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EXECUTIVE DIRECTOR

HEARING CENTER OF EXCELLENCE

Presentation to the Recovering Warrior Task Force
9 December 2013



DEPARTMENT OF DEFENSE
HEARING CENTER
OF EXCELLENCE



- Introduction and Purpose of the Hearing Center of Excellence (HCE)
- Update since 14 January 2013
 - Dec 2013 FOC
 - Leadership changes, staffing updates and pending decisions/approvals
 - Overall progress towards completion of goals and objectives
 - Joint Hearing Loss and Auditory System Injury Registry (JHASIR)
 - Status of JHASIR utilization plan
 - Research Productivity and Dissemination
 - Hearing-related practices to be considered change
 - Research discovery dissemination
 - HCE Influence
 - Most important accomplishments
 - Support needed to help fulfill HCE mission

On-track to Full Operating Capability (FOC)



INTRODUCTION AND PURPOSE

Hearing Center of Excellence



- **Combat is chaotic**
- **The ability to hear and communicate is**
 - Critical to safety (warrior and unit)
 - Central to effective command and control
 - A vital component for mission accomplishment
 - A key consideration in Force Management
 - Attrition, retrain, replace, recruit
- **The capability to prevent is available**
 - Education, Training & Surveillance
 - Hearing Protection Devices
 - Tactical Communication Devices
- **Readiness requires both**
 - Performance and Prevention

READINESS



POPULATION HEALTH



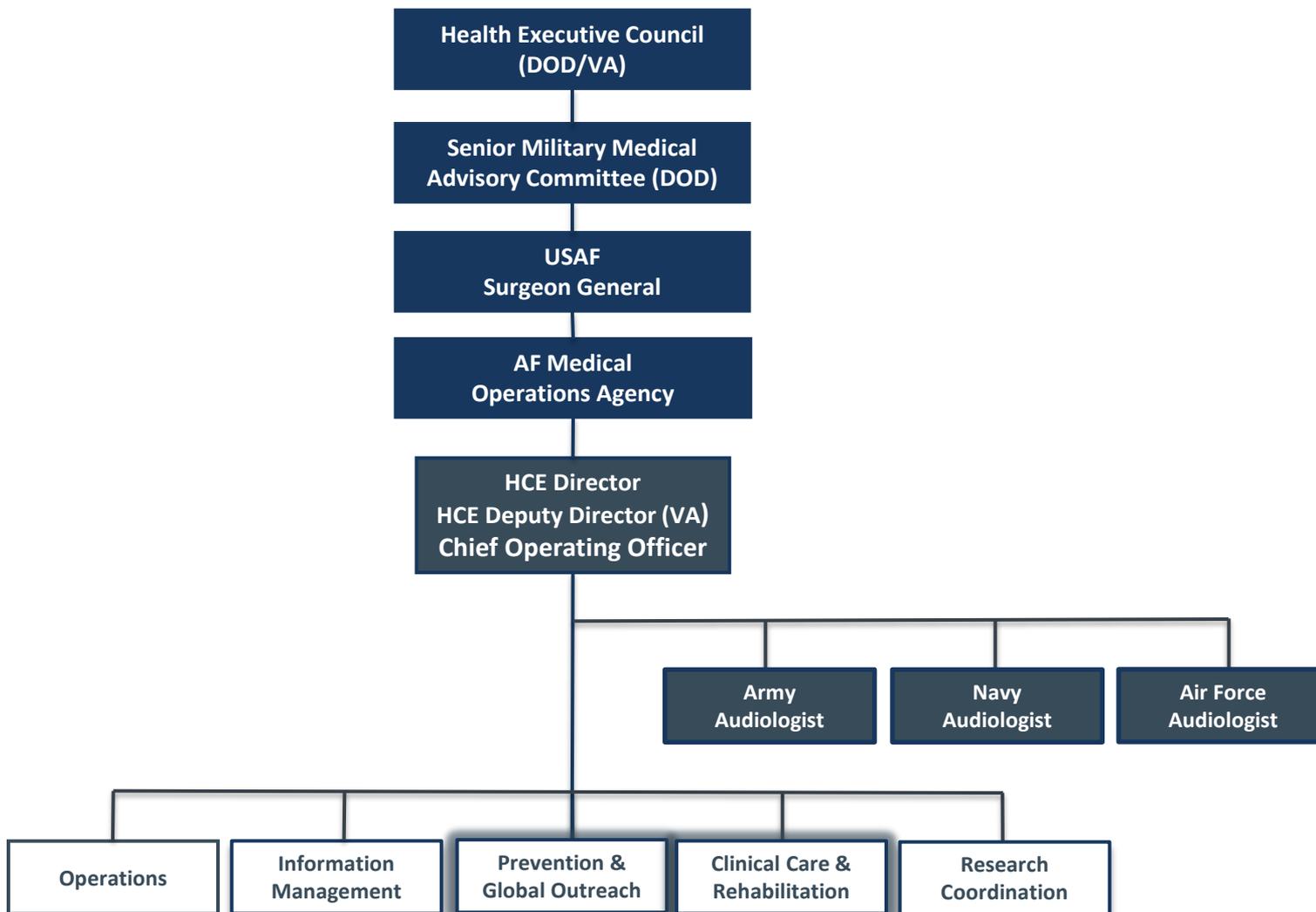
SCOPE OF INJURY

Scope of Injury

- Auditory injuries are the two most prevalent VA disabilities
 - 1.88 M Vets (970K tinnitus, 774K hearing loss)
 - 1.4M claims since 2001
 - 450K injuries from OEF, OIF, OND
 - \$2B annual
 - Hearing loss is insidious, cumulative, progressive, invisible

- READINESS – Hearing is critical to Military function
- POPULATION HEALTH – loss is endemic in industrial nations

- HCE is uniquely responsible for a highly prevalent injury, but also for a ubiquitous environmental threat in theater, in garrison, and at home



UPDATES SINCE JANUARY 2013

Hearing Center of Excellence

12/8/2013



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- ❌ HCE Hearing Health Improvement Network Established
- ❌ JHASIR activated
 - ✅ DUA, DTA, DSA – Ground work sharing authority established (DoD-VA)
 - ✅ DOEHRS - Occupational Audiograms captured and shared
 - ✅ AUIDBASE - Clinical Audiograms networked - Standardized
 - ✅ JHASIR concept approved
 - ✅ Reporting metrics established per NDAA
 - ❌ Auditory Data Mart complete
- ❌ DOD HCE is the “one voice” influencing DOD and other federal funding, regulation, and directives for issues regarding prevention, diagnosis, mitigation, treatment, rehabilitation, and research of hearing loss and auditory system injuries
- ❌ DOD VA transition partnership of auditory care defined
- ❌ DOD HCE prevention plan and education strategy implemented

- SECAF delegated as lead component; AF/SG oversight with Air Force Medical Operations Agency (AFMOA) support
 - CONOPS approved Jan 2012 – Director appointed Apr 2012
- ❖ VA Deputy Director selected: Lynn Henselman PhD
- Senior Military audiology liaison requested
 - ❖ AF – filled
 - Army/Navy can not fill vacancies (manning shortages)
- Civil Service positions finalized/classified; hiring action frozen; Wounded warrior waiver submitted - pending.
 - Chief of Staff
 - Engineer, PEO Soldier
 - Neurotologist
 - Logistics Administrator
 - Resource Administrator
 - Program Analyst

