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TITLE: Military Veterans with Eating Disorders: Prevalence, Incidence, Patterns of Comorbidity and Cost of Care

PRINCIPAL INVESTIGATOR: Bryn Austin and Mihail Samnaliev

CONTRACTING ORGANIZATION: The Children's Hospital Corporation d/b/a Boston Children's Hospital

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14. ABSTRACT

Scope: Eating disorders (ED), including anorexia nervosa, bulimia nervosa, and binge eating disorder, are serious illnesses that lead to disturbance in one's eating behaviors and can result in poorer health, lower quality of life, and long-term expensive treatment. Very little is known about the prevalence of ED and the patterns of co-occurring mental health and substance use problems among military Veterans. Our study is designed to estimate the prevalence, patterns of co-occurring illness, and costs of ED among Veterans so that we can evaluate the overall burden of disease to inform future design of effective ED screening and treatment programs for military Veterans.

Purpose: The purpose of our research activities is to use the largest and most comprehensive database of US military Veterans to: generate precise estimates of ED prevalence (% of Veterans with ED within a year) and incidence (new cases by year) among Veterans in the aggregate; estimate ED prevalence/incidence by sociodemographic groups, including by age, gender, race/ethnicity, obesity status, and age cohort; evaluate whether such co-occurring problems precede (and may lead to) ED or if they develop subsequently to an ED episode (and may be caused in part by ED); document the added utilization and cost of care to the Veterans Health Administration (VHA) associated with ED.

Major Findings:

During Year 1, we have carried out extensive work to progress toward completion of Aim 1 to develop a robust EHR-based algorithm to identify ED on the aggregate and for ED subtypes among military Veterans. We began by engaging with the extensive human subjects approval process with HRPO for the Boston Children's Hospital, Boston VA, and Salt Lake VA sites. We are continuing to develop our EHR-based algorithm. Once developed, we will evaluate its performance relative to chart review diagnosis gold standard. Simultaneously, we will initiate analyses of health care costs attributable to eating disorders. Our study has the potential for an unprecedented impact on the health and quality of life among Veterans with the condition. We will produce the most accurate estimates to date of the scope and impact of ED on Veterans' health as a whole and in high-risk subgroups, changes in incidence over time and with age, and the health services and cost burden posed by ED for the VHA, in addition to Medicare. During Year 1 we also prepared an analysis plan for Aim 3 that provides a step by step guidance to the analysts regarding (i) the study design, merging of datasets, and matching of the ED group to controls, (ii) the analytic dataset that will be created including a list of all health care utilization and healthcare cost outcomes and confounders and how each of these will be measured (e.g. at baseline vs. time varying), and (iii) statistical analysis, including tests for differences between ED and control group, and regression models that would be appropriate for the modeling of utilization counts and costs. The execution of the analysis plan will begin upon completion of Aim 1. Simultaneously, we have developed a brief analysis plan for Aim 2, which outlines how prevalence and incidence of ED and mental health and substance use comorbidities will be estimated.

15. SUBJECT TERMS**16. SECURITY CLASSIFICATION OF:**

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TABLE OF CONTENTS

1. Introduction.....	5
2. Keywords.....	5
3. Accomplishments.....	5
4. Impact.....	6
5. Changes/Problems.....	6
6. Products.....	6
7. Participants & Other Collaborating Organizations.....	7
8. Special Reporting Requirements.....	8
9. Appendices.....	8

1. INTRODUCTION:

We will develop a robust and validated methodology to more accurately identify ED cases in the VHA than has previously been possible using electronic health record (EHR) data. Using our newly developed algorithm, we will generate precise estimates of the prevalence and incidence of ED among Veterans in the aggregate and by ED subtype and by sociodemographic group, patterns of mental health, and substance use comorbidities, and utilization and cost of care to the VHA and other public payers. Further, longitudinal analyses of a 17-year period of CDW will (i) examine whether prevalence and incidence have changed over time and as individuals age, (ii) identify comorbidities associated with increased risk of developing ED, and (iii) assess the cost of care of new ED cohorts over the 17-year period. Our planned research will produce the most robust estimates to date of the scope and impact of ED on Veterans' health as a whole and in high-risk subgroups, changes in incidence over time and with age, and the health services and cost burden posed by ED for the VHA and other public payer systems.

2. **KEYWORDS:** Veterans, cost, comorbidity, healthcare utilization, eating disorder, anorexia, bulimia, binge eating, EHR, algorithm

