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DEFENSE HEALTH BOARD

TASK FORCE ON MENTAL HEALTH DAY

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1 PROCEEDINGS

2 LTG KILEY: Welcome all to this open
3 meeting session of the Department of Defense Task
4 Force on Mental Health. This congressional
5 mandated Task Force was asked to look into the
6 current military healthcare system. The overall
7 intent of our visit here today is to gain insight
8 into that system and ultimately provide Congress
9 with recommendations for areas of improvement, but
10 also to acknowledge areas that are flourishing.

11 We have several important topics on our
12 agenda for today, so I'd like to get started.

13 Ms. Ellen Embrey, the designated federal
14 official for the task force's current federal
15 advisory committee, the Defense Health Board, has
16 an unavoidable conflict and will not be able to
17 attend the meeting. In her absence, she has
18 appointed Colonel Jeffrey Davies, the Army Surgeon
19 General's Executive Officer, as the alternate
20 designated federal official.

21 Colonel Davies, would you please call
22 the meeting to order?

1 COL DAVIES: Thank you, General Kiley.
2 As the acting designated federal official for the
3 Armed Forces Epidemiological Board, a federal
4 advisory committee to the Secretary of Defense,
5 which serves as a continuing scientific advisory
6 body to the Assistant Secretary of Defense for
7 Health Affairs and the Surgeon Generals of the
8 military departments, I hereby call this meeting
9 to order.

10 LTG KILEY: Thank you, Colonel Davies.
11 I'd like now to go around the table and have all
12 of us introduce ourselves before we go on.

13 (Introductions)

14 LTG KILEY: Thank you all very much. At
15 this time I think Dr. Burke has some
16 administrative announcements.

17 DR. BURKE: Thank you, General Kiley.
18 Good morning and welcome to all of our speakers
19 and attendees. Please sign the attendance roster
20 on that table outside the front door, if you have
21 not done so already.

22 Today we will be transcribing this open

1 session, so please use the microphones when
2 speaking and clearly state your name. The
3 transcripts will be published on the task force's
4 website within 90 days of this meeting.

5 Also, there is press in attendance and
6 an independent film crew here today who will be
7 documenting this morning's proceedings. This has
8 been cleared through the Department of Defense,
9 and we would like for all speakers and attendees
10 to be aware of that. We would also request that
11 you be mindful of your fellow speakers and
12 attendees and allow those speaking courtesy and
13 respect. Restrooms are located outside and to the
14 left. If there are any administrative or
15 telephone or messages that need to be sent, please
16 see Ms. Bennett. And if there are any
17 audio/visual issues, please see Ms. Farrell.
18 Thank you, General Kiley.

19 DR. MacDERMID: Thank you and welcome to
20 everyone who is here. We appreciate your time and
21 efforts very much. We'd like to extend a special
22 welcome to our speakers this morning who are going

1 to teach us about things that some of you probably
2 don't know very much about yet, so thank you. I'd
3 like to turn it over at this point to Colonel Greg
4 Gahm of Madigan Army Medical Center, who is going
5 to introduce the speakers for us.

6 COL GAHM: Good morning and thank you
7 all for coming. We're just working on the
8 microphone for the speakers. What we've done this
9 morning is attempt to put together an interesting
10 and informative set of presentations on topics
11 related to behavioral health and technology.

12 The first presentation we're going to
13 have this morning is led by Dr. Mil Brown from
14 Tripler Army Medical Center, along with Dr.
15 Etherage and Mr. Rein from Madigan Army Medical
16 Center, talking about an application that was
17 developed to assist with the improvement of the
18 efficiency and outcomes processing for behavioral
19 health technology.

20 We'll then transition to the Army's
21 suicide event report, which is an attempt to
22 introduce technology to assist with this very

1 sensitive and important topic.

2 Dr. Schlegel is here from Oklahoma to
3 speak to the automated neuropsychological
4 assessment metrics and the ability to use those
5 tools to help with diagnosis and treatment.

6 We'll then transition to a new
7 application in development. Dr. Ciulla from
8 Madigan and Dr. Ruzek from the National Center for
9 PTSD in Palo Alto will be presenting on the
10 development of this online treatment tool to
11 assist with self-help care for soldiers and family
12 members.

13 We have the privilege of Dr. Rizzo
14 coming up from California to speak on virtual
15 reality, along with Captain Reger who has an Army
16 project extending this to the treatment of
17 soldiers.

18 Finally, Dr. Marmar will be presenting
19 on the ability to predict PTSD looking at
20 prospective studies in risk and resilience. With
21 that we'll attempt to stay on time to the greatest
22 extent possible and I will hopefully help

1 facilitate that. Dr. Brown.

2 MAJ BROWN: Good morning. General

3 Kiley, Dr. MacDermid, task force, thank you for

4 having me here. My name is Mil Brown, and I am

5 the program director of the psychiatry residency

6 training program at Tripler Army Medical Center

7 where we have about 25 to 30 residents at any one

8 time and train about 40 percent of the active-duty

9 psychiatrists for the Army in one of only two

10 training programs. Today I'm going to be talking

11 to you about the ABHC as we call it, the Automated

12 Behavioral Health Clinic. You might be asking:

13 Why is a person from Tripler talking about a

14 Madigan initiative? I met Colonel Gahm back in

15 the summer of 2005 at the Behavioral Health

16 Science Short Course as he talked about the ABHC

17 initially, and at that time was convinced that

18 this is a crucial technology solution to really

19 developing a quality mental healthcare system and

20 I wanted to bring it out to Tripler Medical

21 Center. It took me about a year and several tries

22 of trying to find funding sources to bring it out

1 there, and in August of 2006 I was able to
2 identify enough funds, and we're in the middle of
3 deploying the ABHC to four different clinics at
4 Scofield Barracks and at Tripler Medical Center.
5 Next slide, please.

6 My goal is to convince you that the ABHC
7 is a crucial technology solution in bringing the
8 military healthcare system, especially in mental
9 healthcare, to the next quality level. Today
10 we'll be talking about outcomes tracking, how the
11 ABHC connects the (off mike) to the military
12 mental healthcare system and also how it can
13 improve clinical efficiency and actually improve
14 patient care. Next slide, please.

15 As I talk about the ABHC, I just want to
16 give you just a very brief outline of what the
17 ABHC is. Basically it's a computerized
18 self-report web application pushed out via the web
19 to different clinics where patients can sit down
20 before they actually see a mental healthcare
21 provider and report on basic demographic
22 background information and also fill our

1 standardized clinic measures in various mental
2 healthcare domains. And you see some of these
3 domains there that we actually screen for. So
4 you're seeing typical major domains of mental
5 healthcare, but also military-specific items such
6 as combat exposure, unit cohesion and then other
7 really interesting issues that are always of
8 concern with mental healthcare; anger, hostility
9 issues, dangerousness, suicidality, those type of
10 things. When a mental health referral comes into
11 a mental health clinic, before they have their
12 first visit, it takes about 30 to 45 minutes for a
13 person to sit at this kiosk to fill out about
14 several hundred questions. On each subsequent
15 visit, they sit down and they have about five or
16 ten minutes of questions that they have to fill
17 out on each follow-up visit where we are actually
18 doing outcome tracking. This data is then
19 synthesized and put in a one-page report-type PDF
20 and is pushed out to the providers so they can
21 access it in realtime as they're about to see the
22 patient, look at the information, do better, more

1 efficient assessments, and also as they're doing
2 follow-ups, get realtime information as to how the
3 patient is actually doing so they can make
4 well-reasoned treatment decisions and whether they
5 need to alter their treatment plan or not based on
6 how the patient is doing. Next slide.

7 I'm going back up for a second and look
8 at if we're building a quality mental healthcare
9 system, what do we need to be thinking about?
10 Next, please.

11 First we need to know, are any of our
12 efforts doing any good? Are we actually helping
13 the patient? Are we relieving suffering? Next.

14 And really are we achieving any benefit?
15 We're expending a lot of resources; a lot of
16 energy and effort is going in to try and help our
17 soldiers and service members deal with a lot of
18 stressors currently. Are we doing any good? Next
19 slide.

20 What is that benefit? And the benefit
21 can be looked at in several different ways. One
22 is the benefit, what line commanders care about in

1 real-world functionality benefits, can my
2 soldiers/service members function in their actual
3 mission, in this moment today, or are there other
4 things that are distracting them or stressors that
5 they're paying attention to that are distracting
6 them from their actual mission? There's also
7 potential institutional benefits for the whole
8 system overall if we're treating mental healthcare
9 better, potential cost savings for the whole
10 medical care system. And also on the individual
11 level there's really -- we need to be looking at:
12 Are patients actually getting better? If they're
13 diagnosed with something, do we have that
14 diagnosis and when do we know they're actually
15 getting better and back to their functional
16 baseline? Next, please.

17 Functional military outcomes. When I
18 talk to commanders and work with line soldiers in
19 the Army, what the commanders often are really
20 saying to me; what I hear is: Is this guy going
21 to come back and function well for me, or is he
22 going to have lost work days, he's going to have

1 to go back to sick call a lot? Is he going to be
2 facing other stressors? Is he going to have other
3 problems that manifest themselves by family
4 advocacy referrals because of family problems,
5 substance abuse problems, so he has ASAP
6 referrals? Are they going to get lost to the
7 system? Are they going to have divorces that
8 impact their ability to function? These are
9 things I think commanders see. They don't really
10 see depression or PTSD or panic disorder; they see
11 this stuff. I think if we're trying to interface
12 with line commanders and nonmental health folks,
13 this is how we get them on board by these kind of
14 rates, and maybe these are some of the outcomes
15 that we need to be looking at. Next slide,
16 please.

17 For the system overall there are plenty
18 of settings on the civilian side that show those
19 with chronically mentally ill problems, if you get
20 them better access to mental healthcare and you
21 help them utilize mental healthcare better,
22 there's actually a decrease in overall healthcare

1 utilization. If someone has untreated panic
2 disorder, they potentially can be coming into your
3 ER and saying, I have chest pain. And they get
4 this whole cardiac workup that's very expensive,
5 when all they really have is a panic attack, as
6 one example. Next, please.

7 Then on the individual level we only
8 need to be tracking clinical outcomes on an
9 individual patient. So they come in, they're
10 suffering. Are we relieving that suffering? Are
11 we doing any good? Next, please.

12 I'm going to take one step back and show
13 you a little of how I think of the overall mental
14 healthcare system, at least on the Army side, and
15 why I was really interested in the ABHC. Next,
16 please.

17 I tried to look at it in several
18 different layers, the first one being primary
19 prevention. So you see we have the healthy
20 soldiers. Being an Army guy, I'm going to use the
21 word soldier. They're in the green. They're good
22 to go; they're functioning; they can do their

1 mission. There's a lot of things that we're doing
2 in the Army to support the soldiers staying at
3 that level. We're doing great things in family
4 support through Army community service, family
5 readiness groups. Like in Hawaii we brought
6 mental healthcare with our SAFAC model right onto
7 Scofield Barracks so dependents can access mental
8 healthcare when the soldiers were deployed. The
9 Army does a great job, and the military in
10 general, in helping soldiers build skills and
11 progress along in schooling and in the career.
12 When soldiers have a direction where they're
13 going, they're doing well, they're not mentally
14 ill. We're doing a lot of initiatives Army- wide
15 with Battlemind training. You'll see later on
16 today another presentation on the online PTSD
17 program, trying to build web-based services that
18 can be pushed out across the world and be accessed
19 by any National Guard member, any reservists, any
20 active duty member, trying to help them build
21 resiliency; building coping skills to deal with
22 stressors that prevent them from getting mentally

1 ill. Next slide.

2 But we know soldiers -- we know life has
3 its ups and downs. We know people sometimes have
4 stressors in their life, and it's important for us
5 on a secondary level to figure out where those
6 people are and to identify them early. The
7 earlier we identify those who might be at risk,
8 the faster we can actually help them, the better
9 we can help them, the more successful we're
10 actually going to be. So in my mind we have two
11 different ways of doing that. One is to let a
12 service member go figure out for themselves
13 whether they're at risk or not. Where can they go
14 to go look at, gosh, I'm having problems, maybe I
15 need to get help. And you can see later today
16 with the online PTSD portal that might be a
17 mechanism to solve that problem and the ABHC can
18 be used within that program potentially. And
19 there's scheduled screenings which we already do
20 in a lot of ways. We have 2795, 96-type programs
21 in pre- and post-deployment screenings that we do.
22 I know every year I've got to get my vision

1 checked; I've got to get my dental checked; I've
2 got to get my hearing checked every year to make
3 sure I'm good to go on those. Maybe we should
4 have our mental health checkup every year, and the
5 ABHC might be able to be part of that process,
6 screening people to say, are they maybe at risk?
7 Next, please.

8 We know just because someone's at risk
9 doesn't mean they actually need clinical provider
10 help. Sometimes they can identify their own
11 self-help resources; sometimes they're just false
12 positives in the screening process. We don't want
13 to identify people as ill when they're not ill.
14 In Hawaii, I'm pretty sure the task force is
15 familiar with the SAFAC model where you have a
16 single portal of entry, you do an assessment, you
17 do a complete assessment and then you funnel that
18 person to the right resource at the right time so
19 they can get the right kind of help early on. So
20 if they're having marriage, family problems, they
21 might go to a marriage/family therapy clinic and
22 be getting family therapy, marriage counseling,

1 those types of efforts. If they have substance
2 abuse problems, they're going to ASAP referral.
3 And we're going to utilize other resources like
4 the chaplain, One Source, maybe TRICARE, maybe in
5 joint programs. In Hawaii, we're talking about
6 trying to use their residential PTSD program in
7 the VA and trying to get active duty members
8 access to that residential program. So we're
9 trying these joint- type efforts. Next, please.

10 But the real problem in mental health is
11 we don't know when we're actually helping someone
12 and when they're back to functional baseline.
13 This is not unique to the military. This is the
14 same throughout mental health and military
15 sectors. Because of how we have syndromes and
16 diagnostic entities, it's also hard to figure out
17 when someone actually is getting better. I'll
18 kind of go into that more in a couple slides.
19 There's two ways to look at these kind of
20 outcomes. One is the clinical-wise on the
21 individual level. Are we sending that person to
22 be a healthy soldier or service member, or are

1 they a treatment failure and we need to actually
2 try to do a different type of treatment or do
3 something else for that person? Then, again,
4 looking at these functional military outcomes on a
5 population level that commanders might care more
6 about and looking at attrition, are we affecting
7 attrition rates? Are we affecting legal rates,
8 problems with (off mike) Again, all those
9 functional military outcomes. Then we can
10 actually see if our programs are efficacious and
11 efficient or whether there's an unclear benefit or
12 they're not actually doing what we hope they're
13 doing. That's one way that I look at this whole
14 program overall. Next slide.

15 If we're successful, we bring that
16 soldier back to the green, good-to-go healthy
17 soldier and that's our ultimate goal. Next,
18 please.

19 What are some of the obstacles? The
20 problem in mental healthcare we have no labs; we
21 have no x-rays; we have no vital signs to say,
22 "Gosh, am I doing any good when I'm doing some

1 kind of therapeutic encounter with a patient?" We
2 don't have blood pressure to track if we're trying
3 to help someone with hypertension. We don't have
4 glucose to track if we're trying to help someone
5 with diabetes. There are standardized object
6 mental health outcome measurements that we can
7 use, and the ABHC really tries to do this.
8 There's been a lot of efforts through the VA/DoD
9 practice guidelines and other efforts to say we
10 need to be tracking whether someone gets better,
11 like the Beck depression inventory for depression.
12 But I can tell you, asking clinical providers to
13 do that on every single patient all the time in a
14 routine standardized way just doesn't work. You
15 need to have some part of the clinical business
16 process to actually make it useful. Next, please.
17 In our current system, and I don't think
18 this is unique to the military and also on the
19 civilian side in general, is that a lot of the
20 systems that don't have built-in outcome measures
21 that are, to me, very meaningful. We don't have
22 standardized clinical procedures that we're doing.

1 The current metrics we have are: How many
2 hospital days? How many outpatient visits?
3 Depending on your clinical orientation and
4 depending on types of therapy or medications
5 you're doing, more might be better for certain
6 patients even though it looks more inefficient.
7 So it depends on how you approach the patient as
8 to whether you think you're doing better or worse.
9 It's very hard to measure whether we're doing well
10 or not based on these kind of outcome measures
11 that are currently out there. There's always a
12 question with what is the diagnosis, and we'll
13 kind of get into it with the next slide with the
14 different types of mental healthcare providers.
15 There's always different institutional pressures
16 to either -- maybe on the civilian side they
17 over-report what a diagnosis might be to make sure
18 they actually get paid for a certain diagnostic
19 code. In the military there might be other
20 pressure. We're trying to get around stigma;
21 we're trying to get around other issues. We don't
22 want to force someone into a medical board until

1 we absolutely have to, because we want them to get
2 better. So we might be under-diagnosing things at
3 some times. And there's also different types of
4 providers that are putting different types of
5 diagnosis codes into our medical records system.
6 So primary care providers, who might get to see
7 them for five minutes, might be putting a
8 diagnosis code in there that may or may not be
9 true. So it's hard to use that as an outcome
10 measurement is my final point on that. Next
11 slide, please.

12 In mental health we have a lot of
13 different providers. We have 68x's, who are
14 mental health techs; we have social workers, who
15 are usually Master's-level trained; psychologists,
16 who are Master's or Ph.D. trained; psychiatrists,
17 who are doctors with specialized training in
18 mental health and they all have different levels
19 of training. They are all trained in different
20 theories of what psychopathology is and are taught
21 different methods of intervening with people to
22 try to make them better. Next, please.

1 The problem is that it leads to a lot of
2 variability in case of implication, and it leads
3 to potentially missing certain diagnoses that
4 might be there. If I'm treating someone with
5 post-traumatic stress disorder, but they also have
6 been self-medicating and using alcohol a lot, they
7 might be hesitant to report all their alcohol use.
8 So I'm trying to treat them for the PTSD; I'm not
9 getting very far because they're drinking every
10 single night and I don't know about it. It also
11 leads -- if we don't know about dangerousness in
12 the complete sense, patients usually, oftentimes
13 are very hesitant to tell us what's going on
14 inside of them. Again, we have no magic way to
15 scan that. It's all based on the clinical
16 encounter and can a provider get that information
17 from a patient. We might be missing certain very
18 significant issues that affect our treatment
19 planning. So we don't -- we might be decreasing
20 patient and family safety because we might be
21 missing abuse issues, domestic violence issues,
22 dangerousness issues. Then, again, obviously it

1 delays accurate treatment. If we don't know the
2 whole context of what's going on, we're not going
3 to be using the right treatment modality. Next,
4 please.

5 Right now as it stands, we have no real
6 reliable way to measure a baseline status, which
7 leads to problems then trying to figure out which
8 treatment modalities might actually be working in
9 certain clinical situations. If we don't have a
10 consistent way of looking at the treatment base,
11 what that baseline is, we can't study it; we can't
12 look at it and can't figure out which treatment
13 modes might actually be better for certain
14 situations. Again, it's hard to really know when
15 someone's truly better without some standardized
16 way of looking at functional outcomes. Next,
17 please.

18 What do we need to do? What I'm trying
19 to convince you is we need to have standardized,
20 objective ways that we measure someone's baseline
21 as they come into the mental healthcare system and
22 also have a standardized way of how we look at the

1 tail end, the outcome. What we're all trying to
2 get is relieving of suffering, and we need a way
3 to figure out when are we actually there. It is
4 the objective in standardizing all mental health
5 venues that we treat, and consequently this will
6 also allow all our training programs whether
7 social work, psychology, psychiatry, 68x training
8 and AIT all training to the same end point, the
9 same end-point standard of relieving suffering as
10 measured by these clinical outcomes. If we're
11 able to do that, it doesn't necessarily matter
12 what methods we employ to get to that point, but
13 at least we're all training to the same end point.
14 Of course we want our standards, whatever we do,
15 to be research supported and validated. We want
16 it to be computerized so that we can actually
17 analyze the data, synthesize the data and actually
18 push that out to providers in realtime so they can
19 actually use it in the clinical decision making.
20 It also has to be military specific. We have very
21 specific needs in the military. Hopefully that
22 system, whatever we can find, is proven to work in

1 the real clinical setting, that it's already been
2 field tested, service members already tried it and
3 actually accept it as a part of mental health
4 treatment. Important to me, I think, really what
5 I believe in the system is it doesn't depend on
6 the provider to actually make it work. It's done
7 before seeing the provider. It's done
8 pre-clinically. So patients come in and
9 self-report on a computer kiosk before they see
10 their provider. Providers are very protective of
11 their clinical time. They don't want other
12 outside forces telling them how to do their
13 clinical encounter. This system allows for meted
14 outcomes tracking without affecting the provider.
15 Again, really about training and also about other
16 types of intervention measures, whether it's some
17 kind of therapy, whether it's some kind of
18 medication, some kind of family involvement, case
19 manager work with primary care, whatever it is,
20 we're still going towards the same functional
21 patient-centered outcome. Fortunate for us we
22 already have a system that's already there; it's

1 the ABHC. It actually does that; it does all of
2 these things. I think I'm going to turn it over
3 to Matt Rein now to talk about how the ABHC was
4 actually developed.