HCE GOALS & OBJECTIVES UPDATE

12/8/2013



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PROGRAM		01/13	Now
PREVENTION & SURVEILLANCE	Develop a Strategic Communications and Prevention Plan		
	Interval screening and questionnaire sampling of Military population		
	Develop downloadable educational tools for HCE website		
	Determine scope of FFD standards for appropriate Military Occupational Specialties (MOS)/AFSCs/Ratings		
	Integrated development of EARPRO Qualified Products List		
	Comprehensive Hearing Health Program Strategy developed		
	Standardized surveillance strategy outlined		
	Leveraging VA acquisitions for centralized purchase of hearing protection devices		



Completed



In Progress



Not Started



PROGRAM		01/13	Now
CLINICAL CARE & REHAB	Establish DOD Information Assurance Certifications and Accreditation Process (DIACAP) - interface Clinical audiometric data with JHASIR		
	Develop Clinical Practice Guidelines (CPGs), clinical tools, training enhancement: (simulation; dizzy; tinnitus; ASNHL; SSNHL)		
	Develop DoD fitness for duty standards; scope MOS/AFSCs/Ratings; catalogue noise environ; develop speech-in-noise test of critical task - 2015		
	Develop acquisition policy for hearing prosthetics leveraging VA purchasing power and online contract services		
	Sponsor Conferences and Workshops: Acoustic Trauma/FFD/acquisition standards/Military Vestibular Assessment Rehabilitation (MVAR)/Blast tinnitus conferences/ ECHO/ Device trng		
	Identify gaps and translate emerging technologies for care into MHS/AOR: Auditory diagnostics in theater; four prosthetic devices MHS; Vestib tools		
	Establish plan for transitional care sharing with VA		
	Identify Tele-audiology value for MHS strategic tele-health planning		



Completed



In Progress



Not Started



Iterative



PROGRAM		01/13	Now
Global Outreach	Hearing prosthesis acquisition standardization – Execute Policy		
	Partner with hearing health advocacy groups		
	Activate Hearing Health Caucus		
	Promote FFD, CPGs and clinical tools to appropriate clinical and line communities		
	Lead NATO effort addressing auditory injury and troop reintegration		
	Develop rehabilitation and restoration technologies with international partners; Coalition warfighter group; Inst of St Louis; Industry; ASIC		
	Establish advisory boards		

Completed
 In Progress
 Not Started

Iterative



PROGRAM		01/13	Now
INFORMATICS	Launch website		
	Interface Defense Occupational Environmental Health Readiness System-(DOEHRS-HC) data with authoritative personnel databases		
	Develop JHASIR architecture to interface DOEHRS-HC data, clinical audiometric data, Joint Theater Trauma Registry (JTTR) data JHASIR		
	Pilot JHASIR		
	Publish Inter-Agency business rules for data capture and sharing – including signed MOAs, DUAs, DTAs, DSAs		
	Provide VA DOEHRS data for baseline documentation		
	Develop reporting format and metrics		



Completed



In Progress



Not Started

Iterative



PROGRAM		01/13	Now
RESEARCH	Develop Auditory Research Program and charter Inter-Agency Auditory Research Working Group (ARWG); (AFFD; PIHL; CENC; ANSW2R)		
	Partner with Grant sponsoring agencies (provide Gap analysis, prioritization, scientific review, steering, programmatic review, and reporting)		
	Coordinate auditory research portfolios between sponsoring agencies		
	Consolidate auditory-vestibular scientific interests, resources and opportunities on interactive web –based platform.		
	Host collaborative research conference		
	Formal approval of MOU for HCE-Centralized IRB		
	Enable and encourage multisite DOD HCE investigations		
	Integrate with strategic planners for translational research		



Completed



In Progress



Not Started



Iterative



JOINT STRATEGIC PLAN PROGRESS

Develop a comprehensive plan for JHASIR utilization to encourage/facilitate research, development of best practices and clinical education



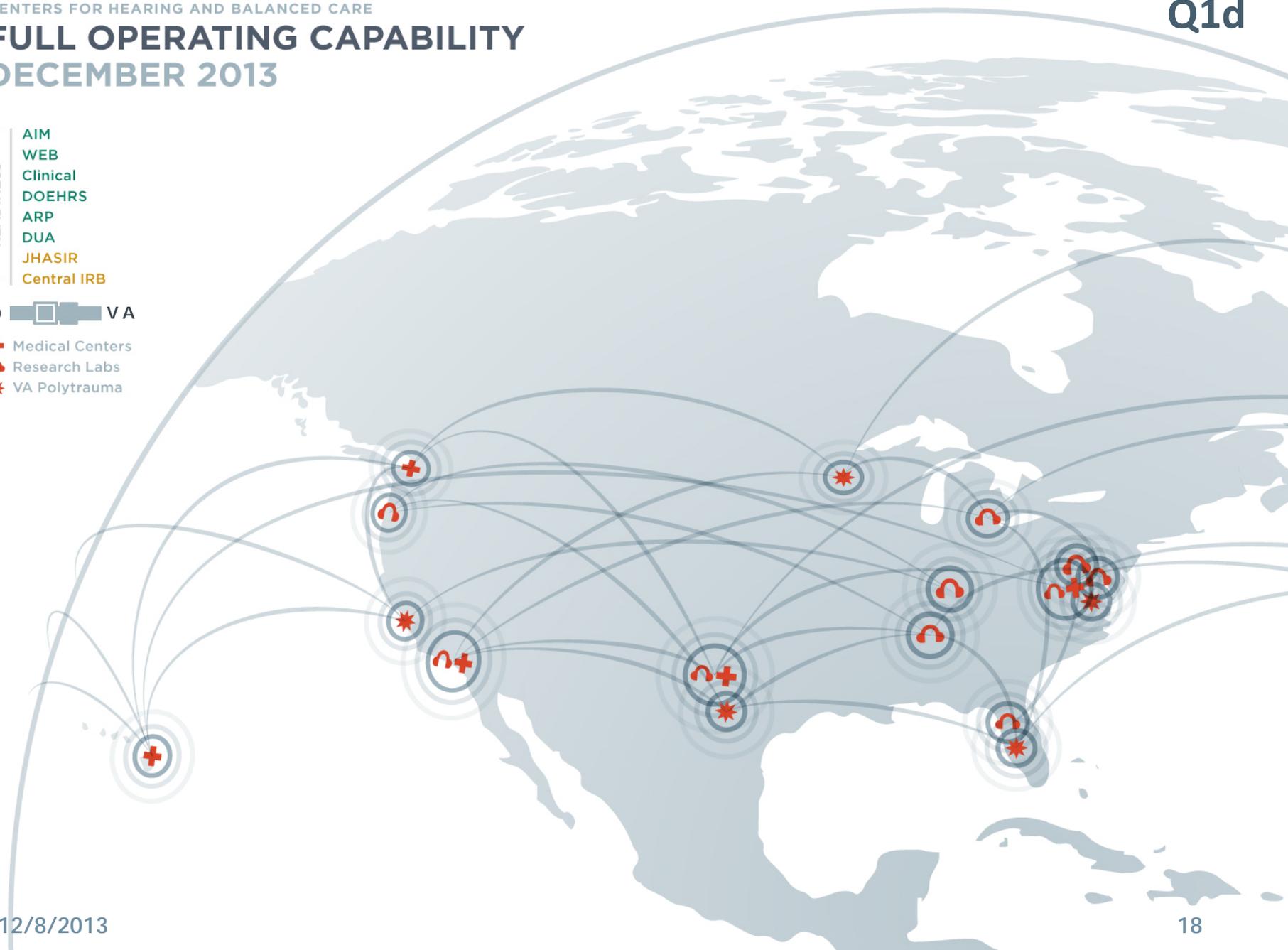
- 30 Jun 2012
 - Develop a comprehensive plan for JHASIR utilization to encourage/facilitate research, development of best practices and clinical education
- 14 Jan 2013
 - JHASIR architecture and reports feature under development – Course of Action approved January 2013
- Today
 - Developing Auditory Data Mart Under HSDW
 - Launching Audbase to standardize clinical data and pilot infrastructure
 - Hearing Health Improvement Network established to analyze and disseminate information
 - Active collaboration to utilize registry information are ready

