variables within PDCAPS

and variables available in the USAPDA's paper records (such as Congressional Involvement) are valid and reliable. In addition to valid independent variables from PDCAPS, this study determines relationships of variables with a reliable SPSS software package and performs regression analysis on a known, finite N. The incidence of a Type II error is small (Isaac and Michael, 1985; Cooper and Emory, 1995; Neter, Wasserman and Kutner, 1990). Additionally, according to Issac and Michael, the statistical solution to evaluating the null hypothesis often ignores standards of meticulous calculation of Type II errors on the grounds that it is not necessarily statistically significant or crucial to evaluating the worthiness of the null hypothesis.

#### 4. RESULTS

Analysis of the finite population  $N = 8,301$  with respect to the dependent variable, adjudication and processing duration days, yielded a  $\mu = 155$  days,  $\sigma = 114$  days, a median of 131 days and a range of one to 2,052 days, Graph 4. The distribution of the dependent variable is slightly Right-Skewed. This means the mean is higher than (to the right of) the median.

**Graph 4**  
**Distribution of Dependent Variable**



Two cases exceeded 2000 days while eleven cases exceeded 1000 days. A total of 344 cases exceeded one year or more in the PDES. The mode for the population was one processing day. Additionally, 89 percent (n = 7,383) of the cases meet at joint understanding between the Army Medical Command and Personnel Command to complete the MEB within fifty days. Furthermore, 63 percent (n = 5,271) of the cases meet DoD guidance for completion within ninety days after the final MEB. Frequencies and measures of central tendency for the eleven independent variables are located in Annex 3. Graphical analysis of independent variables with

respect to the dependent variable of adjudication and processing days is located in Annex 4.

Through analysis of Pearson correlation coefficients and multiple regression, the contribution of each independent predictor variable makes to the explanation of the variance in the dependent variable is observed. The significance of each partial regression coefficient is measured through analysis of stepwise backward elimination (Norusis, 1996). In backward elimination, all independent variables are included in the regression equation,  $Y = a_0 + b_1X_1 + b_2X_2 + \dots + b_nX_n$ . At each step in the process, one predictor variable is removed that changes the  $R^2$  the least, provided that the change is small enough that it does not reject the null hypothesis that the true change is zero (Norusis, 1996). Variables are no longer removed when the removal of any variable in the model results in a significant decrease in  $R^2$ . Prior to conducting the regression analysis, a Pearson product moment correlation coefficient (Pearson's  $r$ ) was determined to judge the relationship the independent variables had with each other and on the dependent variable. A Pearson's  $r$  is the standard correlation coefficient generally computed prior to conducting regression analysis (Conley, 1996; Brown, 1996). Analysis of a correlation matrix may provide insights as to what variables may contribute significantly to the ultimate regression equation (Conley, 1996; Brown, 1996). Analysis of a one-tailed, Pearson's correlation coefficient matrix for all the variables in the model is displayed in Table 11.

**Table 11**  
**Pearson Correlation Coefficients**

	AGE	COMP AWD	COM PONEN	CONG RESS	LOSVC	GRADE	GEN DER	FORM PEB	RACE	REGON PEB	ERET IRE	*DV DAYS
AGE	1.00 p=.	.0862 p=.000	.3561 p=.000	-.0206 p=.060	.5815 p=.000	.6210 p=.000	-.0624 p=.000	-.1448 p=.000	.0529 p=.107	-.0177 p=.107	.3603 p=.000	.1081 p=.000
COMPAWD	*	1.000 p=.	-.0214 p=.052	-.0277 p=.012	.0960 p=.000	.0755 p=.000	-.0601 p=.000	-.0145 p=.188	.0148 p=.179	-.1152 p=.000	.0281 p=.011	.1509 p=.000
COMPONEN	*	*	1.000 p=.	-.0269 p=.014	-.0821 p=.000	.1744 p=.000	.0268 p=.000	-.0979 p=.000	-.0078 p=.478	.0581 p=.000	-.0382 p=.001	.1022 p=.000
CONGRESS	*	*	*	1.000 p=.	-.0092 p=.401	-.0370 p=.001	.0239 p=.031	.1183 p=.000	.0131 p=.234	.0110 p=.314	.0079 p=.471	-.0939 p=.000
LOSVC	*	*	*	*	1.000 p=.	.4928 p=.000	-.0910 p=.000	-.0742 p=.000	.0642 p=.000	.0169 p=.124	.6545 p=.000	.0270 p=.014
GRADE	*	*	*	*	*	1.000 p=.	-.0644 p=.000	-.1029 p=.382	-.0096 p=.382	-.0135 p=.220	.3162 p=.000	.0646 p=.000
GENDER	*	*	*	*	*	*	1.000 p=.	-.0222 p=.044	.0313 p=.005	-.0002 p=.989	-.0549 p=.000	-.0057 p=.000
FORMPEB	*	*	*	*	*	*	*	1.000 p=.	-.0069 p=.528	-.0113 p=.302	-.0699 p=.000	-.3233 p=.000
RACE	*	*	*	*	*	*	*	*	1.000 p=.	-.0698 p=.000	.0129 p=.000	.0181 p=.099
REGONPEB	*	*	*	*	*	*	*	*	*	1.000 p=.	-.0043 p=.698	-.1823 p=.000
ERETIRE	*	*	*	*	*	*	*	*	*	*	1.000 p=.	.0326 p=.003
*DV_DAYS	*	*	*	*	*	*	*	*	*	*	*	1.000 p=.

\* DV\_DAYS = Dependent Variable

The first number in the matrix is the observed significance. These numbers range from negative one to one. A value of zero denotes no association between variables and a value of one denotes a perfect association. An item-to-item counterpart of one in analysis of the correlation coefficients is observed between independent variables in the rows and columns. The lack of association between the correlation coefficients in the eleven independent variables in the columns confirms concurrent criterion validity for these items (Conley, 1996; Brown, 1996). No variables offer evidence of a dependency based on the observed significance of the independent variables (Norusis, 1996; Conley, 1996; Brown, 1996). Based on this significance the null hypothesis becomes a good candidate for rejection that there is no linear relationship between variables (Norusis, 1996).

The second number in the matrix is the one-tailed test of observed significance level for a

correlation coefficient at least as large and of the same sign when the population correlation coefficient is zero. Those items having a p value,  $\alpha < .05$  are highlighted as significant correlations. The associated p value displays a relationship; however, the p value does not indicate how strong the relationship is or what kind of relationship is present (Conley, 1996). Population characteristics regarding Length of Service and Grade offer correlation coefficients of 0.5815 and 0.6210 in relation to Age and 0.0270 and 0.0646 in respect to the dependent variable (Days), respectively. This is evidence that much of the information contained in Length of Service and Grade may already be contained in the Age variable (Norusis, 1996; Conley, 1996; Brown, 1996). While it is possible that soldiers with the same Length of Service and in the same Grade may be the same Age, this may not always be the case.

Table 12 outlines those variables removed from the application of the backward linear regression equation. Predictor variables for Age, Gender, Eligibility to Retire, Grade, Length of Service and Race all have  $\alpha > .05$  (Sig T) and were not included in the ultimate regression equation.

**Table 12**  
**Variables Removed From Final Regression Model**

----- Variables not in the Equation -----							
Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374	<b>.1695</b>
ERETIRE	.009135	.009922	.992607	1.007	.970761	.898	<b>.3690</b>
GENDER	-.006101	-.006633	.994585	1.005	.975410	-.601	<b>.5481</b>
GRADE	.004375	.004662	.955443	1.047	.955443	.422	<b>.6729</b>
LOSVC	-8.339E-04	-.000899	.978067	1.022	.969879	-.081	<b>.9351</b>
RACE	.002990	.003252	.995206	1.005	.975857	.294	<b>.7684</b>

Tables 13 outlines those variables included in the ultimate regression model after expression of the backward regression equation. Independent variables of Component, Compensation Award, Congressional Involvement, Formal PEBs and Regional PEB are significant with  $\alpha < .05$  (Sig T).

**Table 13**  
**Variables in Final Regression Model**

----- Variables in the Equation -----					
Variable	B	SE B	95% Confdnce Intrvl	B	Beta
COMPAWD	<b>13.860272</b>	1.141170	11.623290	16.097255	.123764
COMPONEN	<b>29.666810</b>	3.482681	22.839872	36.493747	.086840
CONGRESS	<b>-42.980002</b>	8.747266	-60.126859	-25.833145	-.050160
FORMPEB	<b>-88.263262</b>	2.942359	-94.031032	-82.495492	-.307606
REGONPEB	<b>-22.420305</b>	1.386796	-25.138776	-19.701833	-.164848
<b>(Constant)</b>	<b>383.550041</b>	18.588816	347.111252	419.988829	
Variable	Tolerance	VIF	T	Sig T	
COMPAWD	.988300	1.012	12.146	<b>.0000</b>	
COMPONEN	.987453	1.013	8.518	<b>.0000</b>	
CONGRESS	.984700	1.016	-4.914	<b>.0000</b>	
FORMPEB	.975921	1.025	-29.997	<b>.0000</b>	
REGONPEB	.987022	1.013	-16.167	<b>.0000</b>	
(Constant)			20.633	<b>.0000</b>	

The ultimate regression equation as a whole accounts for 16 percent, ( $R^2 = 0.15861$ ) of the variance in the dependent variable of days with a predictive value (Multiple R) of 0.40, and an overall Regression F-Test (Signif F) of 0.0000, Table 14. This means that 16 percent of the variation can be explained by this regression model and the predictive frequency of the model (40%) is acceptable. Additionally, the F-Test is highly significant. An F-Test of 0.0000 indicates a p value less than 0.00005. According to Harry M. Conley, one of the statistical advisors for this study and former Director for Sampling Methodology, United States General Accounting Office (GAO), Washington, DC, and co-author of GAO's book on sampling and statistics, Using Statistical Sampling-GAO/PEMD-10.1.6, an  $R^2$  between 15-20 percent with a significant F-Test for a population this large ( $N = 8,301$ ), is a very good measure of the statistical methodology when dealing with social populations and statistics. Conley went on to explain that a large and diverse population may have numerous characteristics and a near incalculable level of recombinants which affect the ultimate expression of a population. Such factors may not be present in studies of other types of data. Whenever one model explains nearly 1/6th of the variance in a population, it is considered a success by the GAO. This element is agreed with by the researcher's second statistical advisor, Lieutenant Colonel Richard Guerin, Dental Corps, Deputy Director, Measurement and Methods, Health Services Operations and Readiness, Office of the Assistant Secretary of Defense (Health Affairs), Washington, DC.

Variables in the study do not suggest multicollinearity. Collinearity diagnostics are revealed through examination of the variable Tolerances and Variance Inflation Factor (VIF), in the regression equation, Table 13. Variable Tolerances below 0.1 and VIF equal to or greater than 10 suggest collinearity.

**Table 14**  
**Proportion of Variability Explained by Regression Model**

Multiple R	.39826		
R Square	.15861		
Adjusted R Square	.15810		
Standard Error	104.29352		
Analysis of Variance			
	DF	Sum of Squares	Mean Square
Regression	5	16811472.98607	3362294.59721
Residual	8199	89181655.62624	10877.13814
F =	309.11574	Signif F =	.0000

**a. Hypothesis Decision:** Based on the statistical evidence as profiled in Table's 11, 12, 13 & 14 the Null Hypothesis ( $H_{10}$ ), that there is no difference in variables affecting processing and adjudication duration in the PDES,  $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \dots \beta_n = 0$ , is rejected in favor of the Alternative Hypothesis ( $H_{1a}$ ), that there is a difference in variables affecting processing and adjudication duration,  $\beta_i \neq 0$  for some  $i$ ,  $1 \leq i \leq n$ .

**b. Solving the Regression Equation:** Utilizing the calculated regression constant ( $a_0$ ,  $u = 383.55$ ) and the five discriminate partial regression coefficient's of determination ( $B = "b_n"$  of each  $b_n X_n$ ) for each predictor variable included in the backward regression analysis, the linear regression equation is transformed as follows, Table 15.

**Table 15**  
**Estimated Regression Equation**

$$Y = a_0u + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \dots + b_nX_n$$

**Becomes**

$$Y = 383.55 + (13.86 \times \text{COMPAWD}) + (29.67 \times \text{COMPONEN}) - (42.98 \times \text{CONGRESS}) \\ - (88.26 \times \text{FORMPEB}) - (22.42 \times \text{REGONPEB})$$

- **Y** is the dependent variable and represents the number of days in the PDES.
- **383.55** is the regression constant, or the Y intercept.
- **COMPAWD** represents one of the five predictor variables.
- **13.86** represents one of the five least square's regression weights, partial regression coefficient or the slope of the linear equation.

The calculated partial regression coefficients for each predictor variable explain how much the value of the dependent variable changes when the value of the independent variable increases by one and the values of the other predictor variables do not shift (Norusis, 1996). A negative regression coefficient such as Request for Formal PEB (FORMPEB) has an inverse relationship with the dependent variable of adjudication and processing days. As the dependent variable decreases, the independent variable increases. By inserting the means ( $\mu$ ) of each predictor variable generated through analysis of the descriptive statistical output (Annex 3), the regression equation can be solved for Y as follows, Table 16.

**Table 16**  
**Solved Regression Equation**

$$Y = a_0u + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \dots + b_nX_n$$

**Becomes**

$$155.79937 \text{ days} = 383.55 + (13.86 \times 2.001) + (29.67 \times 1.129) - (42.98 \times 1.982) - (88.26 \times 1.806) - (22.42 \times 1.975)$$

\* Solved regression equation, Y = 155.79937 days

\*\* Actual population  $\mu$  = 155.4 days

\*\*\* Y ~  $\mu$  demonstrates validity of least squares linear regression model.

The actual processing and adjudication mean duration for the population under study is 155.4 days while the solved regression equation yielded 155.8 days. This finding demonstrates validity of the least squares linear regression model (Guerin, 1996; Conley, 1996). Independent variables of Component, Compensation Award, Congressional Involvement, Formal PEB and Regional PEB are significant with  $\alpha < .05$ . The overall model has an  $R^2 = 0.15861$ , a Multiple R of 0.40, and an overall Regression F-Test of 0.0000. The evidence suggests the overall model is successful and the decision to reject the Null Hypothesis in favor of the Alternate Hypothesis is satisfactorily supported (Guerin, 1996; Conley, 1996).

## 5. DISCUSSION

**a. Variables Removed From The Model:** Several stereotypical assumptions associated with soldiers undergoing disability review can be eliminated through analysis of this study's findings. Variables concerning Gender, Grade and Race were removed from the ultimate expression of the equation. There is no difference in processing and adjudication duration for these categories. The study found male soldiers exceed female soldiers in processing duration by two days, African Americans exceeded caucasian soldiers by two days (other races not ecologically significant) and the range of means for Grade categories is distributed from a low of 148 days for enlisted soldiers E-1 to E-4 and a high of 193 days for officers 0-4 and 0-5, Table 17. The forty-five day gap between these two categories is not ecologically significant. That is, it is not large enough nor does it impact the population significantly to make policy decisions or take action on the observed finding (Conley, 1996). Field grade officers in the 0-4 and 0-5 category accounted for 2.0 percent of the population as

compared with nearly 51 percent of the population comprising the E-1 to E-4 category. Similarly, soldier Eligibility to Retire, Age and individual service member Length of Service did not significantly contribute to excessive duration days beyond the mean of the regression model. These variables were not in the discriminate regression equation.

