

EPISODE FORTY-FOUR OF "ARMED WITH SCIENCE: RESEARCH APPLICATIONS FOR THE MODERN MILITARY," A DEPARTMENT OF DEFENSE WEBCAST HOST: DR. JOHN OHAB GUEST: DR. ROBERT HEINSSSEN, DIVISION OF SERVICES AND INTERVENTION RESEARCH, NATIONAL INSTITUTE OF MENTAL HEALTH SUBJECT: STUDY OF SUICIDE AMONG ACTIVE DUTY SERVICEMEMBERS TIME: 2:00 P.M. EST DATE: WEDNESDAY, NOVEMBER 18, 2009

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(Intro music begins.)

ANNOUNCER: "Armed with Science: Research and Applications for the Modern Military" is a weekly Webcast that discusses cutting-edge science and technology and how they apply to military operations.

Each week we will interview scientists, administrators, and operators to educate and inform our listeners about the importance of science and technology to the modern military.

(Intro music ends.) DR. OHAB: Good afternoon and welcome to episode number 44 of "Armed with Science: Research and Applications for the Modern Military." Today is Wednesday, November 18th, 2009.

I am Dr. John Ohab at the Office of the Assistant Secretary of Defense for Public Affairs.

Today we'll be exploring both an important topic and also one that is extremely timely. Last week, the U.S. Army announced that the number of reported active duty suicides among Army personnel has increased since this time last year and, indeed, suicide rates have risen substantially since the beginning of the conflicts in Iraq and Afghanistan.

The Army has responded with major surveillance and intervention efforts, including \$50 million in funding to support a collaborative study with the National Institute of Mental Health.

The study, known as the Army Study to Assess Risk and Resilience in Servicemembers, is the largest study of suicide and mental health among military personnel ever undertaken.

We're joined today by Dr. Robert Heinssen. He's the acting director of the Division of Services and Intervention Research at the National Institute of Mental Health, or NIMH.

He's going to explain more about how NIMH investigators aim to identify risk and protective factors for suicide among soldiers and provide a science base for more effective and practical interventions.

Dr. Heinssen, it's a real pleasure to have you here today. Thank you for joining us.

DR. HEINSSSEN: Thank you very much. I really appreciate your making your time available to me.

DR. OHAB: Quick note to listeners. If you have any questions for Dr. Heinssen, you can tweet them to @armedwscience. I'll be watching the Twitter feed throughout the show, so send those in and we'll try to get those answered for you.

Dr. Heinssen, the U.S. Army, as I mentioned, has committed \$50 million in the Army Study to Assess Risk and Resilience in Servicemembers, and it's quite an enormous undertaking.

Can you give us a sense for how common suicide is in the Army and also in the general population?

DR. HEINSSSEN: Sure. Maybe I'll start with the general population. As tragic as suicide is, it's a relatively rare phenomena. In 2006, which is the last year that we have data for the U.S. population as a whole, there were roughly 33,000 suicides that occurred throughout the nation.

That translates into a rate of about 18 per 100,000 persons. So it's a relatively rare phenomena, but clearly it's one where the tragedy lies in that these deaths are, to some extent, preventable.

And it is a national goal to be able to reduce the level of suicide in the civilian population, and now that we are seeing the rate of suicide increasing in the Army over the last several years, it certainly has become a focus of attention to military and civilian leaders within the Army, to see whether we can apply the tools of science to get a better handle on the problem and to be able to intervene more strategically.

In terms of rates in the Army, in 2008 the rate in the Army was roughly 20 individuals per 100,000. There were a total of 140 suicides in 2008, but in terms of the rate within the population, it slightly exceeded the rate in the civilian population for the first time in quite a while.

DR. OHAB: Now, as I mentioned, this is the largest-ever study of suicide in the military. What are the major goals of the study?

DR. HEINSEN: Well, if I could, I think the best way for people to understand this is if I could explain this in terms of another type of research study that was conducted over the last several decades.

And this is -- our listeners may be surprised to hear that several decades ago, it was quite mysterious as to the causes for heart attack and stroke. It was a source of death that really was not well understood. And it appeared that otherwise healthy people were just struck down for reasons that weren't clearly apparent.

A couple of decades ago the forerunner to the National Heart, Lung and Blood Institute launched a study that subsequently was called the Framingham Heart Study where they enrolled the population of Framingham, Massachusetts, in a study where individuals agreed to have various aspects of their lifestyle, various aspects of their medical condition, followed over time to try to -- with the goal being to try to understand the pathways that led to cardiovascular disease and then to heart attack and stroke.