FULL OPERATING CAPABILITY DECEMBER 2013

- ↑ READINESS
- AIM
 - WEB
 - Clinical
 - DOEHS
 - ARP
 - DUA
 - JHASIR
 - Central IRB
- ↓

DoD  VA

-  Medical Centers
-  Research Labs
-  VA Polytrauma



Service	Baseline Assessment	Annual Assessment (Population Health)	Annual Assessment ("Risk-based")
Army	Yes	Operational Personnel (90% of force since 2006)	
Navy	Yes	(In progress)	
Marine Corps	Yes	Yes (since 2012)	
Air Force			Yes



RESEARCH UPDATE

12/8/2013



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Number of Active Studies in FY2013 (Coordination Efforts)			Articles in Peer-Reviewed Publications	Poster/Podium Presentations
Number in Development	Number in IRB Review	Number in Data Collection		
26 (grant aps)	21 (contracted)	84 (active)	77	84

- **Coordination for Auditory Research (ARWG)**
 - Pharmaceutical Interventions for Hearing Loss (PIHL)
 - Auditory Fitness for Duty (AFFD)
 - DOD Otology Collaboration
 - DoD/VA epidemiology
- **Cross-COE efforts**
 - Allied NeuroSensory Warrior Related Research (ANSW2R/Polytrauma)
 - Chronic Effect of Neurotrauma Consortium (CENC)
 - Joint Steering Committees – (Gap analysis, prioritization, translation)
 - DoD/VA Guide to Collaborative Research
- **International Efforts**
 - NATO RTO 229
 - Coalition Warfare Program
 - Air and Space Interoperability Council (ASIC) – Aircrew Hearing Protection Project



Performance
Service Members

Prevention

Acute Care

Veterans
Rehabilitation

INJURY

brain
psyche
vision
hearing
pain
extremity

MOM

CCC

CRM

ONR

AFMS

NIH

ORD



RESEARCH LEADING CHANGE

12/8/2013



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**Journal of
Clinical
Epidemiology**

Journal of Clinical Epidemiology 60 (2007) 181–191

Millennium Cohort: enrollment begins a 21-year contribution to understanding the impact of military service

Margaret A.K. Ryan^{a,*}, Tyler C. Smith^a, Besa Smith^a, Paul Amoroso^b, Edward J. Boyko^c, Gregory C. Gray^d, Gary D. Gackstetter^{c,†}, James R. Riddle^f, Timothy S. Wells^f, Gia Gumbs^a, Thomas E. Corbeil^a, Tomoko I. Hooper^c

^aDepartment of Defense Center for Deployment Health Research, Naval Health Research Center, P.O. Box 85122, San Diego, CA 92186-5122, USA

^bArmy Research Institute of Environmental Medicine, Military Performance Division, Natick, MA, USA

^cSeattle Epidemiologic Research and Information Center, Veterans Affairs Medical Center, Puget Sound, Seattle, WA, USA

^dDepartment of Epidemiology, College of Public Health, University of Iowa, Iowa City, IA, USA

^eDepartment of Preventive Medicine and Biometrics, Uniformed Services University of the Health Sciences, Bethesda, MD, USA

^fAir Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA

Accepted 7 May 2006

N = 200,000 by 2011 – matching subjective losses with DOEHRS data for hearing losses



- OAE devices are handheld units which are utilized like aural temperature probes
 - Test is conducted via probe in the ear canal - 30 seconds per ear - **FAST**
 - **E**ffectively administered by technicians: newborn nursery, home health care
 - Portable OAE systems are **low cost, Booth-less**
- HCE evaluating OAE screens w/ dental readiness exams

"...low-level OAEs indicate an increased risk of **future hearing loss** by as much as nine fold."

(Marshall et al., 2009)

"...[OAEs] provide an indication of cochlear damage **prior to** any change in the pure tone audiometric threshold."

(Prasher & Sulkowski, 1999)



Acceleration of Age-Related Hearing Loss by Early Noise Exposure: Evidence of a Misspent Youth
(Kajawa & Liberman, *J Neurosci.* 2006)

Personnel effectiveness issue = DoD issue



Performance Measure	Good Hearing	Poor Hearing
Time to Identify Target	40 sec	90 sec
Incorrect Command Heard	1%	37%
Correct Target Identification	98%	68%
Enemy Targets Killed	94%	41%
Wrong Target Shot	0%	8%
Tank Crew Killed by Enemy	7%	28%

Source: Garinther & Peters (1990)





Videographer records mission - critical events
Real World Environment

Hearing Critical Task

Tasks in which the speed and accuracy to identify, locate, interpret, and respond to sounds are essential to safe, successful military operations.

Acoustic Environment

Recordings will include gunfire, crowd noise, vehicle noise, etc.

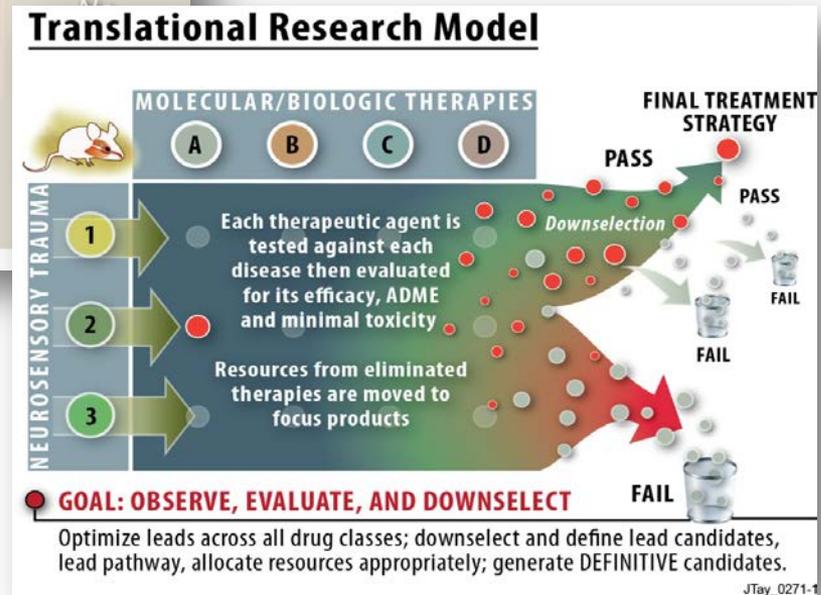
Clinical Assessment

Mission critical audio signals will be identified, and H3s will be asked to identify them. Vignettes may be provided to set the context of each event.