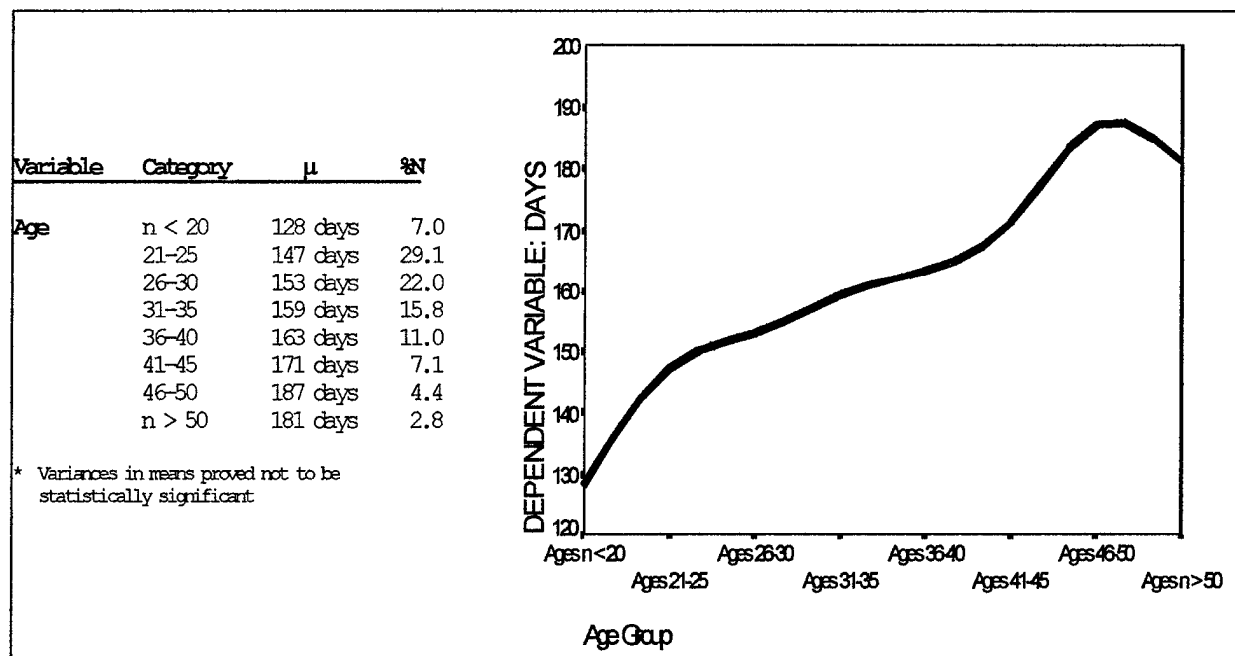
**Table 17**  
**Variable Means: Gender - Race - Grade**

<b>Variable</b>	<b>Category</b>	<b><math>\mu</math></b>	<b>%N</b>
<b>Gender</b>	Male	157 days	81.0
	Female	155 days	19.0
<b>Race</b>	Caucasian	155 days	65.6
	Black	157 days	25.3
	Yellow	146 days	0.7
	Red	131 days	0.5
<b>Grade</b>	E1-E4	148 days	50.8
	E5-E6	160 days	31.0
	E7-E9	167 days	10.9
	01-03	165 days	3.8
	04-05	193 days	2.0
	06-010	156 days	0.4
	W01-W05	163 days	1.2

\* Variance in means not statistically significant.

A preponderance of the literature reviewed predicted that age would most likely be an indicator of duration days in the ultimate regression equation. While days in the PDES does increase with age, this finding proved not to be statistically significant (Graph 5) in the final regression expression. This finding can probably be explained through the strict regimen of fitness soldiers are required to maintain throughout a military career. Soldiers are generally more fit than their civilian counterparts and are able to recover from physical impairments more expeditiously.

**Graph 5**  
**Variable Means: Age**



**b. Variables Included In The Model:** Several factors present themselves for possible analysis and discussion in examining the final regression equation with respect to disability processing.

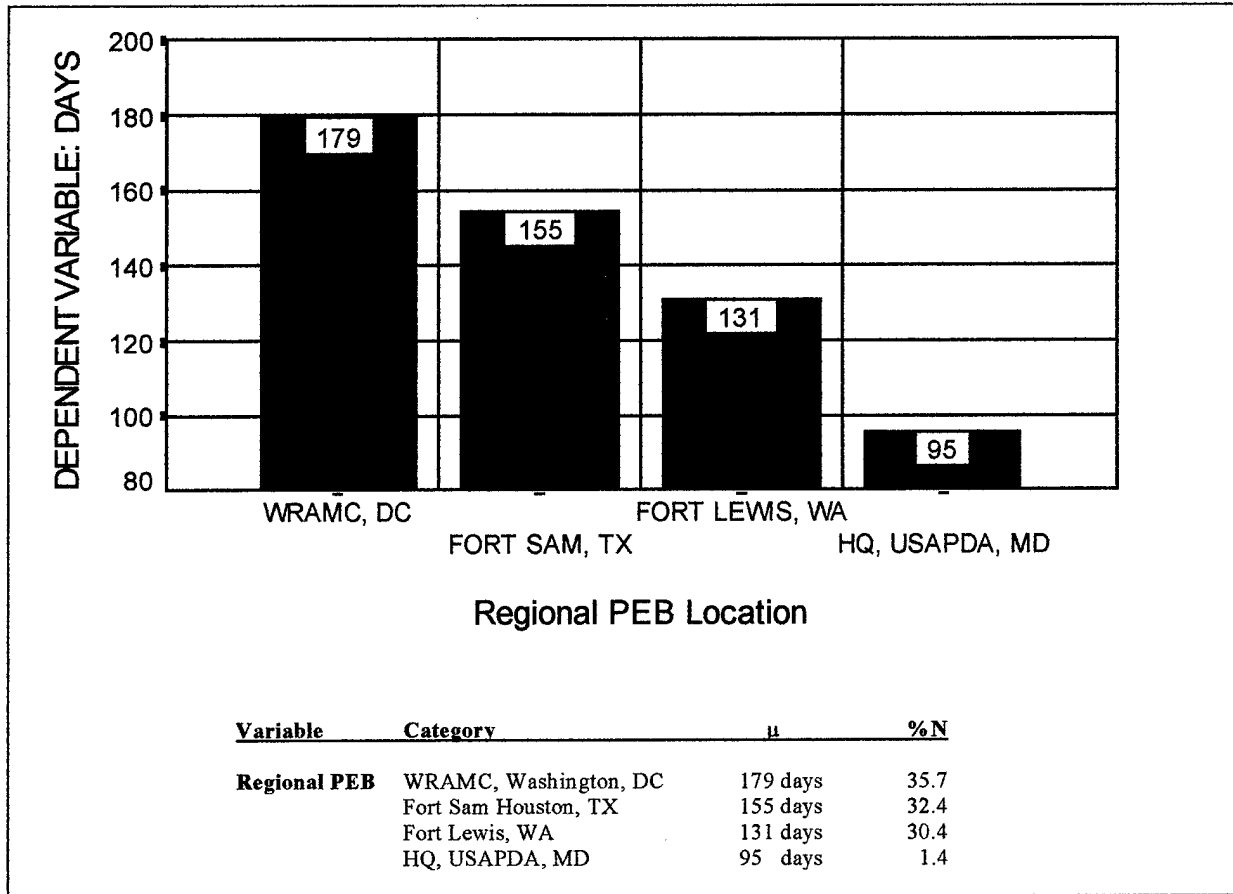
Formal PEBs, one of the five predictor variables included in the final regression equation, may be explained through standard administrative and operating procedures. Formal PEBs are requested by the soldier and scheduled by the President of the Regional PEB. The mean duration between requesting and receiving a Formal PEB is thirty-six days with a range of one through 128 days. Delays in scheduling and receiving Formal PEBs are the result of both seasonal and intermittent occurrences such as: Holiday schedules, queues for presenting cases to the PEB President, individual soldier medical, professional and personal commitments and individual soldier self-activism. The literature review predicted soldiers who are disgruntled with the compensation

system may employ delaying tactics in order to prolong the beneficiary process. Requesting a Formal PEB involves risk. The ultimate award may either increase or decrease depending on special circumstances. However, for a soldier whose goal is to prolong PDES completion, a Formal PEB guarantees additional processing time at full pay and allowances.

Ultimate Compensation Award granted to soldiers upon conclusion of the PDES process also proved to be significant with processing duration. However, increases in processing time can also be correlated with the degree and complexity of the medical ailment. Soldiers having permanent disability compensation awarded averaged two or more VASRD codes when compared to those soldiers who were found fit for duty, separated without benefits or received permanent compensation allowances.

One of the independent variables which lends itself to further investigation is the operation of the Regional PEBs. The Fort Lewis, Washington, PEB has a mean processing duration time 131 days as compared to mean of 179 days at the WRAMC, PEB and 155 days at the Fort Sam Houston, PEB, Graph 6. Explanation of the variance may be a result of the specialty care that is available in the Washington metro area which is not available in proximity to the other Regional PEBs. Cases being processed at the WRAMC PEB may involve higher medical and administrative complexity and require longer or additional periods of adjudication and processing review. The explanation may also be the result of increased attention to initiatives in TQM or CQI in the Fort Lewis PEB.

**Graph 6**  
**Independent Variable: Regional PEB**



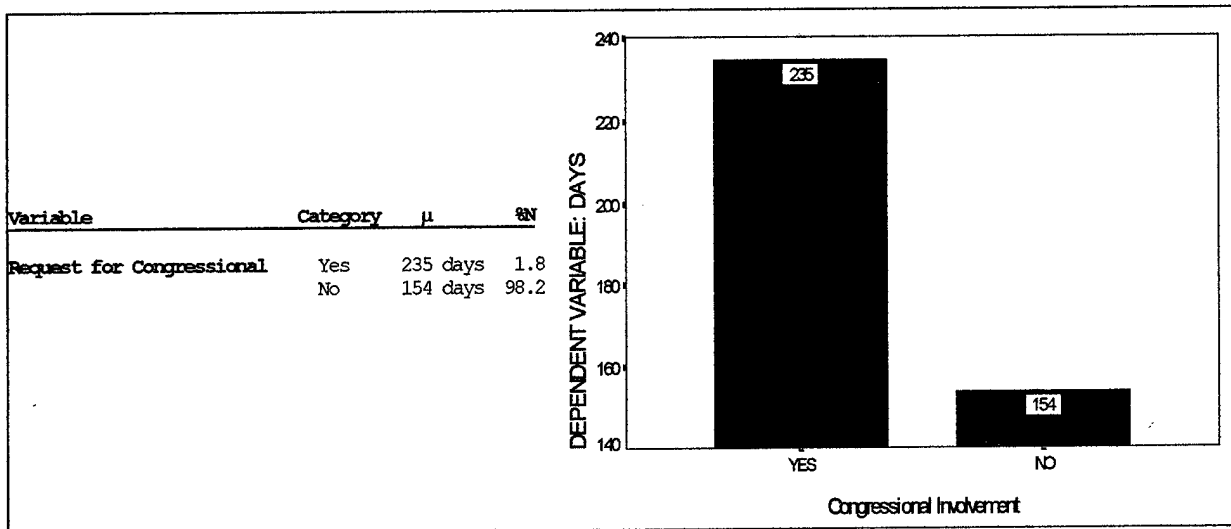
Complaints to political representatives (Request for Congressional Involvement) can be interpreted in only one way, the soldier is disgruntled with one or more aspects of processing in the PDES. The USAPDA received over 350 letters from members of the Senate, House of Representatives or White House in FY 96 requesting additional review on subject matters as outlined by constituent requests for involvement. Of these cases, 148 requests are pertinent to this study population. The remaining requests received by the USAPDA involved ongoing cases, cases

completed prior to FY 96 or were duplicate requests for the same information initiated by members of the Senate, House or White House from the same constituent plea.

No action was taken to categorize the complaints. However, a majority of the Requests for Congressional Involvement involved individual soldier perceptions of unfair persecution and distress over the ultimate Compensation Award and determination of fitness. Many of the complaints involved disgruntled soldiers who were found "Fit for Duty" through the Presumption of Fitness or Performance Based Criteria. Other complaints referenced the type of ultimate retirement granted (permanent or temporary) or a relationship to fifteen-year retirement. Very few of the Requests for Congressional Involvement included soldier dissatisfaction with the duration of PDES processing.

No other category offered more evidence of an increased length of stay in the PDES than Request for Congressional Involvement. The average difference between processing time for a soldier who requested Congressional review and those who did not is eighty-one days, Graph 7. The overall number of soldiers requesting additional review is relatively small and represents only 1.8 percent of the total population. However, the finding is ecologically significant given the research which shows that soldiers who are maintained for protracted periods of time in the PDES utilize an increased incidence of health care utility. It may be advantageous to the MTF to closely monitor those cases, base policy and take action on PDES cases which have already received Congressional assistance.

**Graph 7**  
**Request for Congressional Involvement**

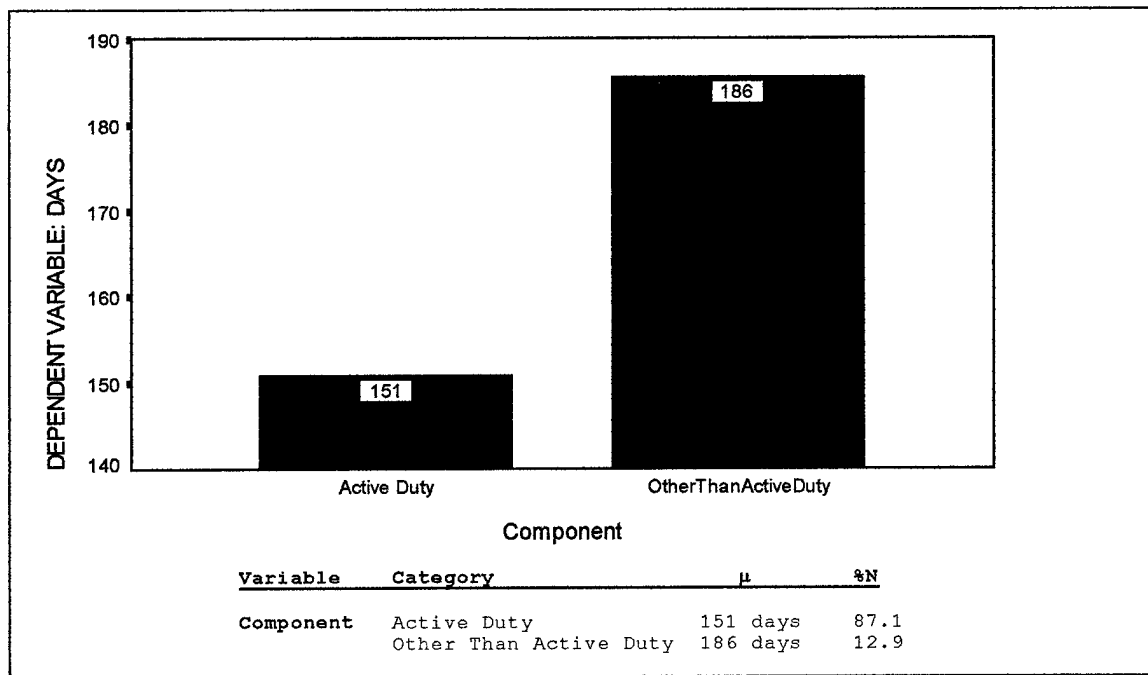


Study findings regarding Army Reserve or National Guard PDES (OTAD) processing time contributed significantly to an increase in the dependent variable, Graph 8. These OTAD personnel averaged thirty-one more days than Active Duty personnel being processed through the PDES. This increase may be a result of additional constraints which are placed upon OTAD personnel. Such constraints may involve increased travel to and from the MTF, full time civilian employment work-week considerations or some other form of individual soldier self activism. Additionally, many OTAD soldiers must receive authorization from the National Guard or Army Reserve Bureau prior to entering into the PDES. This procedure may often take several weeks (Peck, 1996).