And over that time, we've learned an incredible amount of information about the mix of biological factors, behavioral health choices, lifestyle factors that interact to create varying levels of risk for heart attack and stroke and to see that these levels of risk can change, and change over time in relation to biological factors, lifestyle choices, and so forth. Well, that -- the results of that study have given us a way of identifying risk factors and protective factors that can be applied in a way that we've developed a whole host of interventions that are delivered far in advance of acute coronary distress.

So we now have treatments for things like high blood pressure, high cholesterol levels. We regularly advise people about maintaining a healthy weight and an exercise level. We counsel people about quitting cigarette smoking.

The reason we do all of those things is because the research program that developed out of Framingham identified all of those things as risk factors or protective factors for myocardial infarction.

So that -- how does that relate to the problem of suicide? Well, we think that there are some similarities in that there are risk factors and protective factors for suicide that we don't know enough about today to be able to develop targeted interventions, but if we --

Our belief is that if we roll out a research program similar in its characteristics to what was done in heart disease, that in fact we will identify risk and protective factors. We'll understand how they evolve over time to create increasing levels of risk and, most importantly, will identify targets for intervention far upstream of the acute distress that people experience when they're entering into a place where suicidal activity becomes more likely.

So the end game here is to be able to intervene with preventive strategies early in the process so that we keep soldiers

healthy and robust, and that we interrupt the kind of process that would lead to acute distress and the tragic choices to take one's life.

DR. OHAB: Now, endeavors of this magnitude, there are always various organizations that make different important contributions.

Can you tell us what the National Institute of Mental Health does, and the specific role that the Institute will play in this study?

DR. HEINSSSEN: Well, we're a research organization. And we are organized to promote research that is directed at understanding the causes of mental disorders and developing cures.

What we do is we partner with the finest academic institutions in the United States and abroad to develop a research agenda and research projects that look at the causes, as well as areas for intervention for a variety of mental disorders.

In this particular instance, the Army contacted us to ask that if we would apply the strategies that we have for engaging the best scientists in -- to address specific problems, if we would do that for the problem of suicide.

And we did just that. We challenged the field to come up with proposals that would help us to understand these kind of aggregate risk and protective factors that are related not just to suicide, but actually to mental and behavioral health problems more generally and give us a way of studying them so that we get actionable information in a timely manner that's rigorous in its -- rigorous in terms of scientific standards and informative in terms of strategies that we can take for innovative intervention possibilities.

So we have, in addition to Army scientists and NIMH scientists, we have a stellar academic team that's led by Dr. Robert Ursano from the Uniformed Services University of the Health Sciences, in collaboration with Dr. Ronald Kessler from Harvard University, Dr. John Mann, from Columbia University, and Dr. Steve Heeringa, from the University of Michigan. These individuals bring together a unique skill -- set of skills that are related to risk and protective factor research in military populations, factors related to mental disorder and suicide, population epidemiology, and survey research.

It's a unique combination of skills that are really going to make the study that we envision a reality.

DR. OHAB: Can you talk a little bit about the experimental design? How are these investigators actually going to conduct their research?

DR. HEINSSSEN: It's a combination of approaches. We're going to capitalize on very, very rich data that the Army already collects on individuals in the service.

The Army has been fantastic about finding ways of integrating various databases that capture information about the soldiers' training experiences, their deployments, the exposures that they have during those deployments, as well as information about health problems, health utilization, and so forth.

Those data are being pulled together, and the first part of the study is actually looking at archival records of soldiers who committed suicide between 2000 and 2009, compared to control soldiers from that -- drawn from that same period who did not commit suicide, but have other characteristics that would be important for purposes of comparison.

By doing this kind of case-controlled study where the suicide individuals are the cases and the controls are drawn from the rest of the Army, we think that we'll get some early leads on signals that may tell us something about potential risk and protective factors that will help us target the second part of the study, which will be a survey of soldiers who are currently serving in the active duty component.

That will be both active duty soldiers plus mobilized Research and National Guard soldiers. So that prospective survey part will get at some of the attitudes, the beliefs, the experiences that soldiers are currently having.

And those two sets of data -- the administrative data that the Army routinely collects will be yoked to the data that we get through our surveys -- to give a very powerful means of then tracking the kinds of characteristics and experiences that soldiers have and how that may play out in terms of a variety of behavioral and mental health outcomes.

I'll mention that in addition to that, we're going to be collecting some biological material from certain subsets of soldiers -- saliva and, in some cases, blood -- to allow us to do some tests of neurobiological factors that may be related to risk. So again, going back to that analogy that I used with the heart studies, the most powerful risk prediction tools that we have in heart disease are combination of biological factors like blood pressure and cholesterol levels, combined with behavioral characteristics, health behaviors, lifestyle choices, and so forth.