- Little duplication of investment in neurosensory trauma (n=1300 projects)

		TECHNICAL READINESS LEVEL								
		Research			Deployment Continuum				Ready	
Care Continuum		1	2	3	4	5	6	7	8	9
Neuroinformatics		█	█							
Cell/animal/human		█	█	█						
Etiology/pathophysiology		█	█	█	█					
Diagnostics/devices		█	█	█	█	█				
Rehabilitation		█	█	█	█	█	█			
Treatment		█	█	█	█	█	█	█		
Pharma		█	█	█	█	█	█	█	█	
Education and training		█	█	█	█	█	█	█	█	█

Research Density



Research to date emphasizes:

- Single injury paradigms
- Acute stages of injury (esp. mTBI)
- Diagnostic and etiological objectives (Technical Readiness Levels 1-2)

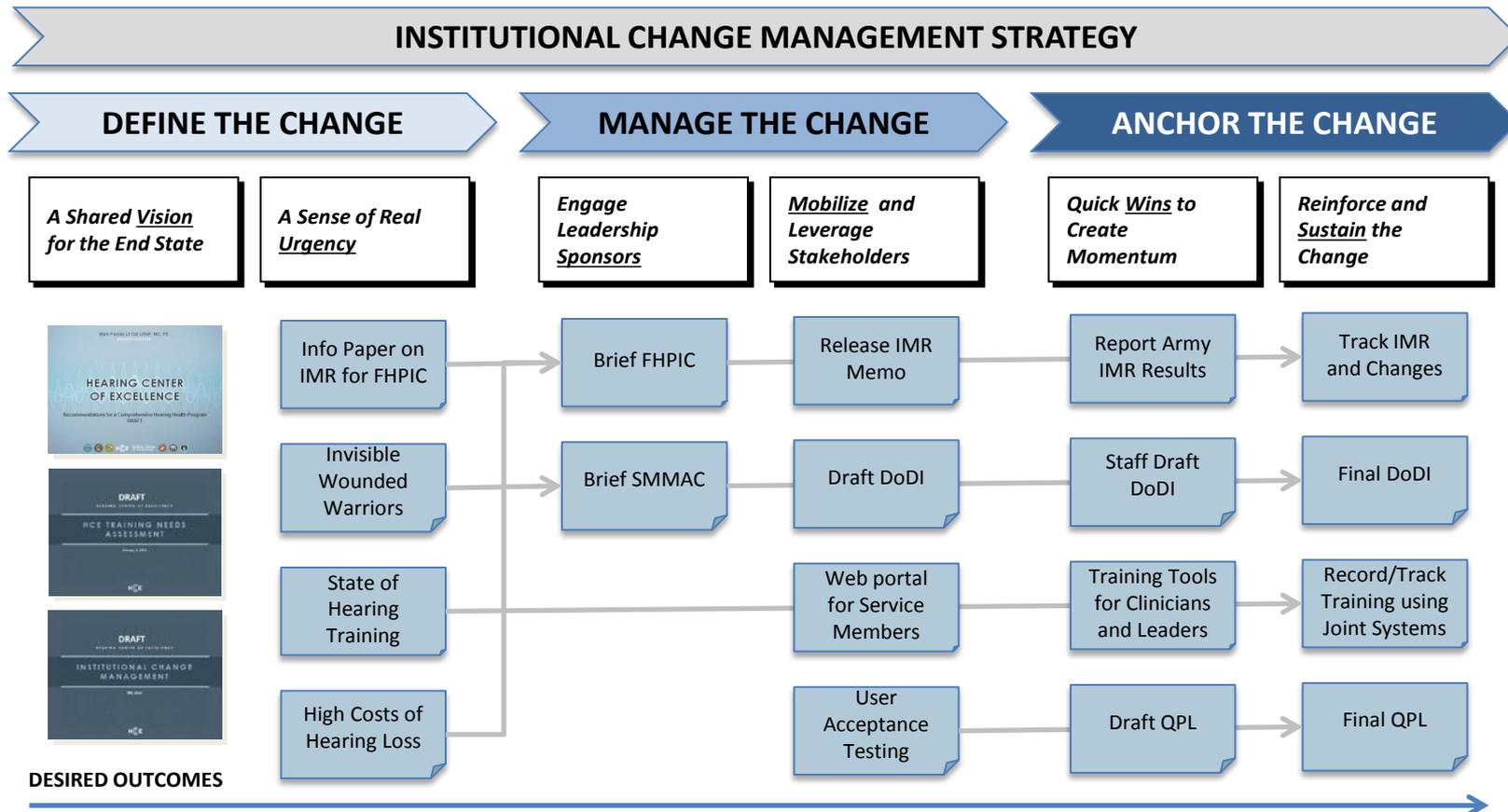
HCE INFLUENCE

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DESIRED OUTCOMES

Stakeholders have a common understanding of the critical need for a comprehensive hearing health program and what it means.

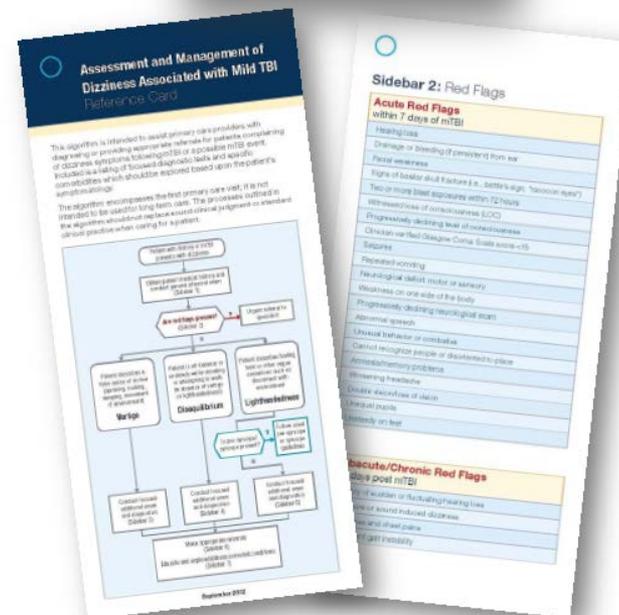
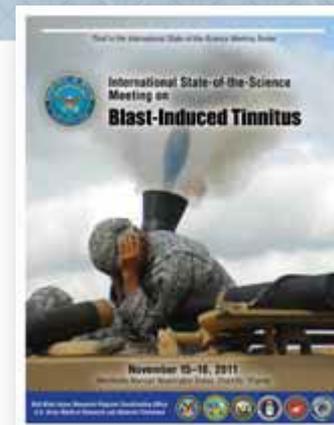
Senior leaders are vocal advocates for the change and involved in helping drive the four components.

Steps taken to generate a positive buzz around the hearing health program and they are aligned in DoD systems and structures.

