**National Guard Bureau - Suicide Risk Support Database (SRSD)**

DAPT 611 – Advanced SQL Project
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## Executive Summary

According to the 2014 DoDSER, if you have committed suicide as a member of the armed services, you are highly likely to be: white, male, non-Hispanic, enlisted rank, 25 or younger, unmarried, without a college degree… and *in the National Guard*. With the highest rate of suicide incidence across all joint services, the National Guard requires an integrated database enabling suicide prediction and responsive monitoring the grouping of high-risk across all fifty states. Our team designed a database that concatenates not only the highly predictive variables of personnel demographics – it supports the use of one's entire service record to assess level of risk. The National Guard Suicide Risk Support Database (NGB - SRSD) enables dynamic groupings of shared experiential and geographical profiles, enabling analysts to consider the pace of deployments, the number and type of injuries acquired, their treatments, amounts of leave accrued and taken, regionally required immunizations, and, very significantly, civilian employment. Through this fully-realized database, the Bureau for the National Guard acquires an essential and dynamic Sense and Respond capability supporting improved resourcing to at-risk individuals and groups, efficacy-of-resource monitoring, and targeted, proactive measures that reduce service-wide incidence of suicide.

## Introduction

Since 2008, the Defense Suicide Prevention Office (DSPO) has partnered with the individual Suicide Prevention Offices of the Air Force, Army, Marine Corps and Navy to create and refine a system for collecting and reporting data critical for characterizing suicide-related behavior within the DoD. Each year, the National Center for Telehealth and Technology (T2) assembles this data into the Department of Defense Suicide Event Report (DoDSER), which summarizing service-aggregate suicide distributions among duty service members. For theses assessments, T2 members supplement reported DoDSER-system data with data reported in two other systems: The Armed Forces Medical Examiner System (AFMES) and the Defense Manpower Data Center (DMDC). Together these data inform analytics designed to indicate a core set of standardized variables from among numerous suspected behavioral determinants. These variables may be generally categorized as: Demographics, Behavioral Health History, Psychological Stressors, and Deployments.

In addition to summarizing data reflecting the joint services, the 2014 DoDSER report includes for the first time statistics reflecting active-duty National Guard and Reservist data.
In this report, the rates of suicide for Reservist and National Guard components include all service members, irrespective of duty status, and span from years 2012 to 2014. As found in this report, incidences of suicide are much more frequent within the National Guard and Special

Reserves when comparing service branches (Figure 1.1). Furthermore, the categorization of 2012-2014 personnel data within the 2014 DoDSER suggest a general profile of recent National Guard suicides that inform an understanding of who might be most at risk of suicidality (Figure 1.2). What the DoDSER data fail to do, however, is predict *when* some-*one* or some *group* is most at risk before suicide incidence, so that these suicides may be prevented.

Like the DSPO, the Veterans Affairs Office compiles an extensive amount of research from suicide incidence data in order to form generalizations that better profile those likely to be of higher suicide risk. The *VA/DoD Clinical Practice Guideline: Assessment and Management of Patients at Risk for Suicide* groups suicide Risk Factors into the following categories: (1) Psychological factors, (2) Social Factors, (3) Medical Conditions, (4), Mental Disorders, (5) Military-specific, and (6) Pre-existing & Non-modifiable (Figure 1.3). Our database design considers how presently-existing personnel service- and health-record data may be used as indicators of heightened risk within the framework of these six categories. Further, we consider the addition of a seventh category: (7) National-guard Specific indicators.

The unique differences in the functional nature of the National Guard from other military service branches mean unique challenges to National Guard service persons. First, the National Guard primarily operates independently within each state under the Title 32 statute, which directs employment use through the state governors. During a period of declared war, when additional forces are needed to augment war-fighting demands, the National Guard Bureau orchestrates these independent branches in support of national war-fighting efforts. Second, unlike other services which require a full-time commitment, National Guardsmen serve only part-time, unless they are deployed – only when they are on active-duty do they receive access to medical-health benefits through TriCare. Finally, unlike other services where personnel are full-time active-duty, Guardsmen typically have or require full-time civilian employment beyond their service requirements.

Because the National Guard branches operate independently within each state, each branch fails to benefit holistically from coordinated actions aimed at detecting and diminishing high risks of suicide. Our solution is designed to integrate each state's various personnel records data into a nationally accessible, synchronized database capable of flagging potential risk factors as they emerge. In the first two phases of implementation, our design considers both service records and medical record data. Eventually, this database would integrate with IRS systems in order to incorporate servicemen's annual financial information. Our goal is to enable predictive analytics that support targeted, strategic and proactive intervention for individuals and groups measuring at high risk. The primary users of this system would be the analysts and directors at both the state and national levels of National Guard operations.

