Department of Veterans Affairs

Office of Inspector General

Informational Report

Quantitative Assessment of Care Transition: The Population-Based LC Database

Executive Summary

In March 2005, the Undersecretary of Defense for Personnel and Readiness requested that the Department of Defense (DoD) Office of Inspector General (OIG) perform an independent review of the care transition process for injured Service members returning from Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF). In July 2006, the DoD OIG and Veterans Affairs (VA) OIG entered into an interagency agreement to jointly evaluate the medical care transition process for injured service members from DoD to VA. Prior to this, only a very limited quantitative characterization of care transition issues was possible using available government data.

To quantitatively characterize the care transition process, we used relevant data files from both DoD and VA sources to create an analytical database (called the LC database) that incorporates details about all 494,147 service members discharged during July 1, 2005—September 30, 2006. In this report, we describe the LC database, including an overview of its structure, the methodology used to create it, data confidentiality issues, its limitations, and its analytic potential for research and other applications. We believe this provides background for understanding and interpreting ongoing and planned studies using this unique database. We also present selected descriptive statistics of veterans who comprise the database population.

DEPARTMENT OF VETERANS AFFAIRS
Office of Inspector General
Washington, DC 20420

SUBJECT: Informational Report – Quantitative Assessment of Care Transition: The Population-Based LC Database

Purpose

On March 10, 2005, the Undersecretary of Defense for Personnel and Readiness requested that the Department of Defense (DoD) Office of Inspector General (OIG) perform an independent review of the care transition process for injured Service members returning from Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF). On July 24, 2006, the DoD OIG and Veterans Affairs (VA) OIG entered into an interagency agreement to jointly evaluate the medical care transition process for injured service members from DoD to VA.

Background

Prior to this current endeavor, only a very limited quantitative characterization of care transition issues was possible using available government data (including Government Accountability Office (GAO) reports, Veterans Health Administration (VHA) Office of Public Health and Environmental Hazards data, and the *Report of the President's Commission on Care for America's Returning Wounded Warriors / July 2007* and references within). There were no databases or files that integrated treatment and other pertinent information collected by both DoD and VA on service members who were discharged or released[1] from active military duty. To quantitatively characterize the care transition process, we used relevant data files from both DoD and VA sources to create an analytical database (hereafter referred to as the LC database) that incorporates details about all 494,147 service members discharged during July 1, 2005—September 30, 2006. Derived from more than 30 files provided by VA and DoD, the LC database incorporates information about these veterans regarding Reserve/National Guard status, referral to the Physical Evaluation Board (PEB) for the appropriate military service, military medical treatment and other care funded by DoD, OEF/OIF status, application for VA health care and other benefits, VA medical treatment and other care funded by VA, and veterans

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[1] In this report the terms "discharged," "released," and "separated" are used synonymously.

vital status. To our knowledge, this is the first and the only available population-based database that provides the opportunity to systematically address transition issues, and thus fills a critical gap in the understanding of service members' experiences with transition to civilian life. This population-based approach eliminates potential bias in the selection of study subjects.

In this report, we describe the LC database, including an overview of its structure, the methodology used to create it, data confidentiality issues, its limitations, and its analytic potential for research and other applications. We believe this provides background for understanding and interpreting ongoing and planned studies using this unique database. We also present selected descriptive statistics of veterans who comprise the database population.

Methods

LC Database Population File (ALLID)

The LC database population consists of all service members who were discharged from active military duty during July 1, 2005—September 30, 2006, inclusive.

In order to establish the population of veterans, three military discharge files were used:

- Veterans Assistance Discharge System (VADS)
- Beneficiary Identification Record Locator Subsystem (BIRLS)
- VA/DOD Identity Repository (VADIR).

VADS files are maintained by the Veterans Benefits Administration (VBA) of VA. VADS captures information from copies of the Certificate of Release or Discharge from Active Duty (known as DD Form 214 or simply DD214), issued by DoD to service members upon their separation from DoD. VADS then disseminates this information to be used for determining and processing benefits and entitlements that the VA is responsible for administering to veterans. Reserve and National Guard members may be issued multiple DD214 forms, one for each time that they were released from active duty.

BIRLS files are also maintained by VBA. The primary purpose of BIRLS is to track folder location and provide information about veterans and their beneficiaries. BIRLS files are updated daily by VADS files. In addition, they also contain DD214 information entered by the staff at VBA Regional (field) Offices. Only verified BIRLS DD214 data were used when establishing the LC database population.

VADIR data files for Active Component and Reserve (including National Guard) Component were requested from the Office of Information and Technology of VA. The VADIR database was established to support a One VA/DoD data-sharing initiative in order to consolidate data transfers between DoD and VA. DoD's Defense Manpower

Data Center (DMDC) stages shared data as defined in a Memorandum of Understanding (MOU), and transmits data to VADIR. The VADIR data are used to assist in determining veteran benefits.