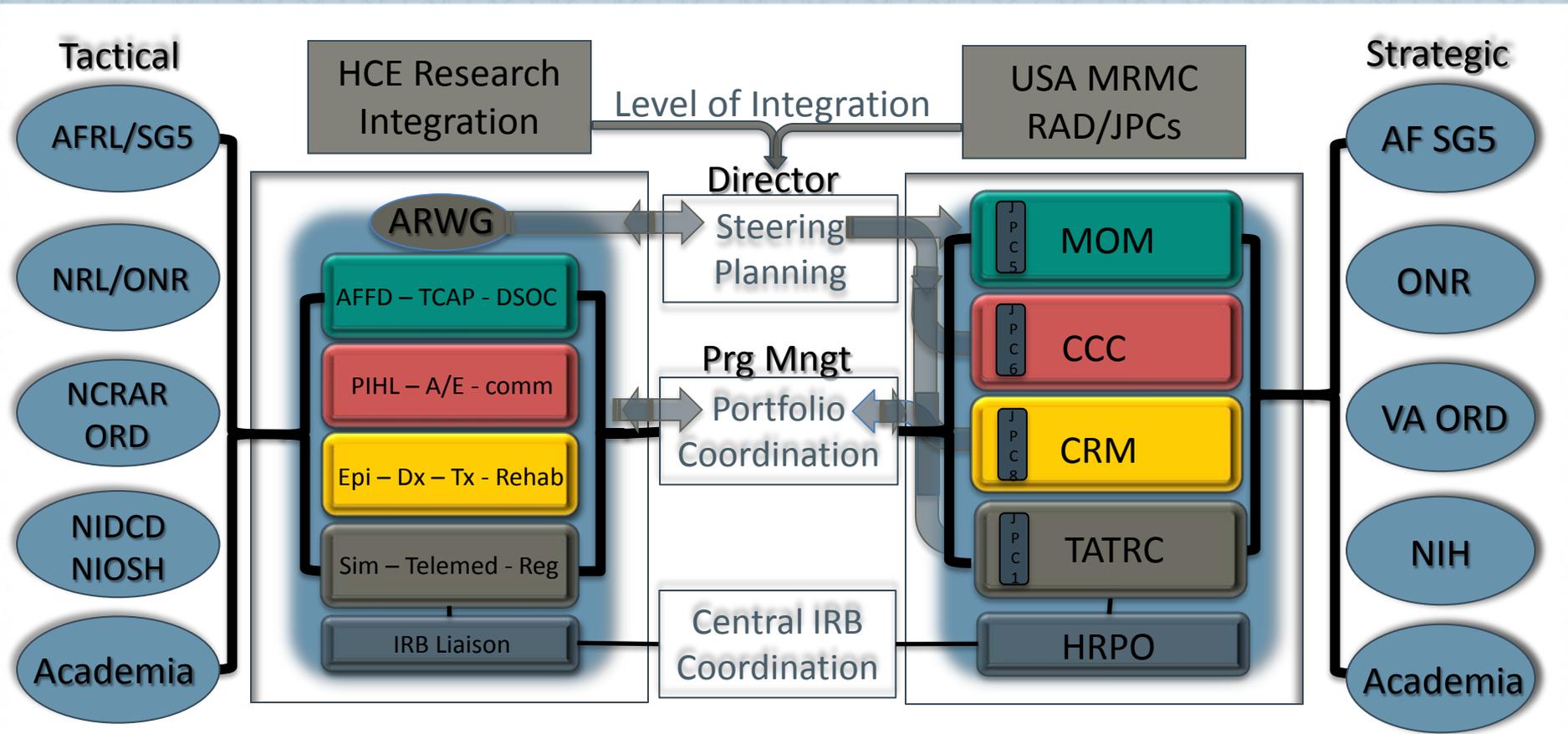
Given the challenges and our advantages, these are strategies we can employ.



- Conferencing:
 - Military Vestibular Assessment and Rehabilitation
 - State of the Science Blast Tinnitus
 - Acoustic Trauma
 - Auditory Research Working Group
 - Auditory Fitness For Duty
 - Pharmaceutical Intervention Hearing Loss
 - Noise Induced Hearing Loss Program Rev
 - ATACCC/MHSRS
 - Trauma Symposium Collaboration
 - NATO HFM 229
 - Temporal Bone Surgical Dissection Course
 - Middle Ear Implant Training
 - AAO/ARO/CHHC
 - Oversight Working Groups - Standardization



Programmatic Translational Research



ARWG Auditory research Working Group
 – Practice Based Research Network: 7 DoD Acoustic Research Labs, 6 MTFs, 5 VA sites



- Fitness for Duty, Total Comm and Protection, Job Task Analysis
- Pharm Intervention in Hearing loss, POI care, Air evacuation comm
- Clinical / translational investigations



Develop probability table for H2 or H3 with that score will fall in bottom 5th percentile

Audiogram Category (1 worst, 9 best)

	1	2	3	4	5	6	7	8	9
0%	100%	90%	90%	90%	90%	80%	70%	60%	50%
10%	100%	90%	90%	90%	80%	70%	60%	50%	40%
20%	100%	90%	90%	80%	70%	60%	50%	40%	40%
30%	90%	90%	80%	70%	60%	50%	40%	40%	40%
40%	90%	80%	70%	60%	50%	40%	30%	30%	30%
50%	80%	70%	60%	50%	40%	30%	30%	30%	30%
60%	70%	70%	60%	50%	40%	30%	30%	20%	20%
70%	70%	60%	50%	40%	30%	30%	30%	20%	20%
80%	60%	50%	40%	30%	30%	30%	20%	20%	10%

Table can be used to set cutoff in audiogram and speech score



HCE ACCOMPLISHMENTS SINCE 01/13

12/8/2013



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Extend / Augment Auditory-vestibular care

Better
CARE



TELE-HEALTH OPTIONS



Remote Sites

Augment TBI
Centers



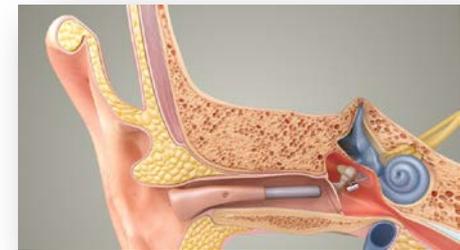
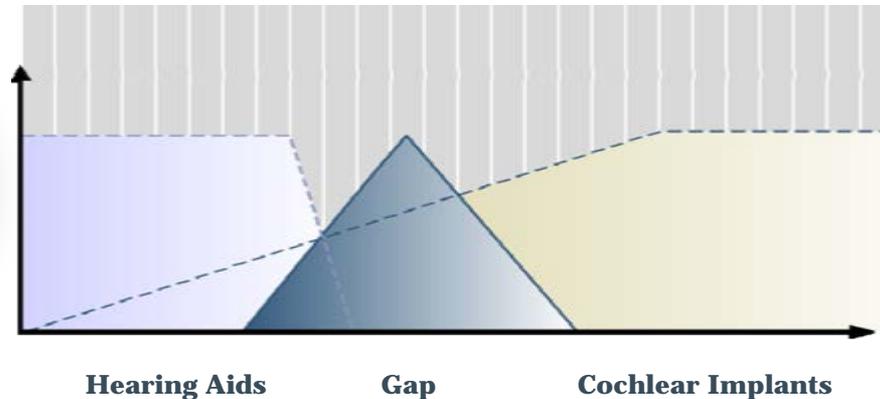
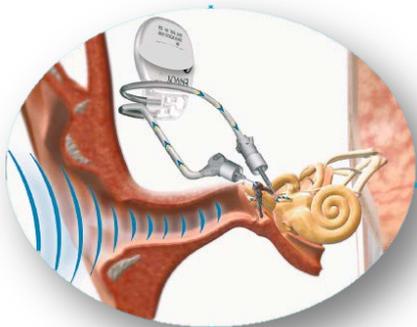
Theater Care

Training Sites/Ranges

VA/DoD HEARING PROSTHESIS PURCHASE STANDARDIZATION

- **Background**
 - Combining DOD and VA's secure web-based system will improve efficiency, accountability, and reduces DOD costs
- **Key Accomplishments**
 - **15 Aug 2013**, Guidance on the Establishment of Department of Defense Standardization for Ordering and Procurement of Hearing Devices/Prostheses was signed into policy (Dr. Jonathan Woodson – Health Affairs)
 - To use the VA as an acquisition source, DOD must approve a waiver from restrictions of NDAA FY 2008
 - FY14 waiver signed/approved **16 Sep 2013** (annual requirement)
 - Training developed for audiologists (dates provided through service reps)
 - Ordering/Payment interfaces are through web-based system
- **Next Steps**
 - EARPRO Fund program at Service or DoD-level

- 20 – 23% hearing loss sufferers utilize conventional amplification
- Hearing aids benefit mild to moderate hearing loss range
- Cochlear implants rehabilitate severe to profound losses
- Bone anchored systems serve conductive and mixed hearing loss
- **Gap:** Hearing aids often do not maximize audibility for individuals with **moderately-severe hearing loss**.