A civilian study conducted by McWhinnie showed that personnel who received pay during compensation processing had longer periods of disability than those personnel who did not receive pay. McWhinnie recognized different behavior patterns between his subjects who were receiving salaries and those who received no pay during the beneficiary process.

OTAD soldiers being processed through the PDES may continue to draw full pay and allowances commensurate with their Active Duty counterparts if the injury occurred while on an Active Duty For Training requirement. This same injury may hinder the soldier from returning to his or her civilian job and maintaining their livelihood. Some OTAD soldiers being processed through the PDES may be employing delaying tactics in order to perpetuate protracted PDES processing if civilian employment opportunities are questionable. It would be interesting to examine an OTAD population undergoing disability review to find which soldiers were gainfully and happily employed prior to becoming a disability beneficiary. Both Emanuel et al. and Lippman found the incidence and duration of becoming a disability beneficiary increased when the prospect of favorable or dedicated employment was not available to the individual.

**Graph 8**  
**Comparison of AD and OTAD**



**c. Examination of Alternate Factors Affecting PDES Processing:** In examining large social populations variables may often affect the actual characteristics of the population in a variety of ways (Conley, 1996). These variables may not always act consistently. A 1968 court case, People v. Collins, 68 Cal. 2d 319, 66 Cal. Rptr. 497, 438 P.2d 33 (Michaelson, 1993), established the Product Rule for introducing statistical evidence in court cases. An example of this rule states that if a white man with a beard, blue mask, in a yellow shirt, black pants, blue car robs a store with a .45 caliber pistol and drives away, and thirty minutes later a white man with a beard in a yellow shirt (etc., above) is caught, despite no one having seen his face, the product rule can be applied in order to apprehend him for further examination under special circumstances. The product rule states that the joint occurrence of a number of mutually independent events is equal to the product of the individual probabilities of each event occurring. Visual inspection of five completed PDES cases with the highest total number of days reveals some interesting theories, Table 18.

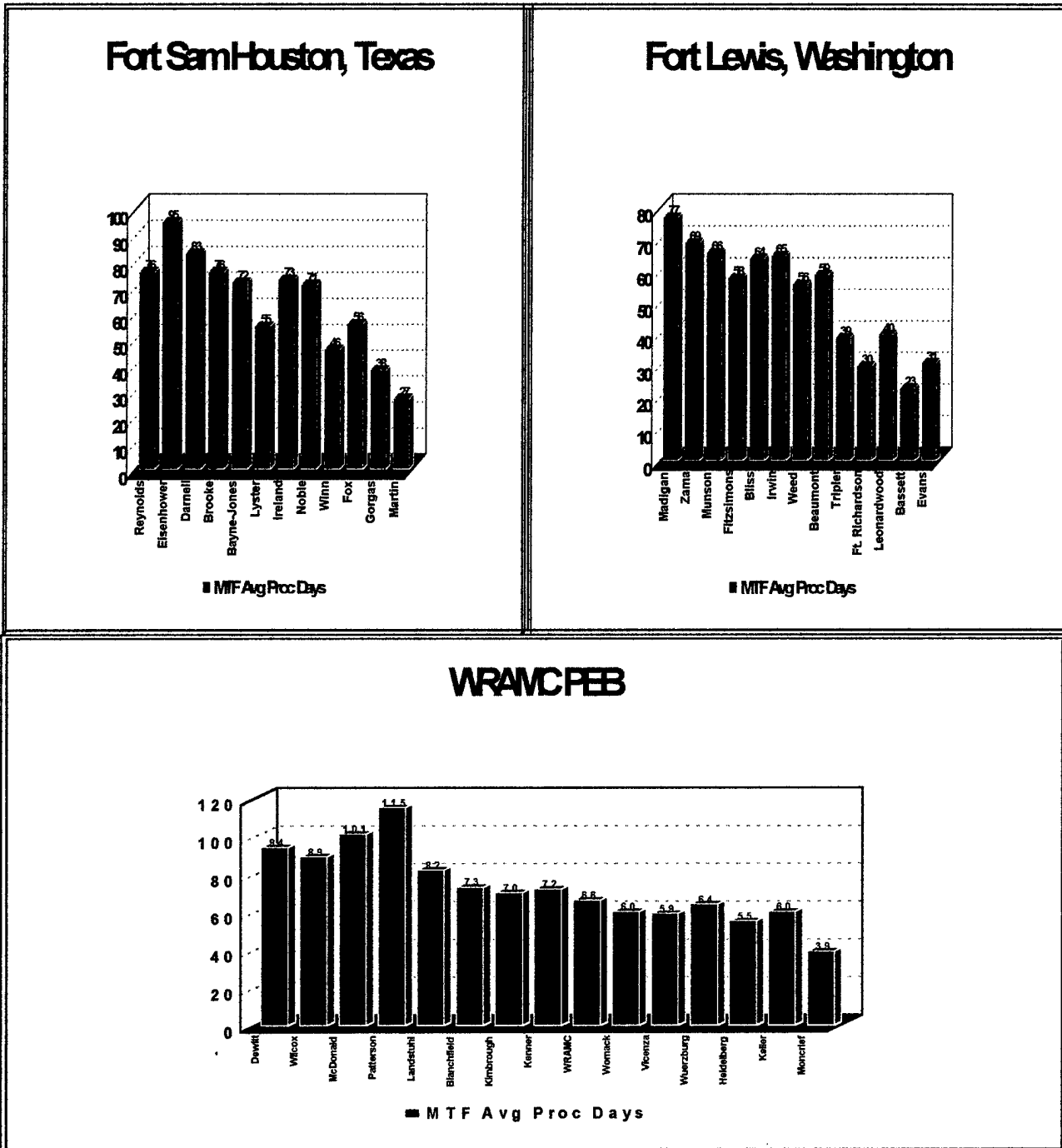
**Table 18**  
**Top Five Disability Cases By Day**

<u>Total DAYS</u>	<u>Compensation Award</u>	<u>Component</u>	<u>Congressional Involvement</u>	<u>Formal PEB</u>	<u>Regional PEB</u>
2052	0%, Separate Without Benefits or Return to Duty	Active Duty	No	No	Fort Sam Houston, TX
2017	0%, Separate Without Benefits or Return to Duty	Active Duty	No	No	HQ, USAPDA
1893	50%-70%	Active Duty	No	No	HQ, USAPDA
1603	0%, Separate Without Benefits or Return to Duty	Active Duty	No	No	HQ, USAPDA
1601	0%, Separate Without Benefits or Return to Duty	Active Duty	No	No	WRAMC

None of the cases displayed in Table 18 possess two or more of the discriminate regression variables. While this visual inspection may be a weak form of interpretation, the next ninety-five cases in descending order produce similar findings, as does examination of groups of cases around the population mean, mode and median. Application of the product rule or strict employment of discriminate independent variables in the final model to determine or predict duration in the PDES is not prudent. However, if the discriminate regression equation explains only 16 percent of the variation associated with PDES processing days, Emanuel et al. may have been correct when his research found that "apart from medical factors, work-leisure preferences, denoted as inclination factors, are of influence" (Emanuel et al., 1987).

Another factor not expressed as an independent variable may be the leadership of the personnel in the MTF processing the disability case. Analysis of the MTFs in the three Regional PEBs reveals average processing times as low as twenty-three days for Bassett Army Hospital and a high of 115 days for Patterson Army Hospital, Graph 9. Furthermore, retrospective study of disability processing at WRAMC reveals a decrease of PDES processing from 280 days in 1992 to a low of fifty-three days in 1994. This average has since increased to sixty-six days as of the end of FY 96. Examination of TQM/CQI intervention at the MTF level may reduce PDES processing.

**Graph 9**  
**Regional PEBs**



The availability of specialty care in each MTF and Regional PEB cannot explain all the wide variance in duration days for soldiers being processed through the PDES. A preponderance of the research clearly shows that patient behavior patterns while undergoing disability review are affected by incentives concerning pay, favorable employment status and other financial rewards. These rewards are generously available in the MHSS and can act as intrinsic and extrinsic motivation incentives for soldiers attempting to abuse the MHSS for personal or secondary gain.

Analysis of forty-one ( $n = 41$ ) ongoing PDES cases at WRAMC examined in November 1996 reveals soldiers with a variety of factors which may influence behavior patterns while undergoing disability review. Ten soldiers (24 percent of MHC) have pending, or have already received adverse administrative, disciplinary or Uniformed Code of Military Justice (UCMJ) actions which may prevent a successful twenty year military career. Six of the forty-one disability cases involve soldiers who are non-selected for promotion to the next highest grade, have received an Article-15 or who have already been court-martialed for a pre-existing offense. Four of the ongoing disability cases have pending adverse administrative, disciplinary or UCMJ action. The leadership of the MHC, WRAMC are skeptical as to a minority of the remaining soldier's abilities to function on Active Duty despite their medical condition. Some of these remaining soldiers may be candidates for future force reductions through quality management programs or retention control point cut-off ceilings. This population characteristic supports the findings of Sorkin, Schneder, Lippman, Fenn and Harris when they found that compensation incentives increased patient likelihood of becoming beneficiary claimants. Examination of PDES processing time for WRAMC as of November 1996 reveals a  $\mu = 138$  days with a range of fourteen days to 529 days.

Several authors have addressed the evidence and potential of patients abusing, committing fraud or malingering in the compensation system. Direct costs for these behavior patterns are difficult to measure (Blum, 1996) and, therefore, no metric has ever been assigned to such behaviors. It is possible that soldiers are engaging in subtle delaying tactics which will produce an increase in disability processing duration over the long term length of the PDES process. Such delaying tactics may involve:

- Scheduling an appointment as far out as possible and then canceling it the day before.
- Removing documentation from the personal medical record for deception purposes.
- Withholding pertinent medical information from the attending physician.
- Failing to appear for a medical appointment.
- Refusing to follow physician directives.
- Imitating behavior characteristics of an ill patient.
- Intentionally making one's self ill.
- Educating one's self on the PDES to identify avenues to prolong disability evaluation.

The effort and time associated with attempting to assign a metric to these behaviors may be prudent. Shalala, Thomas, Feldstein and Weiner et al. (among others) have discussed the increase in costs associated with maintaining patients on protracted hospitalization for disability evaluation. Many civilian beneficiary and claimant organizations utilize Sullivan's metric for attributing costs to disability processing and duration (Sullivan, 1996). This metric states that the full cost of disability when examining the direct, indirect and disability management costs equate to 8 percent of the claimants total salary over the term of disability duration (Sullivan, 1996).

During the 20-23 November 1996 annual conference of the National Health Care Anti-Fraud Association (NHCAA), issues concerning worker's compensation and disability fraud were discussed in great detail. According to the NHCAA, health care fraud is defined as the intentional deception or misrepresentation that an individual or entity makes when the misrepresentation

could result in some unauthorized benefit to the individual, or the entity or to some other third party (NHCAA, 1995).

The earliest case of patient misbehavior perpetuated from a claimant perspective may be documented within the United States Military Community Health Care System. (Coppola 5, 1997). Prior to 1861, officers appointed on active military duty remained in service until they were cashiered, resigned or died. It was only in cases of extreme and unmistakable debilitating conditions that a soldier would be involuntarily separated from service. The impetus prior to 1861 was on hiding debilitating conditions and keeping the medical record clean to avoid involuntary separation. There simply existed no economic incentive for the soldier-patient to fabricate injuries. On the contrary, it was in the patient's best economic interest to always give the appearance of being healthy. Failing to give the perception of fitness might result in the loss of job, pay and medical benefits simultaneously. Evidence of board coercion and manipulation of medical records (unhealthy personnel attempting to look fit on paper) during the 1855 mandate, "An Act to Promote Efficiency in the Navy," was so prevalent that this legislation was repealed two years later (Annex 2) and a regular retirement scheme was established in 1861 (Coppola 5, 1997).

The modern Army beneficiary process offers different incentives to patients undergoing review in the PDES. It may now be in a soldier's best economic interest to imitate sickness when he or she is healthy. Federal benefits are known to be among the best in the workforce. It would not be prudent for providers and senior military leadership to discount the occurrence of patient malingering, abuse and fraud within the Army MHSS. According to the NHCAA and HIAA, approximately one-third of all fraudulent activity is committed by the claimant. There is

no evidence to suggest that this behavior pattern might be dissimilar in the Army model of disability and claimant processing.

## 6. RECOMMENDATIONS

The following recommendations meet the criteria of effectiveness, efficiency and acceptability as outlined by Simmons and Schumaker (Simmons and Schumaker, 1994). The following recommendations will reduce processing and adjudication duration, may be implemented within a twelve month period, will pay for themselves through reduced incidence of protracted disability duration and do not require dramatic reengineering or reorganization initiatives. Rather, the tenets of each recommendation revolve around the principles of TQM as defined by Deming (Covey, 1990; Kettner, Moroney and Martin, 1990).

The findings of this study show that Requests for Congressional Involvement have the most dramatic affect for increasing PDES duration. However, the entire structure may be improved through a systems oriented approach to disability management as a concept of integrated health care delivery. The current structure and process of the PDES model do not produce the same outcome for soldiers with like circumstances every time. A systems oriented approach to management is recommended to decrease the ALOS of the entire PDES model.

**Problem 1: Structure/Conceptual Philosophy.** The DoD TRICARE program and Army MEDCOM do not capture disability processing as a component of managed care, a readiness initiative or a metric for improving quality of care. Additionally, the PDES is managed by PERSCOM with elements of responsibility shared by MEDCOM. The two organizations do not always share the same goals in respect to PDES processing duration (Peck, 1996; Smith, 1996).

**Research Recommendation 1:** In concert with MEDCOM and PERSCOM, incorporate disability review as part of TRICARE's, MEDCOM's and PERSCOM's strategic plan for improving readiness. Studies have shown that top-down leadership is the most effective tool for accomplishing mission objectives (Duncan, 1995). Ensure regional leaders take ownership for this tenet and structure systems and organizations to support this new readiness concept. Increase cooperation between leaders of the MEDCOM and PERSCOM through shared vision, goals and objectives within the strategic plan.

**Problem 2: Process Management at The Top.** The MEDCOM does not dedicate time for regular quantitative review of statistics concerning PDES duration (Blum, 1996; Smith, 1996). Although this information is forwarded to individuals in the MEDCOM from the USAPDA, dissemination and feedback from Regional MTF Commanders to the MEDCOM is irregular. This lack of management initiative violates Deming's TQM philosophy of statistical measurement and follow-up. It also violates the tenets of stratified situational leadership (Jaques, 1989), which is the one of the pillars behind the founding of the current organizational structure of the Army MEDCOM. Stratified situational leadership empowers regional leaders to problem solve based on environmental conditions and resources within the local area; however, incorporates fundamental guidance, goals and directives from a central agency as a starting point.

**Research Recommendation 2:** The MEDCOM should dedicate a single point of contact (POC) responsible for monitoring PDES statistics. There is a mutual understanding between the MEDCOM and PERSCOM that the MEB will be completed in fifty days (Peck, 1996). Additionally, there is a DoD Directive outlining a goal of completing all PDES cases within ninety days upon receiving a completed MEB (Peck, 1996). This metric should be used as a starting point

for PDES processing and a goal for Regional MTF Commanders to achieve. The MEDCOM POC will review measures of central tendency associated with PDES duration quarterly and forward results to Regional Commanders. Those commanders not meeting goals and objectives for PDES processing should be given assistance by the MEDCOM in meeting objectives on a case-by-case basis. Additionally, this POC will work in cooperation with the sister services to exchange information and share best practice initiatives associated with PDES processing duration.