5 MR. REIN: Good morning. My name is
6 Matt Rein. I'm a software developer and a project
7 manager with the Army Behavioral Health Technology
8 Office. I've overseen the delivery of two
9 software applications; the ABHC and the ASER, the
10 Army suicide event report, which Dr. Reger will
11 speak to in a few minutes. Next slide, please.

12 For us, to really try and get at the
13 obstacles of optimal mental health that Dr. Brown
14 has just outlined, the invention that we came up
15 with was a sophisticated questionnaire tool, a
16 dynamic questionnaire tool that you could capture
17 data from patients between the time they check in
18 and they are seen by a provider, and then we could
19 report on that data in a meaningful way to
20 providers in time for them to make sense of that
21 data and improve patient care. Next slide.

22 So to do this we thought we'd start out

1 with a prototype, which we ended up building a
2 paper scanning software solution. This is great
3 and it gave us an opportunity to get clear about
4 what sort of measures we wanted to include in the
5 content of the questionnaire. Ultimately it was
6 awkward in practice, the business process, a bit
7 too clumsy, so we needed something better. Next
8 slide.

9 So, Colonel Gahm through his connections
10 in the military went through AHLTA channels to try
11 and see if we can get these requirements
12 implemented in the AHLTA system and that's a work
13 in progress. Other software applications were
14 evaluated within the AMED infrastructure, the
15 mental health world, but ultimately we decided
16 that we needed to go ahead and build it here at
17 Madigan. Next slide.

18 What did we build? We built an intranet
19 application that runs at Madigan and is accessible
20 from provider workstations through Internet
21 Explorer, just a web browser, and it's also
22 available through touch-screen kiosks for patients

1 to use, again, using Microsoft Internet Explorer
2 browser. Custom software development; that was an
3 ambitious undertaking for us to go ahead and try
4 and do, and in order to do it we needed to hire
5 software developers; we needed funding to get
6 those developers on board. So we received funding
7 from TATRC to hire those developers, worked the
8 security logistics, basically standing up the
9 system on the network, went through the discount
10 process. And then to get software right we've
11 really listened carefully to subject matter
12 experts and implemented their feedback in the
13 software and tried to drive the functional
14 requirements through what was validated as a
15 necessary thing to build in the software. Next
16 slide.

17 What I'll do now is demonstrate a bit of
18 the application. This is the home page for the
19 clerk portal and the provider portal. We're using
20 a flash demo. We're not able to access the
21 application from here; it's only available inside
22 the Madigan network. So the business process that

1 we're automating is the check-in process. Right
2 now we're seeing a view that a clerk sees. And
3 the clerk is accepting an ID card from a patient
4 and scanning the barcode on the back of the ID
5 card. The system is decoding the barcode and
6 we're clearing an enterprise system for more
7 demographic information about this patient. This
8 is a test patient. And we're finding a match over
9 an AKO, which is Army knowledge online, and we can
10 query any number of enterprise systems. Next,
11 please.

12 Now the clerk has so far just done two
13 things; scan the barcode and hit save changes. So
14 the new patient is now in our system, it's
15 uniquely identified and now the patient needs to
16 be checked in, and the clerk simply clicks the
17 check-in button and hands the ID card back to the
18 soldier. The soldier then goes to an available
19 kiosk and is greeted by this screen. The kiosk
20 also has barcode standards attached to them, and
21 so the patient has the opportunity to swipe their
22 ID card to begin answering questions or they can

1 also log in using the keyboard. And that's what
2 I'm mimicking here with a test patient on our
3 system. A confirmation page comes up to verify
4 that we've got the right person. Next.

5 A quick welcome message. We can
6 customize the welcome message to say whatever we
7 need to. A quick how-to it is a touch-screen
8 kiosk. Many of our patient computers are touch
9 screen, so we remind the patients that they can
10 quickly answer questions by touching the screen.
11 There's a consistent looking field, we've got a
12 next button here in the lower right-hand corner, a
13 quit button in the upper right, and then a status
14 bar. Dr. Brown mentioned that there are hundreds
15 of questions and we thought it would be nice to
16 radiate back to the user just how far along they
17 are in the process. Next.

18 Now we're just answering questions. So
19 far the system is able to handle check boxes, free
20 text fields, and we'll see on the next screen
21 single select options radio button. Here's an
22 example of radio buttons. It's a dynamic

1 questionnaire. It's divided into segments, what
2 we're calling modules, sets of questions that make
3 sense to stay together. So you would want -- for
4 the PHQ-9, for example, you'd want all nine
5 answers -- it's a nine question (off mike), so
6 you'd want answers to all nine questions to be
7 saved to the database before you allow the patient
8 to move on. Here's another demonstration of
9 another feature. A question was skipped, and so
10 we allow the patient to go ahead and answer the
11 question before we invite them to continue. Here
12 we are demonstrating the take a break function.
13 What we want to do is try to make this as
14 user-friendly as possible. So we're radiating
15 information back to the user to let them know what
16 the ramifications of taking a break are now.
17 We're at the end of that first section of
18 questions, and so if they just continue on for the
19 current page they won't lose any data, so we'll
20 get that full set of the first module. So they
21 decided to continue on and answer that question
22 and continue. Here's an example of just

1 maximizing the screen real estate. The look and
2 feel has been customized for a kiosk, so a touch
3 screen looks a little bit funny on the browser, so
4 the address bar and the navigation items, those
5 don't appear on our patient kiosk screen. Then,
6 too, what we tried to do is to get through as many
7 questions as possible, trying to fit what looks
8 reasonable on a screen, but ideally maximize the
9 number of questions that appear on a single
10 screen. Then, too, the status bar has been
11 incrementing as we've gone through. Then skip
12 ahead to the end, we're back and the patient is
13 having a seat, the provider is looking at the data
14 and able to prepare for that encounter with the
15 patient. I'm going to hand it over to Dr.
16 Etherage at this point.

17 DR. ETHERAGE: Good morning. My name is
18 Joe Etherage. I work as a clinical psychologist
19 at Madigan. I also work as the deputy chief for
20 the department of psychology, and in the past I'm
21 also a former Air Force psychologist. I'll be
22 talking to you about the provider side of the

1 application today.

2 Just very briefly. This system has been
3 going for over a year. We have over 15,000
4 patients who actually use the system. One of the
5 reasons providers like this system is because it's
6 up, it's stable, it's always working, we know we
7 can count on it. We can use the system by itself
8 within a web browser or alternately within AHLTA.
9 So we'll go ahead and log into AHLTA. All of the
10 information that we're going to be viewing is
11 fictitious information, there's no patient
12 information we're going to viewing today. We'll
13 begin by logging into AHLTA, and as you can see
14 we're within AHLTA now in the browser and we can
15 begin by going ahead and looking up a patient.
16 Next.

17 The system will find this patient for us
18 and we can immediately look at this, so they're
19 actually working on the kiosk, we can actually see
20 that information before they're finished at the
21 kiosk, again, being able to efficiently use our
22 time as we prepare to see that individual. This

1 is the patient detail screen and from this we can
2 see some basic but very important information
3 that's very helpful to us. Next.

4 First off, treatment intensity. ABHC
5 assigns every patient a treatment intensity and
6 that's important and we'll see why in just a
7 moment. Next.

8 Also important is that every patient is
9 connected with a care owner. A simple idea, but
10 incredibly powerful and we'll show you why in just
11 a minute here. Next.

12 Also the ABHC will summarize for you how
13 many times the individual has been to different
14 clinics. So you have a quick snapshot as to how
15 much care that individual has received. Next.

16 We'll go ahead and click on a provider
17 report. Next. This will take us to the detailed
18 information that that individual has filled out
19 for us at the kiosks. One of the things, again,
20 that makes this system so powerful is we're not
21 just looking at one questionnaire, but we're
22 looking at all the information this person has

1 ever entered into the system, across sites. When
2 you think about the typical paper chart that we're
3 all used to dealing with, you can see how powerful
4 this becomes as we have all this information at
5 our fingertips. This is the summary page. The
6 provider report, again, as we've mentioned before,
7 is made up of modules. So independent modules can
8 be plugged into the ABHC very readily and we can
9 very easily meet the needs of different types of
10 specialties. So, for example, substance abuse may
11 have specific modules they like to use. The Air
12 Force, in the quirky way that they like to work,
13 and I can say that since I was a former Air Force
14 psychologist, may have specific modules they like
15 to use. But, again, the customizability is also
16 very powerful. So standardization with
17 customizability. Also, as you can see on the
18 right hand side of the screen are critical items
19 that get pulled out of the modules and are shown
20 for you on this provider report. Again, very
21 helpful information to the provider. Next.
22 I've already mentioned the modules.

1 Next. We'll go ahead and scroll down a little
2 bit. All the modules are summarized in this
3 provider report for the individual and are
4 highlighted as blue text and these are all
5 hyperlinks that the person can then click on.

6 Next.

7 ABHC is very thorough and gathers some
8 very important information for us. As you can
9 see, we have a number of modules that provide a
10 thorough assessment of risk. Next.

11 Very important is we're using public
12 domain measures. These are measures that are used
13 very widely, standardized measures, but also
14 measures that are not leading to additional costs
15 for us as well. Next.

16 Scroll down a little bit a farther, you
17 can see the PHQ measures again, public domain
18 measures that many folks use. Let's go ahead and
19 look at a specific module. Next.

20 We'll open up a module. This is a
21 report of an individual module and you can see
22 actual individual items there presented as well as

1 the summary at the top right for the provider.

2 Next.

3 We'll go ahead and scroll down. At the
4 bottom you actually have an interpretation, so
5 interpreted information that's available to the
6 provider as well. This is a part of every module.

7 Next.

8 One of the things that makes ABHC so
9 powerful is we're not just looking at that one
10 visit, but every visit that the person has had.
11 So we're looking at all that information and the
12 ABHC makes it very easy for us to look at this
13 information. Tracking treatment outcomes, so, so
14 important, and ABHC gathers that information for
15 us. We can look at that information graphically.

16 Next.

17 ABHC will go ahead and take a summary of
18 a module and then present that for us in graphical
19 format. So very readily now, we can then track
20 outcome. Next.

21 Those are the individual level, but also
22 at the institutional level. Next.

1 Closing this table will return us to the
2 patient detail screen. By assigning a care owner
3 and treatment intensity, we're then able to do
4 some really powerful things with that information
5 in the system. One of those things is the
6 creation of powerful patient lists. Next.

7 We can customize those patient lists to
8 meet the needs of the provider, to meet the needs
9 of a clinic. This is a sample list showing all of
10 the patients assigned to me, again, all fictitious
11 information. Next.

12 Here we actually have the option of
13 customizing the lists we create, the patient lists
14 we create. So we can look and filter based on
15 different clinics, look at all clinics. We also
16 can change the care owner from this location. So
17 the concept we're working off of is that one
18 individual owns the care that's been provided to
19 this individual, and we can use this simple
20 drop-down box and change the care owner. That
21 simple action that automatically will send an
22 e-mail to both the losing care owner as well as

1 the gaining care owner. So we've then
2 automatically set up a process where we have
3 transferred care, ensured continuity of care, a
4 powerful tool. And that e-mail, by the way,
5 includes a hyperlink that goes right to that
6 patient. Next.

7 We also assign every individual a
8 treatment intensity that's receiving care. And
9 that treatment intensity serves as the signal to
10 the system to remind the provider, to remind the
11 clinic of when that individual needs follow up.
12 We have three different intensity levels. High,
13 moderate and low. None effectively closes the
14 episode of care for that patient. Next.

15 We'll go ahead and close the options
16 screen and return to the patient list. So we can
17 sort the patient list by any column. Here we have
18 sorted by intensity level. So very readily we can
19 see all of those individuals who the provider has
20 deemed need a higher intensity level of care.
21 This is wonderful, by the way, in a training
22 environment where you as a supervisor want to know

1 all the individuals that your trainee is treating
2 and this a wonderful way of tracking those
3 individuals, making sure you're providing close
4 supervision and support. Next.

5 The system, as I mentioned earlier, also
6 assigns everyone a treatment intensity, so that
7 individual does not come back into the clinic.
8 According to their set treatment intensity, the
9 system automatically flags that individual for
10 follow-up, as highlighted in blue. This is a
11 powerful tool, not only for the clinician, but
12 also for the clinic manager, the clinic chief to
13 then be able to ensure that their clinic is
14 following up with patients according to the
15 treatment intensity that the provider had assigned
16 them. Next.

17 We'll go ahead and look at another
18 patient. Because the ABHC doesn't just gather
19 information from the kiosks, I heard somebody the
20 other day mention this is one of the things that
21 makes it a killer ap, but we're also gathering
22 other important as well. One of the things that

1 we utilize ABHC for is our SWAPP program, our
2 PDHRA program. So all the information from the
3 PDHRA is also available in SWAPP. It's not a
4 paper form that disappears. This is information
5 readily available and used by the providers.

6 Next.

7 Dr. Reger will be talking in a minute
8 about the ASER. We also have that ASER
9 information available to us as well through the
10 ABHC. Next.

11 We'll go ahead and close out this
12 screen, return to the patient and exit through the
13 system. That's the end of the demonstration and
14 I'll turn it over to Dr. Brown.

15 MAJ BROWN: Next slide, please. So I
16 want to finish up this part of the presentation
17 with talking about what type of deliverables can
18 you expect from the ABHC. Next, please.

19 What it really can do for you is
20 establish standardized clinical and functional
21 outcome measures that are standardized throughout
22 the entire mental healthcare system that we can

1 also train to, we can actually provide care to.
2 We know where patients start, we know when we come
3 to our functional baseline and either have a good
4 outcome, or we have not gotten to that good
5 outcome and we need to shift and try a different
6 treatment modality. Next.

7 There's a potential for more efficient
8 care. So using the same resources and actually
9 getting better care, getting more people through
10 the system and those people doing well. If we're
11 able to identify all the key issues up front as to
12 what's going on with this person, we can then have
13 better treatment planning, direct them to the
14 right treatment modalities early on, and also have
15 that feedback mechanism ongoing throughout the
16 treatment process to know when we're doing well or
17 when we need to address a fire. Next.

18 There is a potential throughout the
19 entire medical system that we actually can
20 decrease overall healthcare utilization as we have
21 better access, better utilization of mental
22 healthcare. We're hopefully reducing somatisizing

1 people going to primary care, coming to the ER
2 with physical complaints that are really the
3 mental health illness coming out in a physical
4 form. Next, please.

5 Again, if we are able to implement the
6 system, we have a built-in system in place where
7 we can then test existing programs and even test
8 new programs that we want to develop and actually
9 test them out and see if they're actually working.
10 So we can see if we're actually getting any
11 benefit from all the resources that we're trying
12 to dedicate to mental health. Next slide.

13 My suggested course of action for the
14 task force to consider in their deliberations is I
15 will actually encourage you to support funding of
16 further phases of development for the ABHC. Like
17 I was saying before, we're currently deploying
18 into four clinics at Tripler Medical Center and at
19 Scofield Barracks with the 25th Infantry. We're
20 going live with the first clinic up at the 25th
21 probably next month in February of '07. By April,
22 we'll have all four clinics going. One of those

1 clinics includes our TriStar Clinic at Tripler,
2 which is our substance abuse intensive outpatient
3 program. So we're trying to test it out in other
4 types of mental health clinics beyond the
5 traditional outpatient clinic and seeing how we
6 can use it in different functional ways. We're
7 also adding functionality to family members. The
8 first thing we'll be adding is for dependents.
9 And we can even develop different modules that
10 actually are specific to dependents and their
11 specific mental health needs. What we also really
12 need is continued funding to actually do some
13 program evaluation. So with these deliverables
14 I'm telling you about, we actually need to be
15 testing it out and see if we're actually hitting
16 our mark or not. Are we decreasing healthcare
17 utilization when we know patients are getting
18 better care? We can actually test it out. We
19 have those types of systems already in place that
20 capture that healthcare utilization data, we can
21 pull that data, connect to patient outcomes and
22 see if we're actually doing that or not. Ideally,

1 the endgame is to bring this behavioral health
2 functionality into AHLTA, so patients self-report
3 the baseline status and their outcome and it
4 populates patient notes in the AHLTA system, so
5 there's no need to transfer data into the AHLTA
6 system allowing a real efficient process for
7 behavioral healthcare. Finally, I encourage you
8 to really adopt the ABHC system as the primary
9 means of assessing whether programs that we
10 develop are actually doing well and doing what
11 their targeted intent is and that -- the only
12 system I know that in this current phase of
13 development that we can deploy immediately and
14 actually be testing out our intervention programs.
15 So with that, that ends our presentation here.
16 Colonel Gahm will come up and we can try to answer
17 any question you may have.

18 COL PEREIRA: Wonderful presentation.
19 It looks like a wonderful program. I really like
20 the general idea. I have a couple of questions,
21 though. What different psychosocial environmental
22 domains are measured and summarized by the

1 instruments? In other words, does the ABHC
2 measure social functioning, support systems, and
3 other social environmental elements that may not
4 be mental illness, but are frequently the focus of
5 treatment especially for social workers and
6 psychologists?

7 MAJ BROWN: I can answer part of it and
8 then I'll defer to Colonel Gahm. There are things
9 like the quality of marriage index that looks at
10 relationship qualities in a person's life, so
11 there's that kind of social context. There's
12 other measures within a social context of
13 someone's unit, there's a unit cohesion measure.
14 There's even a post-traumatic growth inventory
15 looking at ways that stressful experiences can
16 actually be helpful. I'm not quite sure about
17 other --

18 COL GAHM: I think actually the most
19 important part of it is that as a modularized
20 system, as we deploy it through additional
21 specialties, we're aware that there will be
22 specific foci for different specialties and adding

1 modules, for example, for drug and alcohol; they
2 clearly have a greater interest in more detail.
3 So that model works very well with this in terms
4 of for different clinics your core of the ABHC,
5 but you also then add specialized modules to
6 support the specific goals of the specific
7 specialties.

8 MAJ BROWN: Ideally things are in module
9 format. So depending who comes into this system
10 doesn't get shown to combat exposure scale, they
11 might go into a certain psychosocial realm that
12 you're interested in. They can develop -- and
13 then the system knows if it's a dependent or not,
14 so it pushes them to that module so they answer
15 those questions based on the patient
16 characteristics. So it has some smart
17 functionality built into the system.

18 DR. McCORMICK: Obviously the system has
19 a lot of advantages including duplication of
20 assessments, which can be a problem. I was part
21 of a system in the VA when I was there where we
22 were developing our computerized medical record.

1 Yours is basically an input, kind of, output
2 portion of that. It was certainly our experience
3 that if the efficiency and speed of the platform,
4 in this case AHLTA wasn't there, clinicians got
5 terribly frustrated and frankly an input system
6 just wasn't used. And as we've been going around,
7 we've heard complaints that AHLTA, in fact, is not
8 efficient, that clinicians end up trying to sit
9 there and wait for the machine to catch up with
10 them. If that's so, what makes you think they
11 will sit there waiting for your data to come out
12 of AHLTA to them so they can use it?

13 COL GAHM: Perhaps I can speak to that
14 in terms of the eventual goal is to integrate this
15 into AHLTA. We are aware that AHLTA is struggling
16 with basic performance requirements that do
17 frustrate clinicians. The ABHC, as it exists now,
18 runs independent of AHLTA and the performance time
19 is immediate because it doesn't have all the
20 complexities they're challenged with.

21 MAJ BROWN: As long as there's an
22 internet connection up and running in any form

1 then it's able to be pushed out to the web
2 application. That's one of the things we'll be
3 looking at in the next few months as we deploy
4 this to Tripler Medical Center. We're using
5 servers at Madigan and pushing through secured
6 channels all the way out to Hawaii. So that's
7 going to be one of our functional -- look and see
8 if it actually --

9 DR. McCORMICK: The task force's
10 recommendation point of view, I am hearing you say
11 that you really wouldn't recommend this being
12 integrated into AHLTA until AHLTA gets fast enough
13 to support it?

14 MAJ BROWN: Correct. I'm imagining that
15 the long-term solution here is years down the
16 road, my guess, five, ten years down the road.
17 But we also need something now to be looking and
18 developing programs. We can't wait five or ten
19 years to figure out if our programs are actually
20 working or not. We need this kind of system now
21 in our mental healthcare system.

22 DR. MacDERMID: Dr. Blazer and then Dr.

1 Zeiss.

2 DR. BLAZER: I actually had the same
3 question that Dr. McCormick did regarding just the
4 functionality of the hardware. But I have another
5 question. You would be feeding a lot of
6 information to clinicians here. Do you have any
7 experience so far as to how well clinicians will
8 actually use this, because you could imagine the
9 time they would spend looking at the information
10 that you're giving them might take away from the
11 time they would spend with the patient or
12 counselor?