DD214 records with discharge/release date from active duty (DD214 date) from July 1, 2005—September 30, 2006 were extracted from VADS, BIRLS, and VADIR files, separately. Because VADIR files lacked DD214 dates, the Active Duty End Date (for the Active Component file) and Activation End Date (for the Reserve/National Guard Component file) were used as the DD214 date. If more than one record exists for a unique Social Security Number (SSN) in a file (as a result of multiple DD214 forms issued to a same person), the record with most current DD214 date was kept. SSNs were first checked for validity in terms of being 9 digits, and records with invalid SSNs were excluded from further consideration.

The kept discharge records (one per unique SSN) from each of the military discharge files were then merged by SSN to build the LC database population file, ALLID. If more than one record exists (as a result of the same SSN being captured in more than one military discharge file), the ALLID file kept the record that contained the most current DD214 date. Thus, the ALLID file kept only unique SSNs, with one data record for each person (SSN).

The ALLID file captures information from military discharge files on sex, date of birth, pay grade, separation type (VADIR files do not contain this information), character of service, service branch, and etc., in addition to the DD214 date. These data elements were first converted to a common coding scheme if different coding methods were used in VADS, BIRLS, or VADIR files. Consistency of these (non-missing) data values was then checked if they were available from more than one discharge file. If they were inconsistent for a given person, the non-missing value that was most frequently agreed on was used. If there was no such agreement, the non-missing value was used from the files in the following prescribed order: VADS, BIRLS, and VADIR.

In addition, the ALLID file contains information regarding Reserve/National Guard status, referrals to PEB, military medical treatment and other care funded by DoD, OEF/OIF status, application for VA health care and other benefits, VA medical treatment and other care funded by VA, and veterans' vital status. These data elements were derived and rolled up from the LC database master files that were built based on more than 30 files provided by VA and DoD.

LC Database Master Files

Master files were built from their corresponding original source data files by keeping only relevant data records for those included in the population file ALLID. Master files deleted personal identifiable information and kept most of data elements in the original source data files. If necessary, special coding schemes used in different original files

were first converted to a common code, and then prescribed business rules were applied to cope with inconsistent information from multiple file sources. In addition to original data elements, master files also created their derived variables. In contrast to the population file, ALLID, these master files may contain multiple records corresponding to a same person.

The ALLID file and its associated master files were all de-identified by removing personal identifiable information and assigning a study identification number (ID). Veterans included in the database were distinguished within each file and linked among different files by their own unique ID. The ID was assigned specifically for this project, which was unrelated to individual's personal identifier, SSN.

DoD Medical Treatment Master Files

Five DoD medical treatment clinic master files have been built:

- DoD Inpatient
- DoD Outpatient
- TriCare Inpatient
- TriCare Outpatient
- Deployment

These clinical master files contain all the medical visits information of all persons in ALLID who had been treated by DoD (including TriCare) from October 1, 2004—September 30, 2006. The sources of these master files are the 5 corresponding types of treatment files provided by DoD Patient Administration System and Biostatistics Activity at San Antonio, Texas.

In addition, each of the clinic master files contains 11 diagnosis-specific indicators, which were considered as either severely injured or common chronic conditions, for every record in the file. These indicators were created based on the existence of following specific diagnosis codes of International Classification of Disease, Ninth Revision (ICD-9) on treatment records: The codes are as follows.

- Traumatic Brain Injury (TBI)
    - 310.2 Post-traumatic encephalopathy, post-concussion.
    - 800.xx–804xx Skull fracture.
    - 850.xx Concussion.
    - 851.xx Cerebral laceration and contusion.
    - 852.xx Subarachnoid, subdural, and extradural hemorrhage.
    - 853.xx Other and unspecified intracranial hemorrhage following injury.
    - 854.xx Intracranial injury of other and nonspecified injury.
    - 950.xx Injury to optic nerve and pathways.

- Post-Traumatic Stress Disorder (PTSD)
   309.81

- Amputation
   887.xx Arm and/or hand.
   896.xx Foot.
   897.xx Leg.

- Blindness
   369.xx Blindness and low vision.
   377.75 Cortical blindness.

- Major Depression
   296.2 Major depressive disorder, single episode.
   296.3 Major depressive disorder, recurrent episode.

- Spinal Cord Injury (SCI)
   806.xx
   952.xx

- Diseases of the Musculoskeletal System and Connective Tissue (Pain)
   710.xx
   739.xx

      excluding:
      710 Diffuse diseases of connective tissue.
      712 Crystal arthropathies.
      713 Arthropathy associated with other disorders classified elsewhere.
      714 Rheumatoid arthritis and other inflammatory polyarthropathies.
      720 Ankylosing spondylitis and other inflammatory spondylopathies.
      725 Polymyalgia rheumatica.
      733 Osteoporosis.