**Implementation**

Our team anticipates that the implementation of this database will be both iterative and perpetual. The overall scope of our design may be summarized in three phases, each with three steps. Phase one will focus at state-level integration of internal Army and Air National

Guard personnel records. Phase two will expand at a national layer in order to integrate personnel data from external government sources. Phase three will further extend into the realm of social media and public data-sources to bring the potentials of Big Data analytics as a capability supporting the National Guard.

For this project, our team focused at a very primitive level on the problem of integrating personnel records data in such a way as to enable predictive analytics measuring suicide risk. Understanding the sensitive nature of government-owned data, our team produced 1000 "dummy" profiles in an effort to simulate general military-record information. Although it would be delightful to design a solution using hypothetical and ideal data – which could then be recommend that the services collect in support of predictive analytics – our team approached the problem of reducing the rate of suicide incidence within the National Guard by considering: (1) what data do we currently have available; and (2) how can we use this to see what we need to see?

Personnel data is currently available as an untapped resource within the National Guard. Using a DoDSER and VA-informed categorical framework for predicting suicidality, our design considers how different views of this personnel data may deliver vital clues that indicate when a person and/or group is increasing (and decreasing) in risk of suicidal action. Because personnel-records data is presently accessible, it's integration into a national-level database offers an immediate sensing capability to each and all of the National Guard services grappling with the immediate problem. This is phase one – *to enable a suicide prevention sense-and-respond capability across the National Guard services using pre-existing and available data.*

As demonstrated by our Suicide Risk Support Database (SRSD) proof-of-concept (PoC), this first phase proceeds along a series of steps that cleanse data elements, define variables and relationships, determine specific business rules, normalize data tables and orchestrate the database integration. In addition to performing these steps, our team would work across the National Guard services to ensure an ongoing processes enabling data governance and master data management of authoritative records data supporting the ongoing integrity of this database.

The first sprint to develop our working PoC accomplished much; however, more research and time is necessary in order to fully represent the capabilities this concept offers to the National Guard. For instance, our Dependent Table only contains spouse information as we ran out of time to generate mass instances of children born to a large percent of the personnel. Additionally, both geographic location code tables (international and US) and the civilian education table remain in 2$^{nd}$ normal form. There remains a need for our team to consult with National Guard administrators and Subject Matter Experts to better refine our database requirements and further normalize our data. Finally, although our conceptual EER diagram illustrates nearly thirty entities, we have yet to generate personnel medical-records data – again, consultation is required to enhance our understanding of the data available.