- Background
 - Collaborative research requires IRB approval at each engaged facility
 - Army, Navy, Air Force and VA have varying review processes and policies
 - Process requires duplication of time and effort decreasing overall efficiency
 - DODI 3216.02 (Nov2011) recommends single IRB review for multi-site research
 - Drafted MOA process for participating regional institutions, June 2010
 - Estimated Completion of Centralized IRB process: Dec 2013
- Progress since May 2011
 - Centralized IRB meeting with Health Affairs and Medical Research and Materiel Command (MRMC) decision to proceed with MRMC C-IRB plan, August 2011
 - Memorandum of Agreement (MOA) drafted to establish working relationship between HCE and MRMC, November 2011
 - MOA fully **executed September 2012**
 - Kickoff meeting between HCE and MRMC administrators - December 2012
 - **FOC reached December 2012**



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- January 2012
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- February 2012
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Bread Crumb > Bread Crumb > Bread Crumb

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The screenshot shows the Athena University SciVal Experts website. At the top, it says "ATHENA University" and "SciVal Experts". Below that, there's a profile for "Hill, Elizabeth" with a photo and a list of details including "Home", "Expert Overview", "Profile", "Publications", "Books", "Journal Articles", "Books & Reports", "Bibliography", "Works", "Departmental Network", "Collaborative Network", "Research Network", and "Research Activities & CV". To the right of the profile is a "Research Network" section with a large, complex network graph showing connections between various nodes.

CHHP Posters for Individual Hearing Counseling

AWARENESS

SOUND FACTS

HEARING IMPAIRMENT OR DEAFENING

TIME TO SURVEY COUNTY	9900 BUILDING	POSS. HEARING
WISCONSIN COMMUNITY HEARING	40 LBS	88.8%
WISCONSIN MARKET BIRTH/DEATH	1%	30%
WISCONSIN DEATHS DUE TO	99%	68%
WISCONSIN DEATHS DUE TO	9%	6%
WISCONSIN DEATHS DUE TO	1%	2%

IMPACT OF HEARING LOSS ON BUSINESS

HEARING IS A CRITICAL SENSE

- Hearing loss - Prevents - Progression - Prevention - Prevention
- The energy is when heard before they are gone
- Sound information is available to all directions
- Sound hearing can make the difference between life & death
- Effective battlefield communication requires good hearing
- Good hearing increases survivability and lethality

LEVELS OF NOISE

VERY LOW	10-20 dBA	Whispering
LOW	20-40 dBA	Normal conversation
MEDIUM	40-70 dBA	Normal office environment
HIGH	70-90 dBA	Normal factory environment
VERY HIGH	90-120 dBA	Normal rock concert

INTERPRETING THE AUDIOGRAM

HOW LOUD IS TOO LOUD?

HEARING LOSS IS A SILENT KILLER

UNDERSTANDING YOUR HEARING TEST RESULTS

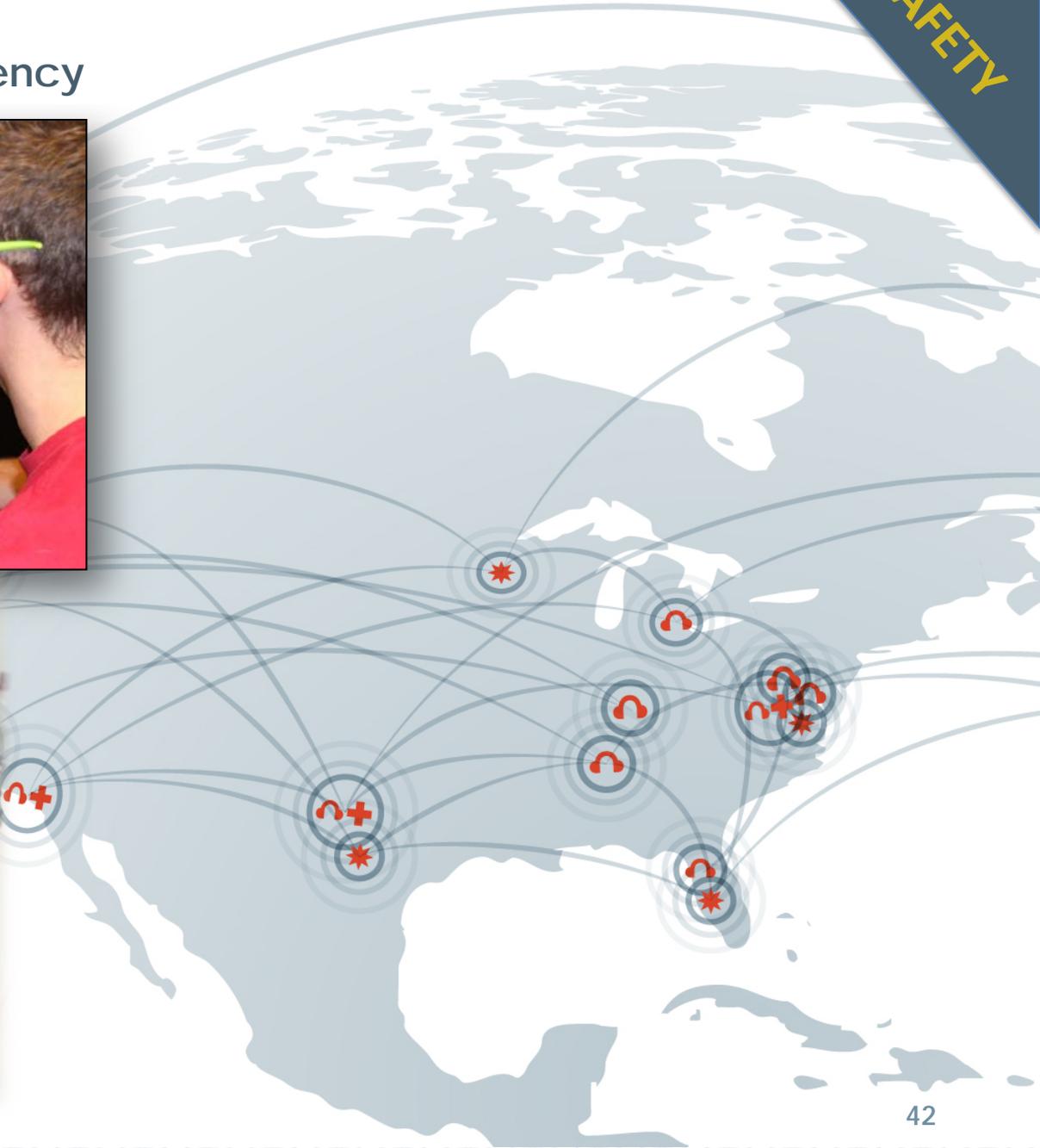
1 IDENTIFY RESULTS FOR LEFT AND RIGHT EARS.