- Asthma
   493.xx

- Acute Myocardial Infarction (AMI)
   410.xx Acute myocardial infarction.
   411.xx Other acute and subacute forms of ischemic heart diseases.

- Diabetes Mellitus
   250.xx

- Substance Abuse
    - 303.xx Alcohol dependence syndrome.
    - 304.xx Drug dependence.
    - 305.0, 305.2 – 305.9 Nondependent abuse of drugs.

These diagnosis-specific indicators and their corresponding diagnosis dates were rolled up to ALLID. Diagnosis date was the hospital discharge date for the inpatient treatment and the admission date for the outpatient visit. If a patient had more than one diagnosis date for a diagnosis-specific indicator in a file or in different files, the latest diagnosis date was used and the corresponding diagnosis date with the indicator was rolled up to the ALLID file. Two latest diagnosis dates were rolled up that corresponded to a diagnosis-specific indicator: one was the latest diagnosis date before their DD214 date of separation from DoD, another was the latest diagnosis date before September 30, 2006 (independent of individual's DD214 date). The second date (regardless of DD214 date) was especially relevant because some service members might receive specialty care (such as for TBI) from VA before their separation from DoD.

To keep track of the master files from which the diagnosis was taken, the source file information for each of the 11 diagnosis-specific indicators was combined with the diagnosis-specific indicator to create the corresponding diagnosis-specific categorical indicators before they were rolled up to ALLID.   For example, in the master files, an indicator of PTSD was added to each record based on the presence (PTSD=1) or absence (PTSD=0) of the ICD-9 code of 309.8 in that record. In the ALLID file, the existence of PTSD code and which of the five master files contained the code was combined to create a categorical indicator that takes more than just 0 or 1 to keep tracking which master files contained the code.   For example, in the ALLID file, PTSD=0 indicates that the discharged service member was not found being diagnosed with PTSD in any of the five types of DoD treatment files; PTSD=1 means that the member was found as being diagnosed with PTSD in DoD Outpatient file only; and PTSD=11 specifies that the member was found being diagnosed with PTSD in TriCare Outpatient and in both DoD Inpatient and Outpatient files.

Two indicators of any DoD medical treatment and their corresponding dates were also created and rolled up to ALLID. One indicator was for receiving any DoD care that occurred from October 1, 2004—September 30, 2006. Another indicator was for any care that occurred before separation from DoD, that is, from October 1, 2004, to the day prior to the individual's DD214 date. If more than one diagnosis date existed for a treatment indicator in a master clinic file or in different master clinic files, the latest treatment date was used as the corresponding treatment date when the DoD treatment indicator was rolled up to the ALLID file.

In addition to the five clinical master files, we also built the DoD medical treatment demographic master file. This file held static (unchanging) demographical data based on information from all five types of DoD treatment files (Inpatient, Outpatient, TriCare

Inpatient, TriCare Outpatient, and Deployment). First, within each type of file, the demographic data element was taken from the latest treatment record that contained a non-missing value for that specific data item, as we reasoned it was likely that the static demographic data item was modified because of corrections to previously collected incorrect information. Because medical records contain missing values for some of their data elements, the non-missing values of different demographic data elements for a patient may come from different treatment records within a file. For example, the information on race for John Smith may be taken from his (latest) June 28, 2006, outpatient record, while the ethnicity information may be taken from his (earlier) May 8, 2006, outpatient record, as a result of missing the ethnicity information on his (latest) June 28, 2006 record. The demographic information taken from each of five types of treatment files were converted into a common coding scheme if necessary. For example, several different categories of Hispanic ethnicity were re-coded to a single indicator to establish coding consistency across different treatment files. Then, the values from different files for a same patient's demographic data item were merged, and the derived data value was the non-missing one that was most frequently agreed upon. If there was no such an agreement, the non-missing value was taken from the file in the following prescribed order: TriCare Inpatient, TriCare Outpatient, DoD Inpatient, DoD Outpatient, and Deployment. These DoD demographic data were also rolled up to ALLID.

VA Medical Treatment Master Files

VA medical treatment clinic master files and the demographic master file were built in a similar approach as described for the DoD treatment master files. Four VA medical treatment clinic master files were built based on corresponding VA treatment files:

- VA Inpatient (Patient Treatment files).
- VA Outpatient (National Patient Care files).
- Fee Basis Inpatient.
- Fee Basis Outpatient.

These VA clinical master files include medical visit information of all persons in ALLID who had sought VA medical care from July 1, 2005—to June 30, 2007.

