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Predicting U.S. Army Suicides After Hospital Discharge

Study suggests that high-risk patients can be identified using Big Data predictive analytics prior to hospital discharge

FINDINGS

A new report from *the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)* suggests that some high-risk Army suicides can be predicted with enough accuracy to justify implementing preventive interventions.

RELEVANCE

The high concentration of post-hospital suicide deaths and other adverse outcomes in the small proportion of hospitalized soldiers classified by the researchers as having highest suicide risk might justify expanding post-hospital interventions in an effort to prevent suicides.

FUNDING

The *Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)* is a large-scale epidemiological-neurobiological study of Army suicides and their correlates sponsored by the Department of the Army and funded under a cooperative agreement with the U.S.

Department of Health and Human Services, National Institutes of Health, and National Institute of Mental Health (NIH/NIMH).

JOURNAL

JAMA Psychiatry

Boston, MA (November 12, 2014) – It has long been known that patients recently discharged from psychiatric hospitalizations have significantly elevated suicide risk. However, the rarity of suicide even in this high-risk segment of the population makes it impossible to justify providing intensive post-hospital suicide prevention programs to all recently-discharged patients. Targeted programs for patients at especially high suicide risk would be more feasible, but it is difficult for clinicians to predict with good accuracy which patients are at high suicide risk.

A new report published online today in *JAMA Psychiatry* suggests that big data predictive analytic methods might help address the problem of determining which recently discharged patients are at highest suicide risk. The report comes from *the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)*, a multi-component epidemiological and neurobiological study of Army suicides and their correlates sponsored by the Department of the

Army and funded under a cooperative agreement with the U.S. Department of Health and Human Services, National Institutes of Health, and National Institute of Mental Health (NIH/NIMH).

The study looked at 53,769 regular Army soldiers during the 12-month period following their discharge from a psychiatric facility during the years 2004-2009. Hundreds of potential predictors of post-hospital suicide were abstracted from the extensive Army and Department of Defense administrative data files available for all soldiers. Big data machine learning methods generated a prediction algorithm in which 5 percent of hospitalized soldiers were classified as having the highest post-hospital suicide risk. This 5 percent of highest-risk hospitalizations accounted for 52.9 percent of all post-hospital suicides. Highest-risk soldiers also had significantly elevated risks of unintentional injury deaths, suicide attempts, and re-hospitalizations over the follow-up period. At least one of these adverse outcomes occurred in the year after discharge for 46.3 percent of the highest-risk hospitalizations.

“The high concentration of suicide risk in the 5 percent of highest-risk hospitalizations is striking,” said lead author Ronald Kessler, McNeil Family Professor of Health Care Policy at Harvard Medical School. “The fact that nearly half of all highest-risk hospitalizations were followed by at least one adverse outcome – either suicide, unintentional injury death, suicide attempt, or re-hospitalization – argues strongly for developing expanded post-hospital preventive intervention services for these highest-risk soldiers.”

“The application of big data methods to target soldiers at high risk of rare but important outcomes like suicide is an exciting development because it gives us a way forward in focusing prevention efforts on an ongoing basis,” said Robert Ursano, Chairman of the Psychiatry Department at the Uniformed services University of the Health Sciences, and an Army STARRS Principal Investigator.

The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) is funded by the U.S. Army and the National Institute of Mental Health. The study is led by co-principal investigators Robert J. Ursano, M.D. (Uniformed Services University of the Health Sciences) and Murray B. Stein, M.D., M.P.H. (University of California, San Diego), with site investigators Steven G. Heeringa, Ph.D. (University of Michigan) and Ronald C. Kessler, Ph.D. (Harvard Medical School) and with collaborating scientists Lisa J. Colpe, Ph.D., M.P.H. (NIMH), and Michael Schoenbaum, Ph.D. (NIMH), all of whom can be contacted through http://www.armystarrs.org/media_room

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Commentary on the significance of the Army STARRS report:

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REFERENCE

Kessler RC, Warner CH, Ivany C, Petukhova MV, Rose S, Bromet EJ, Brown M, Cai T, Colpe LJ, Cox KL, Fullerton CS, Gilman SE, Gruber MJ, Heeringa SG, Lewandowski-Romps L, Li J, Millikan-Bell AM, Naifeh JA, Nock MK, Rosellini AJ, Sampson NA, Schoenbaum M, Stein MB, Wessly S, Zaslavsky AM, Ursano RJ. Predicting U.S. Army suicides after hospitalizations with psychiatric diagnoses in the Army Study to Assess Risk and Resilience in Servicemembers, *JAMA Psychiatry*, November 12, 2014

A complete list of Army STARRS publications can be found at <http://www.ARMYSTARRS.org>.

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