We're imagining that there's going to be a similar combination of biological, behavioral, and experiential variables that will give us a better ability to predict and intervene.

DR. OHAB: Now, what are some of the challenges of conducting a study like this in a military setting, versus maybe in the general public?

DR. HEINSEN: Well, one of the challenges is just the nature of the problem.

So we were asked to design a study that will give us more information about suicide. And because suicide is a relatively rare phenomena, you need to study many, many thousands of individuals to be

able to do this kind of risk-and-protective-factor analysis that we propose.

So one of the challenges is to be able to survey not only thousands, but hundreds of thousands of soldiers.

So the plan is actually to conduct what's called an all-Army survey, which will be a survey that, once it starts, it'll survey several thousand soldiers every month over a period of three consecutive years. This'll give us an idea about what's going on among people who are already in their military career.

In addition to that, we'll be surveying new recruits over a three-year period, approximately 100,000 a year as they move into their initial training, and then we'll be following them over time.

So you can imagine there's a lot of logistics to work out with that kind of design, identifying -- in the case of the all-Army survey, identifying a random selection of soldiers that are representative of the Army, identifying where they are, collecting data from them, storing it in a way that's confidential and secure, and doing similar procedures with the new recruits.

All of these represent some solvable but daunting logistical challenges. And we're in the process now of working all of those details out with our Army collaborators.

DR. OHAB: Now, you mentioned that there would be some neurobiological studies. Can you explain the details of those a little more? DR. HEINSSEN: Well, we know enough about the genetics of mental disorders to know that it is not the case that there are genes that tell you that somebody's at risk for suicide or at risk for a particular mental disorder.

But some of the latest findings are showing that certain genes are related to certain neurobiological operations, like, for example, stress responding.

Everybody's stress response system is a little bit different. So there's a range of activity that's associated with stress response and how that stress response interacts with different environmental inputs, different training experiences, different deployment experiences, different exposures to operational and combat stressors.

The combination of those environmental inputs and certain genetic characteristics may prove to be very informative about who is at risk for, in this case, maybe very dramatic stress responses in different types of situations. It may also identify people who are uniquely robust to stress responses.

This is an emerging area of science. And being able to characterize individuals in terms of some of their behavioral characteristics, their experiences, and then having the biological material to add to that mix gives us really a unique opportunity to

understand a variety of biological functions that are related to normal, human mental activity -- how they interact with training, with exposure, with combat, to create different kinds of outcomes.

DR. OHAB: And the study, of course, is going to take place over a course of years. But suicide is impacting people in the present.

How will the study balance the current need with the length of the study?

DR. HEINSSSEN: That's an excellent question, and I think soldiers should be aware that the Army leadership was very clear to us that they were not interested in science just for science' sake.

They told us if excellent research papers come out of this, that's great. But the bottom line is we want to apply science in a way that it's going to solve this problem to the benefit of soldiers.

And the way that that impacted our design was we couldn't take the traditional route where we allow a grant to start -- we give the researchers tremendous latitude in the way that they go about designing and conducting a study. And at the end of a period of time, typically five years, they report back to us on the results in the form of a peer-reviewed scientific paper.

That framework, that type of business-as-usual clearly was not acceptable to the Army leadership.

And so what we did at NIMH is we challenged the field to say we need a strategy that allows us to analyze data as soon as it's collected. We need a process for interpreting that data. We need a process where experts would pore over that data and make sense of it in a very -- in a just-in-time manner.

And then, together, would decide on the direction that the next phase of research should take in relation to the information that was just acquired.

This is called an adaptive research design, where you build in the capacity to be flexible, creative, and to re-target the research enterprise to capitalize on findings that are happening during the project period.

We think that this kind of approach is going to maximize the chance that we're able to deliver actionable information to the Army at least twice a year, and sooner if we identify anything that seems particularly dramatic and relevant to either treatment or intervention.
DR. OHAB: So at some point you'll have a large body of data. What is the next step after that? How do you actually turn all of this information into interventions?

DR. HEINSSSEN: So the -- as I said, we'll be collecting data in waves. As each wave of data is collected, it will be analyzed. We'll have this process of interrogating the data for a signal -- a signal

meaning that there's some indication there that we've identified either a factor that either confers risk or confers protection.

And then we've established relationships with different entities within the Army where we can turn that information over to people who then will develop interventions, based on this new information, to target these new -- this new idea about what confers risk and what may confer resilience --

And have that delivered in terms of randomized, clinical trials so that we have an idea about whether intervening on those variables actually has an impact on the outcomes of interest -- meaning, a variety of mental and behavioral health problems and then, downstream from that, suicide.