In contrast to DoD treatment, if a VA patient had more than one diagnosis date for a diagnosis-specific indicator in VA master files, then the earliest, rather than the latest VA diagnosis date was used, and the corresponding diagnosis date when the indicator was rolled up to the ALLID file. Two earliest VA diagnosis dates were rolled up that corresponded to each of the 11 VA diagnosis-specific indicators: one was the earliest diagnosis date after the individual's DD214 date; another was the earliest diagnosis date from July 1, 2005, regardless of the DD214 date. The second date (regardless of DD214 date) was necessary because VA might send veterans to DoD for its specialty care. Similarly, the earliest dates were used for any VA treatment indicators (that is., first time receiving any VA treatment from July 1, 2005, or from individual's DD214 date, to

June 30, 2007). In essence, all DoD treatment indicators are associated with dates of last time treated at DoD and all VA indicators are associated with dates of first time treated at VA. We reasoned that the time segment between the last treatment at DoD and the first treatment at VA would be the more relevant measure when evaluating timeliness of care transition.

Besides DoD treatment indicator counterparts, two additional special indicators and their corresponding dates were created in VA master treatment clinic files and then rolled up to ALLID. One indicator was for first time seeking any VA care from July 1, 2005—June 30, 2007. Another one was for first time seeking any VA care from the individual's DD214 date to June 30, 2007. In contrast to other treatment indicators, these two indicators of seeking VA care made no distinction between encounters (where at least one ICD-9 code recorded in the corresponding medical record) and "occasions of services." An occasion of service was defined by VHA as the health service provided to a VA patient without the presence of a decision-making provider, so that there were no ICD-9 codes recorded for the service. Examples of occasions of service were laboratory tests, radiology exams, and EKGs. Indicators of seeking VA care were created with the same approach as creating indicators of VA treatment, except that medical records without any ICD-9 codes were excluded when creating treatment indicators, and they were included when creating indicators for seeking care. Indicators of seeking care were created in an attempt to capture the earliest VA effort of providing health care services to service members who were newly separated from DoD. The indicators would be a relevant overall measure of timeliness of care transition that was not limited only to treatment.

The derived VA demographic data elements which were brought forward to ALLID were the most current available non-missing value that was most frequently agreed upon among the four types of VA treatment files. If there was no such an agreement, the most current available non-missing value was used that was taken from in the following prescribed file order: VA Inpatient, VA Outpatient, Fee Basis Inpatient, and Fee Basis Outpatient.

PEB Master File

Service members who have a serious illness or injury may be referred to a PEB for possible medical discharge from active military duty. A service member may be referred to a PEB more than once. The PEB master file included every person who was in both the ALLID file and in the PEB file provided by DoD. The DoD PEB file contained dates submitted for PEB evaluation. These PEB dates ranged from September 2005—January 2007. The master file used the earliest PEB date if more than one PEB record was found in the DoD PEB file (as a result of more than one PEB process). A service member was considered as having had PEB referral only if the individual's (earliest) PEB date occurred before the individual's DD214 date. The indicator of referral to PEB and its corresponding referral date were rolled up to the ALLID file.

Reserve Affairs Reserve/National Guard (RN) Master File

The RN master file was established using the Activation file provided by DoD Reserve Affairs. The Activation file provided one record for each activation of a Reserve or National Guard member that included in the corresponding activation start date and end date. The activation start dates ranged from October 1, 2001—July 2007.

A service member was defined as having served in a Reserve/National Guard unit before the service member was released from active duty only if this individual's first activation start date in the Activation file was earlier than the individual's DD214 date, the separation date from DoD. This effectively assumes that once a service member started serving in a Reserve/National Guard unit, then the individual would continue the service only in a Reserve/National Guard unit. In other words, only members of the active component may later switch to the Reserve/National Guard unit, but not otherwise. This precludes the likelihood of members of the Reserve/National Guard unit joining an active component later.

The RN master file included every person who was included in the ALLID file and judged as served in a Reserve/National Guard unit. The indicator for Reserve or National Guard members and the corresponding first and last activation start dates were rolled up to the ALLID file.

VADIR RN Master File

The VADIR RN master file was created from the VADIR data file for the Reserve/National Guard component using the same approach as creating the RN master file. A service member was classified as having served in a Reserve/National Guard unit only if the individual's first activation start date in the VADIR file was earlier than the individual's DD214 date. The activation start dates in the VADIR Reserve/National Guard file ranged from October 1, 2001—January 2007. The VADIR RN master file included all persons who were included in the ALLID file and were judged as served in a Reserve/National Guard unit. The indicator for Reserve or National Guard members and the corresponding first and last activation start dates were rolled up to the ALLID file.