2 PLOT AND CHART YOUR DATA.



STANDARDIZED Education, training, competency

SAFETY



POLICY CHANGES

12/8/2013



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- **Update DoDI 6055.12, Hearing Conservation Program**
 - Establish a Comprehensive Hearing Health Program
- Hearing acuity is a **READINESS** issue
 - Policy needed to conduct **baseline audiograms** when entering Services
 - Policy needed to conduct **annual hearing health services** for all Members
- Hearing loss is a **POPULATION HEALTH** issue
 - Policy needed to **standardize surveillance** across Services
- Create a rapid process to **share data** between VA and DOD
 - Clinical and Claims data between agencies is highly relevant to effect change, yet very difficult to obtain data for improving outcomes of HCE programs

BACKUP SLIDES



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- **Background**

- Prevent and reduce noise-induced hearing injuries in service members
 - Annual Hearing Health Education
 - Hearing Protection Fitting and Training
 - Periodic Hearing Surveillance

- **Key Accomplishments**

- Launch HCE website as repository of information and resources
- Auditory Fitness for Duty WG Progress
- PEO Soldier partnership – customized care

- **Next Steps**

- Update DoD policy to standardize hearing health practices in various services
 - Readiness - Population Health
- Develop additional hearing health promotional materials
- Develop “Qualified Products List” for hearing protection devices
- Develop central funding/ordering between DoD/VA for hearing protection



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Occupational Hearing Loss Surveillance

► **Project Description and Status**

Information about Partnering with NIOSH on this Project

Program Staff

Publications

Related Resources

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OCCUPATIONAL HEARING LOSS (OHL) SURVEILLANCE

Project Description and Status

Project Description

In 2006, the National Academy of Sciences identified the lack of hearing loss surveillance as a key shortcoming of the NIOSH Hearing Loss Prevention Research Program. Surveillance is vital to hearing loss prevention. Surveillance is vital to hearing loss prevention. It makes possible the establishment of estimates for the prevalence and incidence of hearing loss within various industries. Surveillance also enables NIOSH to identify high risk groups, guide prevention and research efforts, and evaluate the success or failure of interventions. Without surveillance data, progress in hearing loss prevention efforts cannot be quantified, nor the need for improvement in these efforts.

Importance of Surveillance

CDC Home



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

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Workplace Safety & Health Topics

Workplace Safety and Health Topics

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Occupational Hearing Loss Surveillance (OHL) SURVEILLANCE

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OHL

Occupational Hearing Loss Surveillance

Diseases & Injuries
Safety & Prevention
Occupational Hearing Loss Surveillance
► **Project Description and Status**
Information about Partnering with NIOSH on this Project
Program Staff
Publications
Related Resources
Chemicals
Emergency Preparedness

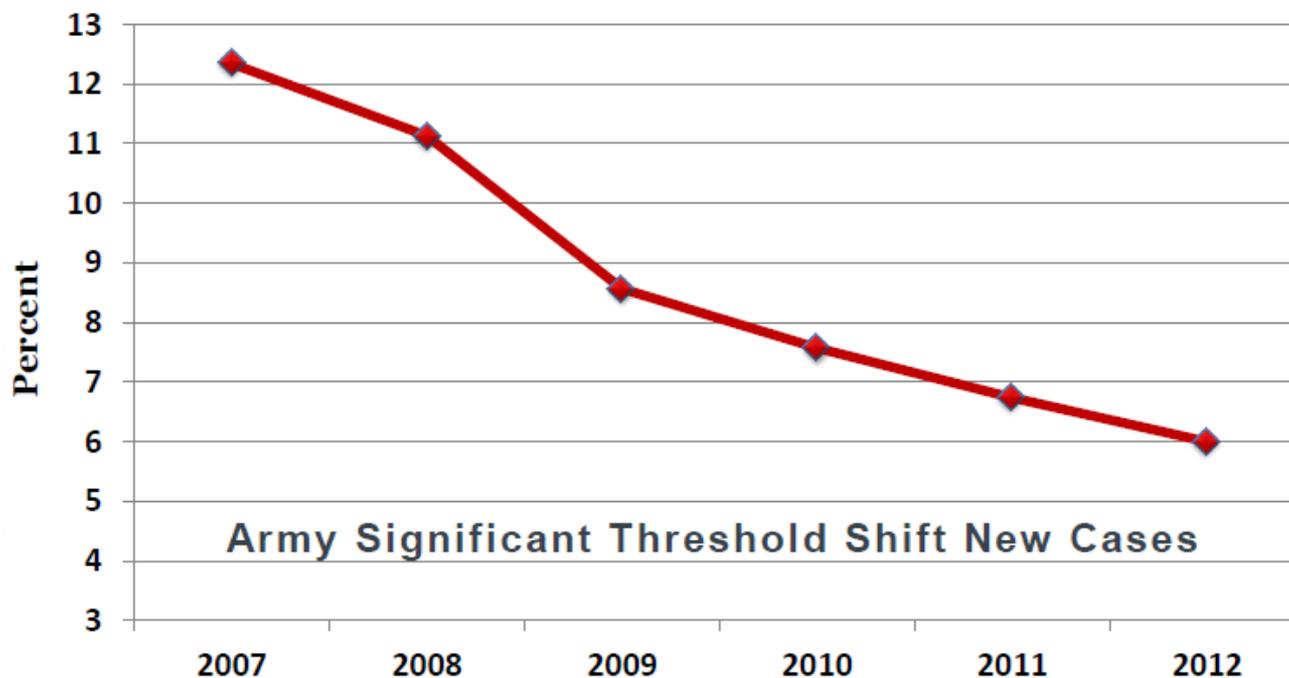
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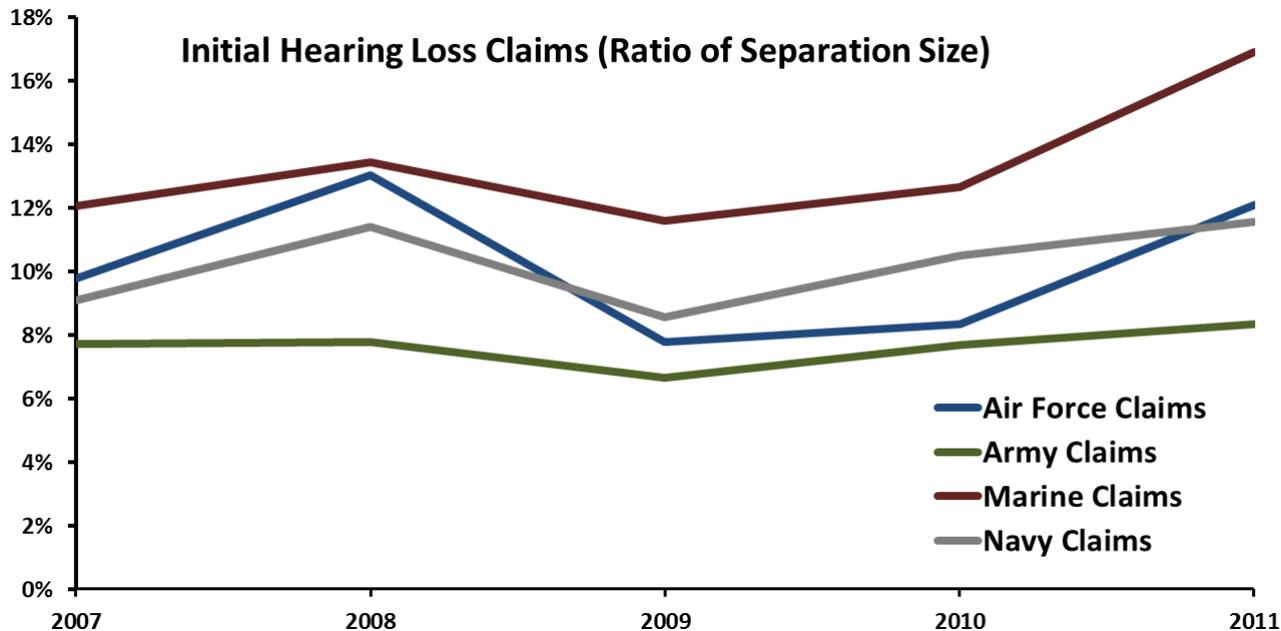
Does Hearing Surveillance Work?

