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Predicting Soldiers Who Will Commit Severe, Violent Crimes
Study suggests that soldiers at high-risk for perpetrating severe violent crimes can be identified using Big Data predictive analytics.

FINDINGS
A new report shows that a machine learning model using Department of Defense and Army administrative records was able to identify in advance 5 percent of U.S. Army soldiers serving 2004 to 2009 who subsequently committed more than one-third of all major Army workplace violent crimes over that time period.

RELEVANCE
If confirmed with subsequent data, the model could be used to identify soldiers needing intensive preventive interventions to reduce serious Army workplace violence.

JOURNAL
Psychological Medicine

Boston, MA (October 6, 2015) – Workplace violence perpetrated by military personnel is a major concern of the Department of Defense (DoD). Although programs have been implemented to teach violence prevention strategies to all military personnel, such programs are much less intensive than others developed in settings for people judged to be at high risk of violent behavior.

But what is the best way to predict who is at high risk of violence?

A new report published online today in *Psychological Medicine* suggests that Big Data predictive analytic methods might help provide an answer. The report describes research funded by the DoD and conducted in collaboration with the *Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)*, a multi-component epidemiological-neurobiological study of Army suicides and related behavioral health outcomes.

The report describes the development of a machine learning model based on an analysis of administrative data available for all 975,057 Regular U.S. Army soldiers on active duty during

2004 to 2009. The model aimed at predicting which soldiers would subsequently commit a severe, physical violent crime.

Hundreds of potential predictors were examined from the extensive administrative records available for all soldiers. The 5 percent of soldiers classified by the final model as having highest predicted risk accounted for 36.2 percent of all major physical violent crimes committed by men and 33.1 percent by women over the six years of study. When the model was applied to a more recent cohort in 2011-2013, the 5 percent of soldiers with highest predicted risk accounted for 50.5 percent of all major physical violent crimes.

"These numbers are striking," said Ronald Kessler, Ph.D., the McNeil Family Professor of Health Care Policy at Harvard Medical School and principal investigator on the project. "They show us that predictive analytic models can pinpoint the soldiers at highest violence risk for preventive interventions. Targeting such intervention s might be the best way to bring down the violent crime rate in the Army.

"The fact that the model identifies such a high proportion of violent crimes is especially exciting because the variables used in the model are routinely-collected administrative data the Army can use to identify high-risk soldiers without carrying out expensive one-on-one clinical assessments," said Anthony Rosellini, Ph.D., the lead author of the paper and a postdoctoral fellow at Harvard Medical School.

John Monahan, Ph.D., the John S. Shannon Distinguished Professor of Law at the University of Virginia, another study author, cautioned that "it is important to recognize that severe violent crimes are uncommon even in this high-risk group. This means implementing intensive high-risk preventive interventions would make sense only if the interventions are shown to be highly efficient– something that has not yet been demonstrated."

The study was carried out by researchers at Harvard Medical School as part of the research project *Behavioral-Based Predictors of Workplace Violence in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)*. The project was funded by the Department of Defense, Office of the Assistant Secretary for Defense for Health Affairs, Defense Health Program (OASD/HA).

Behavioral-Based Predictors of Workplace Violence in the Army STARRS is led by principal investigator Ronald C. Kessler, Ph.D. (Harvard Medical School) and funded by the Department of Defense, Office of the Assistant Secretary for Defense for Health Affairs, Defense Health Program (OASD/HA), awarded and administered by the U.S. Army Medical Research & Materiel Command (USAMRMC), at Fort Detrick, MD. Army STARRS is funded by the U.S. Army and the National Institute of Mental Health. The Army STARRS 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).

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

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