OEF/OIF Master File

The source file for the OEF/OIF master file is the OEF/OIF file that contains the roster of military personnel who had served in the OEF/OIF theater and separated from active duty since October 1, 2001. The OEF/OIF file contains selected DoD data elements from the Contingency Tracking System of the DoD DMDC and the file was provided by VA.

The OEF/OIF master file included every person who was included in the ALLID file and judged as having served in the OEF/OIF theater. A veteran was deemed as having served

in the OEF/OIF theater only if the individual's first deployment start date was earlier than the individual's DD214 date.

The master file contains indicators for Reserve or National Guard members based on information in the OEF/OIF file. In the OEF/OIF master file, a veteran was classified as having served in a Reserve/National Guard unit only if the individual's first deployment start date in the OIF/OEF file was earlier than the individual's DD214 date. Indicators for OEF/OIF and for Reserve or National Guard members and the corresponding first and the last deployment start dates were rolled up to the ALLID file.

VHA National Enrollment Database (NED) Master File

The NED resulted from the Veterans' Health Care Eligibility Reform Act of 1996 (Public Law 104-262), which mandated the VA to establish and implement an annual patient enrollment system to manage the delivery of health care services. The Health Eligibility Center (HEC) in Atlanta is responsible for determining eligibility of veterans for VA medical care. NED serves as the single primary source for storing VA healthcare enrollment records at a national level. It is populated on a nightly basis from enrollment and eligibility data residing at the HEC via a Health Level 7 (HL7) messaging interface.

The NED was used to get an indication of if and when veterans sought VA healthcare benefits. Two special files were requested to be extracted from the NED: the Enrollment Application NED file and the Automatic Enrollment NED file. The Automatic Enrollment NED file included three categories of veterans who are not required to apply for enrollment to be eligible for VA health care. They are veterans who: (1) have a service-connected disability of 50 percent or more, (2) are seeking care for a disability the military determined was incurred or aggravated in the line of duty, but which VA has not yet rated, and who are within 12 months of discharge, and (3) are seeking care for a service-connected disability only (*Federal Benefits for Veterans and Dependents, VA 2006* Edition). The Enrollment Application NED file contains all other veterans who are required to apply for enrollment for their eligibility determination (by completing VA Form 10-10EZ, Application for Health Benefits). Both extracted NED files cover the time period January 1, 2005—December 31, 2006.

The NED master file was created based on both NED file extractions. Veterans were classified as having sought VHA benefits if their records were found in NED, regardless of their eligibility determination. Date of first time seeking VHA benefits (NED date) was defined as the Initial Enrollment Date for those auto-enrolled veterans. For those who were not auto-enrolled veterans, the NED date used the non-missing date in the following order: Initial Enrollment Application Date, Initial Enrollment Date, and Enrollment Change Date. Two NED dates were derived, one for first time seeking VHA benefits since January 1, 2005, and another for first time seeking VHA benefits after individual's DD214 date. These two NED dates would be identical if persons only sought first time VHA benefits after their separation from DoD.

The NED master file contained every person who was included in both the ALLID file and in the NED file extractions. The indicator for NED, its two corresponding NED dates, Enroll Priority Group and Enroll Category Type, were brought forward from the NED master file to ALLID.

VBA Benefits Enrollment (WIPP) Master File

Work-In-Progress Processing (WIPP) files were used to get an indication if and when veterans applied for VBA benefits such as Compensation and Pension, home loans, or educational benefits. WIPP files are produced weekly by VBA. They are used primarily as a workload monitoring and management tool for benefits claims. The WIPP files contain information for every completed pending claim. The source of the WIPP transactions is the Pending Issue File (PIF) database, a temporary work area the VBA Regional Offices use. When a claim record is erased from the PIF—because it is either completed, cancelled, or cleared—the record is moved over to the WIPP file.

The WIPP master file used WIPP files that covered the period from January 1, 2005—June 30, 2007. Veterans were considered as having applied for VBA benefits if their records were found in 2005–2006 WIPP files, regardless of their application outcomes. Date of (first time) applying for VBA benefits (WIPP date) was defined as the claim date in WIPP files. Two WIPP dates were derived, one for first time applying for VBA benefits since January 1, 2005, another for first time applying for VBA benefit after individual's DD214 date. These two WIPP dates would be identical if persons only sought first time VHA benefits after their separation from DoD.

The WIPP master file contained every person who was included in both the ALLID file and in the WIPP files. Indicator for WIPP, its two corresponding first WIPP dates, and corresponding claim complete date were rolled up from the WIPP master file to ALLID.