13 MAJ BROWN: Correct. I'm going to defer
14 to the Gerald in one second. There's two parts to
15 that. I think they've had over 15,000 soldiers go
16 through this, either through the psychology clinic
17 or through the SWAPP process. And providers are
18 actually looking at the information in realtime.
19 They do present it in a hotsheet format, so
20 there's a PDF that pops up on the provider portal
21 that will give most of the standardized measures
22 in one page and gives them a real snapshot view of

1 under the suicidality screen, this is what they
2 scored on, and on the PTL they scored this, on the
3 PHQ-9 they scored this. So in one simple snapshot
4 providers get use of that kind of information.
5 You can synthesize that very quickly actually and
6 know where the major domains are when you're doing
7 your initial mental health intake, so you know
8 where you need to spend most of your time on it in
9 that sense. Joe, do you want to answer the other
10 question more so on how providers actually look at
11 this volume of information?

12 DR. McCORMICK: Do you have any
13 experience on what providers have done with this
14 so far?

15 DR. ETHERAGE: From the beginning,
16 they've loved it. This is something that provides
17 a lot information and so the challenge has been
18 being able to synthesize that information. But
19 what they find is that the way the information is
20 presented, they're able to synthesize that
21 information efficiently and be able to have this
22 very comprehensive available to them versus what

1 we're used to, which are these paper forms that
2 are sometimes five, six pages long someone's
3 having to sort through, go back and forth. We're
4 doing a click on a hyperlink and, boom, we have
5 that information available to us. The other piece
6 is that we find we're not having to re-enter the
7 patient history that's on these paper forms into
8 AHLTA and so you see significant increases in
9 terms of the efficiency of charting as well, which
10 is something that also the providers have really
11 enjoyed.

12 MAJ BROWN: It also allows the provider
13 to actually interact in the real world sense on a
14 person-to- person level instead of it being like,
15 How's your sleep? How's your energy? How's your
16 concentration? If I'm treating someone for
17 depression trying to figure out if they're better
18 or not, the patient has already told that to the
19 computerized system. There's even data out there
20 that people tell a computer more information than
21 they tell a human face-to-face, because they're
22 more comfortable with that. So we have all this

1 real information that we then know that we can
2 actually talk about the story, talk about their
3 functional day-to-day life problems and actually
4 connect with patients and hopefully help them.

5 DR. ZEISS: Dr. Blazer asked one of the
6 questions I wanted to ask. Thank you. The other
7 I'm interested in is that I think you're
8 presenting this as a tool particularly for use in
9 mental health sites and it strikes me, in VA we've
10 done some rather similar things and are trying to
11 roll out even more broadly, things that have some
12 shared components in the primary care setting. I
13 wonder what discussion you've had or thoughts
14 about how this might improve the linkages between
15 mental health and primary care and the ability of
16 primary care providers to identify and potentially
17 address some mental health concerns.

18 MAJ BROWN: Good question. But the
19 problem is trying to balance how you're screening
20 in primary care with the volume of people coming
21 through primary care, the time that they have,
22 each person can't sit down and do 350 questions.

1 You may have certain targets. Ideally, you can
2 actually deploy this to different clinics and
3 they're adding multi-site functionality, which
4 means the system can actually know which computer
5 is looking at the web application. So if we know
6 it's coming from a primary care site, it might
7 only pop up for a person, the PHQ-9 for
8 depression, and looking at anxiety or depression
9 or maybe PTSD, whatever you want to look at in
10 that primary care site. So it will allow,
11 potentially in the future, to be able to allow
12 certain primary care sites to have a very selected
13 module to be pushed out to them. It could, for
14 the (off mike) mil process it could potentially be
15 used as the outcome measurement looking at those
16 -- tracking those patients in out-process. I
17 think in Hawaii it's coming out this summer in its
18 phase and development, so I'll be looking at that
19 and seeing if one of those processes can actually
20 work for that.

21 DR. ZEISS: Exactly. It does seem like
22 the modular development really could lend itself

1 then to similar site review.

2 DR. MacDERMID: I have a couple of
3 questions. One is: One of your colleagues said
4 that the system assigns treatment intensity. If
5 that's true, what is the algorithm for doing that
6 or is there a person involved at some point?

7 DR. ETHERAGE: A lot of discussions
8 regarding how to implement that feature. What
9 we've come up with is that that's dependent on the
10 clinic, or if the clinic decides, the provider,
11 with the intent being that this is primarily a
12 tool for the clinician to be able to make sure
13 that they keep connected with those patients.
14 That's something that mental health struggles with
15 throughout the country when I engage somebody in
16 care, how do you keep up with that individual? So
17 we've tried to keep that broad in regard to
18 letting clinics, MTFs, branches of the service
19 decide how they want to implement that. For
20 example, the Air Force is required to keep a
21 high-risk log. The high-intensity patient with
22 ABHC would automatically generate that log for

1 them. Unfortunately, they don't have a system
2 that allows them to do that automatically. So I
3 think we've built the flexibility to be able to
4 allow the tool to be functional with different
5 types of implementation.

6 DR. MacDERMID: My second question is:
7 We've heard a lot of information how this works
8 well for providers and how it helps us to do a
9 better job of being consistent, tracking outcomes;
10 we didn't hear so much about the patient
11 interface. So, for example, do we know how
12 patients respond to being asked to provide all of
13 this information to a computer when they show up
14 at a clinic, potentially very upset? Are there
15 any people who give up and leave because the
16 instrument is too long? What are the empirical
17 implications in terms of quality of the data of
18 having them do it repeatedly? I realize they're
19 not doing the same thing every time they come, but
20 when you show that chart, they're obviously
21 answering the same questions. So I haven't heard
22 very much about the interface with the patient and

1 I'd like to know what you know about that.

2 MAJ BROWN: The have done some measures.

3 DR. ETHERAGE: We have used satisfaction

4 surveys to be able to address the ABHC. The

5 initial survey in its current form is long and

6 does take some time. That's where having a good

7 clinic manager, having individuals at the front

8 desk who are monitoring patients and can readily

9 see who's appropriate and who may need to see a

10 provider before internet information is important

11 and helpful. That's certainly something we pay

12 attention to. In terms of our surveys, what we

13 found were that people actually were satisfied

14 with the system. It works well, it's stable, so

15 there weren't complaints on that end. Especially

16 once they complete that first initial survey, that

17 is much longer, those follow-ups are very brief.

18 Individuals can go through that questionnaire at

19 follow-up in just a couple of minutes.

20 DR. MacDERMID: I will just say, as a

21 researcher, I have a little bit of ethical

22 discomfort with requiring people to fill out, you

1 know, not letting them move forward without
2 completing all the items on the survey. As a
3 researcher, we're not allowed to do that. People
4 have to consent filling out every piece of
5 information.

6 DR. ETHERAGE: That's actually an
7 important piece of what we do. We actually do our
8 informed consent prior to them working on the
9 ABHC.

10 LTG KILEY: Can you tell me how much
11 this costs? Why are you smiling, Colonel?

12 COL GAHM: Sir, this project was not
13 funded as a development effort. It was funded as
14 a number of smaller initiatives, really leveraging
15 creative ideas to put together a product. So I
16 would estimate that it costs around \$500,000 to
17 this point.

18 LTG KILEY: Is there much of a
19 maintenance tail to it?

20 COL GAHM: There's not. Presently, Mr.
21 Rein is our primary support staff. Obviously if
22 this were rolled out worldwide, some of the scale

1 issues -- there would be other issues to contend
2 with. But at this point we handle it with the
3 same development staff dealing with any minor
4 problems that occur.

5 LTG KILEY: How about at Tripler?

6 MAJ BROWN: We're in our initial phase
7 development, sir. The main cost for us was
8 hardware and the other part was trying to get some
9 funds to the software development piece to look at
10 Hawaii's specific needs. The hardware piece, all
11 you really need is a computer that runs Internet
12 Explorer. So it's a real basic computer. You
13 don't need any high-end machines.

14 LTG KILEY: How about the kiosks? Do
15 you have to get a bunch of kiosks, you use
16 tablets, or what do you use?

17 MAJ BROWN: At Madigan they developed
18 these touch-screen kiosks. We went the more low
19 tech way. We just had the basic computer, we have
20 a little booth that they sit in and they use a
21 mouse that you point and click, so it keeps the
22 costs down and people are used to using that type

1 of functionality, so I don't foresee that as a
2 problem. So it's the cost of some chairs and
3 computers for the most part.

4 LTG KILEY: I may have missed it, and
5 don't take the question wrong, it's almost
6 rhetorical. You started out, how do we know we're
7 doing any good, what are we achieving, what are
8 the outcomes, et cetera, and I didn't hear any of
9 that in the presentation. I mean, a couple of you
10 said, hey, this is really good. The providers
11 like it. There's a little of me that says, so
12 what? So what? What's your sense? I mean, are
13 there any outcome metrics you have or can monitor
14 other than it's nice data capturing and people
15 don't have to fill out a 22-page form, et cetera,
16 et cetera?

17 COL GAHM: The one slide that probably
18 spoke to that somewhat was the graph that shows
19 the change-over time when we use this on a
20 repeated measures model for an individual patient.
21 But the goal is to use these standard measures.
22 So the Tripler extension of this is to say we've

1 now managed to work out the bugs and make this
2 functional at Madigan. Now, how do we take it to
3 that next step, which is to say, Okay, how do
4 providers use this to document that a patient's
5 change is reliable and meaningful in terms of
6 improvement and functioning? It really, at its
7 basis, it's really a tool to support that. It
8 isn't a solution for that.

9 MAJ BROWN: I believe the data's
10 actually there. It hasn't really been looked at
11 yet. And you can let me know if I'm wrong, sir.
12 But they have about 15,000 soldiers that have gone
13 through this. They have a data systems there,
14 they have it in a database. We have healthcare
15 utilization rates; we can very easily do some
16 program eval pieces to look at; let's look at
17 those who actually got better. Did their
18 healthcare utilization go down pre-mental
19 healthcare versus post-mental healthcare? We have
20 all the data captured. Now there's actually doing
21 the work.

22 LTG KILEY: That's some of the power of

1 having all this data at your fingertips. I would
2 caution you about everyone jumping on the
3 bandwagon and beating on AHLTA on this thing too.
4 From my prospective, if you've got a software
5 capability that allows data input like this is and
6 manages the data a little bit, the only thing I'd
7 like to see it do is to be able, at some point, to
8 at least download the data into AHLTA, whatever
9 data we're doing. At some much farther date in
10 the future, AHLTA would probably supplant this and
11 replace it, but it's a long list of things AHLTA
12 still has to get to and get through before we're
13 going to be able to do all these things. The list
14 is a mile long, the stuff they're trying to get
15 done. It's like building a plane while it's
16 flying sometimes. There's no doubt that it's been
17 a frustration. And I think what comes from that
18 are these kinds of spin-off products. I mean, a
19 stork over at Landstul taking care of inpatient
20 (off mike) is another example of that. CIS is
21 another example of that.

22 DR. MacDERMID: Would it be possible for

1 you to run -- I'm trying to get a sense of if
2 there's any sort of outcome information you could
3 give us in time for us to consider for our report.
4 For example, one of the things a system like this
5 would seem to offer is the opportunity for fewer
6 people to fall through the cracks and not get
7 followed up on. So would it be possible, for
8 example, to run something on appointments kept
9 compared to people who aren't in the system or
10 before the system was in place or just some really
11 simple things to tell us about in terms of whether
12 it seems to have accomplished anything? Is that
13 possible?

14 COL GAHM: We can do that. If you have
15 other specific ideas that you think that show this
16 to be of value, we can run it against those as
17 well.

18 DR. MacDERMID: Well, you probably know
19 better than I what was in your vision, and I'll
20 encourage task force members to talk to you
21 individually if they have ideas. I certainly
22 don't want to create a lot of work for people.

1 LTG KILEY: I do. I do. I'll create
2 some more work. I think the other thing you
3 should do is that I'm very interested in the SWAPP
4 program, because a lot of our large issues is the
5 post-deployment assessment of our soldiers both
6 immediately and long term. If this lends itself
7 to that in a way that captures the data,
8 destigmatizes the process. You guys just did a
9 brilliant job with the units that you had
10 everybody do some face-to- face. I testified just
11 the other day. If this reinforces that process,
12 tell us how that works to make that happen because
13 there's always a concern that there aren't enough
14 questions on a PDHA or PDHRA to really ferret out
15 the issues soldiers may be having. If this is the
16 way to get at some of that, that would be very
17 valuable for us.

18 COL GAHM: I'll prepare an information
19 paper for the task force.

20 DR. MacDERMID: We should probably move
21 along. Thank you very much.

22 COL GAHM: Next we'll hear from Dr. Mark

1 Reger on the Army suicide event report.

2 DR. REGER: Thank you very much. It's
3 an honor to be here. My name is Mark Reger. I'm
4 a research psychologist with the suicide risk
5 management surveillance office based in Madigan.
6 Next slide.

7 The purpose of my brief this morning is
8 to describe how technological solutions can
9 improve behavioral health surveillance efforts.
10 More specifically, how we have used some of these
11 solutions in the suicide risk management
12 surveillance office as well as describe some
13 featured directions. To that end I'll describe
14 some background on our program, describe some of
15 the challenges that we face that are common to
16 these efforts, and describe a range of
17 technological solutions that can be used to
18 support these efforts. Next slide.

19 First off, clearly quality suicide
20 surveillance data is of high value to the Army and
21 to everyone. It allows us to track trends over
22 time. The Army -- there's certainly a reason to

1 suspect it's a unique population. Our
2 demographics differ from the broader United States
3 population. There are unique experiences related
4 to deployment, combat exposure, training
5 experiences. As the Army refines its suicide
6 prevention efforts, there's good reason to track
7 suicide surveillance data over time to evaluate
8 the impact those refinements are having. Next
9 slide.

10 The suicide risk management and
11 surveillance office manages the Army suicide event
12 reports data collection process. This is a
13 program that was started in 2004 and it really
14 supplements the excellent suicide tracking efforts
15 that G1 was already doing. The suicide risk
16 management and surveillance office, which I'll
17 refer to as SRMSO, is really an epidemiological
18 study of suicide risk factors. It's a worldwide
19 data collection process. The Army suicide event
20 report, commonly referred to as the ASER, is a
21 questionnaire, a standardized questionnaire that
22 collects standardized data on all suicide events

1 in the Army that meet certain criteria, more
2 specifically for all completed suicides and
3 suicide events, suicide behaviors that result in a
4 hospitalization or an evacuation from theater.
5 This standardized questionnaire is required to be
6 submitted in each of those events. In order to
7 collect this data we have regional medical
8 treatment facilities. Each have regional
9 responsibilities for submitting data that relates
10 to events in their regions. So at each MTF our
11 office has an ASER command POC, most commonly the
12 MTF commander, that we're in communication with.
13 That ASER command POC is responsible for ensuring
14 compliance with this requirement and also
15 appointing an ASER POC underneath them to
16 facilitate and ensure that the data is collected
17 and submitted. The data that's used to complete
18 the questions -- the questions range from
19 demographics to suicide risk factors, military
20 history and such. The ASER POC is required to
21 review medical and mental health records, personal
22 counseling records, investigative agency records,

1 toxicology, autopsy reports, and where
2 appropriate, interviews. Most commonly these are
3 interviews with individuals who have attempted
4 suicide to collect the data. Next slide, please.

5 The data collection process differs
6 slightly depending on whether the event was a
7 completed suicide or not a completed suicide. If
8 it's a completed suicide, we have a nice
9 relationship with the Armed Forces Medical
10 Examiner office. Anytime they determine that a
11 death was a result of a suicide, they notify our
12 office and we in turn notify the ASER POC for that
13 reason that a questionnaire is going to be
14 required for this event. If it was not a
15 completed suicide, what we do is we ask the ASER
16 POC each month: How many hospitalizations or
17 evacuations from theater did your region have in
18 the last month? They are simply required to
19 submit those numbers to us. We then track those
20 events and remind ASER POCs that ASERs are
21 required for those events for compliance. We're
22 very proud of the program. As I said, data

1 collection began in 2004. This program was
2 initiated and has developed under leadership that
3 pre-dates me, including several people here this
4 morning. It is the only source of Army-wide
5 information about suicide attempts and a number of
6 risk factors for suicide completions, we have the
7 only Army-wide data on that. We also believe the
8 SRMSO is the solution for standardizing suicide
9 surveillance across the DoD as current momentum to
10 standardize this process. Next slide.

11 As I said, the data collection began in
12 2004, and something our office realized is we're
13 placing a requirement on MTFs without providing
14 funding or personnel to accomplish these
15 requirements. That's going to be a challenge.
16 Every individual in the job has to weigh the costs
17 and the benefits of meeting the various
18 requirements. Something that we realized in 2004,
19 was that we did not observe full compliance with
20 ASER requirements. So the question we asked is:
21 How can we make this a better process? We can
22 either improve the benefits, decrease the cost of

1 compliance. We've actually attempted both of
2 those procedures.

3 At the end of 2004, one of our major
4 efforts, if you can hit the next slide, was to
5 decrease some of the costs of compliance. What I
6 mean by that is: How can we make it easier to
7 collect this data to submit it to us? In 2004,
8 ASER was a Word version. It was a Word file that
9 then had to be sent to our office, oftentimes a
10 paper-based system. How could we decrease the
11 costs of those compliance? Next slide, please.

12 We are very fortunate to be at Ft.
13 Lewis. Obviously Ft. Lewis is an active base,
14 power projection platform and it's also the
15 location of the Army behavioral health technology
16 office, which you've heard a little bit about
17 today. This is the office that Matt Rein is a
18 part of that has helped develop the ABHC system
19 that we just heard about. So working side by side
20 with them we were able to develop an application
21 that would allow POCs to submit the data through a
22 web form. It's an internet- based system that

1 automatically stores all the ASER data in an
2 Oracle database. One of the clear advantages of
3 this is that the data can be accessed realtime.
4 We have instant access to the most up-to-date
5 information on Army suicide events. And the
6 application has gone through the DITSCAP process
7 that was mentioned earlier. We have a security
8 certificate and approval to operate for this
9 application. Next slide.

10 Some of the features of the website you
11 can see up there. It uses form field validation,
12 which means the software has some programming to
13 flag data entry that's not possible or illogical
14 to prevent data entry errors. It uses animation
15 to prevent data entry errors. To reduce some of
16 these costs, we don't present all of the questions
17 on the website if they're not applicable to a
18 specific case, and it uses other features that you
19 just cannot use to assist POCs if it's a
20 paper-based system that are common to web form
21 submissions. Next slide.

22 What we observed in 2005 was a

1 significant improvement in compliance with ASER
2 requirements. We do attribute this to the web
3 form development. Although it was a new program
4 in 2004, submission rates were really stable by
5 April of 2004, so the improvement in compliance we
6 don't attribute to this sort of rolling forward of
7 a new program. It really does appear that it was
8 the technological solution. In addition to this
9 solution, we have some future directions that
10 we're looking at. One of the things that -- since
11 we're based in Ft. Lewis that seems would be an
12 absolutely improvement in our process would be to
13 integrate the ASER with the ABHC. Currently the
14 application I've described is a separate
15 application than the ABHC application that you
16 heard about. They're independent programs, but
17 we've already integrated the two at Ft. Lewis and
18 I want to show you how we've done a little bit of
19 this. The ABHC, as you saw, provides secure
20 log-ins for retrieval of the ASER data. Currently
21 the ASER website is only data entry. ASER POCs
22 can't go back into the system and pull back their

1 data, but by linking this with ABHC, we can do
2 that. Next slide.

3 What you see here is a Ft. Lewis example
4 of the ABHC page that we showed to you earlier.
5 This is a hypothetical patient with a list of
6 ASERs that have been submitted for suicide events.
7 Obviously a lot of events, this is a hypothetical
8 patient we've used many times. You have the
9 opportunity with this log-in to click on the links
10 to these events, and what's generated is a report
11 that provides all the ASER data to the provider.
12 There's a lot of very significant clinical
13 information that can be very helpful in safety
14 (off mike) appointments. Currently this is live
15 and active at Ft. Lewis and we're excited about
16 the opportunities that ABHC expand us to Tripler
17 and maybe other sites. Next slide.

18 Other opportunities by combining this
19 with the ABHC includes all the clinical data that
20 it generates. It will provide a very rich
21 analysis to link our suicide data with the other
22 clinical data the ABHC generates. Also JCAHO has

1 a requirement for root-cause analysis for any
2 sentinel event, a suicide that has occurred within
3 two weeks of treatment. The ASER data, in our
4 opinion, can be extremely helpful to that
5 root-cause analysis and providing that feature
6 perhaps with some additional software development
7 could be very helpful. One thing you saw about
8 the ABHC is it does have some reporting features
9 to provide data, providing senior leaders with
10 log-ins that can generate reports based on the
11 ASER data, which could be very helpful to our
12 leaders, as well as possibly even regional
13 commanders. We'd like to extend our surveillance
14 program sort of backwards. Currently the process
15 is there's a suicide event that's identified; we
16 retrospectively gather the relevant data. By
17 linking this to the ABHC could provide some more
18 prospective suicide surveillance program. Finally
19 what we'd like to do is the ASER currently
20 requires data entry that already exists in a
21 number of Army databases. In order to continue to
22 improve the data collection process and reduce

1 those costs on ASER, POCs linking the ASER data
2 collection process with other existing Army
3 databases just makes sense. We currently have a
4 grant pending with TATRC to explore some of these
5 options.