**Problem 3: Process Management at the Medical Facility.** Common managed care practices such as concurrent review, case management, cost containment, practice guidelines, retrospective review and standard PDES protocols are not developed in every facility in the MEDCOM concerning PDES processing (Smith, 1992). Such procedures have been shown to improve the quality and timeliness of administration in health service organizations (Kongstvedt, 1995; Kovner 1988), and to decrease claimant processing duration in the civilian beneficiary industry (Ford, 1996; DuVall, 1996; Smith, 1996). At least one MTF (WRAMC) in the MEDCOM has had success with such practices resulting in a decrease in PDES processing from 280 days to fifty-three over a two year period from 1992-1994 (Coppola 1, 1994). Furthermore, the reduction in bed days for MHC resulted in a 23 percent decrease in bed occupied days for the entire facility.

**Research Recommendation 3:** A centrally developed, locally implemented Patient Management Team (PMT) be established in each MTF which conducts PDES processing. Responsibility for the centrally developed PMT should be dedicated to the MEDCOM. Critical pathways and standard PDES protocols should be developed, put in writing and disseminated to regional leaders. Representatives on the PMT should include individuals representing the departments of MHC, PEBLO, Patient Administration, Personnel, Patient Representative and the

Inspector General's office (WRAMC, 1992; Smith, 1992). Items to be discussed should incorporate the tenets of concurrent review, case management, cost containment, practice guidelines and retrospective review. Presentation of locally developed protocols should be made to the commander of each regional facility. The PMT should meet on a weekly basis and concentrate efforts on those personnel who have exceeded the average PDES duration for that particular MTF. Additional effort should be placed on managing OTAD soldiers and personnel who have requested Congressional assistance and Formal PEBs. These characteristics have been identified in this study as red flags for an increase in disability processing duration. Furthermore, case managers should be assigned to patients whose appointment history and medical progress (as validated by CHCS, the attending physician and the PMT) is inconsistent with similar patients being managed in the same facility. Lastly, increased emphasis must be placed on those transition assistance programs which can help facilitate a smoother career changeover or retirement opportunity for the departing soldier. These incentives will encourage the soldier to move on to a new life and career. Increased emphasis for transition assistance programs will include more cooperation and attention to local Veterans Administration groups, job fairs, resume writing workshops and skills building programs.

**Problem 4: Process Management at the Clinical Level.** Reliability of physical and medical parameters must be validated as per DoD Directive 1332.18, Separation from the Military Service by Reason of Physical Disability. These parameters are not being met (Peck, 1996). This directive requires certain cases be evaluated on three different occasions and agree with one another within the 5 percent level of deviation. Physical disability medical records and the NARSUM contain medical information which is specific to a certain condition at one point in time and may not accurately reflect the validity or reliability of the physiological impairment. In some cases, a soldier being

evaluated through the PDES will be evaluated by an independent medical examiner whose findings contradict what is contained in the patient's MEB. In some instances, an opinion of a member of the American Academy of Disability Evaluating Physicians (AADEP) must be obtained to discern which finding accurately describes the patient's medical condition (Peck, 1996). Additionally, Lumbrosacral Strain and Intervertebral Disc Syndrome are the number two and four most common injuries and VASRD Codes, respectively, reported in the PDES in FY 96, Graph 3 (page 36). Back injuries are the easiest impairment to imitate when disgruntled employees are seeking compensation benefits for personal or secondary gain (Ford, 1996; DuVall, 1996; Smith, 1996). No established and uniform mechanism is in place in MTFs to evaluate the semantic differences with the behavior model of disability and the medical model of disability as outlined by McWhinnie, Emanuel et al., DuVall and others, despite the established validity and reliability of the Waddell test (Wiesel et al., 1996). Waddell tests are commonly used by insurance companies and providers to identify patients who may be imitating injuries for personal or secondary gain (Ford, 1996; DuVall, 1996). Waddell scores are generated which identify variances in patient behavioral models of impairment and physiological models from reliable samples (Waddell, 1987; Waddell, 1993). Waddell tests distinguish between nonorganic physiological signs (tenderness, simulation, distraction, regionalization and over reaction) that are independent of those commonly used to detect organic disease, but correlate with treatment failure, with long standing symptoms, with elevated hypochondriasis and hysteria scores of the Multiphasic Personality Inventory, and with various other psychological factors. Waddell Scores may be used to normalize responses between patients (Wiesel et al., 1996).

**Research Recommendation 4:** Comply with DoD Directive 1332.18. Waddell tests and other measures of validity and reliability become standard requirements for inclusion in the NARSUM and MEB when evaluating injuries. Regional MTF Commanders ensure this information is included in the MEB prior to forwarding it to the PEB. Additionally, develop a standardized MEB dictation which will reduce the variability of information normally contained in the record. Lastly, forward the findings of the most common injuries incurred by soldiers each year (Graph 3, page 36) to the Army's Center for Health Promotion and Preventive Medicine for analysis and dissemination, as applicable.

**Problem 5: Outcome Planning through Education:** Education and training for providers and administrators working with the PDES is inconsistent (Peck, 1996; Smith, 1996). As a result, the MEB dictation, PDES processing procedures, outcomes measurement and incidences of waste, fraud and abuse vary from facility to facility.

**Research Recommendation 5:** The USAPDA in concert with members of the MEDCOM have proposed to make a training video outlining various administrative and clinical actions which should take place during PDES processing (Peck, 1996). This training video should be approved, completed and disseminated to Regional MTF Commanders by the MEDCOM for professional development and continuing education by the end of FY 98. Additionally, increased attention should be given organizations such as the National Health Care Anti-Fraud Association. Organizations such as this increase the awareness of incredulous patient behavior patterns during disability processing.

## 7. SUMMARY

There has been no refereed research to date which has examined variables affecting adjudication and processing duration in the Army PDES. Although there have been a number of intermittent Process Action Teams and Congressional Committees which have determined various measures of central tendency in the medical and disability evaluation board process, there has been no statistically significant data collected on individual soldier mutable and immutable variables affecting adjudication and processing duration.

The strength and benefit of this study is in the elimination of stereotypical assumptions normally associated with PDES processing. There is no significant difference for processing duration concerning Gender, Race, Age, Grade, Eligibility to Retire and Length of Service. Overall, the system is remarkably fair and unbiased. Independent variables reference soldier Component, Request for Formal PEB, Request for Congressional Involvement, Compensation Award and Regional PEB explained 16 percent of the variation ( $R^2$ ) with a Multiple R of 40 percent and a significant overall Regression F-Test when examining 8,301 records successfully completed in FY 96. Evidence concerning administrative protocols and actions either locally or regionally implemented can explain all the identified independent variables in the final regression equation except Request for Congressional Involvement. This variable produces an average length of stay eighty-one days above the mean.

Recommendations to reduce PDES processing revolve around the tenets of TQM as defined by Deming. These avenues include evaluating the traditional structure-process-outcome model to validate expected results with current processes. These incremental improvement initiatives include:

1. Incorporate disability review as a tenet for readiness in TRICARE's, PERSCOM's and MEDCOM's strategic plan.
2. Review PDES statistics in existing quarterly meetings briefed to MEDCOM.
3. Establishment of a centrally developed, locally implemented Patient Management Team philosophy in each medical facility which processes disability cases. Increase emphasis on existing transition assistance programs for departing soldiers.
4. Introduce a standard MEB dictation format and inclusion of validity measures for physiological impairment in the MEB such as Waddell tests and Waddell scores.
5. Increase education and training programs involving the PDES process.

The limitation of this study was in strict examination of the scientific model of PDES processing. Numerous characteristics may ultimately affect the actual expression of a population when measuring variables in large social groups. Identifying scientific models which explain outcomes is often a difficult process. Behavioral models explaining characteristics of a population are increasingly more difficult to validate (Sorkin, 1992); however, may provide explanations for variances not included in scientific explanations of the same model (Conley, 1996; Brown, 1996).

The literature review in this study indicated strong and reliable evidence for behavioral characteristics reference fraud, abuse and malingering as predictors for increased duration in the civilian claimant and beneficiary process. These characteristics may also explain an increased measure of the variance in the military model of disability duration. A qualitative case study analysis incorporating retrospective review, survey of claimant attitudes and Delphi Technique is recommended to continue the research effort in this endeavor.

## 8. Explanation of Abbreviation, Symbols & Terms<sup>2</sup>

### a. Abbreviations:

<b>AADEP</b>	American Academy of Disability Evaluating Physicians
<b>ACAP</b>	Army Career Alumni Program
<b>ALOS</b>	Average Length of Stay
<b>AMEDD</b>	Army Medical Department
<b>AMGA</b>	American Medical Group Association
<b>AR</b>	Army Regulation
<b>CHCS</b>	Composite Health Care System
<b>CQI</b>	Continuos Quality Improvement
<b>DoD</b>	Department of Defense
<b>FY</b>	Fiscal Year
<b>GAO</b>	General Accounting Office
<b>GMP</b>	Graduate Management Project
<b>HIAA</b>	Health Insurance Agency of America
<b>R-CA</b>	Republican, California
<b>LOD</b>	Line of Duty
<b>MEB</b>	Medical Evaluation Board
<b>MEDCOM</b>	Medical Command
<b>MHC</b>	Medical Holding Company
<b>MHSS</b>	Military Health Service System
<b>MMRB</b>	Military Occupation Specialty Medical Retention Board
<b>MOS</b>	Military Occupation Specialty
<b>MPRJ</b>	Military Personnel Record Jacket
<b>MTF</b>	Medical Treatment Facility
<b>NCCI</b>	National Council on Compensation Insurance
<b>NARSUM</b>	Narrative Summary
<b>NHCAA</b>	National Health Care Anti-Fraud Association
<b>NICB</b>	National Insurance Crime Bureau
<b>OTSG</b>	Office of The Surgeon General
<b>PAT</b>	Process Action Team
<b>PDCAPS</b>	Physical Disability Case Processing System
<b>PDES</b>	Physical Disability Evaluation System
<b>PEB</b>	Physical Evaluation Board
<b>PEBLO</b>	Physical Evaluation Board Liaison Officer
<b>PERSCOM</b>	Personnel Command
<b>PMO</b>	Personnel Management Officer
<b>PMT</b>	Patient Management Team

<sup>2</sup>Abbreviations, Symbols & Terms have been collected from the entire body of research as outlined in Chapter 9, Works Cited.

<b>POC</b>	Point of Contact
<b>PTSD</b>	Post Traumatic Stress Disorder
<b>Signif F</b>	Regression F-Test
<b>Sig T</b>	T Significance
<b>SPSS</b>	Statistical Package for Social Scientists
<b>TAP</b>	Transition Assistance Program
<b>TRICARE</b>	TRICARE
<b>TQM</b>	Total Quality Management
<b>UCMJ</b>	Uniformed Code of Military Justice
<b>USAAA</b>	United States Army Audit Agency
<b>USAPDA</b>	United States Army Physical Disability Agency
<b>USR</b>	Unit Status Report
<b>VASRD</b>	Veterans Schedule for Rating Disabilities
<b>VEAP</b>	Veterans Education Assistance Program
<b>VIF</b>	Variance Inflation Factor
<b>WRAMC</b>	Walter Reed Army Medical Center

**b. Symbols:**

$a_0$	Regression constant, or the Y intercept.
$b_n$	Least squares regression weight, partial regression coefficient or the slope associated with $X_n$
$H1_a$	Alternate Hypothesis
$H1_0$	Null Hypothesis
$N$	Population
$n$	Sample
$R^2$	R Square
$\mu$	Population mean
$Y$	Dependent variable
$\alpha$	Alpha
$\sigma$	Population Standard Deviation
$X_n$	Represents the predictor (independent) variables
$\beta$	Beta, product of the partial regression coefficients and the independent predictor variables or symbol for Type II error

### c. Terms:

**Acceptability Recommendation:** With respect to acceptability, the alternative of choice must be acceptable to the key stakeholders or their designated representatives. Among the factors to be considered is the degree of disruption of the alternative being considered.

**Active Duty Service Member:** A person who serves full time in a uniformed service under orders that do not specify thirty days or less.

**Adjudication & Processing Duration:** The period of time required for a designated board of officials and agencies to satisfactorily complete a soldier's medical/administrative disposition. Processing begins with initiation of a physical for the MEB, follows through to PEB adjudication, USAPDA review and ends with final action by PERSCOM.

**Adjusted R Squared ( $R^2$ ):** An estimate of how well the model would fit another data set from the same population.

Multiple R	.39826
R Square	.15861
<b>Adjusted R Square</b>	<b>.15810</b>
Standard Error	104.29352

**Alternate Hypothesis:** A research hypothesis.

**ANOVA:** Analysis of variance is a way of testing the null hypothesis that several group means are equal in the population, by comparing the sample variance estimated from the group means to the estimated within the group.

**Article-15:** See nonjudicial punishment.

**Attending Physician:** The physician who has the primary responsibility for the medical diagnosis and treatment of the patient. A consultant, an assistant-at-surgeon or an anesthesiologist is not an attending physician. Under very extraordinary circumstances, because of the presence of complex, serious and multiple but unrelated medical conditions, a patient may have more than one attending physician concurrently rendering medical treatment during a single period of time.

**B:** Partial regression coefficient for the independent variable. Also identifies slope and intercept of the line. Where " $b_n$ " of  $b_n X_n$  = Partial regression coefficient.

Variable	B	SE B	95% Confdnce Intrvl B	Beta	
COMPAWD	<b>13.860272 (slope)</b>	1.141170	11.623290	16.097255	.123764
(Constant)	<b>383.550041 (Intercept)</b>	18.588816	347.111252	419.988829	

**Backward Elimination:** All independent variables are included in the regression equation. At each step, a variable is removed that reduces  $R^2$  the least.

**Behavioral Model:** A model which seeks to interpret the often unpredictable manner or behavior of a social (or individual's) data set and categorize the aggregate observable responses to external and internal stimuli in a semantic fashion which can be used to make predictions about a similar population (or person) occupying a similar point in time and space. Behavior models may revolve around decisions regarding a predisposition component, an enabling component and an illness component. The illness component may be either perceived or clinically evaluated.

**Beneficiary:** One who is designated to receive or benefit from something.

**Beta or Beta Weights:** Partial regression coefficients when all independent variables are expressed in standardized (Z-Score) form.

Variable	B	SE B	95% Confidence Intrvl	B	Beta
COMPAWD	13.860272	1.141170	11.623290	16.097255	.123764

**Bivariate:** Involving two variables.

**Board of Correction of Military Records.** An administrative board that decides whether the military wronged a service member in a way that affects his or her military records, such as an erroneous date of rank or an improper discharge.

**Business Process Reengineering:** Dramatic and radical reorganization of labor, human resources and past practices.

**C-Rating:** A one through five Likert scale denoting unit preparedness and combat readiness. C-1 denoting Fully Capable and decreasing thereafter.

**Case Management:** Active, concurrent coordination of medical care in complex, high cost cases.

**Cashier:** A form of severance pay given to soldiers prior to retirement legislation.

**Central Limit Theorem:** A rule that states the sampling distribution  $\mu$ , of means from any population will be normal for a large sample or population, N.

**Chi-Square:** Statistic used to test the hypothesis that the row (up and down) and column (left to right) variables are independent. Allows for comparison of two pairs of dichotomous data.

**Claimant:** One who asserts a right or who believes something is due.

**Collinearity:** (See Multicollinearity).

**Composite Health Care System (CHCS):** A computer database containing privileged medical and personal data on a soldier undergoing medical review.

**Concurrent Review:** An ongoing assessment of the appropriateness and necessity of the investigations, treatments, procedures and course of a patient's hospitalization.

**Confidence Interval:** Interval estimates based on specified confidence levels; upper and lower limits of the interval are known as confidence limits. The 95 percent confidence band for the mean is obtained from the sample mean, standard deviation and sample size. The confidence band is based on the sample mean, plus or minus 1.96 times the standard error of the mean. 1.96 is used because 95 percent of the area under the normal curve is within 1.96 standard deviations of the mean:

<u>Confidence Coefficient</u>	<u>Z - value</u>
90	1.645
95	1.96
99	2.575

**Congressional Involvement:** A soldier requests assistance through his or her legislative representative.

**Continental United States (CONUS):** Refers to a soldier's primary duty assignment falling within the forty-eight continental United States.