Vital Status Master File

Service members who died before their separation from DoD were excluded from the LC database population. The death master file captures deceased veterans after their discharge from active military duty. Veterans vital status in ALLID was determined based on information from both Social Security Administration (SSA) death file and VA vital status dataset. VA vital status file is maintained by VHA National Data Systems, a component of the Office of Information, Austin, TX. VA vital status file includes death dates only for veterans who had been entered into the VA veteran database. The SSA death file was not limited to VA veterans.

The Death master file included death dates for all veterans included in ALLID and whose death dates were within the period July 01, 2005—June 30, 2007 from the VA Vital Statistic file and to August, 2007 from the SSA death file. Two death indicators were created and rolled up to ALLID: one for deaths occurred from July 01, 2005 (used for

excluding deaths before military discharge and data checks), and another for death dates after an individual's DD214 date.

Statistical Analysis

Because PEB information was available only from September 2005, analyses presented in this report were limited to all service members who were discharged from active military duty during fiscal year (FY) 2006 (October 1, 2005—September 30, 2006). In addition, those whose age at discharge was age 16 or under, or over 65, were excluded. Age at discharge was calculated based on DD214 date and date of birth.

A service member was considered as having served in a Reserve/National Guard unit if Reserve/National Guard status was indicated in any of the Reserve Affairs RN, OEF/OIF, or VADIR RN Master files. Pay Grade was grouped into 5 categories: E1–E4, E5–E9, O1–O3, O5–O10, and "Other"; the "Other" group included W1–W5, codes other than specified above including missing Pay Grade information. Service branches of other than Army, Navy, Air Force, and Marine Corps, including missing branch information, were grouped as "Other."

Service Character was re-categorized as follows:

- **Honorable/General** incorporates "Honorable" and "General, Under Honorable Conditions." This category also includes those judged "Honorable for VA Purposes" by VBA.
- **Other Than Honorable.**
- **Bad Conduct/Dishonorable** includes "Bad Conduct" and "Dishonorable" discharges. It also includes those judged "Dishonorable for VA Purposes" by VBA
- **Uncharacterized** consists of those without character of service listed.
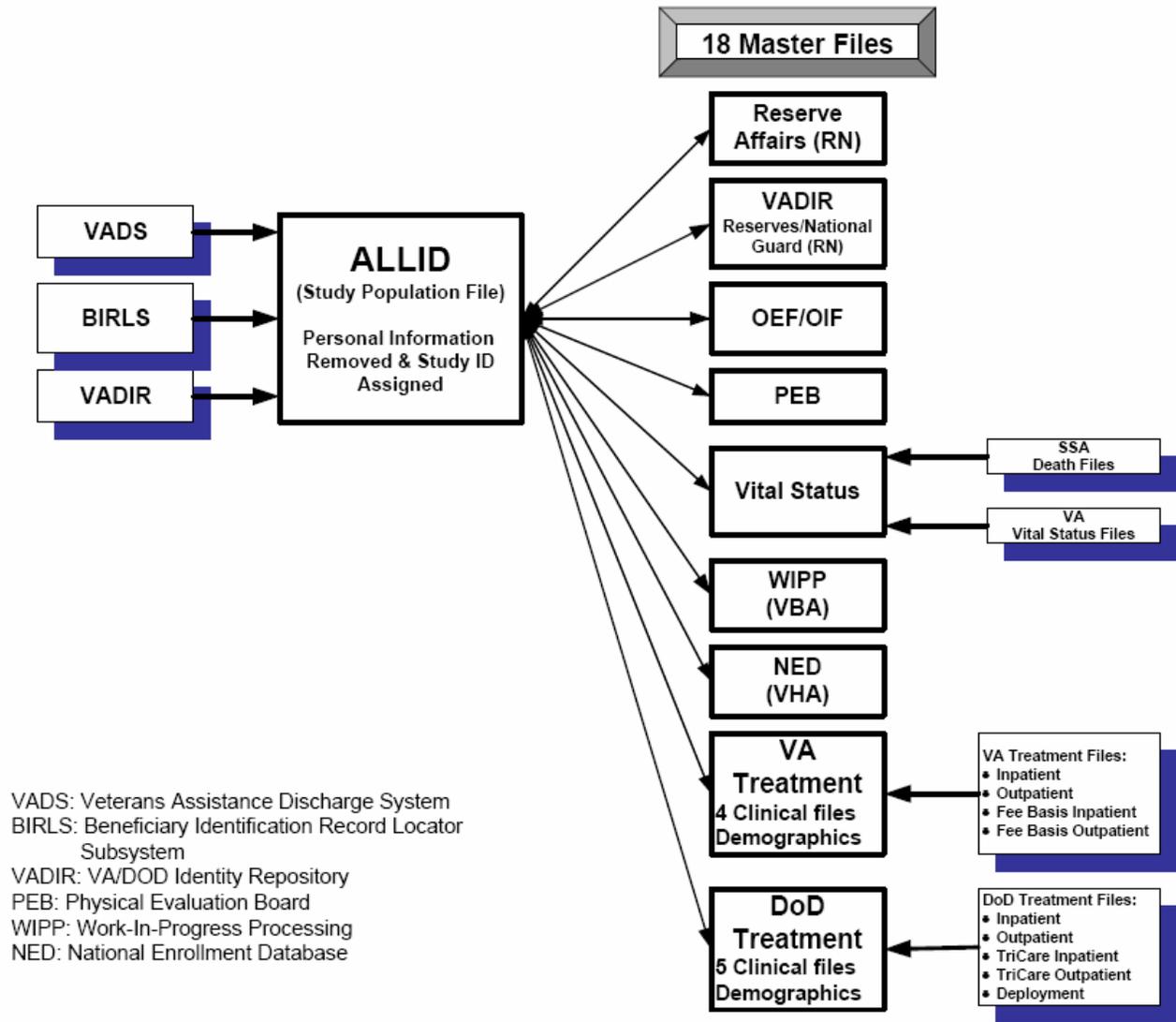
DoD treatment counted only clinical encounters (that is, with at least one ICD-9 diagnosis code). The "sought VA health care" category included both encounters and occasions of services (no ICD-9 codes).