6 In summary, senior leaders deserve high
7 quality data on Army suicides and epidemiological
8 surveillance studies are challenging. What we
9 have found already is that technological solutions
10 can improve the data quality and in the future
11 provide us opportunity to improve reporting to
12 senior leaders as well as MTFs quality assurance
13 requirements. Thank you.

14 DR. MacDERMID: I'm sure there are other
15 questions, but I have one. When I look at the
16 report, the sample report that you've provided, I
17 don't know a lot about root-cause analysis. What
18 are the elements of the report that are most
19 tightly connected to root causes would you say?

20 DR. REGER: The root-cause analysis
21 requires a variety of data including some
22 qualitative investigation of what these root

1 causes of the event were. Some of the data
2 elements that are required for a root-cause
3 analysis are the exact same data elements that are
4 required on the ASER event report. Some basic
5 information like the method that was used and
6 these kind of details.

7 DR. MacDERMID: So, for example, one of
8 the things that we hear anecdotally is that
9 relationship problems are very often implicated in
10 suicide events. I don't see a category for those.
11 Where would they show up?

12 COL GAHM: The sample you have there is
13 actually just the first 11 elements out of the
14 ASER.

15 DR. MacDERMID: Oh, okay. All right.

16 COL GAHM: It actually is quite long and
17 we can provide that.

18 DR. MacDERMID: Thank you. Katherine?

19 DR. POWER: How is your surveillance
20 data a derivative or tracked against the kind of
21 surveillance data that Kessler does at Harvard or
22 CDC does through their BRFSS surveys so that the

1 senior leadership can see how the general
2 population is behaving and then matching that
3 against what is going on in the military services?

4 DR. REGER: Our data collection process
5 was modeled after a lot of the current, existing
6 high-quality surveillance studies. Our population
7 is different than obviously the United States
8 population. So there's caution whenever you're
9 comparing Army data to populations that don't
10 match in demographics and other features. Our
11 data collection process is actually very similar
12 to what the CDC does. In fact, we modeled a lot
13 of what we do on the CDC system. We certainly can
14 provide some of those analyses, but really what we
15 want to do is compare Army suicide data to Army.

16 COL GAHM: One point on that. In the
17 2005 revision of the ASER, we started with
18 previous elements that actually were developed in
19 a project in Europe and then modified that. The
20 Air Force has an SCFS system for monitoring
21 suicide-related events, and the Navy and Marine
22 Corps have the DONSIR system. The CDC, the

1 national violent death reporting system was their
2 parallel system. Really focused on firearm
3 deaths, but the subset was suicide. So when we
4 revised for 2005, we looked at the elements of all
5 services, including the NVDRS and ensured that we
6 included every element that's relevant to suicide
7 from the NVDRS into this application. What we
8 were hoping is that there was more data actually
9 out of suicide down to the element level. And as
10 you're aware, there isn't. So we're trying to
11 find a model state to pair our data with, because
12 it's a state-by-state buy-in eventually, and
13 Washington was not one of the states that's really
14 signed up yet. But to say, can we use a state
15 comparison while they're waiting to get a national
16 roll-out? But we do have every element and we
17 actually tracked with the same time frame. So we
18 basically have the same elements, but we have some
19 different times, like three months versus four
20 months. So we ensured that we matched theirs 100
21 percent.

22 DR. POWER: We're just about ready to

1 get back some BRFSS data on the 41 states that we
2 funded so we may be able to give you a couple of
3 states that you might want to look at.

4 COL GAHM: That would be great. Thank
5 you.

6 DR. MacDERMID: Thank you very much.

7 COL GAHM: The last one before the
8 break, we'll have Dr. Schlegel present on the
9 ANAM.

10 DR. SCHLEGEL: Good morning, General
11 Kiley and Dr. MacDermid and other members of the
12 task force. We certainly appreciate the
13 opportunity this morning to provide a briefing on
14 the automated neuropsychological assessment
15 metrics. You notice the word "automated" shows up
16 in all these presentations today. ANAM is a
17 computer- based cognitive and neuropsychological
18 assessment system that has been developed and
19 supported with Army funding over the past 15
20 years. ANAM provides technology for measuring
21 human cognitive function across a broad spectrum
22 of applications, test conditions and populations.

1 Within the past few years, the responsibility for
2 managing the development, improvement and
3 distribution of ANAM has been transferred to the
4 Center for the Study of Human Operator Performance
5 or C-SHOP. C-SHOP is a multi-disciplinary
6 research center that was established in 2002 at
7 the University of Oklahoma that focuses on the
8 development and application of computer-based
9 technology for assessing human performance across
10 a broad range of military, industrial, educational
11 and medical applications. The Center is directed
12 by Kirby Gilliland and myself. Kirby and I have
13 developed a program of scientific research in
14 computer-based cognitive performance assessment
15 that dates back to 1984, when we first (off mike)
16 with a system developed by the U.S. Air Force
17 called the Criterion task set that was initially
18 running on Commodore 64 microcomputers, so we've
19 been with this technology quite some time. Kirby
20 himself extends an apology for not being able to
21 attend the meeting this morning as he is currently
22 in Germany delivering a course to some military

1 personnel that is part of an extension program
2 allowing them to obtain graduate degrees. The
3 objectives of my presentation this morning are to
4 provide you with an overview of the scientific
5 origins and structure of ANAM, its current use and
6 value to the military in the area of behavioral
7 health assessment, and to give you information on
8 two specific ANAM test battery configurations that
9 are of particular current relevance; one for
10 traumatic brain injury and a second for a general
11 neuropsychological screening. As the name
12 implies, ANAM is automated in that the computer
13 manages the testing of the individual by providing
14 instructions to the person taking the test,
15 presenting all the test stimuli, recording
16 responses, managing the data files and then
17 providing summary information regarding the
18 results of the testing. So ANAM is thus a rather
19 sophisticated tool to assist neuropsychological,
20 psychologists and other healthcare providers, not
21 replace them, but assist them, in making clinical
22 diagnoses and evaluating the effectiveness of

1 treatments, recovery progress, for those whose
2 cognitive function may have been compromised. One
3 key feature of ANAM is its solid scientific
4 foundation. Many of the individual ANAM tests
5 were constructed to reproduce existing tests that
6 have been used in evaluating human performance for
7 a number of decades under a variety of conditions
8 including: Fatigue due to sleep loss, time zone
9 changes, shift work, environmental conditions such
10 as extreme cold and heat, altitude, noise and so
11 forth, and a variety of personal risk factors that
12 would include: Prescription and other drugs,
13 alcohol, isolation, confinement, emotional stress
14 and so on. These tests coming from the human
15 factor or human performance literature often
16 originated in laboratories up to 50 years ago,
17 using mechanical and electromechanical devices,
18 they're well known and well validated in
19 literature.

20 Other ANAM tests are a computerized
21 version of various paper-and-pencil tests or
22 one-on-one evaluations that have been well

1 established in clinical practice and linked to
2 standards in clinical diagnosis.
3 This slide presents kind of an
4 abbreviated view of the historical development of
5 ANAM. In the early 1980s, the Army, Air Force and
6 Navy each undertook separate efforts in cognitive
7 test battery development. Many of those efforts
8 funded by the U.S. Army, which at the current time
9 would have been the medical research material
10 command. Taking the best that each system had to
11 offer, there was a consolidation by the unified
12 tri- services committee into the UTC performance
13 assessment battery. In addition to that, NATO
14 further contributed to the development effort by
15 establishing a set of international standards for
16 cognitive tests for a subset of the UTC PAB test,
17 and that's what you see there with the AGARD-STRES
18 collection. That set of test standards NATO
19 AGARD-STRES were first implemented by a
20 programming team in Pensacola, Florida, again with
21 U.S. Army support. This implementation has been
22 continually expanding until we have the current

1 ANAM test system as it exists today. Outside of
2 DoD laboratories and university research
3 laboratories across the country, variations of
4 ANAM technology have been used by the FAA in
5 various screening purposes and readiness to
6 perform applications, and by NASA, both as a
7 research tool of performance assessment
8 workstation or PAWS, and also as an ongoing
9 operational tool called WinSCAT, which actually
10 flies on the international space station and on
11 the space shuttle. Here you see examples of four
12 specific ANAM tests to give you an idea of the
13 range of complexity of the testing. In most of
14 the ANAM tests a test problem of one sort is
15 presented, the (off mike) is presented on the
16 screen, and the test taker typically must respond
17 using one or two responses answering as quickly
18 and as accurately as possible, typically by using
19 the left and right mouse buttons or perhaps the
20 keyboard of a computer.

21 For example, in code substitution, the
22 person is provided with a nine single-digit

1 pairing in a row across the top of the screen.
2 Another pair is then presented in the center of
3 the screen. The person must decide whether the
4 pairing is correct or not based on what's shown
5 above in the top row. That test, code
6 substitution test, may then be repeated later
7 within the test battery after the person has
8 memorized the pairings, so then it becomes a
9 memory test where the row of matching pairs is not
10 presented, just the individual stimuli are
11 presented.

12 In math processing the person performs
13 the arithmetic operations that you see there and
14 decides whether the answer is less than five or
15 greater than five. In procedural reaction time a
16 person presses one button if the number that's
17 displayed is a two or a three; a different button,
18 if it's a four or a five.

19 Then, finally, in the matching to
20 sample, one of those spatial patterns is presented
21 briefly on the screen, there's a delay of three to
22 five seconds when it's removed from the screen and

1 then the person has to decide which of the two
2 patterns presented next was the one that was
3 memorized previously. So fairly basic cognitive
4 performance tests, but ones that have been
5 established in the literature for many, many
6 years. There are also more complex variations of
7 the test. The one on the left called the
8 switching task is one there's a directional arrow
9 instructing the person either to perform the
10 Manikin, the special test that's on the left-hand
11 side or, again, the arithmetic test on the
12 right-hand side. What you're looking at there is
13 the ability of the person to change attention, to
14 switch attention after they've been performing a
15 series of one set of problems or the other. The
16 tower puzzle down in the lower right is one where
17 the person must essentially go through a series of
18 planning and executing a series of moves. Both of
19 these more complex tests are really tests of
20 executive function. Obviously these tests that I
21 showed as examples represent a number of different
22 but rather interrelated cognitive functions or

1 cognitive domains. And you see here a more
2 inclusive list of cognitive domains, a majority of
3 which are addressed by a variety of different ANAM
4 tests.

5 Currently in the ANAM test library there
6 is a collection of more than 30 individual tests
7 ranging from some of those basic tests of simple
8 reaction time to the tests of memorizing and
9 preparing spatial patterns and up through things
10 like the switching and tower tests used for more
11 complex cognitive function testing. ANAM tests
12 historically have had rather strong correlations
13 with a number of traditional measures for
14 neuropsychological functioning, including subtests
15 of the WAIS-R and the Halstead-Reitan. All tests
16 have a rather high test/retest reliability and
17 high differential stability, which is important
18 from both a clinical and a research standpoint,
19 and the majority of tests have been used in a
20 rather large number of studies that establish
21 their construct validity both through their
22 current ANAM implementations and also through the

1 original forms from which they were derived. As a
2 result there's a substantial amount of supporting
3 data for the use of ANAM testing, including a
4 number of military normative data basis. A Ft.
5 Bragg paratrooper study that is an ongoing study
6 currently has 8,000 individuals in the database.
7 General purpose normative study, a study that will
8 be beginning at USARIEM up in NADCs sometime this
9 spring, and then other non-military normative data
10 including the use of this testing technology in
11 sports concussion, ranging from elementary through
12 high school, college and professional football
13 teams.

14 In addition to that, there's an ANAM
15 bibliography project that's provided a database
16 that we've compiled an end note that has more than
17 500 articles specifically reporting the use of
18 ANAM. As I mentioned previously, our charge at
19 C-SHOP from the Army has been now to manage the
20 future development and distribution of ANAM.
21 We've completed a thorough software quality
22 assurance evaluation, made more than 750

1 improvements, some of those major, some minor, in
2 particular, improving the usability of the system.
3 This is a system that's come from beginnings in
4 research labs, but now has great potential in a
5 clinical environment. So our goal is to move it
6 towards that clinical environment.

7 There are three primary products; the
8 ANAM test system itself, a software utility for
9 managing data extraction and presentation of large
10 ANAM databases, and then one of our own
11 developments, the ANAM performance reporting tool
12 to assist clinicians and researchers with
13 diagnoses and evaluations. The user manuals are
14 in the form of online files in PDF format with
15 hyperlinks to navigate through the manuals. More
16 importantly from a clinical standpoint is the ANAM
17 performance report that is able to present the
18 results of the testing in a format that is easily
19 used by clinicians. We've had a number of subject
20 matter expert meetings with clinicians and that
21 information has gone into the development of the
22 supporting tool. Up in the upper left-hand corner

1 you're provided with demographic information on
2 the individual taking the test. In the next block
3 there is what we call performance at a glance that
4 gives you information on each of the individual
5 tests that have been taken along with a comparison
6 to a relevant comparison group indicating whether
7 the performance or highlighting test performance
8 differs substantially from that what might be
9 expected from that particular group. Below that
10 there is a narrative summary that indicates any
11 causes of any abnormal performance and then
12 individual performance details as you see in the
13 various charts that allow graphical depiction of
14 the current performance and then comparison with
15 historical data, because, again, as has been
16 mentioned in a couple of the other presentations,
17 the importance of having baseline information on
18 the individual is critical in terms of making
19 evaluations. Absent the baseline information, you
20 can still make comparisons with normative
21 comparison groups that are relevant.

22 From a broad perspective, ANAM has been

1 used in quite a number of applications. I thought
2 to start out here I might give you some specific
3 examples before going into the broader set. ANAM
4 has been used in a number of pre-, post-deployment
5 studies in Iraq, Afghanistan and Bosnia. I've
6 already mentioned Ft. Bragg paratrooper training
7 study looking at traumatic brain injury. It has
8 been used in a boxing study at West Point. The
9 Defense and Veterans Brain Injury Center has a
10 number of TBI application in their various
11 clinics. They're also the people that have been
12 supervising the paratrooper training and its been
13 used in some live-fire studies in the Mojave Viper
14 exercises, and its also used by a number of
15 clinicians to evaluate Parkinson's disease,
16 multiple sclerosis and we have currently more than
17 250 registered ANAM users just based on software
18 use agreements that are in effect.

19 From a broader perspective ANAM has been
20 and can be used in military academy application,
21 in course of study and training with respect to
22 combat care and triage. There are individual

1 neuropsychologists and psychologists currently in
2 Iraq and other theaters that are using ANAM for
3 triage and other combat care applications. Here
4 in the United States it is being used to exam
5 PTSD. Toxin exposure assessments is illustrated
6 by the individuals in the center of the slide here
7 who are actually taking ANAM on the laptop and on
8 a PDA unit while wearing their chem defense gear.
9 In addition to that, you'll notice in the lower
10 left-hand corner care outside of theater. What
11 certainly has been observed through the Ft. Bragg
12 study is that there are a number of injuries that
13 result during training but unrelated to military
14 activity, from automobile, motorcycle crashes,
15 altercations outside the base and so forth.

16 So to summarize the DoD behavioral areas
17 where ANAM is a benefit currently and in the
18 future, we can certainly highlight the following:
19 Screening and surveillance, triage, medical
20 monitoring, and aid with respect to return to duty
21 or fitness for duty decision. You've seen that
22 the ANAM testing system incorporates a library of

1 more than 30 tests, but typically all tests are
2 not given in a specific application, of course.
3 Rather a subset of tests is configured into a
4 battery that is most relevant for the application
5 within the constraints that are allowed for time
6 constraints. Primarily they're allowed for giving
7 the test. So batteries may range from as little
8 as 15 minutes to an hour in length. Two relevant
9 examples here are the battery that's being used by
10 DVBIC and the Ft. Bragg folks, which takes less
11 than 20 minutes or so to perform, up to a more
12 comprehensive general neuropsychological screening
13 assessment. The ANAM TBI battery consists of the
14 five ANAM tests that are shown here, simple
15 reaction time, math processing, running memory
16 continued performance test, code substitution and
17 matching to sample, and as you see mapped to those
18 are the individual domains or functions that are
19 assessed by each test. As I said, this battery
20 takes less than 20 minutes, currently in use by
21 DVBIC and Ft. Bragg in various DVBIC clinics and
22 is also the battery that is primarily being used

1 in Iraq by a number of individual
2 neuropsychological and psychologists. What we are
3 working feverishly to do is to expand the
4 distribution so that it can worldwide be used. In
5 addition, we've actually developed the ANAM
6 screening battery, general purpose screening
7 battery, which is a configuration of 12 modules
8 that can be completed in less than 45 minutes and
9 that provides a much broader coverage of important
10 cognitive domains. Finally, we have undertaken a
11 major initiative to incorporate ANAM in AHLTA and
12 once this is accomplished, then DoD would be able
13 to obtain baseline cognitive function data as the
14 individual entered the military. Testing can take
15 place at various stages to determine any change of
16 cognitive function during training, pre- and
17 post-deployment as a result of injury or other
18 incidents, for triage and (off mike) repair,
19 hospitalization within theater, during transport
20 and then care outside of theater, perhaps
21 extending as the person might be transitioned into
22 VA facilities for extended treatment. In this

1 sense ANAM testing has the potential to serve a
2 similar function to other elements and
3 individuals' medical records such as vital
4 statistics, blood chemistry and so forth, and
5 providing a comparison in the event of a
6 significant event on that particular individual.
7 From a feasibility standpoint, the TBI and the
8 general purpose screen are ready to go, are being
9 used. The general purpose screen we've initiated
10 a study through our university health sciences
11 center and the VA facility located in Oklahoma
12 City to validate that particular instrument. The
13 system can be delivered on desktop, laptop,
14 notepad, and there are also PDA versions that are
15 available. More importantly, we think the ANAM
16 performance report is moving now from a research
17 tool to a clinical tool that extracts critical
18 measures to a file that can be easily integrated
19 into AHLTA, either in straight data format or a
20 PDF if you want to actually provide the clinical
21 information in the form that's easy to use.

22 In summary, the points that I would like

1 to leave you with this morning are that ANAM
2 provides an advanced technology for qualitative
3 objective neuropsychological assessment. The
4 technology is linked to modern neuropsychology;
5 it's capable of broad deployment; it is a very
6 cost-effective technology for DoD application
7 since it has already been developed by the DoD.
8 This eliminates the need to duplicate development
9 or to support alternative development efforts or
10 more importantly to invest in other higher cost
11 commercial alternatives which do exist. ANAM
12 provides a low-cost alternative to imaging and is
13 based directly on cognitive performance so,
14 therefore, is a direct indicator of cognitive
15 function. Finally, we are working with the other
16 folks that have already given presentations and
17 will give presentations today to demonstrate that
18 ANAM can be integrated with other initiatives to
19 compliment the acquisition of other information
20 that we've seen and also to supply standardized
21 assessment metrics to some of the rather novel
22 technologies such as simulation and virtual

1 environments, which we'll see later this morning,
2 therefore, advancing the value of all of those
3 various technologies. At this point, ready for
4 any questions.

5 DR. BLAZER: Quite interesting. I
6 appreciate your comments. One question is: Have
7 you -- you may already do this, you just didn't
8 mention it, but have you thought about audio
9 assisted; in other words, actually have the
10 instructions read to an individual at the computer
11 as opposed to just reading it off the screen?

12 DR. SCHLEGEL: We have. In fact, there
13 have been some intelligence agents that are also
14 used to present the instructions. The Ft. Bragg
15 installation used that as an alternative for a
16 period of time. We actually found it not to be as
17 successful as reading the instructions. Also if
18 you're dealing with someone who is already
19 compromised or someone who is elderly, perhaps
20 with Parkinson's or so forth, sometimes it's
21 necessary to actually do a one-on-one
22 implementation where you sit down with the

1 individual that's taking the test and make sure
2 they understand the instruction. Most of the
3 tests also have criterion tests or catch trials at
4 the very beginning to ensure the person actually
5 understands what they're (off mike).

6 DR. BLAZER: The second question, this
7 may be a hard one to answer: What percentage of
8 routine neuropsychological referrals that might be
9 made in a mental health clinic could be
10 accommodated by ANAM?

11 DR. SCHLEGEL: I don't have the answer
12 to that question. I think we're still trying to
13 determine what that is. You've also caught the
14 industrial engineer, not the psychologist this
15 morning.

16 DR. BLAZER: I guess what I was
17 specifically asking is: Are you really talking
18 about a small percentage that you can pick up
19 here, or are you talking about a pretty wide range
20 of individuals who routinely get referred because
21 neuropsychological is very expensive?

22 COL GAHM: One of the concepts with this

1 is to really use this as a pre-screen to
2 neuropsychological testing so that now people may
3 be referred for a neuropsychological battery
4 because we don't know. And depending on the
5 neuropsychologists, they may put someone through
6 this whole evaluation. This would be a tool in
7 the hands of a range of professionals and maybe
8 paraprofessionals to allow that to be referred on
9 to make a scientifically-based distinction as to
10 who actually needed the more expensive
11 neuropsychological battery, not as a replacement
12 to that whole battery.