**Continuous Quality Improvement:** Improvements to existing TQM programs.

**Court-Martial:** A military court that can decide guilt or innocence of the accused and appropriate sentence if the accused is found guilty in a criminal case.

**Correlation (Pearson's r):** Measures the relationship between two sets of data that are scaled to be independent of the unit of measurement +1 to -1.

**Cost Containment:** An approach to managed care and health care which seeks to reduce expenditures through quality improvement measures.

**Counseling Officer:** When a soldier is referred for a MEB/PEB, the Physical Evaluation Board Liaison Officer (PEBLO) assigned to the MTF counsels the soldier on MEB/PEB findings and the related rights and benefits. If the MTF determines that the soldier is not mentally competent, the PEBLO counsels the designated next-of-kin. The soldier may also participate in such programs as the Army Career Alumni Program (ACAP), and the Transition Assistance Program (TAP).

**Criterion Validity:** (Criterion = Y and predictor of X). The assessment of criterion validity deals with how well the instrument which is doing the measuring yields results that correlate highly with the criterion against which it is being checked. Key to this validity measure is the reliability and validity of the criterion, the standard against which the instrument is being compared.

**Critical Pathways:** Ideal management of a given condition. Highly detailed and outcome oriented designed to decrease variation and clarify expectation of outcomes.

**Cronbach's  $\alpha$ :** If the items are standardized (have a standard deviation of one), the reliability coefficient is based on the average correlation of items within a test. If the items are not standardized, it is based on the average covariance among items. Negative values for alpha ( $\alpha$ ) occur when the average interitem correlation is negative, which violates the reliability model.

**Degree of Freedom:** A parameter used to help select the critical value in some probability distributions.

Analysis of Variance			
	DF	Sum of Squares	Mean Square
Regression	5	16811472.98607	3362294.59721
Residual	8199	89181655.62624	10877.13814

**Delphi Technique:** A group decision making procedure in organizational dynamics.

**Dependent Variable:** A variable to be measured or estimated; it is customarily plotted on the vertical or Y axis of a chart and is therefore identified by the symbol Y.

**Deployable:** See Worldwide Deployability.

**Determining Sample Size From a Finite Population:** A random sample population,  $n$  may be calculated from a finite population,  $N$  utilizing the formula  $S = \chi^2 NP(1-P) / d^2 (N-1) + \chi^2 P(1-P)$ . This formula has been suggested by Isaac and Michael (1985) to determine a reliable sample size  $n$ , from a known, finite population  $N$ , such that the sample proportion will be within  $\pm \alpha = 0.05$  of the population proportion. Once the sampling population size has been determined, all cases in the population should be coded and assigned a number one....to  $N$ . Through use of a randomized sample table, the sample can be selected where:

- $S$  is the required sample size.
- $N$  is the given population size.
- $P$  is the population proportion that for table construction has been assumed to be 0.50, as this magnitude yields the maximum possible size required.
- $d$  is the degree of accuracy as reflected by the amount of error that can be tolerated in the fluctuation of a sample proportion  $p$  about the population proportion  $P$ -the value for  $d$  being 0.05 in the calculation for entries in the table, a quantity equal to  $\pm 1.96 \sigma_p$ .
- $\chi^2$  is the table value of Chi-Square for one degree of freedom relative to the desired level of confidence.

**Direct Cost:** Expenses that can be directly identified with costing object such as a product and department.

**Disciplinary Action:** The procedure a military superior or court-martial uses to punish a service member who has committed a crime, such as nonjudicial punishment or a court-martial.

**Disability:** A physical or a mental impairment that substantially limits one or more major life activities of an individual. It may be partial or total. (See Partial Disability or Total Disability).

**Ecological Significance:** A significance level that is large enough or will have a great enough impact on a system in order to make policy decisions or take action on a finding.

**Efficiency Recommendation:** With respect to efficiency, the alternative of choice, all else being equal, is the alternative which is the most economical to be implemented. The alternative must potentially pay for itself in potential cost or manpower savings.

**Effectiveness Recommendation:** With respect to effectiveness, the alternative of choice, all else being equal is that alternative which reduces the problem in the shortest span of time with the least reduction to available administrative resources. Any alternative to be considered must be able to be implemented in twelve months after adoption.

**Enlistment (Enlisted Soldier):** The act of voluntarily entering into the military service as an enlisted member.

**“F” or F ratio:** The F ratio tests that all coefficients are zero. They are computed by dividing each of the main effect and interaction mean squares by the residual mean square. If the null hypothesis for an effect is true, the corresponding F ratio is expected to be one. The Significance level of the F ratio (Signif F in SPSS) is used to reject the corresponding null hypothesis if  $\text{Signif F} < .05$ , if .05 is used.

F =	309.11574	Signif F =	.0000
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**Factors Affecting Compensation:** Military disability compensation is based on disposition, rank, and years of service.

**Fiscal Year:** The twelve month accounting period of the Federal Government running from October 1 to September 30 of the following year.

**Fitness For Duty Medical Examination:** When a commander believes a soldier of his or her command is unable to perform MOS related duties due to a medical condition, the commander may refer the soldier to the MTF for medical evaluation. If evaluation results in a MEB, and the MEB determines that the soldier does not meet medical retention standards, the soldier is referred to a PEB.

**Fixed Cost:** Expenses that remain constant in total regardless of changes in activity within a relevant range.

**Fraud:** Any act which enables someone to gain an advantage over another by deceitful or unfair means.

**Full Cost:** The direct cost of a cost object plus a fair share of its indirect cost.

**Gatekeeper:** A benefit plan approach that attempts to control over-utilization by requiring that a primary care physician provides or authorizes all medical care.

**Governing Statute and Implementing Publications:** Title 10, USC, chapter 61, provides the Secretaries of the Military Departments with authority to retire or separate a member if the Secretary finds the member unfit to perform their military duties because of physical disability. DoD Directive 1332.18 and AR 635-40 establish policies and procedures to implement the statute.

**Health Services Research:** A focus on the health states of individuals or populations, or both; review or analysis of health systems, health interventions, and the factors that influence health states; a comprehensive set of variables involving health care techniques, practices, programs and policies; and combination and integration of these variables in many ways, frequently emphasizing the nonbiological aspects of health and medical care. A multidisciplinary field of inquiry, both basic and applied, that examines the use, costs, quality, accessibility, delivery, organization, financing, and outcomes of health care services to increase knowledge and understanding of the structure, processes, and effects of health services for individuals and populations.

**Immutable Variables:** Consistencies with a designated event or occurrence.

**Inadequate Duty Performance:** The soldier, because of disability, is physically unable to perform adequately the duties of office, grade, rank or rating. This circumstance is aimed at long-term conditions. Efficiency reports or other performance related evidence must show that the soldier was not reasonably performing the duties of his or her office, rank, grade, or rating. Essentially, the burden of proof is on the soldier to establish unfitness. Ability to perform duty in the future is not considered.

**Incremental Cost:** Difference in costs between two or more alternatives.

**Independent Variable:** A variable that presumably exerts an influence on or explains variations in the dependent variable.

**Indirect Cost:** Expense that is difficult to trace directly to a specific costing object.

**Kurtosis:** How much the data is distributed near the center. It is normed to the normal curve where the Kurtosis would be zero.

**Linear Regression:** Linear regression is used to assess the contribution of one or more independent variables on one dependent variable. The relationship is generally expressed as  $y = a + bx$ .

**Managerial Accounting:** Provides information which will improve the efficiency and effectiveness of the use of the economic resource.

**Managed Care:** Managed care contains costs, provides quality in health delivery and constrains inappropriate care by using combined economic leverage of coordination and competition. Focus is on an enrolled population, designated providers within the organization system and management of shared risk for both provider and patient.

**Medical Command (MEDCOM):** Formerly referred to as the Health Services Command (HSC) which, as of October 1994, was reorganized into the MEDCOM.

**Medical Evaluation Board (MEB):** When a soldier has received maximum benefit of medical treatment for a condition that may render him or her unfit for further military service, the medical treatment facility (MTF) conducts a MEB to determine whether the soldier meets the medical retention standards of AR 40-501, Chapter 3. If the soldier does not meet medical retention standards, he or she is referred to a PEB to determine physical fitness under the policies and procedures of AR 635-40.

**Medical Evaluation Board Dictation (MEB-dictation):** A soldier's fitness is called into question and a physician evaluates the level of impairment on a standard format.

**Medical Holding Company (MHC):** A company where soldiers are placed when they are discharged from ward bed occupied status, but remain under the control of the military community health care settings' administrators and mentors.

**Medical Retirement:** Permanent retirement: Permanent disability retirement occurs if the condition is permanent and stable and rated at a minimum of 30 percent or the soldier has twenty years of active federal service. Temporary retirement: Temporary disability retirement occurs if the soldier is entitled to permanent disability retirement except that the disability is not stable for rating purposes. "Stable" is in terms of whether the condition will change within the next five years so as to warrant a different disability rating. However, stability does not include latent impairment; what might happen in the future.

**Medical Retirement's Relationship to Fifteen-Year Retirement:** A soldier eligible for retirement under the Temporary Early Retirement Authority (TERA) is not eligible for physical disability retirement unless the disability rating is 30 percent. However, if a soldier enters the physical disability system after having been approved for early retirement under TERA and is determined physically unfit with less than a 30 percent rating, the soldier will be given the option of nondisability retirement under TERA or separation for physical disability with entitlement to disability severance pay. Soldiers who were not approved for retirement under TERA before entering the physical disability system and who are rated at less than 30 percent do not have an option as a matter of policy. However, they may request retirement under TERA as an exception to policy.

**Medical Separation:** Separation with disability severance pay occurs if the soldier has less than twenty years of active federal service and a disability rating of less than 30 percent.

**Medical Treatment Facility (MTF):** Refers to the military medical health care community and its regent military medical activities and communities.

**Military Health Services System (MHSS):** Combined resources available to the Department of Defense for medical operations.

**Min Toler:** The smallest tolerance for any independent variable in the regression model, if the variable enters into the equation next.

Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374	.1695

**Moral Hazard:** An increase in the use of health care utility because this increase in use does not affect individual out-of-pocket costs, but affects the allocation of resources from the care-giving organization.

**MOS Medical Retention Board (MMRB):** The MMRB is an administrative screening board which evaluates the ability of soldiers with permanent three or four medical profiles to physically perform in a worldwide field environment in their primary military occupation specialty.

**Mutable Variables:** Alterable or changing characteristics associated with an event.

**Multicollinearity:** Multicollinearity is an approximate linear dependence and can occur when some of the independent predictor variables are highly correlated. Diagnostics include examination of variable Tolerances and Variance Inflation Factor (VIF). Tolerances  $< 0.1$  and  $VIF \geq 10$  suggest collinearity.

Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374	.1695

**Multiple R:** The correlation coefficient between the observed value of the dependent variable and the predicted value based on the regression model. A value of one indicates that the dependent variable can be perfectly predicted from the independent variables. A value close to zero indicates that the independent variables are not linear related to the dependent variable. A value close to one indicates that the linear regression model predicts very well in most types of data.

Multiple R	.39826
R Square	.15861

**NARSUM:** Narrative Summary. See MEB-dictation.

**Non-Deployable:** See Worldwide Deployability.

**Nonjudicial Punishment:** Article-15 of the Uniformed Code of Military Justice gives commanders this method of imposing minor disciplinary punishments without the formalities of a court-martial.

**Null Hypothesis:** The hypothesis to be tested. It is a statement that no difference exists between the parameter and the statistic being compared to it.

**Officer:** A person who holds a position of trust and responsibility that gives him or her rights and duties. Here, a commissioned officer of the U.S. Armed Forces.

**Opportunity Cost:** Benefits given up by not selecting next best alternative.

**Outliers:** Data items that are extremely large or small in comparison to the rest of the data set.

**Outcomes Assessment:** A systemic measurement of a patient's or a populations response to treatment.

**Outside The Continental United States (OCONUS):** Soldiers whose primary duty assignment is in a base outside the forty-eight states and continental US.

**P-Value:** The statistical significance level is the conditional probability that a relationship as strong as the one observed in the data would be present if the null hypothesis were true.

**Partial:** If the partial correlation coefficient is large in absolute value, the variable has unique information to the contribution of the equation.

Variable	Beta In	Partial	Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374	.1695

**Partial Disability:** The result of an illness or injury which prevents an individual from performing one or more of the functions of his/her regular job.

**Partial Regression Coefficient:** Instead of just intercept and slope, the multiple linear regression equation contains a constant and various coefficients, one for each independent variable. These coefficient are called partial regression coefficients (see also Slope):  $Y = a_0u + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4... + b_nX_n$

**Pearson's r:** See correlation.

**Physical Evaluation Board Liaison Officer (PEBLO):** Civilian personnel who act as consultants to patients during disability review and consolidate medical data and information such as the NARSUM. Counselors consolidate MEBs and forward results to the PEB.

**Performance-Based:** The PDES relies heavily on the performance data provided by the soldier's immediate commander. Variance in case findings is often the result of inadequate information being provided relative to the soldier's duty performance.

**Physical Evaluation Board (PEB):** A board of officers whose responsibility it is to determine a soldier's fitness to stay on active duty and the amount of compensation he or she may receive, if applicable. Evaluation is by a three-member board composed of a (Colonel) President, a Personnel Management Officer (PMO) and a physician who may be civilian or military. The President and PMO may be of any branch except medical. The PMO is usually Reserve Component. Informal Board: The initial findings and recommendation is based on a records review without the soldier's presence. Formal Board: If the soldier disagrees with the informal findings he or she is entitled by law to a formal hearing. The soldier may elect to appear or not appear and to have the appointed counsel or counsel of choice at no expense to the government. The soldier may request essential witnesses to testify in his or her behalf. The PEB President determines whether a witness is essential.

**Physical Fitness/Unfitness (See Disability):** A soldier is determined physically fit or unfit based upon whether the record of evidence shows that the medical condition does or does not preclude reasonable performance of the duties required of the soldier's office, grade, rank, or rating.

**Physical Disability Evaluation System (PDES):** Chapter 61, Title 10, US Code provides the Secretaries of the Military Departments with the authority to retire or discharge a member if he or she finds the member unfit to perform duties due to a disability. The USAPDA, under the operational control of the Commander, PERSCOM is responsible for operating the physical disability evaluation system and executes Secretary of the Army decision-making authority as directed by Congress in Chapter 61, 10 US Code, and in accordance with DoD Directive 1332.18 and Army Regulation 635-40.

**Population:** A well defined collection of persons, objects or events.

**Presumption of Fitness for Retirement Eligible Personnel:** When a soldier is referred for physical disability evaluation after having applied for length of service retirement or who is within nine months of mandatory retirement or who has been approved for certain separation actions, the soldier enters the disability system under the presumption that he or she is physically fit. This is known as the Presumption of Fitness Rule. Philosophy: The soldier is presumed fit because he or she has continued to perform military duty up to the point of separation for reasons other than physical disability. The purpose of military disability retired or severance pay is not to compensate soldiers for any service-incurred condition, but to compensate these conditions which are causing the termination of their military career. History: The presumption rule originated in 1973 as a result of Congressional dissatisfaction over general and medical officers retiring for physical disability when they were eligible for length of service retirement. It was incorporated into DoD Directive 1332.18, Separation from the Military Service by Reason of Physical Disability and applies to all soldiers. Overcoming the presumption: Application of the Presumption of Fitness Rule does not mandate a finding of fit. The presumption is overcome if the preponderance of evidence establishes circumstances described per DoD Directive 1332.18.