So we have -- in particular, the Medical Research and Materiel Command up at Fort Detrick, headed by Dr. Carl Castro, is one entity that we have this kind of bidirectional sharing of findings.

We have a relationship with him to do that, so that we produce information about risk and resilience factors. It goes to his shop; it gets turned into initiatives to develop and test interventions.

And then information from those trials gets fed back to our study so that we can test the degree to which results from those interventions permeate into the population at large.

DR. OHAB: (Inaudible.)

DR. HEINSSEN: I should also mention that we also have a relationship with the Center for Health Promotion and Preventive Medicine, CHPPM (pronounces "Chip-em"), which provides a behavioral health surveillance capacity that will allow us to track how our risk factors relate to a variety of behavioral health outcomes that are experienced in the Army population as a whole.

DR. OHAB: So will the results extend from the Army eventually to the general population?

DR. HEINSSEN: You know, this is really an incredible opportunity, a unique opportunity that the Army is providing us. We're aware that they've made their population and their -- available to us to study a problem that's of tremendous interest to the Army. But even though the Army has that interest at heart, they really are providing a tremendous opportunity for the nation to do science that's going to illuminate a problem that is a considerable problem in the civilian sector.

We would never be able to launch a study as comprehensive and as rigorous as this study on the civilian side. To be able to pull together different types of data that will give us assessments of functioning on multiple domains, being able to follow individuals over time so we can tie those data together to see how risk and protective factors evolve

over time -- this can't be done under any kind of existing infrastructure in the civilian sector.

So what the Army is doing is really making their platform available for us to learn about things that are going to benefit the nation as a whole. And in that sense, yet again, the Army is leading the way.

DR. OHAB: Now, Dr. Heinssen, you are the acting director of the Division of Services and Intervention Research at the National Institute of Mental Health. Can you tell our listeners how you're going to play a role in this project, and some of your academic and professional background?

DR. HEINSSSEN: Well, I'm -- on the NIMH side I'm the overall study director for this project. So I'm monitoring the scientific activity, the productivity, the direction of the project.

I've been involved with it since the earliest conversations between the Army leadership and the NIMH leadership. And hopefully, I'll be able to follow this study to its conclusion.

We do have a number of project scientists who are contributing scientists on the NIMH side who are joining with the academic partners. Their job is to be scientists. My job is to be a study director and make sure that everything keeps moving in an expeditious manner.

I'll also say that I will be a recipient of the information that is produced -- or, I should say, a beneficiary of the information that's produced by this study.

In my other life, I'm a member of the Reserve component of the Army. I'm a -- in the Army National Guard. I'm an AMEDD officer, behavioral science officer. So I have a tremendous interest in this, not only from the perspective of being a scientist who studies the determinants of mental health, but also as a provider who works with soldiers.

And I am eagerly looking for the results of this study to be able to improve the way that I offer care and assistance.

DR. OHAB: About to wrap up today's program, is there anything else that you'd like to add or any final thoughts? DR. HEINSSSEN: Well, I just want to say, from my perspective of being a public servant in NIMH, I have been extraordinarily impressed at the way the Army has approached this entire endeavor.

It could not have been easy to look outside your own organization to ask somebody whether they had tools and perspectives that might be helpful. But the Army showed tremendous courage and leadership in doing that.

They've made it possible for us to join with them in a collaborative endeavor that I think is going to benefit not just the

Army, but the nation as a whole. So I feel very grateful to the Army that they're making this research possible.

And to all of your listeners, they should know that NIMH is joining with the Army with all of the energy, creativity, and scientific knowledge that we possess, to really try to get ahead -- to get a better understanding of this problem so that we can get to the left of the problem and deliver information that's going to benefit the lives of soldiers.

DR. OHAB: Our guest today is Dr. Robert Heinssen, acting director of the Division of Services and Intervention Research at the National Institute of Mental Health.

Thank you again for joining us today, and best of luck.

DR. HEINSSSEN: Thank you very much.

DR. OHAB: Please join us next week on Monday, November 23rd, at 2:00 p.m. Eastern. We've pushed our show, once again, up a couple of days, due to the Thanksgiving holiday. But we're going to try to keep things relatively timely, as we gear up for the inordinate amounts of sweets that we will be consuming during the holidays with a discussion of military nutrition.

We'll be joined by Dr. Andy Young, chief of the Military Nutrition Division at the U.S. Army Institute of Environmental Medicine, and Mr. Gerry Darsch, director of the Combat Feeding Program at the Natick Soldier Systems Center.

They'll discuss how the two organizations work together to provide soldiers healthy, good-tasting, sustainable, and nutritionally sound combat rations.

Have a wonderful week, and thank you again for listening. I'm Dr. John Ohab, and you've been scienced.

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