13 DR. SCHLEGEL: I could add to that
14 exactly what you said. Because of the fact that
15 the ANAM system is a modular system, we can start
16 with triage-type approach where we have perhaps
17 four tests or five tests within the module. And
18 if people do not perform well on a particular
19 module, then we can expand that, ultimately going
20 to the larger neuropsychological screen, which
21 still within 45 minutes to 60 minutes is a lot
22 shorter than perhaps a four-hour visit.

1 DR. McCORMICK: A follow-up question to
2 that. We've seen some examples of a very short
3 screen for concussive injury or traumatic brain
4 injury, the taking of four or five questions.
5 Your 15-minute version here, do you envision that
6 15-minute version to be a universal screen or do
7 you see, first of all, the application of some
8 very short screen and then it's given to some
9 higher risk group would go on to a full
10 evaluation?

11 DR. SCHLEGEL: This has great
12 application in sports concussion work. This is
13 not the type of system, in sports concussion or
14 anywhere, where immediately after the concussive
15 event, you're able to provide the testing and say,
16 Okay, this person is ready to get back out on the
17 line, or this person is ready to go back into the
18 game or what have you. Typically the sports
19 concussion effects don't show up for several day
20 or perhaps for at least 24 hours. So this is
21 testing that will provide a much greater level of
22 information beyond those simple one or two or

1 three questions that can give you kind of the
2 immediate answer.

3 COL GAHM: The idea is also that there
4 would be a series of stages. So Dr. Schlegel
5 mentioned that there's a 15-minute battery and
6 then there would be a follow-on 45-minute battery.
7 The concept is there would also be a one minute --
8 one of the most sensitive questions and you screen
9 out those who don't need to go any further.
10 Everyone is looking at the efficiency with which
11 you can gather that information and be accurate.
12 Always a challenge.

13 DR. SCHLEGEL: You can get down to a
14 five-minute test, but it doesn't tell you much
15 from the cognitive performance standpoint.

16 DR. MacDERMID: Thank you very much for
17 your presentation.

18 (Recess)

19 COL DAVIES: Dr. MacDermid, we're ready
20 to start again.

21 DR. MacDERMID: I know. I'm looking for
22 my script. How about I wing it? Welcome back

1 everyone. Let me turn it over to our
2 distinguished panel again and we'll continue.

3 COL GAHM: With that I'd like to
4 introduce Dr. Ciulla, who will be assisted by Dr.
5 Ruzek in presenting the online PTSD portal.

6 DR. CIULLA: Some background. The
7 health affairs division of TRICARE management
8 activity was tasked by the National Defense
9 Authorization Act, that's the NDAA for fiscal year
10 2006, to conduct a pilot study assessing the
11 efficacy of internet-based automated tools,
12 there's that word again, in identifying and
13 treating post- traumatic stress disorder and other
14 mental health conditions. According to the NDAA
15 statement of work the targeted user population was
16 identified as including service members and their
17 families in the first four months after those
18 service members had returned from combat
19 deployments. Project leader is the Army
20 Behavioral Health Technology office, Colonel Greg
21 Gahm, the chief of the psychology department at
22 Madigan, is also the contracting officer

1 representative. Next slide.

2 In developing the overall plan and
3 subject content for the project, the project is
4 fortunate to be collaborating with multiple sites
5 and subject matter experts including the VA
6 national centers for PTSD at Boston, Honolulu and
7 Palo Alto. We're also partnered with Tripler
8 Medical Center, the VA Medical Center in Portland,
9 Oregon and the National Center for Deployment
10 Psychology located in Bethesda, Maryland. Next
11 slide, please.

12 I'll take you through the timeline
13 pretty briefly. In the spring/summer of 2006,
14 project concepts were developed, funding was
15 secured and subject-matter experts began to be
16 more fully engaged in project issues. Late
17 September of last year our contracts were
18 approved, awards went out to the respective
19 contractors, and on the 29th and 30th of last
20 year, we had our initial kick-off meeting which
21 was attended by the various project collaborators.
22 It was really our first time to work as an

1 integrated project team. In March of '07 we
2 expect to have a prototype up and running and
3 available. We'll be running some focus study
4 groups who hopefully can tell us what we're doing
5 well, what we need to do a little differently.
6 Early summer of '07, we expect our first
7 deployment of the product. We're continuing now
8 to develop metrics aimed at understanding how the
9 website is being used and then secondarily,
10 eventually to be able to actually assess the
11 products effectiveness. Next slide, please.

12 Why build a post-deployment website?
13 Why build an online product aimed at redeploying
14 soldiers and their families? First is the obvious
15 answer is, the incidents of post-deployment mental
16 health problems. A 2004 New England Journal of
17 Medicine article that -- the author of that
18 article, by the way, was Colonel Hoge, a
19 psychiatrist. That article reported on a survey
20 that was conducted of deployed service members
21 concerning mental health issues. There were at
22 least a couple of important findings that came out

1 of that study. First, it was found that
2 approximately 15 to 17 percent of service members
3 deployed to Iraq met screening criteria for either
4 depression, a generalized anxiety, or PTSD.
5 Second, for those who screened positive for one of
6 those mental disorders, approximately 23 to 40
7 percent actually sought out mental health care.
8 Third, those who screened positive were twice a
9 likely to identify concerns about possible
10 stigmatization and other kinds of barriers to
11 mental health care. So the service members most
12 likely in need of receiving mental health services
13 were the least likely or less likely to actually
14 seek out those services. One very good reason
15 then to build a post-deployment online program is
16 that there is a clear need for an alternative
17 pathway for service members to seek out and
18 receive mental health services. What's another
19 reason to build an online program? The stigma
20 that I've just alluded to concerning visiting a
21 mental health clinic. Service members voice
22 concern that if they go to a mental health clinic

1 and see a psychologist or a social worker or a
2 psychiatrist that they will somehow be labeled.
3 They will be seen as not being able to perform
4 their duties. They will be seen as weak. I've
5 actually had service members say to me they're
6 willing to get services, but do they actually have
7 to go to the clinic and sit in the waiting room
8 because of some level of discomfort. Another
9 reason to build an online program is that we're
10 increasingly finding studies that are telling us
11 that computer-based self-guided training is in
12 fact helpful with mental health disorders such as
13 depression, anxiety and PTSD. Lastly, a reason to
14 build an online product is that our user
15 populations are generally going to be younger men
16 and women who are pretty comfortable with
17 technology, so we expect that developing this kind
18 of approach and access to care is going to be
19 appealing for that user population. Next slide,
20 please.

21 What is the product and what does it
22 look like? Here is a mock-up of the initial main

1 page interface. But let me make a couple of quick
2 comments before I speak to this. The website will
3 of course have text-based information, but the
4 intent is to build a site that is multimedia rich
5 that includes audio and a high level of video
6 interactivity. That includes testimonials from
7 actual service members, that has challenging
8 quizzes, that has an "ask the expert" section,
9 that has topical links to e-books and podcasts and
10 blogs. The aim is to be truly cutting edge and
11 render a product that leverages the latest
12 technology. This slide portrays, as I mentioned
13 earlier, an early mock-up of the main page. As it
14 turns out very, very recently we've moved in a
15 different direction from this initial mock-up. A
16 function of working with this kind of product is
17 working with it tends to be very iterative, new
18 ideas come along the result of intensive
19 collaboration with our partnerships. We're
20 continuing to make some changes. Unfortunately,
21 the latest graphical mock-up was not available in
22 time for this presentation. But the original idea

1 was to develop a military-appearance like looking
2 installation. So the idea was that a user would
3 navigate over to one of the buildings on the
4 installation. They would perhaps go over to the
5 hospital to learn something about stress
6 management. They would go over to the gym to
7 learn something about anger management. They
8 would go to the chapel to learn something about
9 spirituality and so on. What holds true from this
10 initial mock-up to where we're at currently is
11 that the website will continue to have a strong
12 military appearance. However, we think we've
13 designed the initial mock-up to be a little bit
14 user- intuitive and user-friendly. I won't
15 presume to be able to describe to you visually
16 what I can't show you visually, but I can tell you
17 what the main page interface will contain. Next
18 slide, please.

19 The main page will have five areas. We
20 call one of those areas, "How am I doing?" We
21 expect that many users will log on to the site and
22 not know what they need to get out of the site;

1 they'll not know how to actually define their
2 problems or their concerns. So we will encourage
3 them to complete one of the self-assessments and
4 educate them that by completing an assessment
5 they'll learn more about themselves and the
6 website will be better able to help them and steer
7 them in the right direction for the right
8 programs. Next slide, please.

9 We've got a couple of different
10 assessments built in. One is what we call the
11 quick checklist. For example, it will be just a
12 couple of brief items, I can't stop thinking about
13 the deployment, I feel down a lot, I'm avoiding
14 places. The aim of the quick check is to within
15 five or ten minutes quickly help users to learn a
16 little bit more about and target in on their
17 concerns. The next type of assessment would be
18 the full check survey. That will be more
19 comprehensive and it will be modeled on the ABHC
20 model that you've all learned about and heard
21 about this morning. The aim of the full check
22 would be to obviously provide a more comprehensive

1 assessment. It will be more time intensive to
2 take, but it will be more thorough on the other
3 side. A crucial advantage is that mental health
4 problems typically don't occur isolatedly. A
5 person having problems with anger is also probably
6 a person having problems with depression. A
7 person having problems with depression is probably
8 also a person having problems with anxiety. Also
9 anger doesn't occur isolatedly, it occurs in
10 context, it occurs at home, it occurs in the work
11 setting. We, in fact, are building a program
12 aimed at addressing conflicts at home and in the
13 work setting. So the advantage of taking the full
14 check survey would be that we would be able to
15 offer a rich array of programs to the person
16 taking that survey. Finally, with the workshop
17 scales. Perhaps a user does in fact log on and
18 knows that they're having a problem with anger.
19 They'll be able to directly go to the anger scale
20 and take a quick assessment. Can you go back a
21 slide, please?

22 Now I've talked to you about the

1 assessment piece. There are also a number of
2 other areas or components on the main page that
3 the user can now work with. The next one is the
4 "Know your stuff" component. Basically, if or not
5 a soldier or a service member has taken the
6 assessment, they can literally navigate over to
7 one of the 11 programs that we're developing. Dr.
8 Ruzek will be speaking a little bit more and
9 identifying what those programs are. I'll name in
10 a couple of minutes what I mean when I say a
11 program. Another component will be the "Get me
12 some help". The get me some help component will
13 include available local and other kinds of
14 resources. There will a piece in there that will
15 speak to stigma, and also a piece in there that
16 will speak to when do you really need to go see a
17 provider in the real world, so to speak. Stories
18 from home and away. We know that a great way to
19 reach people is to have them relate to somebody
20 who talks the same talk and who has walked the
21 same walk. So each one of our programs will have
22 actual testimonials from service members. For

1 example, a testimonial might involve a service
2 member discussing that when they first got back
3 home they were having problems getting a good
4 night's sleep. In that testimonial the service
5 member may talk about having sought out
6 professional services and how that helped them
7 along. Another feature of the testimonials will
8 be that the service member will be able to
9 normalize the problem, will be able to speak
10 onscreen via a video clip to the user that it's
11 common to have sleep problems and maybe even
12 nightmares after getting back from a deployment.
13 Then finally the "check it out" section will build
14 in some links to e-books and podcasts and blogs.
15 Our aim is to make this captivating and even in
16 some areas of the website entertaining. We want
17 users to come back again and again. Next slide,
18 please.

19 So the feedback from the assessment will
20 be immediate and will generate program
21 recommendations in the form of individualized
22 program plans or IPPs. So, for example, on the

1 basis of having taken an assessment, we will say
2 to the user, You're recording a high level of
3 anger. Anger that doesn't diminish over time can
4 obviously be a concern for both you and the people
5 around you. So based on your responses, we
6 recommend the following individualized program
7 plan, the anger management program. Next slide,
8 please.

9 So now the user has found the right
10 program. Either they've got there by way of
11 taking a self- assessment or they've navigated
12 because they know they have a concern about or
13 problem with anger and now they're in the anger
14 management program. First there will be kind of a
15 zooming interface that describes the program to
16 the user and tells them how to navigate that
17 particular program. Second there will be an array
18 of educational content presented in a variety of
19 venues. For example, text and audio delivered
20 psychoeducational materials. The kinds of
21 testimonials I spoke to a few minutes ago. It
22 will be in the "Ask the expert" advice from the

1 expert section. There will be a video clip of an
2 anger management expert or a sleep hygiene expert
3 talking about sleep hygiene techniques or anger
4 management strategies. The expert will also be
5 able to identify they're special and hopefully
6 demythify some of the concern that users have in
7 going to see a mental health professional. There
8 will be a section of frequently asked questions.
9 So for example there will be a question like this:
10 Should I take medication to help with my sleep
11 problems? And the website will provide some
12 guidelines concerning that type of problem. There
13 will be quizzes. For example, test your sleep
14 hygiene IQ. Again, there will be interactive
15 games and challenges. Finally, there will be
16 workshop exercises. I wish that we were at a
17 point where I could actually show you what a
18 workshop exercise will look like, but we're
19 certainly not there yet in the products
20 development. The workshop exercises will consist
21 of actual, structured, self-guided interventions
22 that a user can work through over a course of four

1 to six sessions. The sessions will be guided by
2 an actual provider, onscreen, who will steer the
3 user through various exercises aimed at helping
4 them with the anger problem, the relationship
5 problem, the sleep problems. These sessions will
6 be grounded in the kinds of intervention
7 methodology that providers typically use in their
8 offices. They will be highly interactive and
9 they'll be incorporating a full range of
10 audio/visual multimedia that technology has to
11 offer. I'm going to hand off now to Dr. Ruzek.

12 DR. RUZEK: I'm Joe Ruzek. I'm with the
13 National Center for PTSD in the VA Palo Alto
14 healthcare system, and I'm one of the content
15 developers for this project. I'm just going to
16 enlarge very briefly on Dr. Ciulla's comments.
17 Next slide, please.

18 These interactive behavior change
19 methods that we're putting into this technology
20 are intended to really grab the user and to go
21 beyond the distribution of simple written
22 information to try to make it interactive to

1 enable better ways of helping a person change.
2 The first interactive feature of course is a great
3 deal of choice. As you're going to see, people
4 will have the ability to enter this system in many
5 different ways based on their own perceived need,
6 based on what they want help with. And there will
7 be choice built throughout the entire thing. We
8 know one of the ways of motivating people is to
9 give them a lot of personal selection of how they
10 navigate. Interactive features also include a
11 series of questionnaires that people are going to
12 be able to get individualized, customized feedback
13 as they move and navigate through the various
14 sections that we have. They're going to be able
15 to keep personal records online and monitor their
16 own behavior change effort, whether they're trying
17 to reduce their alcohol consumption or whether
18 they're trying to practice muscular relaxation
19 training on a regular basis, whatever the goals
20 are that are in these interactive workshops, they
21 will have the ability to track these, both online,
22 but also they'll have printout self-monitoring

1 forms. One of the technology that have changed we
2 use our self-monitoring methods. I think for me
3 one of the motivational strategies and change
4 strategies is also the use of modeling. You've
5 heard a little bit from Dr. Ciulla about some of
6 the interactive model components we're going to
7 have. But also within the workshops themselves
8 there will be the opportunity for the user to
9 listen to 30-second and one-minute clipettes of
10 individuals demonstrating some of the skills that
11 we want to teach them how to use. So for example
12 they'll be able to see somebody like them managing
13 a trauma reminder as they come across that in
14 civilian life or on the base. They'll be able to
15 see someone talking themselves through a difficult
16 situation, or talking themselves down if they're
17 feeling worried or guilty. In particular, because
18 this technology, this product is really part of
19 the step- car approach -- we see this as being
20 part of a continuum of care, this is a self-care
21 element, but then there will be obviously provider
22 care. We see this as a foot in the door to

1 face-to-face care for some folks who might need
2 that. And there are a variety of mechanisms for
3 that, there are online screening tools and
4 information about where to get care. But most
5 important we will have the ability for them to see
6 models describe their own initial reluctance to go
7 along for face-to-face care and then tell what
8 happened when they did that; describe the fact
9 that, well, I expected this to happen, but in
10 actual fact, I had this kind of very positive
11 experience. We know from a lot of research across
12 the years that modeling interventions like that
13 are useful in reducing fear and stigma. So we're
14 going to try and make that as interactive as
15 possible to engage users. A second element of it,
16 as Dr. Ciulla referred to briefly is that, really
17 what we're taking are the much tested
18 evidence-based protocols for addressing many of
19 the problems that returnees may have and trying to
20 put them on the web. That means -- because many
21 of these interventions themselves have strong
22 didactic components and strong practice

1 components, we think that we can capture rather a
2 lot of these interventive components on a website
3 like this. So in fact there's a lot of evidence
4 in the field of depression and substance abuse and
5 so on, that this can be done. These are cognitive
6 behavioral interventions that many of us in the
7 room will be familiar with, everything from stress
8 management training, muscular relaxation training,
9 breathing training for managing acute stress
10 reaction to behavioral activation approaches to
11 combat a depressive mood, brief motivational
12 interviewing for reducing alcohol consumption.
13 Also, as I said before, we use many of the kind of
14 technologies of behavior change that we can
15 harness in the web, like motivational enhancement,
16 talking with people about obstacles and modeling
17 them overcoming obstacles to care, setting
18 specific goals, giving people task assignments to
19 go back and do and then come back and put in their
20 results and also assigning self-monitoring, online
21 self-monitoring. The self-guided piece is very
22 important because we think that had we had a one

1 size fits all come into this tunnel approach, work
2 on your post traumatic stress reactions and work
3 through all of this material, we might have a lot
4 of trouble getting people to engage with it. So
5 instead they can come into a number of different
6 workshops, which I'll show you in the next slide
7 that are built around the kind of complaints we
8 think I might have; the anger, difficulty getting
9 along with family and so on. So we think that
10 people will come in and gravitate to whatever is
11 important to them and as they noodle around on the
12 site and start to use it, they will find that
13 there are many sections that we hope will be
14 relevant for them. That way their priorities
15 drive what they use. It's built again around the
16 complaints and reactions and symptoms common to
17 service members. The user can track progress
18 across sections. One of the things that is a very
19 powerful change tool is when people monitor their
20 progress regularly. We think one of the
21 attractions here is that people will be able to
22 enter and see a cumulative graph of some of their

1 stress reactions and other things that they're
2 trying to change, for example, sleep or anger.
3 There's also the possibility and we will also
4 build in on the multisession approach, for
5 example, things like relaxation training, we'll be
6 able to show them whether, as they practice
7 relaxation across the eight weeks of the
8 relaxation module, whether or not their physical
9 tension and their ability to relax changes over
10 time. So they'll be able to track their progress
11 in some of the particular goals that are the
12 subject of these workshops. We believe that
13 anonymity is a very key element of all of this,
14 because we think this is a primary way of getting
15 around the stigma that's associated with
16 face-to-face care so we hope that many people in
17 the privacy of their home will feel free to
18 explore this and it will soften them up and
19 hopefully move them towards addressing these
20 problems. Next slide, please.

21 These right now are the 11 workshops
22 that we are planning to focus on with the

1 intervention. And they start with, "Can't leave
2 the war behind," which is kind of an overview of
3 combat stress and combat stress reactions. It
4 also includes a module on "How to manage
5 triggers". When reminders are coming up for you,
6 how do you respond to those in a way that's
7 effective for you? "Conflict at home and work".
8 We really want to focus on their adaptive
9 functioning, so there will be sections in here on
10 social support, how to engage with the family.
11 The workplace, we think being able to function at
12 work is terribly important, so there will be
13 sections in here on, should I talk with my
14 superior or my co-workers about my problems, and
15 if so, what are the considerations? What are the
16 pros and cons of that? How do I weigh that out?
17 What do I wish to share? How do I wish to do
18 that? And we'll show, again, interactive
19 vignettes of people sharing that information in
20 sensitive ways. There are sections on mood and
21 depression, on anger, on sleep hygiene, on drugs
22 and alcohol. The management of stress will

1 include such things as direct online ability to go
2 through muscular relaxation training. They will
3 hear an auditory demonstration of walking them
4 through the 20-minute exercise for fully relaxing
5 their body. Then they'll be assigned to practice
6 that and be able to come back and report in their
7 results as they move forward. That will also have
8 breathing training. It will also have grounding
9 for how to handle overwhelming stress and
10 reminders if they begin to create intense distress
11 for a person. You can see some sections on "How
12 do I?" How do I talk to my children? How do I
13 deal my kids? Spirituality? Physically? And
14 "Staying fit," will include sections on how to get
15 ready for future deployments. What are some of
16 the pointers on how to maintain myself during a
17 deployment? Next slide, please.

18 The third bullet here I'd like to
19 highlight. This is designed as standalone
20 self-management. So it's not PTSD, post-traumatic
21 stress and the related adjustment difficulties
22 that people experience, but we also believe that

1 this can augment traditional care in many, many
2 ways. Dr. Zeiss mentioned primary care as a
3 setting. I think that this is an absolute winner
4 for enabling a physician or a nurse to sit down
5 with someone that screens positive and get them
6 started. Alternatively it can be a cost efficient
7 saver of some energy for very busy mental health
8 clinicians, because some of the didactic elements
9 of what they're doing and some of the task
10 exercises that they would do as part of their
11 treatment can be taken up by these online programs
12 and they review progress (off mike) and willing to
13 work these programs. I suspect that maybe this
14 is a good way of actually winding up back-door
15 training of providers. So people in primary care
16 who may not be mental health experts, by sitting
17 down and navigating through this and familiarizing
18 themselves, will learn a great deal of what they
19 need to be communicating to the patient in their
20 traditional roles. Next slide, please.