**Profile:** A one through four, ordinal designation assigned to a soldier's functional capabilities. One denoting fully fit and decreasing thereafter.

**Process Action Team (PAT):** A group of subject matter experts or educated personnel who pool resource material together to achieve certain goals.

**Psychometrics:** Divination of facts concerning an object or its measurement.

**R<sup>2</sup>:** R Square. Proportion of variability "explained" by the presence of the independent variables. Explanation of variance ranges from zero to one. Higher R<sup>2</sup> may be preferred with some types of data, but is not necessarily always better than lower R<sup>2</sup>. An R<sup>2</sup> = .82655 means that 82.7 percent of the dependent variables can be explained by the predictor coefficients.

Multiple R	.39826
R Square	.15861

**Range:** Difference between the smallest and largest measures in a set.

**Reliability:** Precision and efficiency; measuring the variable right. Measuring if the hypothesis can be tested under similar circumstances with the same instrument time and time again.

**Residual Mean Square:** Indicates how much the observations within a certain cell vary. This estimate does not depend on the null hypothesis being true.

Analysis of Variance			
	DF	Sum of Squares	Mean Square
Regression	5	16811472.98607	3362294.59721
Residual	8199	89181655.62624	10877.13814

**Retiree:** A former member of a uniformed service who is entitled to retired, retainer or equivalent pay based on duty in a uniformed service.

**Retired Pay:** For permanent retirement or placement on the TDRL, compensation is based on the higher of two computations: (1) disability rating times retired pay base; (2) 2.5 x years of service x retired pay base. Soldiers on the TDRL receive no less than 50 percent of their retired pay base. Retired pay base depends upon when the soldier entered the service. For soldiers on Active Duty prior to 8 September 1980, it is the basic pay of the highest rank held.

**Sample:** (n = subset of N) A subset of a population.

**Sample Size:** See determining sample size.

**Scientific Model:** A method of research involving empirical testing on relevant data.

**SE B: The standard error of the slope and intercept**

Variable	B	SE B	95% Confidence Interval B	Beta
COMPAWD	13.860272	1.141170	11.623290 16.097255	.123764

**Self Activism:** Behavior relating to direct involvement in either delaying or expediting disability processing for personal gain.

**Semantic Differential:** A scientific process involving the classification and categorizing of data into similar groups for investigation and interpretation of the information it contains.

**Severance Pay:** Disability severance pay equals two months basic pay for every year of service not to exceed twelve years.

**Signif F (Regression F-Test):** The F ratio tests that all coefficients are zero. They are computed by dividing each of the main effect and interaction mean squares by the residual mean square. If the null hypothesis for an effect is true, the corresponding F ratio is expected to be one. The Significance level of the F ratio (Signif F in SPSS) is used to reject the corresponding null hypothesis if Signif F < .05, if .05 is used.

F =	309.11574	Signif F =	.0000
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**Sig T or "T-Significance":** If T-Significance is below specified error ( $\alpha = 0.05$ ), it is significant and will be included in the final regression equation.

Variable	Beta In	Partial Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374 .1695

**Skewness:** A measure of the symmetry of a distribution. It is normed so that the symmetric distribution has a measure of zero Skewness. Positive Skewness indicates bunching on the left and a longer tail on the right.

**Slope:** A measure of a lines slant. Represents one of the least square's regression weights, partial regression coefficient or the slope of the linear equation.

**Standard Deviation:** A measure of the random variability, the square root of the variance.

**Standard Error:** The estimate of the variance of the dependent variable for each value of the independent variable.

Multiple R	.39826
R Square	.15861
Adjusted R Square	.15810
Standard Error	104.29352

**Statistical Package for Social Scientists (SPSS®):** Statistical software package used in computing complex statistical equations.

**Sum of Squares Residual:** If you square the residuals for all the cases and add them up, you have a measure of how much variability in the dependent variable is not explained by the independent predictor variable.

Analysis of Variance			
	DF	Sum of Squares	Mean Square
Regression	5	16811472.98607	3362294.59721
Residual	8199	89181655.62624	10877.13814

**T:** Tests that partial regression coefficient for the variable is zero.

Variable	Beta In	Partial Tolerance	VIF	Min Toler	T	Sig T
AGE	.015160	.015172	.842720	1.187	.842720	1.374 .1695

**T-Test:** Method of determining the differences between means based on paired observations between the sample and population.

**Table of Distribution and Allowances (TDA):** Resource allocations normally applied to fixed facilities.

**Table of Organization and Equipment (TO&E):** Resource allocation normally applied to deployable organizations.

**Tolerances:** See multicollinearity.

**Total Disability:** An illness or injury which prevents an individual from continuously performing every duty pertaining to his/her occupation or engaging in any other type of work.

**Total Quality Management (TQM):** Incremental decreases in variation and redundancy which statistically improve output with decrease in energy and/or resources. Deming's Fourteen Quality Measures include:

- Constantly strive to improve products and services.
- Adopt a total quality philosophy
- Correct defects as they happen, rather than rely on inspection of end products.
- Award business on factors other than price.
- Continually improve the system of production and service.
- Institute training.
- Drive out fear.
- Break down barriers among staff areas.
- Eliminate superficial slogans and goals.
- Eliminate standard quotas.
- Remove barriers to pride of workmanship.
- Institute vigorous education and retraining.
- Require that management take action to achieve the transformation.
- Proactive management.

**TRICARE:** DoD Managed Care Program

**Type I Error:** Rejecting the Null Hypothesis when it is true.

**Type II Error:** Accepting the Null Hypothesis when it is false.

**Uniformed Code of Military Justice (UCMJ):** A law passed by congress that establishes the military justice system and defines military crimes.

**United States Army Physical Disability Agency (USAPDA):** Agency responsible for final review and adjudication authority for all soldiers undergoing disability review in the Army. USAPDA Organization: The functional proponent for PDES is the US Army Physical Disability Agency, located at Bethesda, Maryland. Subordinate Physical Evaluation Boards are located at WRAMC, Washington, DC, Fort Sam Houston, Texas and Fort Lewis, Washington. Quality review: USAPDA reviews those cases in which the soldier disagrees with the findings of the PEB and submits a rebuttal. Additionally, USAPDA designates certain cases for mandatory review and conducts a sample review of others. If USAPDA changes the findings of the PEB and the soldier nonconcur, the case is forwarded to the Army Physical Disability Appeal Board for final decision.

**Unit Status Report (USR):** A comprehensive review of a unit's designated resources.

**Utilization Review:** A process by which certain medical services are reviewed for appropriateness. This review is usually done by the UR staff of the managed care program, but it may also be done by a separate UR organization. The components of a UR program usually include some combination of the preadmission hospital review, concurrent hospital review, outpatient surgical review, determination of need for second surgical opinion and pre-authorization of diagnostic procedures.

**Validity:** Accuracy, effectiveness, measuring the right variable.

**VASRD-Rating Schedule:** Once a determination of physical unfitness is made, the PEB is required by law to determine the physical disability rating using the Veterans Schedule for Rating Disabilities (VASRD). Ratings can range from zero to 100 percent rising in increments of ten.

**Variance Inflation Factor (VIF):** See multicollinearity.

**Waddell Test:** The Waddell test is commonly used in the disability and insurance industry by providers to discern between the behavior and medical level of impairment between patients. Test distinguish between nonorganic physiological signs (tenderness, simulation, distraction, regionalization and over reaction) that are independent of those commonly used to detect organic disease, but correlate with treatment failure, with long standing symptoms, with elevated hypochondriasis and hysteria scores of the Multiphasic Personality Inventory, and with various other psychological factors. Waddell Scores may be used to normalize responses between patients.

**Waddell Scores:** The Waddell score has been validated as a useful tool to distinguish between nonorganic physiological signs and physiological disorders in low back pain.

**Worldwide Deployability (non-deployable):** Per DoD Directive 1332.18, Separation from the Military Service by Reason of Physical Disability, inability to perform the duties of his or her office, grade, rank or rating in every geographic location and under every conceivable circumstance will not be the sole basis for a finding of unfitness. Where feasible consideration should be given to reclassifying the service member to an office or MOS for which he or she would be fit before disability separation or retirement is accomplished.

**Z-Score:** A unit of measurement obtained by subtracting the mean and dividing by the standard deviation.

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Annex 1  
Request Permission to Conduct Study

COPY - Original Signed and Approved

DASG-RMP

26 August 1996

MEMORANDUM THRU Colonel Daniel E. Blum, Director, Resource Management,  
Office of The Surgeon General

FOR Colonel Willie McMillian, Deputy Commander, United States Army Physical  
Disability Agency (USAPDA), Forest Glen Section, WRAMC, Washington, DC  
20307-5001

SUBJECT: Request for Permission to Conduct Research at the USAPDA

1. Request permission to conduct record research at the USAPDA in fulfillment of residency requirements for completing a Master of Health Administration (MHA) from the Army-Baylor Graduate Degree Program in Health Care Administration, Fort Sam Houston, San Antonio, Texas from approximately September 1996 thru March 1997 at Forest Glen. I am currently assigned to the Office of The Army Surgeon General, Falls Church, Virginia.
2. Scope of Study: The study will take an appropriate sample from the approximate 8,000 records adjudicated annually by the USAPDA and review variables effecting processing duration. Immutable variables such as Gender, Race, Age, Rank, Branch, Active Duty status, Unit of Assignment, etc., will be considered along with mutable variables such as Request for Formal Boards, and other characteristics. The sample population will be analyzed to determine what (if any) variables prove to be statistically significant to warrant further study in adjudication duration. All findings will be presented to the USAPDA prior to submission to the Army-Baylor Program. Additionally, the USAPDA will be kept informed on a continuous basis of the study progression. The study will probably require me to come to Forest Glen on a weekly basis, at a minimum.
3. Preliminary study parameters have already been discussed with Dr. Charles A. Peck. A potential working objective statement and hypothesis are:

**Annex 1 (Continued)**  
**Request Permission to Conduct Study**

Variables Affecting Adjudication Duration in the United States Army Physical Disability Agency.

Null Hypothesis (H0): There is no difference in variables affecting adjudication duration.

Alternative Hypothesis (HA): There is a difference in variables affecting adjudication duration.

4. Value of Study: The value of the study will simultaneously benefit both the personnel and medical system. The personnel side of the study will identify those characteristics which significantly affect adjudication duration in the USAPDA. The medical community will benefit by possibly decreasing the time soldiers remain on protracted active duty in the medical treatment facility.

5. The utmost confidentiality and ethical behavior will be expressed during the research protocol. I will be pleased to discuss the methods and procedures of the study with you at your earliest convenience.

6. Point of contact is the undersigned, (703) 681-8118, Fax, 3281, E-mail, CPT\_Nick\_Coppola\_at\_OTSG2\_\_FLSCHRCH@otsg-amedd.army.mil

M. NICHOLAS COPPOLA  
Captain, MS  
Administrative Resident

**Annex 2**  
**Pertinent Events Relating to Modern PDES**

YEAR	EVENT/LEGISLATION
1799	Continental Congress of half pay provisions exists. Invalid (disability) pensions exist for all veterans. Amounts varied up to 1/2 pay. Based on colonial statutes and founded on the British Military Pension Law enacted by Parliament in 1593. No formal scope exists at this time.
1812	War Department recommends compulsory retirement for aged officers unwilling to depart service with no benefits.
1838	Some officers receive Longevity Pay allowances in addition to amounts granted in invalid pensions when separated.
1847	House of Military Affairs recommends retirement bill which did not pass.
1855	An Act to Promote Efficiency in The Navy: Compulsory retirement for aged Officers in the Navy and for those suffering from medical impairments which hinder effective continued service. Compulsory retirement decided by a board of medical officers based on information contained in medical records.
1857	An Act to Promote Efficiency in The Navy amended to allow Navy Officers to appeal retirement board decision.
1861	An Act for The Better Organization of the Military Establishment: Provide retirement pay for Army, Navy and Marine Corps Officers with 40 plus years of service for injuries incurred while in the line of duty. Pay was equal to 100 percent of highest rank held. Officers had the right to appeal decisions.  Congress instituted Limited Retirement List: Not more than 7 percent of the military's officers could be put on retirement at one time as set by law. This severely impacted on a number of soldiers retired by the board.
1862	Military Pension Act of 1862: Congress passed legislation allowing soldiers of all ranks to receive pensions based on rank, degree of disability and years of service. The law became retroactive for soldiers not involved in the Civil War or the previous invalid pensions.
1866	Soldiers wounded during the Civil War were to be retired at the rank they held while on the battlefield.
1867	Navy and Marine Corps enlisted personnel with 20 plus years and disabled retired with 1/2 pay.  An Act to Amend Certain Acts in Relation to the Navy: Provided for Navy and Marine Corps enlisted men who had 20 plus years of service who could no longer perform their duty due to age or sea related disability and did not want to reside in the Navy asylum would receive 50 percent pay. Soldiers with 10 plus years of service may be granted the opportunity to apply for compensation.
1870	Retirement/Disability pay for retired officers in the Army and Marine Corps changed to 75 percent of their regular pay.
1872	Retirement/Disability pay for retired officers in the Army and Marine Corps changed to 75 percent of their regular pay discontinued.

**Annex 2 (Continued)**  
**Pertinent Events Relating to Modern PDES**

1873	The Navy enacted a similar pay scheme as the Army and Marine Corps (75 percent). However, those retired as a result of not in the line of duty related injuries or old age continued to receive 50 percent.
1879-1891	7 percent Retirement law lists amended to include numerical ceilings over the years and not just percentages of total force.
1883	The Army began a unlimited retirement list and began to retire all officers over 64 years of age.
1885	Voluntary and non-disability pay was authorized for Army and the Marine Corps with only 30 plus years of service. This was only for officers.
1890	The Army began to give a physical to all officers below the rank of Major to determine fitness for promotion. Those failing the physical may be retired at the next highest rank available, but were placed on a limited retirement list, separate from the 1883 law.
1898	The disability ratings were different for injuries incurred in combat and not in combat, and for officers with more years in service.
1899	Enlisted soldiers in the Navy and Marine Corps were authorized for retirement also, but the 1867 law took precedence in many cases.
1915	The Navy implements plucking boards. Plucking Boards were a reduction in forces technique utilizing medical fitness as a discriminator for continued service.
1917	The Navy forms selective promotion boards based on time and grade and retires non-selected officers. A Medical Physical was widely used. Officers not selected for promotion were retired at their same grade if they failed the medical physical. Retirement pay was based on 2.5 percent of base pay times years in service.
1919	The Army consolidates unlimited and limited retirement lists and allows all officers who failed the medical physical to retire with benefits.
1920	The National Defense Act of 1920 provided the base pay computations for all services. 2.5 percent times years of service. Also, included some reserve officers for the first time.
1928	The Emergency Officers Retirement Act stated all reserve officers should be considered for benefits if injured in the line of duty.
1933	An act passed which repealed all veterans legislation occurring after 1898.
1939	Regular Army Officers, reserve and enlisted personnel considered for equal disability benefits.
1940	The Navy mandated a similar law as the Army 1939 law.
1941	Act to provide for the discharge or retirement of enlisted men of the regular Army or of Philippine scouts. Enlisted men began to receive benefits for disabilities if less than 20 years of service incurred.

**Annex 2 (Continued)**  
**Pertinent Events Relating to Modern PDES**

1946	Navy and Marine Corps reserve officers retired with equal benefits after 20 years.
1948	H.R. 500 passed. This Bill consolidated all military retirement pay, recognized no difference in officers, enlisted, regular and reserve and combat and non-combat injuries. Some restrictions on length of service for eligibility.
1949	Career Compensation Act of Disability Retired Pay disregarded the length of service requirement and formulated tables for distribution of disability pay based on degree and scope of injury/illness. Instituted Temporary Disability Retirement List (TDRL) where soldiers who had recovered from injury/illness could reenter service with forfeiture of retirement pay.
Present	Chapter 61 Title 10, U.S. Code governs disability review and is largely based on the above 1949 Compensation Act.