Since the Army expanded their Hearing Conservation Program screenings to include nearly all personnel (90%) in 2006, there has been a 50% reduction in “Significant Threshold Shift” cases



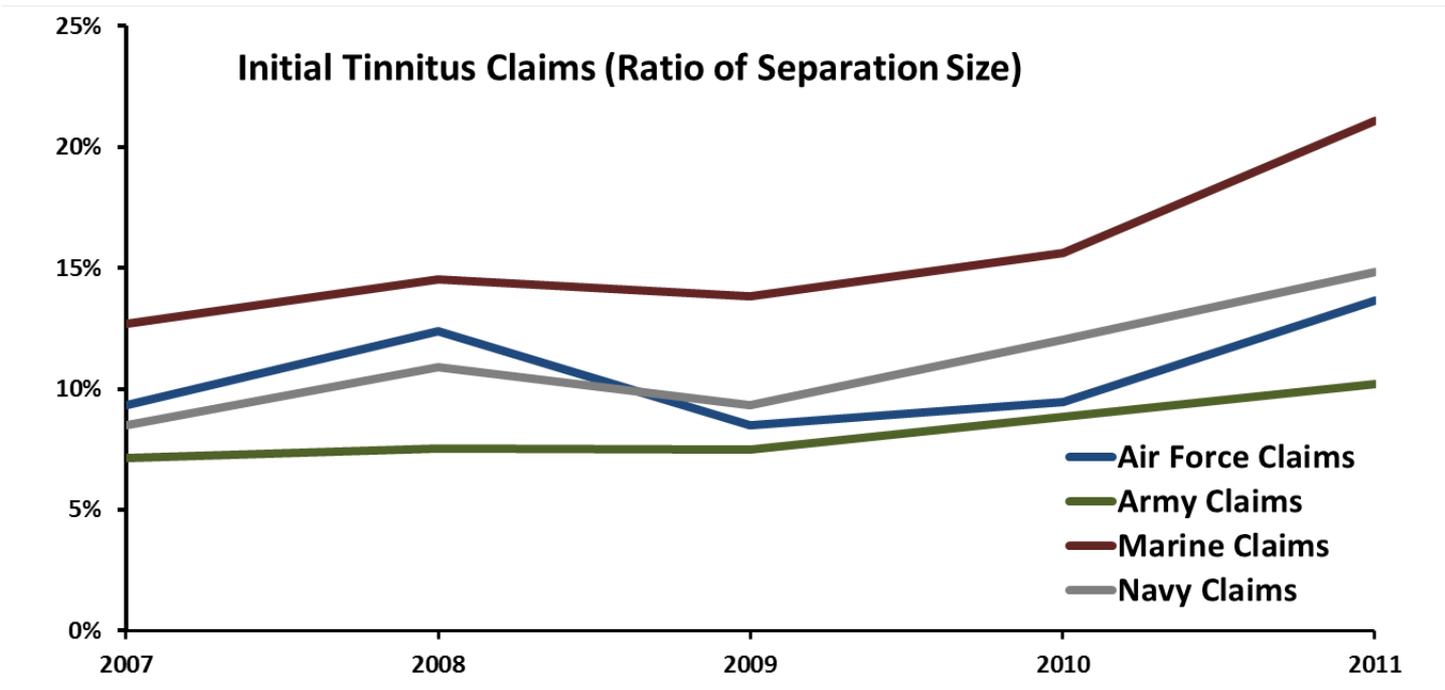
Does Hearing Surveillance Work?

Proportionally, recently discharged Army personnel submit significantly fewer hearing loss VA claims ($p=0.004$)
 (note: VA claims data lags)



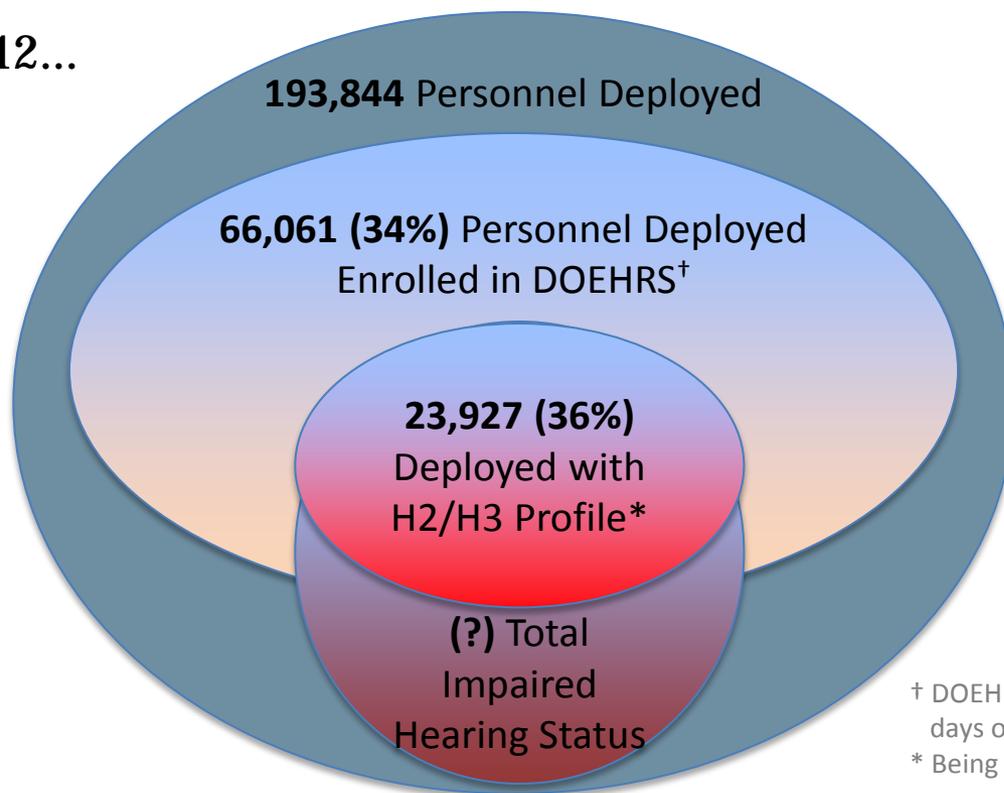
Does Hearing Surveillance Work?

...and significantly fewer tinnitus VA claims ($p=0.008$)



AF Members' Hearing Health

From 2008-2012...



† DOEHS audiogram within 365 days of deployment date
* Being verified by AF Functional

66% of AF personnel deploy with unknown hearing status



JOB TASK ANALYSIS

Record shouted speech over distance in quiet / noise



Acoustic Environment

Record MRT lists shouted in realistic battlefield noise

Normative Data

Live listeners will be tested to evaluate normal performance

Clinical Assessment

Calibrated recordings will be played to H3 listeners



Joint Project with NSWC Dahlgren

Use protocol derived from Aegis training curriculum to measure correct command execution in complex Air Defense scenario with two participants and two confederates