21 Finally, we see that this has possible
22 widespread integration with other types of

1 efforts; with military OneSource, site care
2 online, and particularly with the Veterans
3 Administration's national patient portal,
4 MyHealthVet, where we see a lot of synergies and
5 a lot of similarities, and they'll be able to
6 share and give back information together. There's
7 also been some discussion that if the folks
8 funding and developing this are interested it
9 could be rolled out for survivors of disaster and
10 terrorism, that was thought to be attractive with
11 some modifications. I think I'll end there and
12 I'm guessing we have some time for questions and
13 comments. Robert, would you like to come up and
14 field these as well?

15 DR. MacDERMID: I know I have one and
16 I'm sure others do, too. Could you please tell us
17 about your plans for gathering data with regard to
18 the effectiveness of the program?

19 DR. RUZEK: I will say that -- the first
20 thing we would like to say is this is not being
21 funded as a research project, so it's being funded
22 as a development project. It is our intention to

1 evaluate this in a variety of different ways: At
2 the level of individual modules and at the level
3 of its efficacy in reducing, not only symptoms and
4 improving mental health outcomes, but also
5 affecting functioning.

6 DR. CIULLA: We're at the stage where
7 we're building metrics to understand how users are
8 going to use the website. For example, how many
9 hits on a particular program, how much time do
10 they spend in one of the assessment? We haven't
11 gotten to the point yet where we're really
12 developing metrics to look at effectiveness or
13 clinical outcomes.

14 DR. MacDERMID: Even if it is a
15 development project, given that it is a treatment
16 as opposed as just a front door to treatment, it
17 would seem that that is pretty important, right?

18 COL GAHM: That is the intent. It's a
19 little premature at this point from our planning
20 point. Dr. Riggs at (off mike) is actually the
21 lead person we have for developing the program
22 evaluations as we're calling it. Because it's

1 anonymous, we won't be able to really gather
2 within a realistic setting the data that we want.
3 So our plan is to enroll, perhaps through IRB
4 formal research programs, people into the program
5 who aren't anonymous and track their progress,
6 which will not be an exact parallel but will be
7 the closest we can come to.

8 DR. RUZEK: I'd like to say the entire
9 design team is committed to formal evaluation.
10 Because it's fine to develop these things, but if
11 they're not efficacious they need to be gotten rid
12 of or modified. I think that this should be
13 ideally an iterative design process with
14 evaluation built in. That's our intention.

15 DR. MacDERMID: Other? Dick?

16 DR. McCORMICK: To what degree in
17 developing this were the special needs of National
18 Guard and reserve components taken into account,
19 given that potentially someone like that who goes
20 and get undeployed to rural America would be the
21 ideal user for this?

22 DR. CIULLA: Certainly we're expecting

1 to have the product available to all active duty
2 and reserve and National Guard folks and their
3 families. One of the things, one of the places
4 where it will address some of that is in the
5 "Conflict at home and at work," and will speak to
6 some of the difficulties potentially that soldiers
7 coming back home getting back into the reserves
8 and National Guard have in picking up with their
9 work setting for example. So that will be a place
10 we'll look more specifically at the kind of issues
11 that those kind of service members may experience.

12 DR. RUZEK: My view of this is that this
13 kind of a product is uniquely designed for those
14 folks who are not captured by face-to-face systems
15 because they live in rural areas; they dissolve
16 their service and move off in different places. I
17 think there is going to be a marketing issue of
18 making sure we reach those people and orient them
19 to the site and do everything we can do to get
20 them to use it. In addition, all the information
21 that we provide about services available to them,
22 where those are, what they look, how to motivate

1 them to use that, that has to be customized a bit
2 for folks who might not have some of the
3 facilities available to them that, say, folks in
4 Madigan might have. But in a way I think its
5 unique strength is its universal reach if we can
6 market it and get people to use it. I think that
7 that's going to mean linking it to all kinds of
8 existing places where those folks would go on the
9 web, but also alerting all their providers, trying
10 to build into, for example, the post- deployment
11 health assessment process and getting people
12 information at that point, perhaps orient them to
13 the screens, building it into primary care and
14 putting it everywhere we can.

15 DR. CIULLA: One of the advantages to
16 the multiple partnerships is, for example, with
17 the VA in Portland, Oregon, is that we'll have
18 access to other kinds of populations, not just
19 active duty. So we'll be able to do focus study
20 groups and they'll be able to tell us what else we
21 need to include in this product to make it the
22 most beneficial.

1 DR. MacDERMID: We should probably stop
2 there. Thank you very much.

3 COL GAHM: We're going to shift now to
4 virtual reality. We have Skip Rizzo, who is going
5 to use his own laptop and you'll see why as the
6 presentation starts. We want to make sure
7 everything runs correctly.

8 DR. RIZZO: What I'm going to do is do a
9 quick 30-minute fast fly through on our
10 development work at the Institute for Creative
11 Technologies at the University of Southern
12 California on our work developing virtual reality
13 application for exposure therapy treatment with
14 combat- related PTSD. I've included some of the
15 principles in this project. It's really an
16 interdisciplinary application across computer
17 science, engineering, graphics and psychology, and
18 we have a number of Army partners as well,
19 involved in the project. We also collaborate.
20 We have a VR psych lab at USC where we collaborate
21 with faculty across all disciplines. We've
22 developed applications in addition to the PTSD app

1 in the areas of anger management, cognitive
2 assessment, attention deficit disorder assessment,
3 pain distraction, motor rehab following stroke and
4 traumatic brain injuries using VR game-like
5 applications and so forth. The work that I'm
6 going to present today was done within the ICP,
7 but within the mix reality lab and I want to
8 recognize my partner Jarrell Pair on this, who is
9 really the technical wizard behind much of what
10 you'll see today and some of the groups that we
11 work with worldwide. Now, for those in the
12 audience who aren't aware of what virtual reality
13 is, I'm going to give a three-slide quick overview
14 of what the concept is.

15 Basically, the baseline level definition
16 is an advanced form of human/computer
17 interactions. So as opposed to being limited to
18 operating on a mouse and a keyboard, take
19 advantage of the power of a computer, you can wear
20 a specialized display device, head-mounted
21 displays, tracking devices and basically use
22 technology to put you in a virtual world as

1 opposed to watching it onscreen. So you're, for
2 example, wearing a head-mounted display, there's a
3 tracking device. This tracking device tells the
4 computer where your head is positioned at any
5 point in time and the graphics update in real
6 time, so you get the illusion of being in a space.
7 This hopefully will bring us past being limited to
8 hunting and pecking on a keyboard and being more
9 immersed in a virtual world. Of course the best
10 metaphor here, we're all familiar with simulation
11 technology, it goes way back, and the idea is just
12 like a aircraft simulator would test and train
13 piloting ability, we can design virtual
14 environments that can assess, test, treat, train,
15 rehabilitate human performance under a range of
16 highly specific and controllable conditions, and
17 as well everything that goes on in the virtual
18 environment is captured digitally for analysis and
19 review. Our application is called full spectrum
20 VR exposure therapy. You'll see why in a moment.
21 It was funded initially by the Office of Naval
22 Research. Russ Schilling drove this work. As we

1 all know, the New England Journal of Medicine
2 article really was the first shot across the bow
3 in terms of helping us to become aware that we
4 were in fact dealing with a significant mental
5 health challenge. This has been documented
6 numerous times. I don't think there's any
7 question of the need for any of this.

8 For those of you who aren't fully aware
9 of PTSD, it's a clinical disorder that occurs
10 following exposure to a traumatic experience
11 that's beyond the range of normal human
12 experience, which war experiences may qualify.
13 The general symptomology includes reexperiencing
14 nightmares, flashbacks, avoidance of cues and
15 reminders, emotional numbing, hyperarousal
16 (gunshot sounds). Now, if I had that on a sound
17 system here, which I've done a number of times,
18 people jump out of their seat. What I'd like to
19 say as a little immersive demo here is imagine if
20 when somebody closed the door loud or somebody
21 dropped a book on the floor, you jumped out of
22 your skin. This is how the world of somebody with

1 PTSD would -- this hypervigilance and extreme
2 startle response is like for everyday activities.
3 Of course we know that core symptoms also lead to
4 a long laundry list of other symptoms that need to
5 be addressed. One thing, when we always talk
6 about people that get PTSD, the one thing we've
7 got to keep in mind is the symptomology of PTSD
8 may be a normal response to trauma initially. So
9 that if you were to test people immediately after
10 a traumatic event and look at their scores on
11 whatever assessment measure you're using, those
12 people would qualify for the diagnosis of PTSD,
13 but we don't give the diagnosis at that time, we
14 give it after a period of time has taken place,
15 because what we see with many folks is that
16 eventually over time, people naturally habituate
17 or they adapt or adjust to the traumatic event and
18 over time they're not experiencing this type of
19 symptomology. However, the group we're interested
20 in are the folks that 30 days, 60 days
21 post-trauma, they're still having difficulty
22 dealing with it; for whatever reasons they are

1 unable to adjust or adapt or recover from the
2 trauma.

3 Exposure therapy operates on the
4 principal that you gradually expose somebody
5 typically done in imagination with guided imagery
6 with a therapist and the client also tells their
7 story, but you gradually expose a person in a
8 systematic fashion to the trauma that they
9 experienced. In the process of that a habituation
10 or extinction process occurs and this is based on
11 just pure meat-and-potatoes learning theory that's
12 been developed over the last hundred years in
13 psychology. We've seen reliable findings of
14 course with animals and in simple phobic disorders
15 with imaginal exposure. We call this therapeutic
16 exposure. Now, a lot of times folks initially
17 say, well isn't that kind of cruel? Aren't you
18 making somebody go through something that they
19 were really hurt by? I mean, how could you do
20 that? Well, it's difficult therapy, there's no
21 doubt about it. In fact, it's so difficult that
22 it's not used as much as it should be in light of

1 the success rates with cognitive behavioral
2 therapy with an exposure component as its
3 centerpiece. So if you look at people 30 days
4 post-trauma and they're still scoring high on your
5 trauma scale, that's an indicator that these folks
6 are going to be most likely at six months to be
7 diagnosed with PTSD. And standard numbers that
8 you see are 75 percent that score high at 30 days
9 are going to have full-blown PTSD at six months.
10 If you just do supportive counseling where there's
11 no exposure component, it's day-to-day problem
12 solving, pure unconditional positive regard
13 discussion of everyday activities, what you
14 typically see, based on the work with Bryant is 67
15 percent will develop PTSD at the six-month mark.
16 If you do exposure therapy, the numbers indicate
17 20 to 22 percent will still develop PTSD, but a
18 significant drop, and some empirical support for
19 the effectiveness of this challenging type of
20 therapy to conduct.

21 One of the problems with imaginal
22 exposure, though, is that you're asking somebody

1 to imagine in great emotional detail what they
2 were traumatized by and of course some folks
3 aren't very good at imaging, but if you look at
4 one of the core symptoms of PTSD, you'll also see
5 the avoidance of cues and reminders. So it's a
6 pretty tall order to ask somebody to really
7 emotionally engage in imagination for this
8 treatment. So this opens the door for the concept
9 of using virtual reality, a number of folks have
10 and I'll just cover a couple of them, as a way to
11 systematically expose somebody to trauma-relevant
12 stimuli in a controlled measured, managed fashion
13 that may help support the therapeutic process.

14 Virtual Vietnam, the first effort,
15 unfortunately years post-war. I'm having a
16 problem with the resolution, so I'm going to run
17 this video -- I'm still having some problems. I
18 have a backup on this. We have some images.
19 Basically what the folks did and my co- researcher
20 Jarrell Pair was one of the lead programmers as a
21 graduate student on this '97, at Georgia Tech, so
22 he's a great collaborator because he has

1 experience designing virtual environments in this
2 area. They basically built a rice paddie and a
3 helicopter flyover, a very limited graphic set of
4 environment, but still quite useful. Their data,
5 based on case studies and open clinical trials,
6 seemed to show some support with this population
7 that was 20, 30 years post-trauma. Another group
8 -- let me see if this will work. I may turn my
9 laptop around and do this campfire style if it
10 comes down to it, because I think you should see
11 this. I'm going to do that, so you can see some
12 of the key elements of these environments. You'll
13 see it up here on my laptop.

14 Basically a World Trade Center
15 environment. The people were gradually exposed to
16 from a distance and then closer and then
17 eventually they would see people coming from the
18 building and so forth. The work of Joann Difede
19 at Hunter Hoffman. An initial clinical case
20 study, if you look at when VR was introduced at
21 week five across these various measures, you see
22 five sessions in not much change from baseline,

1 but following the completion of treatment at week
2 14 in one person successful results were seen.
3 Now Joann Difede has published a study in the
4 annals of New York Academy of Sciences with a
5 waiting list controlled small study on, I think,
6 nine people in the active treatment. You have
7 your waiting list control and you have your active
8 treatment and test them at the end of treatment
9 completion and see if the waiting list has change
10 as well, and they found significant reductions in
11 one of the gold standard measures of PTSD, the
12 clinician administered PTSD scale. One of the
13 interesting findings was six of nine people who
14 had done imaginal exposure, did not show any
15 benefit from imaginal exposure, but benefited from
16 the VR application.

17 Another group in Israel doing bus
18 bombing. A group in Portugal. Apparently during
19 the same time as Vietnam they had their problems,
20 and what they've done is to take a game and just
21 modify it, a virtual game and modify it. They
22 only had one level when they presented this data,

1 whereby you're walking through a jungle and then
2 all of a sudden a mortar goes off and the result
3 is a couple of your comrades are dead. The person
4 they tried it through, even though it was like 25
5 years post, the person had an extreme reaction to
6 it and it took a few hours to help settle him
7 down. This underscored the issue that this is the
8 type of treatment that has to be done in graduated
9 steps and a very progressive fashion. You can't
10 just go to the top of the hierarchy and expose
11 somebody. This group actually now has gone back
12 to the drawing board and developed a 12-step
13 program to go through to address this and some
14 results are actually going to be presented at
15 upcoming conference from that group.

16 Our application, Virtual Iraq. The
17 reason we call it full spectrum PTSD exposure
18 therapy is because we initially built it off of
19 graphic content from the game Full Spectrum
20 Warrior, which was an Army, funded combat tactical
21 simulation training game, developed partly at USC.
22 It's not going to show on the screen, but it will

1 show here, a little video clip of the game ap.
2 (Video plays)
3 DR. RIZZO: So we had access to these
4 art assets and began building from that and then
5 built custom assets. Our goals, our design
6 approach was to build multiple scenarios to have
7 different ways a user could go through the
8 environment, whether they're walking; you'll see a
9 couple of different versions, going with a squad,
10 driving a vehicle and so forth. Create a library
11 of trigger stimuli the clinician could introduce,
12 integrate scent and vibration as well as good
13 sound. Try to create a multiple-modal sensory
14 experience here to promote the sense of immersion.
15 Develop a Wizard of Oz clinical interface. The
16 clinician sits and selects stimuli and precisely
17 control what goes on in the virtual environment,
18 integrate physio recording of course and put that
19 on the clinical interface, which we'll see. The
20 goal was to be able to deliver in a customized
21 fashion exposure therapy stimuli in a fashion that
22 is most comprehensive so that a person that had a

1 problem in a Humvee on a desert road versus
2 somebody that had a problem in a city environment,
3 we'd equally be able to address their issues with
4 our environments.
5 Just some quick scenes. I don't know if this will
6 show up on there, well, you can see it here, right? I
7 can add in a little bit of sound, and I'm adding these
8 in on the fly. I think right now you're going by the
9 pickup truck, so we'll add some gunfire. Now you run
10 for cover and we can add in a call for a helicopter
11 and so on. So the clinician can begin to
12 systematically administer stimuli -- I think I might
13 have had a break here. Sorry about this.

14 DR. MacDERMID: No, we feel much better,
15 being not technically competent.

16 DR. RIZZO: Damn technology. So we can
17 do things like adjust the time of day, the weather
18 conditions, sand storms, fogs, as you'll see in a
19 variety of these images coming up hopefully,
20 desert road. Lighting in here isn't so good,
21 maybe you can see it here, but this is a village.
22 You can go through the environment by yourself

1 wearing a head-mounted display or walk through it.
2 This is something we have just about built now
3 where a character will walk along with you with
4 some AI that follows your path. You can ride in a
5 desert road from a position of being in a turret
6 or being inside a vehicle. Here, for example, you
7 can see it here, you're in a Humvee driving, but
8 you're at the very low level of exposure. This
9 could be like driving down a road through Mojave
10 or through Oklahoma. This would be the starting
11 point. In fact, the starting point may be just
12 sitting in the Humvee with no sound to the
13 vehicle, with just the sound of the wind and so
14 forth. We also can ramp up the action. We can
15 make different things, we can adjust the weather,
16 things flying over, characters that will pop up,
17 explosions, things that look like IEDs. This is
18 an example of a little bit more provocative
19 stimulus presentation. You're in the Humvee and
20 there's an explosion that will occur up ahead.
21 All these things are controlled, on a key stroke I
22 can eliminate all of the provocative stimuli and

1 you're back to a sunny day without anything in
2 case a person is having an intense reaction. Let
3 me jump ahead. Building a fly over as well,
4 different ways to fly over the various worlds that
5 we've created and night vision so you actually can
6 get the illusion to some degree with graphics that
7 you have a night vision rig.

8 Now, one of the issues here is a lot of
9 good automated stuff that's out there, but doing
10 this kind of therapy, we're not trying to
11 eliminate the clinician. This is a tool to extend
12 the clinician's skills for doing very difficult
13 kinds of therapy. And that is Sigmund Freud with
14 an early prototype of head mounted display. So to
15 do that we have Wizard of Oz clinical interface
16 that has different components. Hopefully this
17 video will run. It will run here. The clinician
18 in front of their control panel can see exactly
19 what the client is seeing, can have access to
20 trigger buttons and so forth and can monitor -- we
21 don't have this integrated into our output -- can
22 monitor physiology in the future with a good

1 visualization tool so we can see what the person
2 is telling us, but also what their body is telling
3 us, and you're wired so the clinician can talk
4 directly to the client. Here's just a quick video
5 of it. Down here I'm changing the time of day
6 with a wireless internet connected laptop. With a
7 tablet PC I can make things happen and so forth.
8 Let's jump ahead.

9 We aim to use low-cost technology to
10 promote access. We're not using a \$25,000 head
11 mounted display that maybe three centers can
12 afford, this is a system that the price has
13 recently gone up on this, but it has built- in
14 tracking, it's got very good visual displays. The
15 Army's adopted it for a number of training
16 simulation tools. You plug it into the back, I
17 can run it off this laptop, believe it or not,
18 just on batteries and it's good to go. But we
19 also are experimenting with a 120-degree field of
20 view headset that was demonstrated with this
21 application last fall, which is quite compelling,
22 but more expensive. We have the smell machines so

1 we can pump out smells that are relevant. As we
2 know smell directly linked into the limbic system
3 responsible for emotion and memory. These are the
4 smells that we've got. We've gotten a lot of user
5 feedback on some new ones we want to add. We
6 actually use the night vision rig. It's kind of
7 expensive, but we can put the head-mount display
8 on the night vision rig so you can flip it down
9 wearing a helmet, trying to maximize the sense of
10 presence. This is a base shaker platform that has
11 two of these subwoofers, the kind of things that
12 kids that drive by in their car playing rap music
13 and it pops your eardrums, it just annoys you.
14 That's great that they're doing that because
15 they're only \$100 for a pair. You get a stereo
16 amplifier for another \$100, you spend 25 bucks on
17 some plywood and some wood and you've got a base
18 shaker that doubles the experience of presences.
19 You're driving the Humvee, you feel it when a bomb
20 goes off, you feel a concussion. So we're trying
21 to maximize that.

22 Where are we at now? Version 1.4. We

1 can't design this effectively -- I've never been
2 in combat, I can't design this world from the
3 ivory tower, so we employee good user-centered
4 design. Greg Reger will be talking about this
5 shortly, but we had a prototype system set up at
6 the San Diego Naval Medical Center and had people
7 try it that were in Iraq, give us feedback, tell
8 us what we got wrong, don't be shy, tell us where
9 we screwed up, we want to make it better. And
10 this fellow was actually featured on the front
11 page of the San Francisco Chronicle, because he
12 actually came back a couple times wanting to try
13 it. It turned out that he was in his own effort
14 trying to deal with what he was going through and
15 actually reported some positive experience with
16 just the basic prototype as he came back three
17 times to give us feedback about it. Greg Reger
18 will talk about the system we had in Iraq where we
19 got feedback. Clinical version 1.4, and a couple
20 of case studies of the first female treated in
21 virtual reality for PTSD showed a positive
22 outcome. She had just completed treatment, 22

1 years old and we don't have the three-month
2 follow-up on her, we just have the pre and post.
3 Another fellow here with three-month follow-up
4 still showing progress after the end of treatment.
5 There's two others that are completed that were
6 successful and three that dropped out partway
7 through therapy or got to the end and didn't show
8 much gain. So this might not work for everyone,
9 but I think the data from previous work and some
10 of the positive data we get is very encouraging.
11 Working with a large number of groups; we built
12 this tool in a way that it could be used for a
13 scientific study of PTSD, not just as a therapy
14 tool, so we were doing a series of studies with a
15 bunch of different groups.