All analyses were performed using SAS statistical software (SAS Institute, Inc., Cary, North Carolina), version 9.1 (TS1M3).

Results

The LC database consists of the study population file, ALLID, and the 18 master files (see Figure 1 on the next page) that incorporate details about all 494,147 service members discharged or released from active military duty during the period July 1, 2005—September 30, 2006. The LC database excluded 1 service member whose Social

Figure 1. LC Database: ALLID + 18 Master Files

18 Master Files

VADS
BIRLS
VADIR

ALLID
(Study Population File)

Personal Information
Removed & Study ID
Assigned

Reserve
Affairs (RN)

VADIR
Reserves/National
Guard (RN)

OEF/OIF

PEB

Vital Status

SSA
Death Files

VA
Vital Status Files

WIPP
(VBA)

NED
(VHA)

VA
Treatment
4 Clinical files
Demographics

VA Treatment Files:
• Inpatient
• Outpatient
• Fee Basis Inpatient
• Fee Basis Outpatient

DoD
Treatment
5 Clinical files
Demographics

DoD Treatment Files:
• Inpatient
• Outpatient
• TriCare Inpatient
• TriCare Outpatient
• Deployment

VADS: Veterans Assistance Discharge System
BIRLS: Beneficiary Identification Record Locator
          Subsystem
VADIR: VA/DOD Identity Repository
PEB: Physical Evaluation Board
WIPP: Work-In-Progress Processing
NED: National Enrollment Database

Security Number was invalid (an ASCII extended character followed by 8 zeros) and 147 service members who were dead before their DD214 date.

Of the 494,147 in the ALLID, 391,968 service members were discharged during FY 2006. We excluded 10 of the 391,968 service members whose date of birth were unknown, 13 were under age 17 and 41 were over 65 at the discharge time from our analyses (A total of 64 veterans were excluded, which was less than 0.02 percent (64/391,968)). Thus, our analyses included 391,904 service members who were discharged during FY 2006 and whose age at discharge were between 17 and 65.

Of these 391,904 service members, 332,964 (85 percent) were identified from the VADS file, and an additional 12,628 (3 percent) were identified in the BIRLS file, and a further 46,312 (12 percent) were identified through VADIR.

Table 1 (see next page) showed that the median age of the discharged 391,904 service members was 26 years old, that is, half of them were younger and half of them older than 26 at their discharge time. The average age was 29.4 year.

Approximately half (51 percent) of the discharged service members had served in OEF/OIF, and 31percent of them were from the Reserve Component (Reserves and National Guards). Approximately 15 out of 100 discharged members were female. Over 55 percent of the veterans served in the Army, 16 percent and 15 percent were in the Navy and Air Force, respectively, and approximately 13 percent in the Marines. Approximately 89 percent of veterans were enlisted and 10 percent were officers. More than half (51 percent) of the service members were in the E1–E04 pay grade at the time of their discharge, 38 percent in the E5–E9 grade, and 5 percent each in O1–O3 grade or in O4–O10 grade. Less than 0.6 percent of the discharged veterans had died by June 30, 2007.

More than 86 percent of discharged service members earned Honorable (including Honorable VA Purpose), or Under Honorable, or General service character, 3 percent of them discharged with Other Than Honorable character, and 0.1 percent of them with Bad Conduct or Dishonorable conditions. Bad Conduct and Dishonorable discharges issued by general courts martial may bar VA benefits. Veterans separated administratively under Other Than Honorable conditions may request that their discharge be reviewed for possible re-characterization for the purpose of obtaining VA benefits.