## Figures

Figure 1.1, Rates of Suicides Per Service Branch, by Year

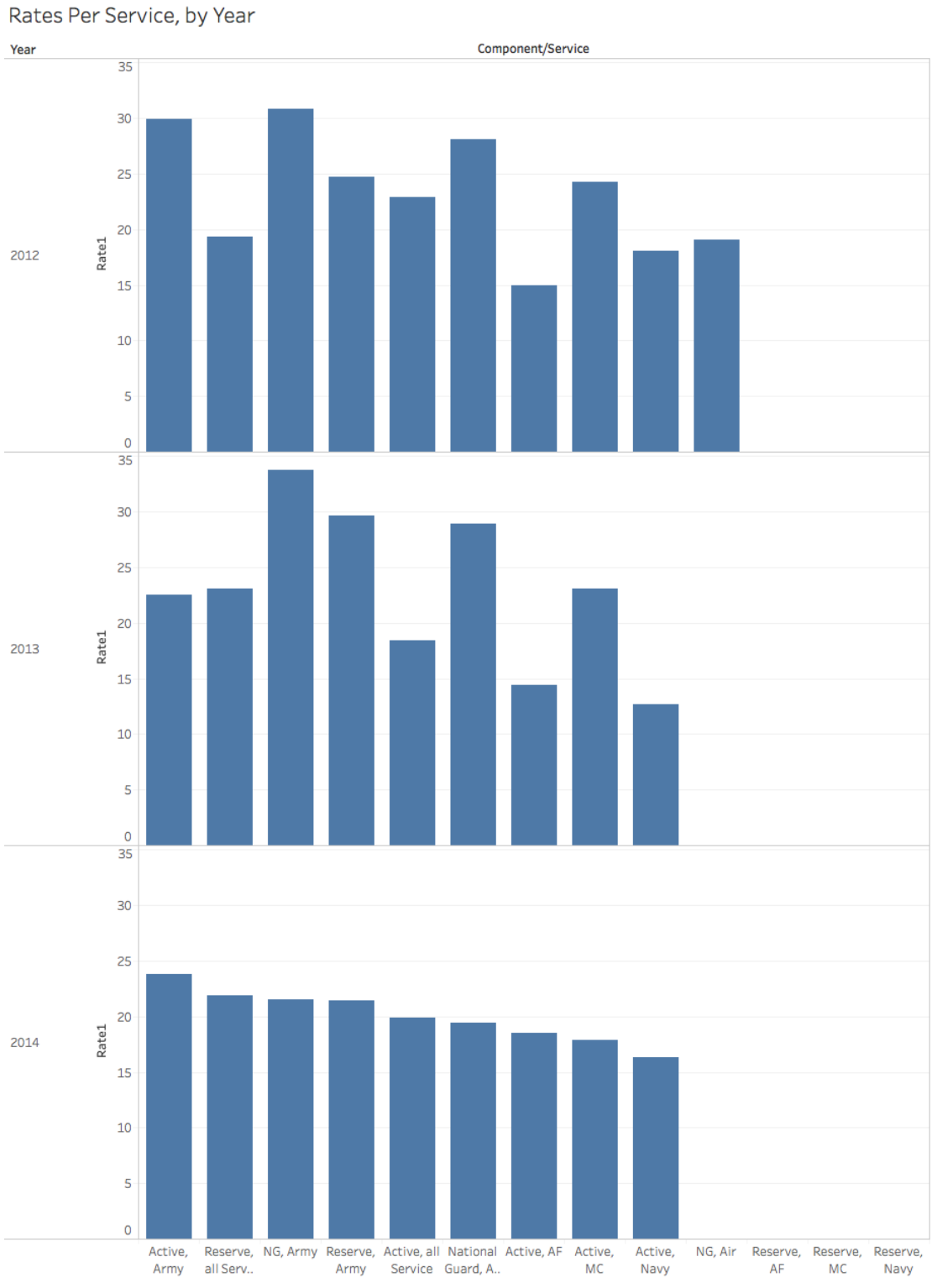

Figure 1.2

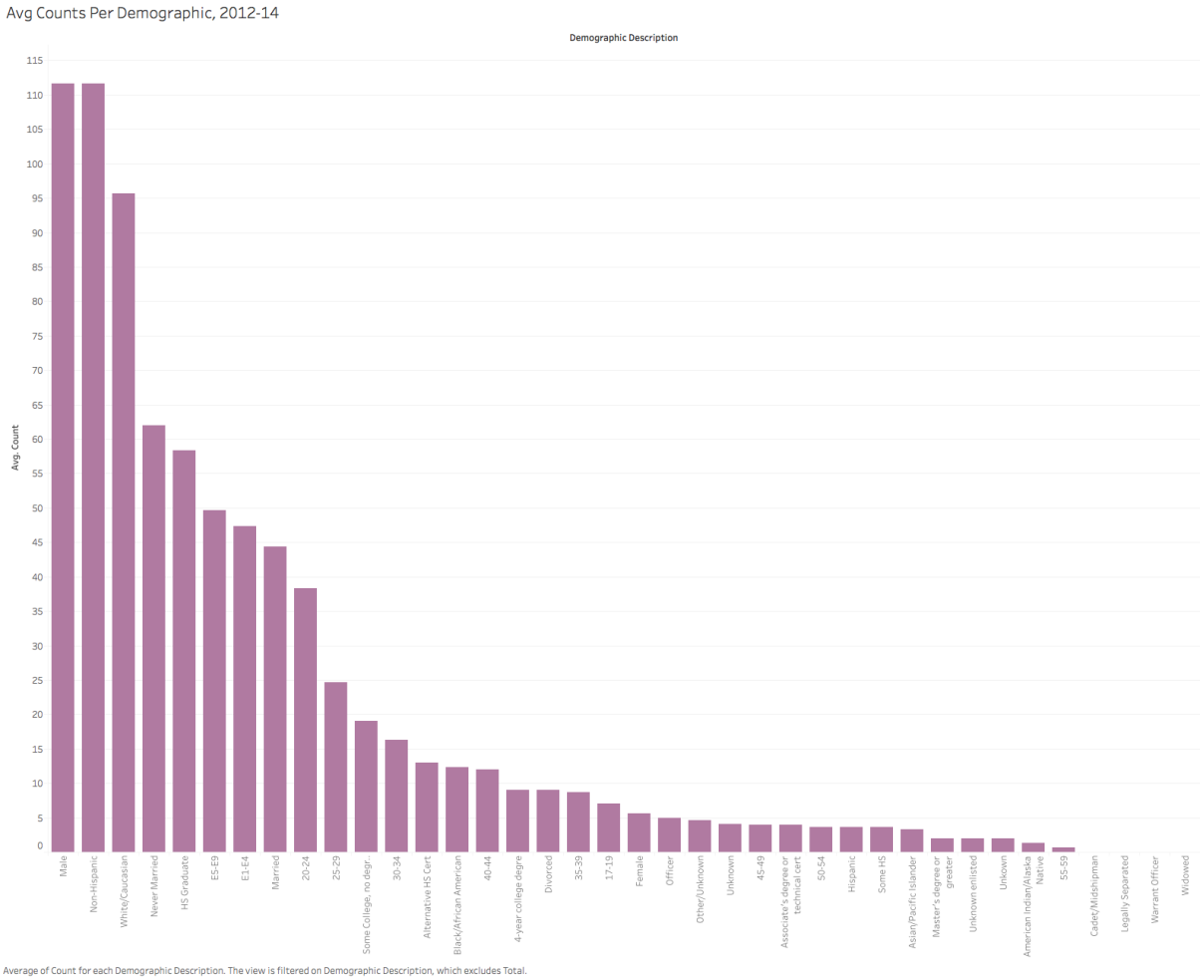


Figure 1.3

## TABLE 2 Risk Factors

**Acute Risk Factors:** Acute (of brief duration) and stressful episodes, illnesses, or life events. While not usually internally derived, these events can build upon and challenge a person's coping skills.

**Chronic Risk Factors** (Pre-Existing)**:** Relatively enduring or stable factors that may increase a person's susceptibility to suicidal behaviors, such as genetic and neurobiological factors, gender, personality, culture, socio-economic background and level of isolation.

### PSYCHOLOGICAL FACTORS

- Suicide of relative, someone famous, or a peer
- Suicide bereavement
- Loss of loved one (grief)
- Loss of relationship (divorce, separation)
- Loss of status/respect/rank (public humiliation, being bullied or abused, failure work/task)

### SOCIAL FACTORS

**Stressful Life Events (acute experiences)**
- Breakups and other threats to prized relationships
- Other events (e.g., fired, arrested, evicted, assaulted)
- Chronic Stressors (ongoing difficulties)

**Financial Problems**
- Unemployment, underemployment
- Unstable housing, homeless
- Excessive debt, poor finances (foreclosure, alimony, child support)

**Legal Problems (difficulties)**
- DUI/DWI, Lawsuit, Criminal offense and incarceration

**Social Support**
- Poor interpersonal relationship (partner, parents, children)
- Geographic isolation from support
- Recent change in level of care (discharge from inpatient psychiatry)

### MEDICAL CONDITIONS

- History of Traumatic Brain Injury