3. ACCOMPLISHMENTS:

- **What were the major goals of the project?**
 - **Aim 1:** Develop a robust EHR-based algorithm to identify ED on the aggregate and for ED subtypes among military Veterans.
 - **Aim 2:** (a) Estimate the prevalence and incidence of ED and ED subtypes and (b) estimate the prevalence of comorbid mental health and substance use disorders among Veterans with ED in the aggregate and in high-risk subgroups defined by gender, race/ethnicity, obesity status, and age cohort.
 - **Aim 3:** Estimate the added healthcare costs and utilization associated with ED and ED subtypes.
- **What was accomplished under these goals?**
 - During Year 1, we have carried out extensive work to progress toward completion of Aim 1 to develop a robust EHR-based algorithm to identify ED on the aggregate and for ED subtypes among military Veterans. We began by engaging with the extensive human subjects approval process with HRPO for the Boston Children's Hospital, Boston VA, and Salt Lake VA sites. We then extracted a sample of veterans with a diagnosis of eating disorders, which we described by type of disorder, time of diagnosis, gender, age, and BMI. Based on that work, we made progress towards finalizing the criteria that will be used to clean the data and determine the information (e.g. diagnoses, sudden changes in weight, procedures, and other) which will be used as input in the final algorithm that will be applied to the entire dataset to identify individuals with ED.
 - During Year 1 we also made significant progress towards planning of Aims 2 and 3, by developing analysis plans that provides a step by step direction to the analysts related to data sources, merging, design, variable creation and statistical analysis. Aim 2 is more straightforward and does not rely on a control group, therefore, we have spent more time on the planning of Aim 3 as described in Section 14 above.
- **What opportunities for training and professional development has the project provided?**
 - Nothing to Report
- **How were the results disseminated to communities of interest?**
 - Nothing to Report
- **What do you plan to do during the next reporting period to accomplish the goals? .**

- We are continuing to develop our EHR-based algorithm. Once developed, we will evaluate its performance relative to chart review diagnosis gold standard. Simultaneously, we will initiate analyses of health care costs attributable to eating disorders.

4. **IMPACT:**

- **What was the impact on the development of the principal discipline(s) of the project?**
 - Nothing to Report
- **What was the impact on other disciplines?**
 - Nothing to Report
- **What was the impact on technology transfer?**
 - Nothing to Report
- **What was the impact on society beyond science and technology?**
 - Nothing to Report

5. **CHANGES/PROBLEMS:**

- **Changes in approach and reasons for change**
 - Nothing to Report
- **Actual or anticipated problems or delays and actions or plans to resolve them**
 - Nothing to Report
- **Changes that had a significant impact on expenditures**
 - Nothing to Report
- **Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents**
 - Nothing to Report
- **Significant changes in use or care of human subjects**
 - Nothing to Report
- **Significant changes in use or care of vertebrate animals.**
 - Nothing to Report
- **Significant changes in use of biohazards and/or select agents**
 - Nothing to Report

6. **PRODUCTS:**

- **Publications, conference papers, and presentations**
 - **Journal publications.**
 - Nothing to Report
 - **Books or other non-periodical, one-time publications.**
 - Nothing to Report
 - **Other publications, conference papers, and presentations.**

- Nothing to Report
- Website(s) or other Internet site(s)
 - Nothing to Report
- Technologies or techniques
 - Nothing to Report
- Inventions, patent applications, and/or licenses
 - Nothing to Report
- Other Products
 - Nothing to Report

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

- What individuals have worked on the project?

Name:	Bryn Austin- no change
Name:	Mihail Samnaliev- no change
Name:	Dr. Kelly Harrington- no change
Name:	Dr. Karen Mitchell- no change
Name:	David Gagnon- no change
Name:	Sherry Lin- no change

- Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

- Nothing to Report

- What other organizations were involved as partners?

- **Organization Name:** Boston VA Research Institute (BVARI)/Massachusetts Veterans Epidemiology Research and Information Center (MAVERIC)
- **Location of Organization:** Boston, Massachusetts
- **Partner's contribution to the project**
 - **Financial support:** Dept. of Defense
 - **In-kind support:** None
 - **Facilities:** Massachusetts Veterans Epidemiology Research and Information Center (MAVERIC) is an interdisciplinary research and development organization with the goal of creating a learning healthcare system within VA through application of research resources and methodologies to important clinical problems. Toward this end, MAVERIC combines resources from each of its core competencies.
 - **Collaboration:** Personnel with MAVERIC at the Boston VA site jointly with Dr. Austin and Dr. Samnaliev develop plans for analyses to address specific aims, providing direction for data programming with input from co-investigators and consultants. In addition, data analyses are carried out

on site at the Boston VA. Collaboration will be ensured through regularly scheduled in-person meetings occurring every two weeks at minimum.

- **Personnel exchanges:** Dr. Austin can carry out work at Boston Children's Hospital and at the Boston VA.
- **Other:** NA
- **Organization Name:** Western Institute for Biomedical Research. (This site was included in BVARI's budget and BCH issued and is managing the award for more effect monitoring.)
- **Location of Organization:** Salt Lake City, Utah
- **Partner's contribution to the project**
 - **Financial support:** Dept. of Defense
 - **In-kind support:** None
 - **Facilities:** Western Institute for Biomedical Research is a nonprofit corporation established in 1989 to promote research and related educational activities at the VA Salt Lake City Health Care System,
 - **Collaboration:** Dr. Nelson provides guidance in dataset construction and analysis to estimate the healthcare costs associated with eating disorders. Collaboration will be ensured through regularly scheduled in-person meetings occurring every two weeks at minimum.
 - **Personnel exchanges:** N/A
 - **Other:** NA

8. **SPECIAL REPORTING REQUIREMENTS**

- **COLLABORATIVE AWARDS:** Mihail Samnaliev (Award # W81XWH1910240)
- **QUAD CHARTS:** N/A

9. **APPENDICES:** N/A