Service members who have a serious illness or injury may be referred to a PEB for possible medical discharge. Overall, approximately 2.3 percent of the service members discharged during FY 2006 was referred to a PEB from September 1, 2005–September 30, 2006.

Most of the veterans (92 percent) had received treatment while serving their active military duty during October 1, 2004–September 30, 2006. Over 1 percent of veterans

Table 1: Characteristics of 391,904 service members discharged from active military service between October 1, 2005 – September 30, 2006, who were 17-65 years old at discharge.

Age (years)	
Median	26
Mean	29.4
OEF/OIF (%)	51.0
Reserve Component (%)	
Reserves and National Guard	31.3
Sex (%)	
Female	14.8
Male	83.6
Unknown	1.6
Service Branch (%)	
Army	55.2
Navy	15.7
Air Force	15.1
Marines	12.5
Other	1.5
Service Character (%)	
Honorable/General	86.5
Other Than Honorable	3.1
Bad Conduct/Dishonorable	0.12
Uncharacterized	10.3
Pay Grade (%)	
E1-E4	50.7
E5-E9	38.1
O1-O3	5.1
O4-O10	5.1
Other	1.1
Referred to Physical Evaluation Board (%)	2.3
Vital Status	
Died by June 30, 2007 **(%)**	0.55
Treated in DoD (%)*	
Oct. 1, 2004 – Sept. 30, 2006	92.2
Before Military Discharge	90.9
After Military Discharge	1.4
Sought Care in VA (%)**	
July 1, 2005 – June 30, 2007	30.2
After Military Discharge	27.1
Before Military Discharge	3.1

* DoD treatment included only encounters with at least one ICD-9 diagnosis code.

**Sought VA health care included encounters with and without ICD-9 codes.

received health care provided by DoD. Thirty percent of veterans had sought VA health care during July 1, 2005–June 30, 2007. More than 3 percent of discharged veterans had sought VA care before their separation from DoD in FY 2006.

Discussion

The LC database provides us unique opportunities for systematically evaluating transition processes using a data-based approach. The population-based nature of the database eliminates potential selection bias.

Systematic evaluation of the transition process can (1) delineate transition times and the extent to which they vary, and (2) explore possible sources of variation, including demographics, rank, diagnoses, service branch, service character, Reserve or National Guard status, and OIF/OEF status. Results from these analyses could allow for better strategic planning, improved targeting of specific groups for outreach, and identification of required legislative and policy changes. In addition, since non-OIF/OEF data can serve as a baseline to approximate peacetime circumstances, OIF/OEF data provide an estimation of the incremental VA workload and cost of care attributable to the conflict. Such an analysis could help VA and DoD to better prepare for the challenges expected in future hostile actions.

Because of the huge size of the database, we split the database into the study population file (ALLID) and the 18 associated master files, instead of one gigantic file. This modular approach makes it possible for us to use the database on desktop computers (rather than a mainframe), so that the database can be used practically. The ALLID population file is a person file with only one data record for one person, whereas the master files are episode files where many data records may pertain to the same person. The ALLID file contains most commonly used information or derived data elements at the person level. For information other than those brought forward to ALLID, the relevant master files should be used to derive or extract that data.

The LC database is limited by the availability of the data files based upon which it is created. For example, the original PEB data file is available starting with referral dates in September 2005. As a consequence, we would not know about referrals to PEB if such referrals occurred prior to September 1, 2005. Similarly, the Activation file from DoD Reserve Affairs is also not available before October 1, 2001 (as the file contains members of Reserve Component activated October 1, 2001, and onward). We could miscount the members of Reserve Component as members of Active Component had they started active duty earlier than October 1, 2001, although this is an unlikely circumstance for members discharged in FY 2006 since the duration of active duty usually is much shorter than 5 years for Reserve members.

In addition, the LC database is also limited by the quality of the data files from which it is created. We used our pre-defined business rules to deal with possible conflicting data

information because it was unrealistic for us to go back to original data collectors to make data correction. However, the files we used are the best currently available data that are also used for other DoD and VA data reporting purposes and policy development.

Other ongoing data analyses indicate that Reserve and National Guard service members comprise a substantial proportion of OEF/OIF personnel and that these individuals have different characteristics at the time of military discharge from their Active Component counterparts. In follow-up reports, we will provide details about the transition experiences of groups of individuals with specific medical conditions by OEF/OIF and Reserve/National Guard status.

We also plan to expand the LC database both backwards and forwards to include all service members discharged from active military service from October 1, 2001, onwards. This expansion would make the database more comprehensive and useful because it would make trending possible.

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