**Annex 3**  
**Summary of Independent Variable Descriptive Statistics**

<b>AGE</b>		<b>Age Group</b>				
Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent	
Ages n < 20	1	583	7.0	7.0	7.0	
Ages 21-25	2	2415	29.1	29.1	36.1	
Ages 26-30	3	1826	22.0	22.0	58.1	
Ages 31-35	4	1313	15.8	15.8	73.9	
Ages 36-40	5	976	11.8	11.8	85.7	
Ages 41-45	6	588	7.1	7.1	92.8	
Ages 46-50	7	368	4.4	4.4	97.2	
Ages n > 50	8	232	2.8	2.8	100.0	
		Total	8301	100.0	100.0	
Mean	3.492	Std err	.019	Median	3.000	
Mode	2.000	Std dev	1.733	Variance	3.005	
Range	7.000	Minimum	1.000	Maximum	8.000	
Sum	28983.000					
Valid cases	8301	Missing cases	0			

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<b>COMPAWD</b>		<b>Compensation Award</b>				
Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent	
0%, SepW/Obenfit, RTD	1	2925	35.2	35.2	35.2	
10%-20% Compensation	2	3461	41.7	41.7	76.9	
30%-40% Compensation	3	1211	14.6	14.6	91.5	
50%-70% Compensation	4	388	4.7	4.7	96.2	
80%-100% Compensation	5	316	3.8	3.8	100.0	
		Total	8301	100.0	100.0	
Mean	2.001	Std err	.011	Median	2.000	
Mode	2.000	Std dev	1.014	Variance	1.028	
Range	4.000	Minimum	1.000	Maximum	5.000	
Sum	16612.000					
Valid cases	8301	Missing cases	0			

**Annex 3 (Continued)**  
**Summary of Independent Variable Descriptive Statistics**

**COMPONEN Component**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Active Duty	1	7230	87.1	87.1	87.1
Other Than Active Duty	2	1071	12.9	12.9	100.0
	Total	8301	100.0	100.0	
Mean	1.129	Std err	.004	Median	1.000
Mode	1.000	Std dev	.335	Variance	.112
Range	1.000	Minimum	1.000	Maximum	2.000
Sum	9372.000				
Valid cases	8301	Missing cases	0		

**CONGRESS Congressional Involvement**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Yes	1	148	1.8	1.8	1.8
No	2	8153	98.2	98.2	100.0
	Total	8301	100.0	100.0	
Mean	1.982	Std err	.001	Median	2.000
Mode	2.000	Std dev	.132	Variance	.018
Range	1.000	Minimum	1.000	Maximum	2.000
Sum	16454.000				
Valid cases	8301	Missing cases	0		

**Annex 3 (Continued)**  
**Summary of Independent Variable Descriptive Statistics**

**ERETIRE Eligibility to Retire**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Yes	1	450	5.4	5.4	100.0
No	2	7845	94.5	94.6	94.6
Missing	3	6	.1	Missing	
	Total	8301	100.0	100.0	
Mean	1.054	Std err	.002	Median	1.000
Mode	1.000	Std dev	.227	Variance	.051
Range	1.000	Minimum	1.000	Maximum	2.000
Sum	8745.000				
Valid cases	8295	Missing cases	6		

**FORMPEB Soldier Requested and Received a Formal PEB**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Requested/Rcvd Formal	1	1607	19.4	19.4	19.4
No Formal PEB	2	6694	80.6	80.6	100.0
	Total	8301	100.0	100.0	
Mean	1.806	Std err	.004	Median	2.000
Mode	2.000	Std dev	.395	Variance	.156
Range	1.000	Minimum	1.000	Maximum	2.000
Sum	14995.000				
Valid cases	8301	Missing cases	0		

**Annex 3 (Continued)**  
**Summary of Independent Variable Descriptive Statistics**

**GENDER      Sex of Soldier**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Male	1	6637	80.0	80.8	80.8
Female	2	1578	19.0	19.2	100.0
Missing	3	86	1.0	Missing	
	Total	8301	100.0	100.0	
Mean	1.192	Std err	.004	Median	1.000
Mode	1.000	Std dev	.394	Variance	.155
Range	1.000	Minimum	1.000	Maximum	2.000
Sum	9793.000				
Valid cases	8215	Missing cases	86		

**GRADE      Grade Category**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
E1-E4	1	4213	50.8	50.9	50.9
E5-E6	2	2576	31.0	31.1	82.0
E7-9	3	870	10.5	10.5	92.5
O1-03	4	312	3.8	3.8	96.3
O4-05	5	169	2.0	2.0	98.4
O6-010	6	34	.4	.4	98.8
W01-W05	7	102	1.2	1.2	100.0
Missing	8	25	.3	Missing	
	Total	8301	100.0	100.0	
Mean	1.811	Std err	.012	Median	1.000
Mode	1.000	Std dev	1.134	Variance	1.287
Range	6.000	Minimum	1.000	Maximum	7.000
Sum	14986.000				
Valid cases	8276	Missing cases	25		

**Annex 3 (Continued)**  
**Summary of Independent Variable Descriptive Statistics**

**LOSVC      Length of Service**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
1-5 years svc	1	4477	53.9	53.9	53.9
6-10 years svc	2	1819	21.9	21.9	75.8
11-15 years svc	3	1070	12.9	12.9	88.7
16-19 years svc	4	485	5.8	5.8	94.6
20-25 years svc	5	395	4.8	4.8	99.3
26-30 years svc	6	40	.5	.5	99.8
n > 30yrs svc	7	15	.2	.2	100.0
	<b>Total</b>	<b>8301</b>	<b>100.0</b>	<b>100.0</b>	
Mean	1.877	Std err	.013	Median	1.000
Mode	1.000	Std dev	1.199	Variance	1.438
Range	6.000	Minimum	1.000	Maximum	7.000
Sum	15585.000				
Valid cases	8301	Missing cases	0		

**RACE      Race**

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Caucasian	1	5444	65.6	65.8	65.8
Black	2	2097	25.3	25.4	91.2
Yellow	3	62	.7	.7	91.9
Red	4	41	.5	.5	92.4
Other	5	625	7.5	7.6	100.0
Missing	6	32	.4	Missing	
	<b>Total</b>	<b>8301</b>	<b>100.0</b>	<b>100.0</b>	
Mean	1.586	Std err	.012	Median	1.000
Mode	1.000	Std dev	1.093	Variance	1.195
Range	4.000	Minimum	1.000	Maximum	5.000
Sum	13113.000				
Valid cases	8269	Missing cases	32		

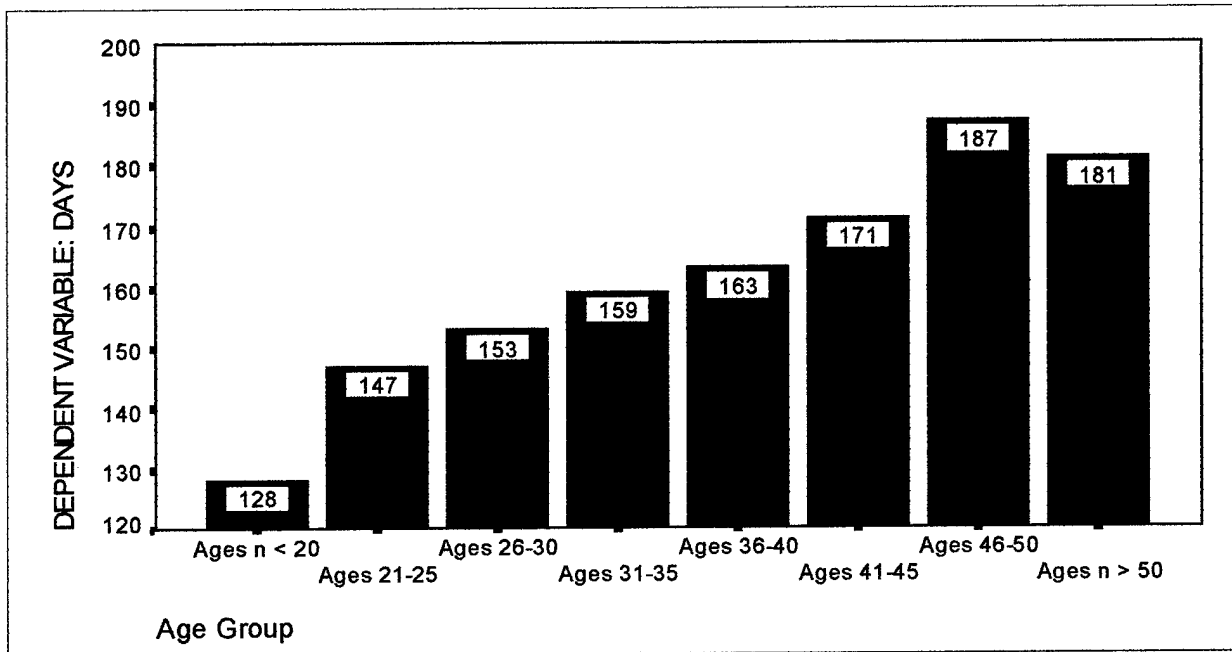
**Annex 3 (Continued)**  
**Summary of Independent Variable Descriptive Statistics**

**REGONPEB Regional PEB Location**

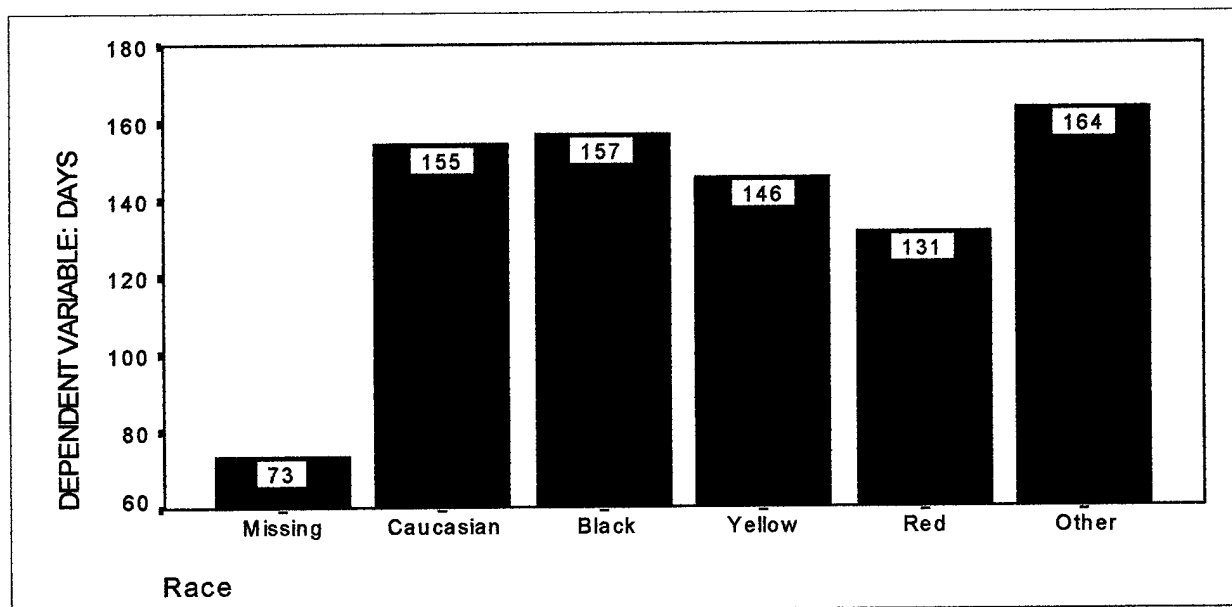
Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
WRAMC, DC	1	2966	35.7	35.7	35.7
Fort Sam Houston, TX	2	2693	32.4	32.4	68.2
Fort Lewis, WA	3	2527	30.4	30.4	98.6
HQ, USAPDA, MD	4	115	1.4	1.4	100.0
	Total	8301	100.0	100.0	
Mean	1.975	Std err	.009	Median	2.000
Mode	1.000	Std dev	.847	Variance	.717
Range	3.000	Minimum	1.000	Maximum	4.000
Sum	16393.000				
Valid cases	8301	Missing cases	0		