16 I just want to mention a D-Cycloserine
17 study in combination with exposure and VR, Barbara
18 Rothbaum and Mike Davis had done a study with fear
19 of heights individuals in VR and showed that
20 adding D-Cycloserine compound seems to enhance the
21 conditioning process, reduce the number of trials.
22 We have an NIH funded project with them.

1 Joann Difede who did the World Trade
2 Center treatment is working with emergency
3 personnel that went through 9/11 that were also
4 reservists that went to Iraq, so they sort of have
5 double experience of trauma. So there are two
6 that I think were pretty neat, but a whole series
7 of application.

8 Now, what does this add aside from
9 possible treatment enhancements? We know, as
10 mentioned in the last talk, that it's hard to get
11 folks in treatment. For all the reasons that were
12 previously discussed, this is an issue. What
13 about if we reconceptualize therapy? We call it
14 post-combat reintegration training and with VR it
15 may appeal to soldiers, the current cohort
16 soldiers that grew up with video games. It takes
17 the illness of tell me about your mother, but that
18 will happen in the therapy eventually as they
19 become engaged, but it may draw more people in.
20 This has been shown in civilian populations with
21 fear of flying. Brenda Wiederhold has presented
22 some data on people that would never go to a

1 therapist, they claim they would never go to a
2 therapist and deal with their fear of flying, they
3 see something on the evening news about this
4 project and they go, Wow, let me try that VR
5 stuff. They go in and they get therapeutic
6 benefit from it. We're hoping we can do the same
7 thing here. Of course, why do this work? Aside
8 from the ethical responsibilities, we're thinking
9 we can use some of this work to fuel our interest
10 in selection and stress inoculation, of course
11 healthcare savings. I have a report that came
12 out last week from the JFK School of Government at
13 Harvard that outlines three possible cost
14 scenarios for medical care that I think everybody
15 in this room should read. There's a lot of value
16 in trying to address this stuff up front, because
17 the financial challenges in the future will be
18 significant. These are just some stats from the
19 VA from a couple of fact sheets.

20 I want to close with a video that --
21 let's see if this will work. You'll have to see
22 this. You may recognize this fellow here.

1 (Video playing)

2 DR. RIZZO: Since we can't show a

3 patient we have a news reporter doing the

4 application and you'll see something happening.

5 He was a reporter, we threw everything but the

6 kitchen sink at him, but we didn't do anything

7 progressive. "I have to tell you, I was stunned

8 by my reaction. I mean, I know it's only a

9 simulation, but my reaction was so powerful. What

10 I didn't show you was that I went to that

11 simulation two more times. I can't say that it

12 ever really got any easier, but I did feel more in

13 control, and from what the psychologists tell me,

14 that's the goal. Face your fears until you can

15 control them, maybe even defeat them. Now, this

16 therapy is only available on a limited basis, but

17 it does seem to be very effective at treating our

18 warriors who are coming home. Dr. Sanjay Gupta,

19 CNN, Atlanta."

20 With that said, future research,

21 enhanced therapy, acute stress in theater,

22 assessment is a big area here using

1 physiological, some imaging techniques. We
2 have a controlled stimulus environment, we can
3 precisely deliver stimuli. I think it's a good
4 match for physio and brain imaging. Initial
5 selection, stress inoculation and we're
6 developing an application to deal with family
7 members for the return home, deal with the
8 unrealistic expectations, somebody who is one
9 day in this environment and then a week later
10 they're home. What we've done is we have an
11 application at USC that's an automated,
12 narrative story generator and an automatic
13 tutoring so the family member can interact with
14 a virtual representation of their loved ones in
15 common every day environments and learn from it
16 what might possibly occur upon the return home.
17 There's a project we're trying to get off the
18 ground now. We've also taken city scenes and
19 built a series of cognitive tests that we'll
20 have to talk about it another time, because I'm
21 way over my agreed upon time. The full demo
22 will be set up in Washington in June at the

1 Cybertherapy conference if anybody is in the
2 Washington area in June. The psychologist's
3 dream, this is what we've all wanted
4 experimental psychology systematic control of
5 an environment, test people or lab animals or
6 whatever in a controlled environment and we'll
7 get how they perform. This is what VR offers.
8 If anybody wants a copy of the real video that
9 will work on your computer, I have it with me
10 on a disk on key. I'm done. I'm over my time,
11 so I should stop.

12 DR. MacDERMID: Our next speaker is
13 Captain Reger who bears a striking resemblance,
14 you'll note, to Mr. Reger from this morning.
15 That's not an accident. Welcome.

16 CAPT REGER: Good morning, General
17 Kiley, members of the task force. My name is
18 Captain Reger. I'm a clinical psychologist with
19 the 98th Medical Detachment combat stress control
20 or the 62nd Medical Brigade and I have been
21 working with behavioral health applications and
22 virtual reality since 1998 collaborating with Dr.

1 Rizzo since that time and in the last two years
2 working with the Army Behavioral Health Technology
3 office at Madigan to look at applications of the
4 work with VR Iraq with the Army. My interests are
5 not only with how do we use this technology at the
6 medical center or the medac, but I'm also
7 interested in those mental health deployers who
8 are asked to go down range and help our soldiers
9 who are in harm's way; does the technology offer
10 anything in the operational environment with
11 mental health providers who are asked to consult
12 with commanders in difficult decision making, in
13 real time in the real world? My brief discussion
14 today will include both a discussion of use and
15 potential of VR in operational environments as
16 well as some of the work in more of the
17 traditional medical center. Next slide.

18 I want to start by acknowledging the
19 soldiers of the 98th. Nothing that we do is done
20 individually, and the efforts of the soldiers and
21 some of the work I'll be discussing was done
22 during a year-long deployment to Iraq and I want

1 to acknowledge their work. I also want to
2 acknowledge our partners, ICT with Dr. Rizzo and
3 the work that we're currently doing is funding by
4 TATRC grant and we're grateful for that support.
5 Next slide.

6 Given that my discussion will include a
7 discussion of operational environments, I'm very
8 briefly going to talk about Army combat stress
9 control. We'll talk about a project where we took
10 the VR Iraq into theater and some of the lessons
11 learned from that as well as our current projects.
12 Next slide.

13 Combat stress is the mental, physical or
14 emotional tension strain or distress that's a
15 result of military operations. It occurs in
16 otherwise health soldiers. The stressors that
17 come from military operations come from a variety
18 of sources. It can include environmental
19 stressors, such as heat, temperatures that we
20 experienced topped 130 degrees, cold, wetness.
21 You see a slide there at the top right,
22 surprisingly the rainy season in Iraq is extremely

1 uncomfortable and that produces some unusual
2 stressors. There's a variety of these
3 environmental stressors. There's also the
4 physiological stressors, sleep deprivation,
5 sustained operations, the demands on the
6 physiology of all the hard work and the muscular
7 exhaustion. There's the cognitive stressors that
8 occur in military operations including challenges
9 of decision making in ambiguous circumstances, the
10 difficulties of uncertainty or unpredictability
11 and figuring out how to employ the rules of
12 engagement from a theater operation. These
13 stressors affect our courageous warriors and the
14 cognitive domain is a very important one,
15 obviously, the emotional domain; all of the
16 various stressors that are under the large
17 umbrella of home front concerns and worries and
18 the effect to families. So given the potentially
19 significant role of combat stress on the
20 individual soldier as well as the success of the
21 mission, the military and the Army deploys combat
22 stress control detachments, go down range with

1 soldiers and try to minimize maladaptive stress
2 reactions, maximize adaptive reactions to stress.
3 Assist soldiers with controlling their stress
4 reactions and finally when necessary, treating
5 mental health disorders. It was into this
6 environment that I took the virtual reality Iraq
7 to help us think through what role, if any, does
8 virtual reality technology have to this mission?
9 Next slide, please.

10 The goals of taking this hardware down
11 range was first we wanted to test the
12 deployability of the current technologies.
13 Whether it's this new ballistic eyewear or desert
14 cooling environments, whatever the new technology
15 is, Army researchers often send this technology
16 into theater to test whether or not what looks
17 good in the lab actually passes the
18 boots-on-the-ground test. So we wanted to test
19 whether or not, is the hardware at this point even
20 realistically deployable. Is it going to sustain
21 the rigors? Can the head-mounted display system
22 with these computer screens going to sustain the

1 rigors of that environment challenge? Can these
2 computers sustain that? What about these gaming
3 pads, and the head-tracking systems, can they work
4 in this kind of environment? We also wanted to
5 obtain user-centered feedback on the realism of
6 the VR Iraq. As Dr. Rizzo mentioned that the
7 researchers at USC are not soldiers, they have not
8 deployed into combat and they're doing a great job
9 with what they've got, but we need to get them
10 some real feedback from soldiers, airmen, Marines,
11 sailors that have been there and understand how to
12 make this realistic. If the VR Iraq is nothing
13 more than a fun game, then clinically it's not
14 useful. Finally, this feedback is particularly
15 important because it remains a prototype. And Dr.
16 Rizzo and ITC continues to develop it, we can get
17 them that feedback and continue to refine the
18 project. Next slide.

19 What did we find? We found that the
20 technology was surprisingly deployable. It
21 sustained the shipment to and from Iraq. And I
22 have to say that when it wasn't in use, we were

1 able to store in a former Iraqi building. It was
2 a hardened building. It was not well built, so
3 they still had significant challenges with sand
4 storms and the sand getting in and such. So we
5 were impressed with the durability of the
6 hardware, the fact that it did sustain it. We
7 lost two computer batteries that just fried out in
8 the heat, but otherwise it did well. As far as
9 the user- centered design from soldiers, we did --
10 research is not our primary mission out there,
11 it's not the mission of our higher headquarters,
12 so we did run into difficulties of obtaining a
13 timely approval of an IRB protocol, so that
14 portion of the project was not implemented and it
15 helped shape our future directions. The
16 deployment of the VR Iraq though did prime us to
17 consider what role might this have for future use
18 in this kind of environment? When we were in
19 theater we had daily interactions with commanders
20 that asked us to consult with them to answer
21 difficult clinical questions. I think that the VR
22 Iraq has potential to assist in that consultation.

1 I'll discuss this more in just a moment. Finally,
2 these experiences helped to shape the projects
3 that the ABHC at Madigan in some of the following
4 ways. Next slide.

5 First, how can it help deployed
6 clinicians with difficult decision making? Well,
7 a representative, but hypothetical case might be
8 of a commander who has a soldier, who, following
9 an IED attack during a convoy has a normal
10 reaction of fear going back on the road. They may
11 not have a mental health disorder, but they have a
12 normal fearful reaction. The soldier wants to get
13 back to duty but isn't sure they can manage the
14 fear in a way that gets them back on the road.
15 The commander then is faced with the difficult
16 decision of safety versus retaining that manpower
17 versus are they well enough to do the job. These
18 are difficult decisions. Current doctrine
19 provides us guidance on how to work with these
20 soldiers. But it was interesting to consider
21 whether or not the role of the VR Iraq with a
22 convoy scenario that would allow me to assess

1 behavioral and physiological reactions in a
2 simulated convoy and simulated combat might help
3 inform my clinical decision making and
4 recommendations to that commander. I think it
5 provides us one more additional tool for the kinds
6 of decisions we need to make.

7 Second, it also can play a role I think
8 enhancing soldier confidence in their skills.
9 This is a central component of combat stress
10 control doctrine. For example the combat medic
11 who is unable to save a soldier in a difficult
12 situation, sometimes might be employed at a local
13 medical treatment facility in theater to help them
14 regain their confidence in their medical treatment
15 skills. This is something that we would do in
16 theater with soldiers. I wonder about the
17 potential of VR Iraq to help us enhance soldier
18 confidence when it waxes and wanes during the
19 course of a deployment for our war fighters who
20 are out there doing difficult work.

21 Finally, the potential for assisting in
22 triage. Again, the combination of physiological

1 assessment behavioral reaction in a virtual combat
2 scenario might assist us in differentiating and
3 triaging the different kinds of soldiers that we
4 encounter. Next slide.

5 Our current projects, since we were
6 unable to implement the user-center designed
7 feedback protocol in theater; we're doing it back
8 home. We are currently collecting data with an
9 IRB approved protocol from soldiers who have
10 deployed in the last year to give us feedback on
11 how realistic is this. What are the ways that the
12 visual stimuli can be improved? How realistic are
13 the sounds? How much do you feel like you are
14 there? Again, if this is just a full spectrum
15 warrior video game that makes us feel like we're
16 having a good time, not clinically useful. But if
17 it is good enough and realistic enough, or can be
18 made good enough or realistic enough to actually
19 emotionally engage these soldiers, it looks like
20 based on some of the stuff Dr. Rizzo showed you
21 it's getting pretty close already, then it can
22 useful.

1 Second, we're developing a protocol to
2 explore the potential for improving the assessment
3 of PTSD based on some of the things Dr. Rizzo
4 already discussed.

5 Third, we're interested in -- one of our
6 partners is Vanderson Simulation Center, Ft.
7 Lewis. They do medical simulations. Many of
8 those medical simulations are in a white painted
9 hospital room. You wonder about the integration
10 of VR Iraq in other simulation technologies and
11 virtual reality to augment medical simulations in
12 order to make them have a little more ecological
13 validity.

14 Finally, we're developing a center for
15 virtual reality behavioral health treatment at
16 Madigan. We've developed a protocol to train
17 clinicians to a standard in order to implement
18 virtual reality treatment of PTSD. This
19 credentialing process will be through the hospital
20 and then we'll ensure that the clinician is
21 appropriately trained to do this kind of work.
22 Then we're also acquiring other technologies to

1 treat a variety of anxiety disorders with virtual
2 reality and really to begin to implement this, not
3 just on the research end, but into the clinical
4 side of the house as well.

5 Subject to the task force questions,
6 I'll be followed by the next speaker.

7 DR. MacDERMID: Anybody have questions?
8 Okay. Let's move along. Thank you very much.

9 COL GAHM: Our final speaker this
10 morning is Dr. Marmar up here from San Francisco.

11 DR. MARMAR: Good morning, General
12 Kiley, members of the task force. It's a pleasure
13 to have the chance to address you this morning.
14 I'd like to briefly try to present you an overview
15 of our current research on identifying risk and
16 resilience factors for post traumatic stress
17 disorder with obviously an emphasis on DoD
18 applications. These are briefly my collaborators.
19 I'm Professor and vice-chair of psychiatry in San
20 Francisco and Chief of the mental health service
21 at the San Francisco VA Medical Center, and we
22 have a large number of colleagues involved in our

1 collaborative research effort. Next slide,
2 please.
3 A lot is known about risk and resilience
4 for PTSD, but most of it is known after the fact.
5 So these are from cross-sectional studies of
6 people who have already been exposed to traumatic
7 events. These are some of the factors that are
8 believed in cross-sectional and longitudinal
9 studies to be associated with greater risk for
10 PTSD being female, at least in the civilian
11 sector, not necessarily in military populations.
12 Childhood trauma across all populations, a
13 personal or family history of psychiatric
14 disorders, poor social support, stressful life
15 events, before or after the traumatic exposure,
16 and most importantly greater distress at the time
17 of traumatic exposure and in the days and weeks
18 afterwards. Next slide, please.

19 Now, in order to address the potential
20 confounds of pre-exposure vulnerability and
21 post-exposure response, we were successful in
22 seeking NIH support to do one of the first ever

1 large-scale prospective study of a population with
2 DoD relevance. That's young men and women
3 enrolled in police academies in the Bay area and
4 in New York. Most of our subjects actually have
5 been from the New York police academy. We assess
6 them very carefully during baseline. That is when
7 they're young, healthy, physically fit and have
8 not been exposed to critical incident stressors in
9 police service. And then we assess them every six
10 months on self-report measures and every year with
11 detailed interviews. Next slide, please.

12 The actual study is very complex and has
13 multiple components and today I'm going to
14 emphasize more the biological predictors with
15 startle, stress hormone responses to police
16 incident simulation, HPA axis responding. We have
17 an extensive subcomponent setting sleep
18 disturbances and genetic family history studies,
19 et cetera, and we have many outcomes for the
20 study. But today for simplicity, I'm going to
21 focus more on some of the biological predictors
22 and their ability to help us to understand who is

1 and is not coping better with police- related
2 critical incident stress. Next slide, please.

3 The first study I'm going to present to
4 you is a study of biological stress response to a
5 very graphic videotaped simulation of actual
6 police stressors. Dr. Otte in our group took the
7 lead in this study. Next slide.

8 In particular, I'm going to focus on
9 some of the differences related to early traumatic
10 stress exposure, that is differences in the way
11 those who have had childhood or early adolescent
12 trauma exposure respond to graphic simulation of
13 police service. It is believed that early
14 exposure to life threatening events increases
15 reactivity to subsequent adult stressors with
16 great relevance for police and military service.
17 Next slide.

18 The research question for this sub-study
19 is: Is exposure to trauma up to age 13 associated
20 with an increase both biological and psychology
21 stress response in healthy adults, young men and
22 women in police service, without any current

1 psychopathology? I should say of the 400 men and
2 women who have been enrolled into our study today,
3 not a single one has met criteria for any
4 significant psychiatric disorder, using a reliable
5 structured diagnostic interview, the SCID and
6 using the caps to screen for PTSD. Next slide.

7 So the participants in this first
8 setting -- by the way, we have now enrolled 400,
9 and the initial results to one year that I'm going
10 to show you today are on a smaller sub-sample.
11 This particular sub-sample were the first 76
12 enrolled being the age of 28. We expose them to a
13 20-minute stress video in which real life police
14 officers are exposed to life threatening events.
15 This is not a simulation. These are police
16 officers caught on video with their life being
17 threatened, an officer hit by a car, an officer
18 mauled by a dog, these are very stressful videos
19 to watch even for us as people who are outside of
20 police service and we measure stress hormones
21 emphasizing particularly cortisol and
22 catecholamine, adrenaline, noradrenaline,

1 metabolite, MHPG in saliva and assess childhood
2 trauma. Next slide.

3 We are finding in our sample of 400
4 police academy recruits that approximately 25
5 percent have been exposed to a life-threatening
6 event by age 14. That's fairly representative of
7 the general population. If you look at those in
8 the first 76 with childhood trauma, compared to
9 those without, their age, demographics, current
10 diagnoses, none on either group met any Axis I
11 SCID diagnosis. A slightly greater increase risk
12 of lifetime depression are those with childhood
13 trauma and current alcohol use is not different.
14 Current psychopathology is generally very similar.
15 Next slide, please.

16 Now, upon completion of the 20-minute
17 video, we ask them to rate on a scale from 0 to 10
18 how upsetting did you find this videotape. You
19 can see those who were childhood trauma positive
20 significantly reported higher levels of distress
21 watching the video. But as has been very
22 importantly pointed out, self-report measures and

1 even clinical interviews by themselves are subject
2 to over and under-reporting biases. So the
3 question is: Can we go beyond self-report to
4 objective biological measures of stress
5 reactivity? That's really what I'm going to talk
6 to you most about this morning. Next slide.

7 We assessed in saliva under laboratory
8 conditions, levels of MHPG the primary metabolite
9 of adrenaline, noradrenalin in saliva, and we
10 assessed it before the videotape, at the
11 conclusion of the 20-minute videotape and during
12 the recovery period, 20 minutes later. I just
13 want to point out two things. When we look at
14 those who had a history of childhood trauma and
15 compared those who did not have a history of
16 childhood trauma. The first is, those with the
17 history of childhood trauma came into the
18 laboratory challenged at a higher level of
19 arousal. Before they were even exposed to the
20 videotape. Second, they showed an incubating
21 pattern of greater adrenaline responding during
22 the tape, and a point of interest to us, during

1 the recovery period. We do not know where this
2 recovery period returns because of the limitations
3 of the experiment. Those without a childhood
4 trauma history showed a minimal response and
5 quickly recovered. Next slide, please.

6 Adjusted for baseline, this shows the
7 percent increase in the marker of adrenaline
8 reaction in those childhood trauma positives and
9 those without childhood trauma. It's quite a
10 striking difference. Next slide.

11 If you look at cortisol, both groups
12 showed a vigorous cortisol response, but the
13 childhood trauma positive and negative groups
14 showed a similar profile. So it's the adrenaline
15 responding, not the cortisol responding that
16 differentiates these two groups, which was quite
17 interesting. Next slide.