- Terminal disease
- HIV/AIDS
- New diagnosis of major illness
- Having a medical condition
- Worsening of chronic illness
- Intoxication
- Substance withdrawal (alcohol, opiates, cocaine, amphetamines)
- Use of prescribed medication w/ warning for increased risk of suicide

### MENTAL DISORDERS

- Mood or affective disorder (major depression, bipolar, post-partum)
- Personality disorder (especially borderline and antisocial)
- Schizophrenia
- Anxiety (PTSD, Panic)
- Substance Use Disorder (alcohol, illicit drugs, nicotine)
- Eating disorder
- Sleep disturbance or disorder
- Trauma (psychological)

**Physical Symptoms**
- Chronic pain
- Insomnia
- Function limitation

### MILITARY-SPECIFIC

- Disciplinary actions (UCMJ, NJP)
- Reduction in rank
- Career threatening change in fitness for duty
- Perceived sense of injustice or betrayal (unit/command)
- Command/leadership stress, isolation from unit
- Transferring duty station (PCS)
- Administrative separation from service/unit
- Adverse deployment experience
- Deployment to a combat theater

### PRE-EXISTING & NON-MODIFIABLE

- Age (young & elderly)
- Gender (male)
- Race (white)
- Marital status (divorce, separate, widowed)
- Family history of:
  - Suicide/ attempt
  - Mental illness (including SUD)
- Child maltreatment trauma-physical/ psychological/sexual
- Sexual trauma
- Lower education level
- Same sex orientation (LGBT)
- Cultural or religious beliefs

Medication regimen [prescription drugs, over-the-counter medications, and supplements (e.g., herbal remedies)] should be reviewed for medications associated with suicidal thoughts or behavior.