**Annex 4**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 1 - Age**

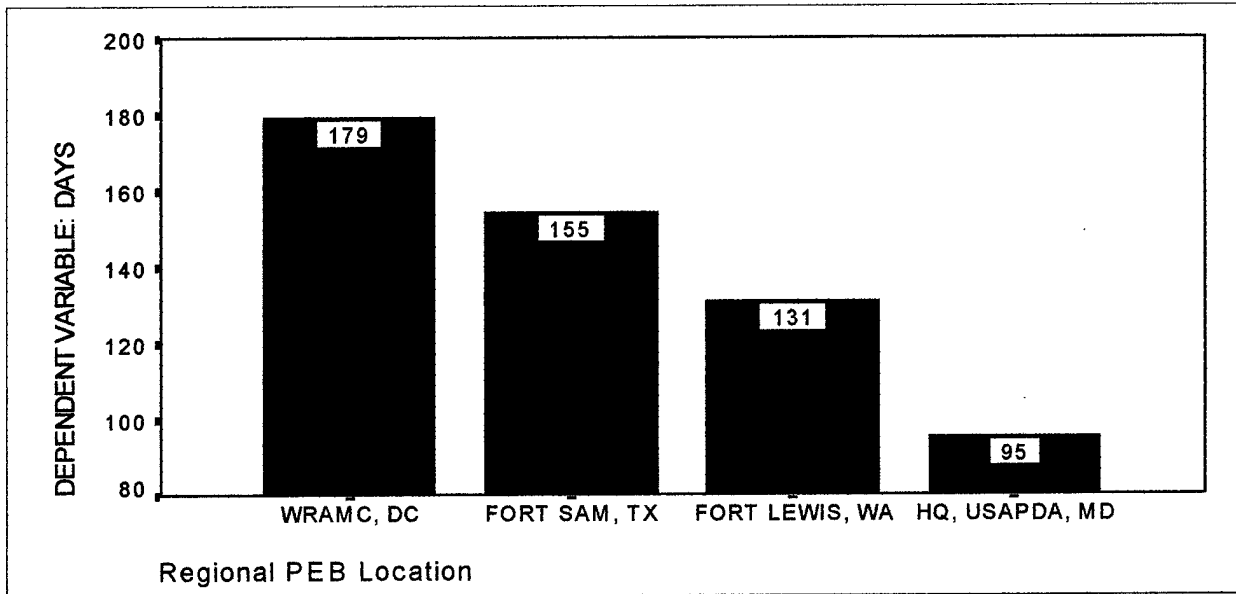


**Graph 2 - Race**

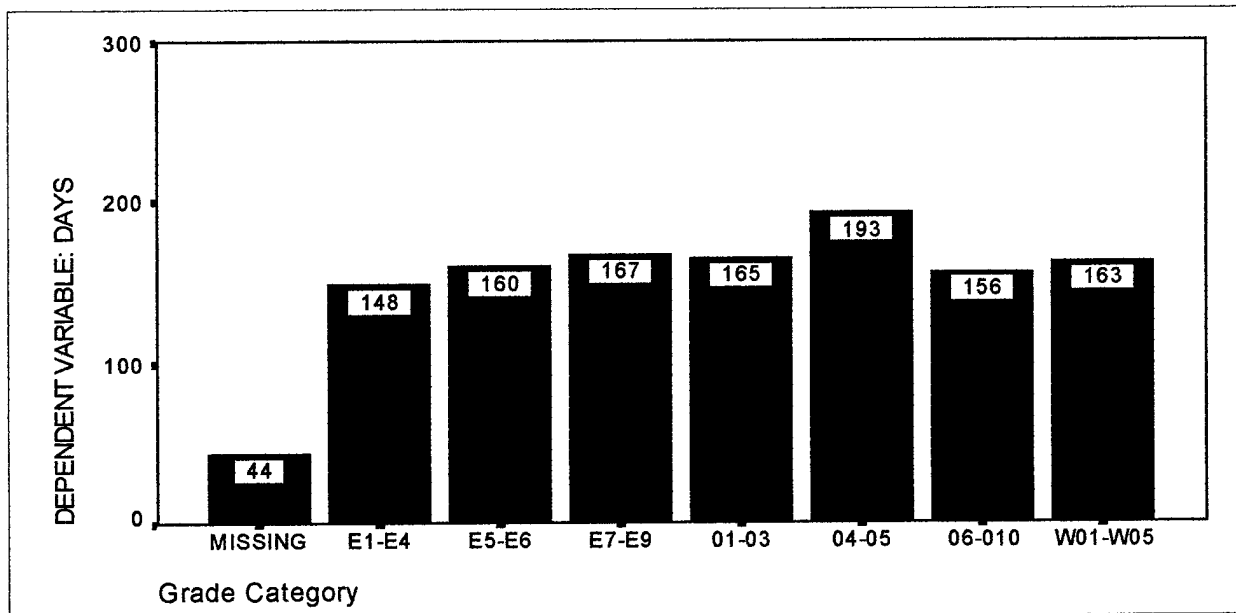


**Annex 4 (Continued)**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 3 - Regional PEB**

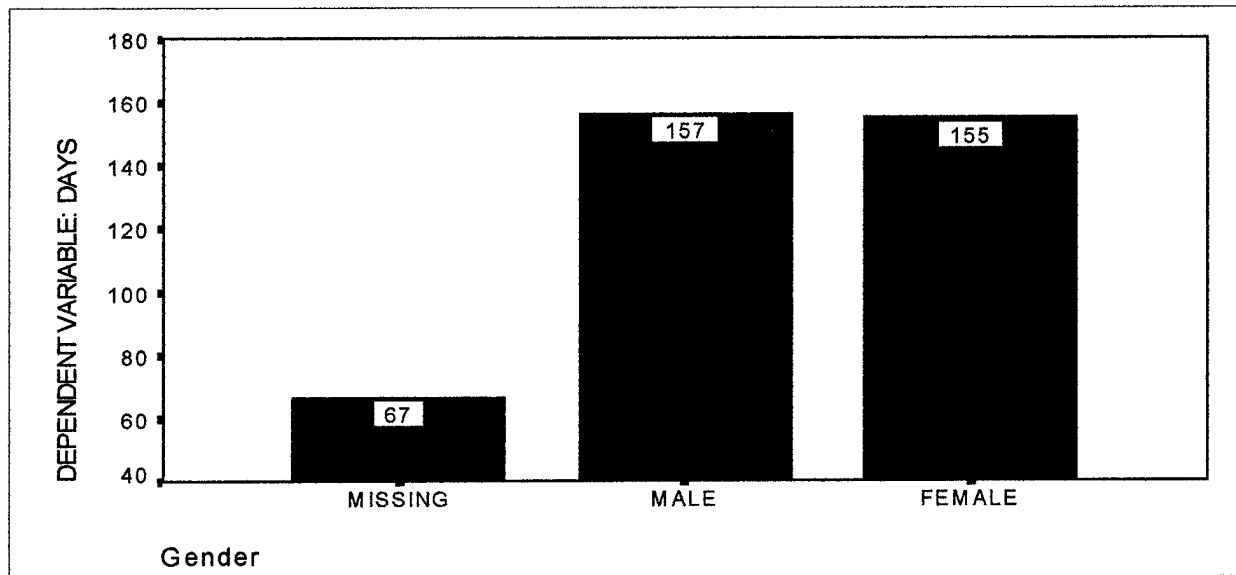


**Graph 4 - Grade**

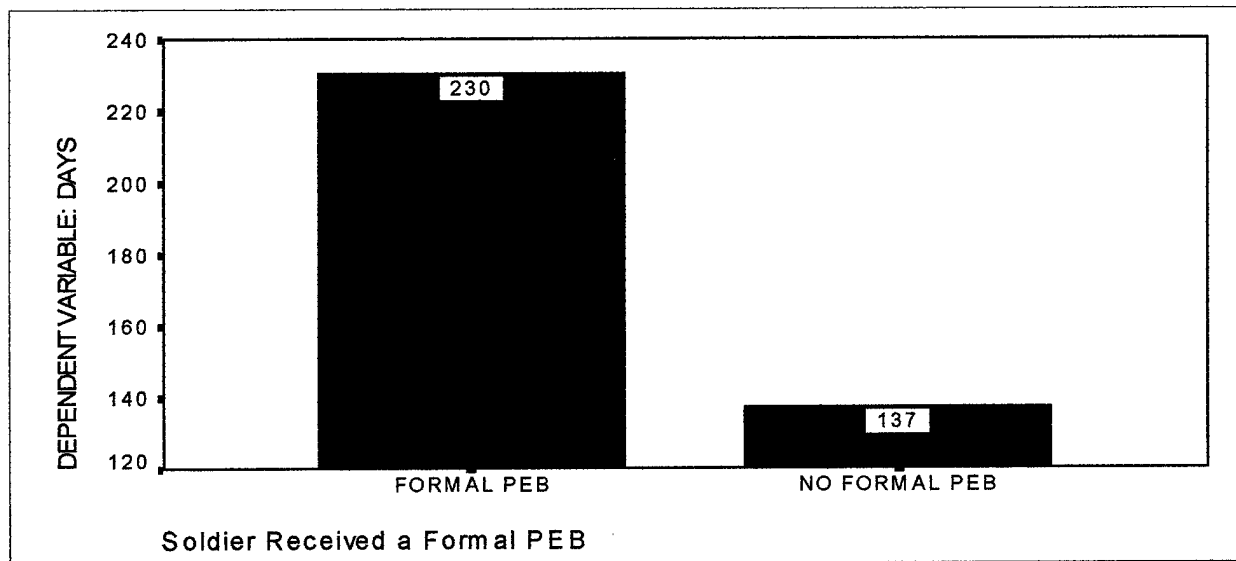


**Annex 4 (Continued)**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 5 - Gender**

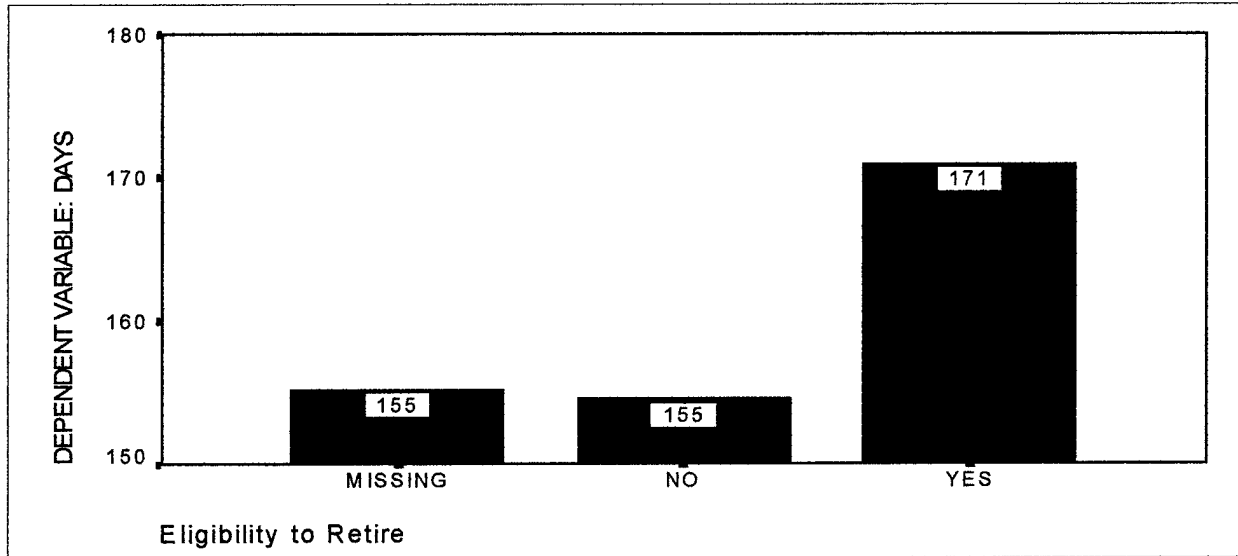


**Graph 6 - Formal PEB**

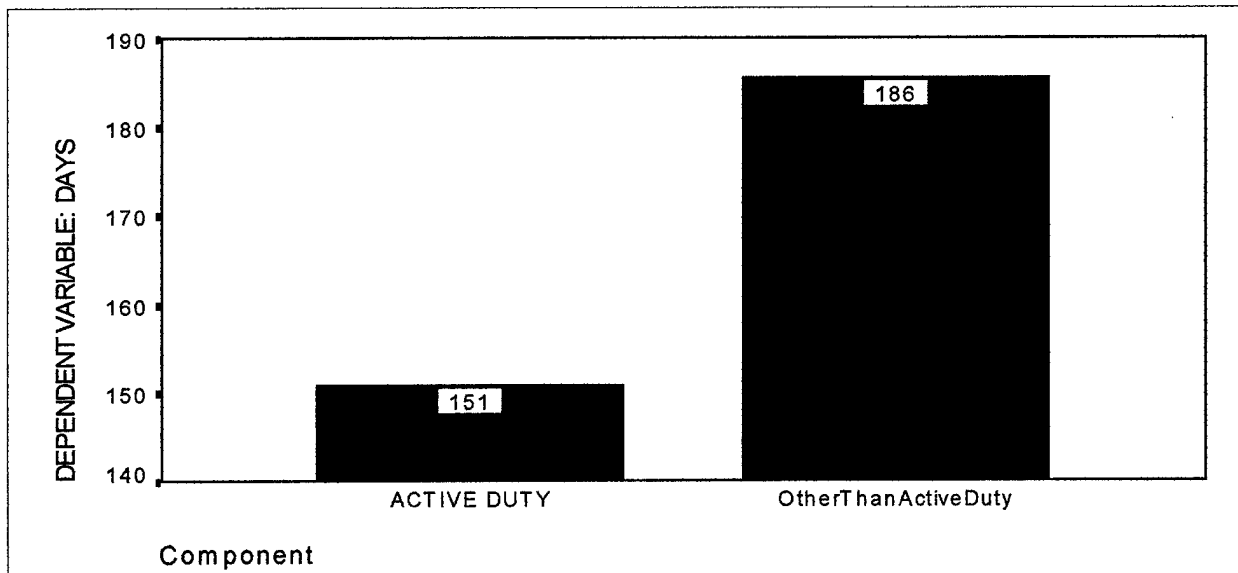


**Annex 4 (Continued)**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 7 - Eligibility to Retire**

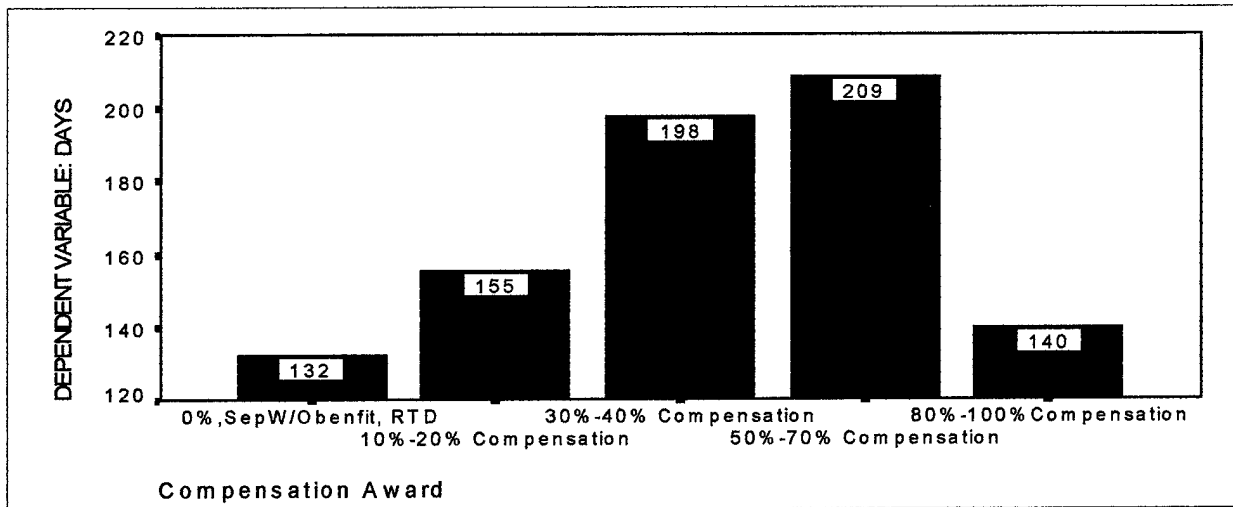


**Graph 8 - Component**

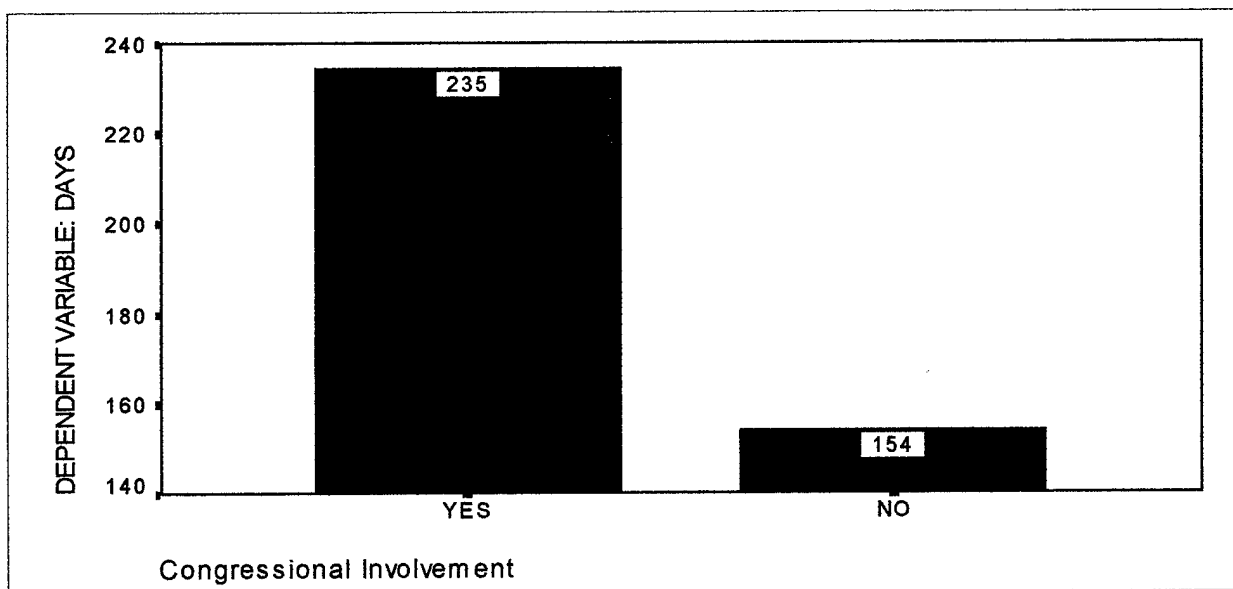


**Annex 4 (Continued)**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 9 - Compensation Award**



**Graph 10 - Congressional Involvement**



**Annex 4 (Continued)**  
**Graphical Analysis of Means of Independent Variables**  
**Against Dependent Variable**

**Graph 11 - Length of Service**