18 There are a number of limitations to
19 this study. It's just the beginning of our study.
20 It's only less than a quarter of our sample. Our
21 experiment is designed to study 400 people for the
22 first seven years of police service. We know have

1 a few hundred up to one year of police service.
2 But just to say, very importantly, this is not a
3 random sample of police officers, it's those who
4 agreed to participate in the study, so we make no
5 general claim about how well these findings
6 generalize, although we do know that the 400 who
7 enrolled in the study are demographically the same
8 as the 7,000 academy members from which they were
9 drawn. Next slide.

10 Now the second conclusion. Childhood
11 trauma is associated with increased catecholamine
12 response to stress. This may be very important in
13 terms of our understanding of either the
14 vulnerability of PTSD and/or the results of
15 traumatic life exposure in terms of the proposed
16 neurocircuitry of PTSD and we ask the question,
17 will officers with childhood trauma and/or
18 increased stress catecholamine response to the
19 video, might they be at greater risk for PTSD
20 symptoms? Next slide.

21 These are the first results. By the way
22 this is the first 50 subjects who completed this

1 experiment and those with greater catecholamine
2 responses are showing greater PTSD symptoms at six
3 months and 12 months of police service and we now
4 have this up to 180 subjects at one year and the
5 results appear to be consistent. Next slide.

6 The second study we undertook was to
7 look at another potential biological marker of
8 stress reactivity and that is acoustic startle.
9 As Dr. Rizzo was demonstrating in his VR work,
10 when you expose people to a loud sound they will
11 jump. You can do this under experimental
12 conditions using the administration of random
13 bursts of loud sound and monitoring physiological
14 responding. As an acute acoustic startle test,
15 Dr. Pole was the lead officer on this component
16 study. Next slide.

17 The subsample I'll present to you from
18 our 400 today is the first 101 police academy
19 recruits that we studied. This may be of interest
20 to you. In terms of the 25 percent who do have
21 childhood trauma, you can see the more common
22 ones, having your life threatened in a natural

1 disaster; one in three of those with childhood
2 trauma reported a life threatening otherwise
3 traumatizing physical assault, mugging, a life
4 threatening illness, motorcycle accident and
5 sexual abuse being relatively small in this group.
6 No current psychopathology on the Axis I
7 diagnosis. Next slide.

8 Again, if you compare the 25 percent
9 with childhood trauma against the 75 percent
10 without childhood trauma, they're very similar
11 demographically. No different than adult trauma
12 exposure. And of interest, they're very similar
13 -- not only are they SCID negative for Axis I
14 psychiatric disorders, they're similar on trade
15 anxiety, positive and negative moods and overall
16 general psychopathology. So they're young,
17 healthy and currently free of psychiatric
18 distress, but carry the vulnerability of having
19 been exposed during childhood. Next slide.

20 We looked at acoustic startle and we
21 looked at it under three different conditions of
22 threat, which we call low, medium and high threat.

1 I should also say this speaks to the wonderful,
2 trusting collaboration we have with the NYPD. Low
3 threat is just listen to a low burst of sound and
4 we measure your response. Medium threat is
5 agreed, and all 400 agreed to this, to wear an
6 electrode on their finger. They were told you
7 will not receive a mild shock during this set of
8 trials. In the high stress they had an electrode
9 on their finger and they were told they would
10 receive a mild shock similar to touching your
11 finger on a doorknob if you rub your socks walking
12 across the carpet. Everyone was free to decline
13 this. The departments all agreed to this and
14 every participant agreed to the study. What we
15 were particularly interested in is this medium
16 threat condition in which we ask you, Listen,
17 please trust us. You have an electrode, but we
18 will not give you a shock. We thought that those
19 with a history of prior trauma might be more
20 anxious in an ambiguous threat condition. What we
21 did find, first of all, is that under all three
22 conditions, low, medium and high threat, those

1 with the childhood trauma history had higher
2 physiological responding to the startle reaction,
3 both in terms of their eye blink, muscle response,
4 their palm or skin conductance and their heart
5 rate acceleration when they were exposed to the
6 sound. Next slide.

7 Then if you look in the first run, at
8 the relationship of the low, medium and high
9 threat condition, to their responses to their
10 actual correlation with symptoms, with PTSD
11 symptoms of one year of police service, you can
12 see that it is primarily reactivity during the
13 ambiguous medium threat condition that's more
14 related to PTSD symptoms at one year. So greater
15 skin conductance response, a greater heart rate
16 response to ambiguous threat during academy
17 training is related to higher PTSD symptom at one
18 year. Next slide.

19 This is some data on IQ testings. This
20 just shows that higher IQ was protective. Next
21 slide, please.

22 This shows the correlation. Next slide.

1 Family history of PTSD. We found in our family
2 history -- we did an in-depth family history
3 interview, you've seen the Myrna Weissman family
4 history questionnaire and our finding of family
5 history of depression and a family history of PTSD
6 symptoms to be related to greater distress at one
7 year of police service. Next slide.

8 In particular, of all of the predictors
9 of PTSD from our research over the last decade, if
10 you really want to look across all of the various
11 vulnerability factors, and ask what simple marker
12 will best explain who will develop PTSD one year
13 after combat or police service or other civilian
14 trauma, it's really how upset you were emotionally
15 during the exposure itself and how long it took
16 you to recover to your baseline afterwards. So
17 it's emotional reactivity, sweating, heart racing,
18 shaking, other stressful emotion during the
19 exposure and how long it takes to calm down
20 afterwards. These are correlations with PTSD
21 symptoms between the worst police incidents in the
22 first year and cumulative and incident-specific

1 PTSD symptoms at one year of police service
2 showing high relations. Next slide.
3 One of the next steps in this police
4 study, we have recently resubmitted this grant for
5 competitive renewal to NIH. We got a very
6 favorable score. It looks like we will be renewed
7 shortly and we have received permission from the
8 police departments to include at the next phase of
9 research, genotyping, or genetic markers of PTSD,
10 and to conduct brain imaging studies before and
11 after exposure to critical incident studies and to
12 follow the cohort, which is now at two years to
13 seven years. The highest risk for dropping out of
14 police service is year's three to five. So we
15 believe we will capture those who are becoming
16 more distressed versus those who are more
17 resilient. Next slide.

18 I want to conclude by saying something
19 about what we believe to be the most important
20 biological marker for studies of PTSD, and that is
21 advanced brain imaging tools that can be used to
22 inform the diagnosis and treatment and prognosis

1 for PTSD. My colleagues in this study are Dr.
2 Neylan, Dr. Meyerhoff, Dr. Schuff, and Dr.
3 Michael Weiner, who directs our neuroimaging DoD
4 funded center of excellence in neurodegenerative
5 disorders. Next slide.

6 There are many areas of the brain that
7 are candidate areas for biomarkers or diagnostic
8 markers for PTSD and in the interest of time, I'm
9 only going to focus on the one that has received
10 the greatest attention and it is the hippocampus,
11 very important for memory processing. Hippocampus
12 is a Greek word for seahorse and you can see that
13 the hippocampi are bilaterally represented
14 seahorse-shaped structures that are part of the
15 mesolimbic system. Next slide.

16 This may be a little hard to see in this
17 light, but this is a meta-analysis done by Dr.
18 Bremner from Emory University, one of the leaders
19 in the neuroimaging of PTSD, showing if you look
20 across all of the public studies that in general
21 the studies show that the hippocampi in PTSD
22 compared to appropriate controls are smaller. Not

1 every study, but most of the imaging studies have
2 shown a smaller hippocampus, raising the question
3 of whether that is a pre-existing vulnerability
4 for PTSD or the consequence of having your life
5 threatened, particularly if repeatedly threatened.
6 Next slide.

7 There's some interesting data from Dr.
8 Gilbertson and Dr. Pitt in this group using a
9 Vietnam twin registry which suggests that having a
10 smaller hippocampus might be a pre-existing
11 vulnerability factor for PTSD. If so, imaging the
12 hippocampi of police officers and military
13 recruits might be extremely informative and
14 helping us understand risk and vulnerability.
15 This is a correlation, (off mike) sounds like
16 scatter quad, showing the correlation of
17 hippocampal volume and PTSD symptoms in twins who
18 were exposed in combat and you can see as the
19 hippocampus gets smaller that symptom severity
20 gets greater. So having a smaller hippocampus is
21 associated with greater PTSD symptom severity for
22 a twin who served in combat. This is

1 interestingly the correlation between the
2 hippocampal volume of the identical co-twin who
3 never served in combat and PTSD symptoms of the
4 twin exposed. You can predict the symptom
5 severity of the exposed twin just as successfully
6 from the hippocampal volume of the unexposed twin
7 as from the veteran themselves. Small study.
8 Very provocative, very interesting. If this were
9 to be replicated and if particularly we could
10 demonstrate smaller hippocampal volume as a risk
11 factor for police officers and for military
12 personnel who were imaged before deployment or
13 before police service, this would be of tremendous
14 interest. Next slide.

15 I'm going to conclude by telling you
16 about some new work that we're conducting at the
17 San Francisco VA and in our DoD funded center of
18 excellence in collaboration with Dr. Michael
19 Weiner and his colleagues who were fortunate to
20 recently receive a very high strength experimental
21 4 Tesla magnets, which can do a lot more than has
22 been done in brain imaging of PTSD, TBI and other

1 disorders. Briefly, what can it do? First of all
2 you get a much higher signal of sensitivity so you
3 get greater resolution for structural brain
4 imagining. Second, you can detect with great
5 sensitivity certain chemicals in the brain that
6 may be important in understanding either
7 vulnerability or reactions to life threat exposure
8 including glutamate and glutamine and several
9 other chemicals which I will show you in a moment
10 and also you can get improved measurements
11 directly of cerebral blood flow. So we can with
12 this magnet do PET equivalent scanning without the
13 use of any radioisotopes. Next slide, please.

14 This is an image, a 4T image of the
15 hippocampus and it's a little hard for you to see,
16 but I wanted to show is using high field magnetic
17 image resolution, we can measure, not only the
18 volume of the hippocampus, but actually separately
19 identify the volume of the major hippocampal
20 subfields and the associated structure, the
21 entorhinal cortex, the tubiculum regions CA1, CA2,
22 CA3 of the hippocampus and areas of the dentate

1 gyrus. It is believed from animal models that
2 vulnerability to stress and/or consequences of
3 stress exposure affect very specific regions of
4 the hippocampus. And we believe some of the
5 unreliability in the previous imaging studies has
6 had to do with the fact that up until now we have
7 not had the capacity to image specific hippocampal
8 subfields. We've just completed a study of 10
9 combat veterans with PTSD in controls using this
10 method and we will soon be analyzing that data to
11 see if there is a specific region of
12 vulnerability. Next slide.

13 You see that again here. These are the
14 specific hippocampal subfields. Next slide.

15 There's another thing that we can do
16 using a separate imagining technique referred to
17 as magnetic resonance spectroscopy. These are
18 spectra which show the presence of certain
19 chemicals in the brain and in the hippocampus.
20 What I wanted to present to you briefly is that we
21 have recently demonstrate and replicated in a
22 second study a profile that might be a signature

1 for PTSD using chemicals in the hippocampus rather
2 than the structure of it. The signal we were
3 getting is a reduction of one peak N-acetyl
4 aspartate, which is a marker of healthy neuromal
5 function. So this pattern was characteristic of
6 our PTSD subjects and this pattern is
7 characteristic of normal control. I just suggest
8 this to you as an example of our beginning search
9 for a true biomarker or diagnostic marker of PTSD.
10 Next slide.

11 Again, just as 4T imagining can produce
12 a much more specific structural anatomical picture
13 of the brain, including the brain and PTSD, 4T
14 magnets produce a much more complex picture of the
15 biochemical spectra of various chemical molecules
16 in the brain. Just as one example, we do not see
17 a glutamate peak in our 1.5T imaging, but we do
18 with our 4 Tesla imagining. We're able to detect
19 it reliably. Next slide.

20 Why is that important? Glutamate has
21 been shown in animal models to be extremely
22 important in explaining stress reactions. It's an

1 excitory amino acid, it is present in high
2 concentration in the hippocampus. It's very
3 important for the formation of emotional memories
4 at the molecular level. In high levels it causes
5 brain damages, this has been shown in epilepsy.
6 There's reason to believe that stress, including
7 traumatic stress, results in an increase release
8 of glutamate. So we will have the capacity -- in
9 fact, are currently conducting a study in which we
10 are doing 4T imaging and looking at glutamate in
11 the brain before and after treatment with CBT and
12 D-Cycloserine a study that Dr. Rizzo mentioned.
13 We are also funded to do such a study. This is an
14 example of how one might look for changes in brain
15 chemicals with successful treatment. Next slide.

16 There are other things you can do with
17 4T structural imaging that you can't do with 1.5T.
18 One thing we can do is using a technique called
19 diffusion tensor imagining. We can actually
20 create three-dimensional models of the tracks
21 connecting different areas of the brain. This is
22 an example of a 3-D reconstruction of the corpus

1 callosum in the brain, the structure that connects
2 both sides of the brain. We will do this to
3 investigate the neurocircuitry of PTSD. Next
4 slide.

5 I mentioned that you can do PET
6 equivalency with this machine without
7 radioisotopes. This is just an example of areas
8 of lower perfusion of the brain and one of the
9 neurological disorders. This is completely
10 noninvasive. You just image people and you can
11 construct different areas of brain flow. Next
12 slide.

13 I'll conclude with this. What are our
14 recommendations for this task force, vis-à-vis the
15 notion of biological markers of PTSD? First,
16 we're recommending support to increase research in
17 identifying neuroimaging markers; I would say
18 other biological markers as well for PTSD, and to
19 test them in prospective longitudinal design
20 similar to our current police study. Why? If we
21 were to successfully do that, what could we learn?
22 First we could establish a gold-standard

1 diagnostic biological marker which would be
2 objective and would move beyond self report,
3 clinical interviews, neuropsychological testing,
4 et cetera, and would serve as an objective
5 biomarker. Then once establishing an objective
6 biomarker we could then move backwards and try to
7 validate some simpler and less expensive test such
8 as laboratory blood and urine screening or
9 self-report measures against the gold- standard
10 brain imaging diagnosis. Third, we could identify
11 risk factors by imaging before and after
12 deployments. We could use neuroimaging to inform
13 resilience-building strategies for those who are
14 more vulnerable. They might form new treatment
15 developments. Right now we don't have good ways
16 of know which treatment to give which patient for
17 PTSD, who should receive CBT, who should receive
18 medication, who should receive virtual reality
19 treatment. Not all patients respond to each
20 treatment. We will use these techniques to try to
21 guide treatment selections. Finally, we could
22 image before and after treatment, which we are

1 doing in our work now. Both to document
2 objectively the outcome and we hope to discover
3 how behavioral and pharmacological treatments work
4 at the brain, mind and behavioral interface.
5 Thank you very much. That concludes my
6 presentation. I'd be happy to answer your
7 questions.

8 DR. MacDERMID: Thank you. Dr. Blazer?

9 DR. BLAZER: It's very interesting. One
10 thing that would be able to help us is could you
11 distinguish between markers for PTSD and markers
12 for vulnerability to PTSD and where you might draw
13 that line?

14 DR. MARMAR: I think at this stage in
15 the research it's somewhat difficult because most
16 of the markers for PTSD have been determined after
17 traumatic life exposure. In comparing those with
18 PTSD against trauma exposed controls and normal
19 controls. There, for example, we do see
20 heightened psychophysiological responding to
21 startle. The question is: Are those true
22 diagnostic markers of the disorder, are they

1 pre-existing risk factors or some combination? At
2 this stage of the research in terms of imaging
3 markers, genetic markers, and psychophysiological
4 responding, all we can say is I think we have
5 state markers of those with greater emotional
6 distress. In order to answer that question, we
7 must to prospective longitudinal studies of the
8 biomarkers.

9 DR. BLAZER: Is it possible in the
10 police study that enough of the subjects that are
11 in this study will undergo some kind of traumatic
12 event that you actually might be able to some of
13 that pre and post?

14 DR. MARMAR: In order to get this
15 prospective study funded, which is very, very
16 expensive, we had to demonstrate in a
17 cross-sectional study of 747 police officers,
18 funded by prior application, what the annual rate
19 of exposure was to a life threatening event in New
20 York and Bay area police officers. What we have
21 shown is that there is a 100 percent exposure rate
22 to a traumatic life threatening event in urban

1 police work in 18 months. So all are exposed by
2 two years, many have two or three life threatening
3 exposures by two years. And by seven years the
4 cumulative exposure is very high. So, yes, we
5 have adequate power to test these predictors
6 because everyone will be exposed.

7 DR. McCORMICK: The issue of
8 non-stigmatizing PTSD is an important one for the
9 task force. Based on the current science and the
10 current literature out there, what do you think
11 can be said about the degree to which biological
12 markers indicate that there is clearly a
13 biological substraight to the disorder?

14 DR. MARMAR: From an experimental point
15 of view, if we were to combine all of the
16 techniques available in neuroendocrine response,
17 psychophysiological response, neuroimaging
18 response, et cetera. We are building towards the
19 research level combination of factors with some
20 reasonable sensitivity and specificity. I would
21 say two things to be very cautious though. One,
22 we do not have a single reliable and valid

1 biomarker that you would feel reaches the level of
2 a diagnostic test. This is still at an
3 experimental stage in development. The second
4 thing I'd like to say is what our long-term hope
5 is to be able to use some of these more complex
6 and very expensive procedures. I mean, the
7 imaging procedure takes an hour; it costs \$500 to
8 acquire the image, another \$500 to read the image.
9 Our long-term goal would be to use those markers
10 to identify something like a common blood or urine
11 marker that could be done. When a pre-deployment
12 and post-deployment military personnel comes in
13 for a routine primary care screening, gets their
14 cholesterol panel screen, we could screen for
15 these markers if we could validate them against
16 some of the higher tech markers. But that is work
17 that remains to be done for the future. The short
18 answer to your question is none of these tests
19 have yet reached the level of a simple reliable
20 diagnostic marker.

21 DR. POWER: I think that the task force
22 does have some interest in trying to look at the

1 efficacy of interventions, so we've tried to
2 become more knowledgeable about risk factors, et
3 cetera, but I'm concerned about this issue about
4 resilience and how do we get our arms around
5 resiliency in terms of risk factors and resiliency
6 factors, and how do we cross-walk what we think
7 those risk factors are and what are we doing about
8 looking for chemical and biological markers for
9 resiliency. I try to talk to my friends at INH
10 and influence them around, we're at the molecular
11 level of the brain, but we're not just looking for
12 deficits from a risk factor standpoint. What are
13 those things that are effective in terms of
14 building resiliency, strengthening resiliency
15 factors and bringing that to bear at an individual
16 performance level? Can you comment Dr. Marmar
17 about where any of that work in terms of research
18 is going and where we might look for some answers
19 to the resiliency side of the equation?
20 DR. MARMAR: Maybe I could also use your
21 question, if you don't mind, as a brief point to
22 talk about the whole issue of risk and resilience

1 more broadly, philosophically in law enforcement
2 and the military. I'm often asked by my partners
3 in law enforcement and in the military, assuming
4 that we are successful, which we think we will be
5 in identifying these risk and resilience patterns,
6 what will we do with that knowledge? My answer
7 is: One, not exclude people who want to serve.
8 Two, use that knowledge to better inform
9 resilience building interventions that might help
10 prepare those who are more vulnerable to endure
11 life threat exposure, especially repeated life
12 threat exposure. That's very important. And
13 three, to help law enforcement and the military
14 and other groups to make informed decisions on how
15 to triage people into different worlds based on
16 their patterns. So the goal is really to inform
17 new tools in resilience building.

18 To answer your question specifically,
19 there are a lot of ideas about how to build
20 resilience for life threat exposure. There's
21 almost no data yet on either biological markers of
22 resilience that have actually been assessed before

1 and after deployment or before and after police
2 service. There's very little objective research
3 on behavioral or biological interventions to build
4 resilience, yet. There are many ideas, and the
5 ideas are common sense. Stress inoculation
6 training, exposing people to vivid simulations of
7 the actual kinds of events that they're going to
8 face in combat. For example the Iraqi village
9 training that's used in the DoD. Law enforcement
10 is very interested in creating critical incident
11 simulation training. Those kind of stress
12 inoculation procedures may be very helpful. There
13 may even be at some point biological interventions
14 that build resilience. But at this stage in the
15 research we don't have, yet, reliable markers of
16 the biology of resilience that have been tested in
17 prospective longitudinal design and we have not
18 conducted randomized control trials of resilience
19 building interventions that are tested pre-
20 deployment. I think it's an urgent priority to do
21 so.

22 LTG KILEY: Dr. Marmar, thanks very

1 much. Fascinating presentation. I'd like to
2 thank all of our presenters today. It's been a
3 series of exceptionally outstanding presentations
4 which I think are going to contribute much to the
5 mental health task force's work and body of
6 knowledge. I'd like to thank everyone else that's
7 attended the open sessions and we do appreciate
8 your comments and feedback. I hope you'll all be
9 back tomorrow at 3:15 when we have public
10 testimony, an open session with public testimony,
11 you all are welcome to attend again. At this
12 point I'd like to ask Colonel Davies to end the
13 open session.

14 COL DAVIES: Thank you, General Kiley.
15 The open session is hereby closed and will open up
16 again at 15:15 tomorrow.

17 (Whereupon, the PROCEEDINGS were
18 adjourned.)

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